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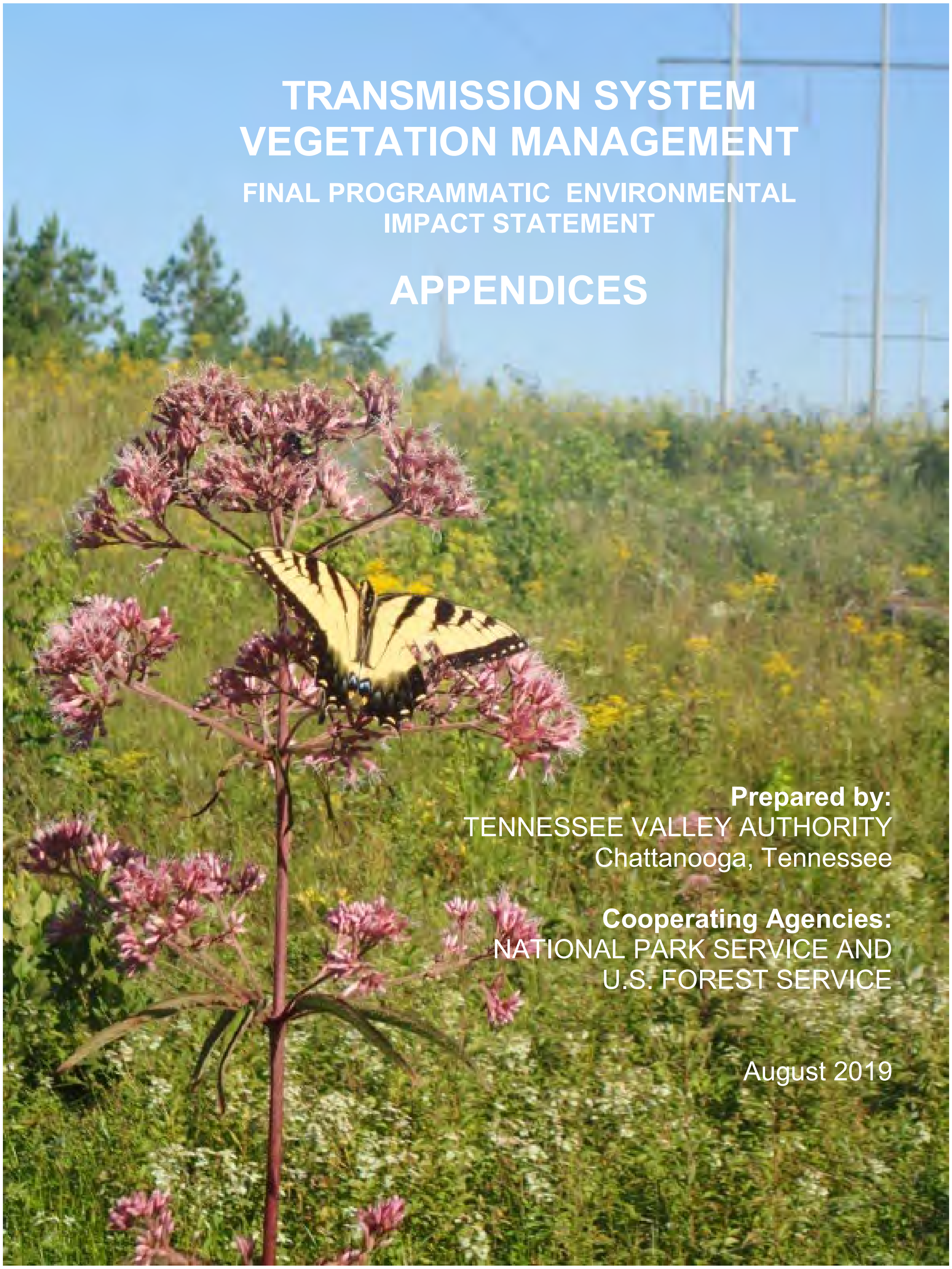

TRANSMISSION SYSTEM VEGETATION MANAGEMENT

FINAL PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

APPENDICES

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Appendix A – Public and Agency Comments on the Draft PEIS and TVA's Response to Comments

Table of Contents

CHAPTER A.1 – INTRODUCTION

As required by the National Environmental Policy Act (NEPA) and implementing regulations, TVA made available to the public and stakeholders the Transmission System Vegetation Management Draft PEIS on TVA's website (https://www.tva.com/Environment/Environmental-Stewardship/Environmental-Reviews/Transmission-System-Vegetation-Management-Program) on August 8, 2018. The Notice of Availability (NOA) of the Draft PEIS was published in the Federal Register on August 17, 2018. Publication of the NOA in the Federal Register opened the 45-day comment period, which ended on October 1, 2018.

Printed copies and/or DVDs containing electronic files of the documents were mailed to certain federal agencies and to others upon request. Comments were accepted by mail, telephone, email, online, and at seven public meetings (Table A1-1).

Table A1-1. Public Meetings

Date	Location
8/28/2018	Chattanooga, TN
9/4/2018	Bowling Green, KY
9/5/2018	Nashville, TN
9/6/2018	Knoxville, TN
9/11/2018	Huntsville, AL
9/12/2018	Tupelo, MS
9/13/2018	Memphis, TN

TVA published notices of the public meetings in the following newspapers: *Chattanooga Times Free Press; the Commercial Appeal; Daily Journal Tupelo; the Daily News Bowling Green; the Dispatch; the Huntsville Times; Knoxville News Sentinel; the Tennessean; Times Daily;* and *Starkville Daily News*.

TVA chose the open forum meeting format to allow the public to drop in at their convenience and meet with TVA staff to discuss the project on an informal basis. Members of the public were provided the opportunity to look at displays, discuss the proposed project with subject matter experts, and submit comments.

TVA received 150 comment submissions by email, telephone, letter, the online comment system, or during public meetings. Twelve comment submissions were from state and federal agencies, five were from nongovernmental organizations and the remainder were from private citizens.

The most frequently mentioned comments included stated preferences for a particular alternative, questions regarding the need for initial tree removal, landowner management of TVA's transmission ROW, cost concerns, use of herbicides, and general comments regarding environmental impacts including the effects of tree clearing on climate change as a result of TVA's proposed method of vegetation control.

Many comments were referencing an opinion article originally published in the *Knoxville News Sentinel* titled: "TVA again wants to hack down 16,000 miles of trees, and you can help stop it" from September 14th, 2018, by V. Sherwood. TVA has provided a response in this Appendix to the incorrect information contained in the published article, which also responds to many of the other concerns expressed by the public.

This Appendix also provides responses to comments submitted by federal and state agencies. Federal agency comments were received from the U.S. Department of the Interior. State agency comments were received from the Alabama Historical Commission, Georgia Historic Preservation Division, Kentucky Heritage Council, North Carolina Department of Administration, North Carolina Department of Environmental Quality, North Carolina Wildlife Resources Commission, North Carolina Natural Heritage Program, Tennessee Department of Environment & Conservation, Virginia Department of Environmental Quality, Virginia Department of Game & Inland Fisheries, and Virginia Department of Historic Resources.

Comments were also submitted on behalf of the following groups: Edison Electric Institute, Packaging Corporation of America, Plaintiffs in *Sherwood v. TVA*, Tennessee Citizens for Wilderness Planning, and the Tennessee Chapter of the Sierra Club.

Cooperating agency comments were received from the U.S. Forest Service (USFS) and National Park Service (NPS). These comments and responses are included in Section 2.6 of this appendix.

TVA carefully reviewed and considered all public comments. For similar comments offered by multiple commenters on a single issue, TVA is providing a “consolidated response” rather than responding individually and repetitively to these comments. Individual responses are provided for more specific public comments, local group comments, and agency comments. Some responses to individual comments also include a reference to general responses, when applicable. Therefore, some commenters are listed in multiple responses due to the range of issues included in their comment. All summarized comments, individual comments, and TVA’s responses are provided in Chapter A.2 of this appendix. Comments submitted by federal and state agencies are include in Appendix B of the PEIS. Public comments received are provided in Appendix C of the PEIS.

CHAPTER A.2 – RESPONSES TO COMMENTS

2.1 Newspaper Editorial Response

Summary of Comments: TVA received 61 comments from 67 people on the Draft PEIS that referenced a newspaper editorial regarding TVA's vegetation management program published on September 14th, 2018, by V. Sherwood. The response below includes responses to each of the key points raised by the editorial regarding TVA's program *(Commenters: R. and L. Albiston; P. Aviotti; Ms. Baily; A. Bass; D. Blane; J. Brewer; L. Brown; N. Carnes; J. Carroll; L. Carter; J. Cartor; G. Chanslow; L. and B. Chapman; S. Crone; J. and E. Crossno; N. and M. Crowe; B. Dailey; R. Daniels; L. Ellis; T. Eskew; P. Eubanks; C. and W. Evans; T. Foster-Allen; K. Fraser; B. Gibbons; M. Greenman; B. Gregory; V. Hart; J. Hembree; L. Hobson; D. Howard; N. Hulley; C. Jones; M. and N. Lofaro; A. May; J. McMekin; M. McPeters; S. Moss; M. Ogle; M. Panodie; T. Peterson; G. Phillips; C. Renier; W. Rogers; T. Ruynon; M. Sanders; K. Scott; M. Sevotti; F. Shaffer; K. Smith; B. Stanley; M. Stephens; R. Stouder; T. and R. Swann; M. Tabler; F. Tipton; L. Turner; S. Weeks; M. Wooten; and two anonymous.)*

Response: TVA's policies, past and proposed, have been misrepresented in the press (see *Knoxville News Sentinel* Opinion titled: "TVA again wants to hack down 16,000 miles of trees, and you can help stop it"). Facts surrounding the necessity of vegetation maintenance, amount of tree removal, loss of trees, long-term visual impacts, and costs reported in this and similar articles are simply incorrect. For example:

a. TVA has a clear need to provide safe and reliable electricity.

b. TVA does not propose to "clear-cut" 16,000 miles of vegetation.

c. TVA would not use chemical defoliators such as "Agent Orange".

d. Though vegetation maintenance has costs, TVA's preferred alternative would cost less in the long-term than the current policy under the court-ordered injunction from *Sherwood v. TVA*.

e. The "old policy" is really a conglomeration of policies that evolved over the greater than 80-year history of TVA's ROW maintenance and is not the best approach to vegetation management because it results in reduced reliability and safety across TVA's transmission system.

f. TVA cannot do "whatever it wants"; it seeks input from stakeholders.

The following are direct responses to misstatements from the *Knoxville News Sentinel* Opinion article referenced above. Quotes directly from the article are presented in italics followed by TVA's response.

a. "FERC did not demand that TVA clear-cut millions of trees."

The Federal Energy Regulatory Commission (FERC) did not demand that TVA clear-cut millions of trees, nor is TVA "clear-cutting" millions of trees. FERC did issue new reliability standards that carry stiff penalties for non-compliance. In response to those standards, TVA has developed its transmission system vegetation management program to strategically manage TVA's existing transmission line rights-of-way (ROW) in a manner consistent with applicable laws, orders, standards, practices, and guidance, while providing reliable energy and protecting environmental resources to the extent possible (see the PEIS Section 1.3, Purpose and Need). Failure to remove standing trees that have become established within the buffer zone, and properly manage brush, downed vegetation, and small trees could result in wildfires, major power outages, and injury to life or property. TVA has the ultimate responsibility for its electric reliability. Outages caused by overgrown vegetation may result in steep federal fines and/or costly mitigation,

TVA, like other energy companies, develops long-range vegetation management plans to protect its transmission system. This planning process includes considerations of how and when TVA would control the vegetation growing within its transmission line ROWs. Traditional methods of vegetation management have had to improve to meet new reliability standards and to incorporate new technologies. TVA continually compares its practices for how and when to control vegetation growing within the transmission line ROW with those of other utilities. It is common practice for comparable utilities to clear vegetation from transmission line easements to the full width of their property rights. Examples include Ameren, https://www.ameren.com/Transmission/transmission; Bonneville Power Agency, https://www.bpa.gov/PublicInvolvement/Vegetation-Management/Pages/Vegetation-Management.aspx; and Duke Energy, https://www.duke-energy.com/community/trees-and-rights-of-way/what-can-you-do-in-right-of-way/transmission-lines-guidelines-and-restrictions.

b. "[C]lear-cut a 150-foot-wide path through 16,000 miles […] of transmission lines across seven states."

TVA's transmission system does consist of a network of more than 16,000 miles of electric transmission lines and approximately 500 power substations all contained within approximately 238,000 acres of utility ROW. However, the statement that TVA would "clear-cut a 150-foot-wide path" is false. First, TVA's preferred action is to manage vegetation within existing transmission line ROW to the full extent of the ROW. This would include the border zones adjacent to the currently maintained wire zone (see Figure 3-8 of the PEIS) and would vary in width depending on the voltage of the transmission line. Such additional tree removal is needed to enhance the safety and reliability of TVA's transmission system.

Second, there are multiple areas of the ROW that need extensive vegetation management; however, under Alternatives B, C, and D, TVA would remove trees from only 3 percent of the total ROW area (or 8,094 acres of the total 238,196 acres of ROW). It should be noted that the original estimate of buffer acreage to be cleared as part of Alternatives B, C, and D was developed using limited Light Detection and Ranging (LIDAR) data. Since publication of the Draft PEIS, additional LiDAR date has become available which allowed estimates of buffer clearing to be refined from 7,336 acres (3 percent of the total ROW) as reported in the draft PEIS to 8,094 acres. The final PEIS has been revised to reflect the refined estimate of initial woody vegetation removal to 8,094 acres (still only 3 percent of the total ROW).

Third, TVA only actively maintains approximately 46 percent (110,752 acres) of the entire transmission ROW. About 51 percent is used as cropland, golf courses, orchards or other similar uses, which do not require further maintenance by TVA. TVA still conducts routine inspections and vegetation management of ditch banks, fence rows, towers, and other features in these areas that are maintained in an acceptable form by others because of their intended use. Additionally, a relatively small amount of the ROW (4,720 acres) requires no routine vegetation management. These include areas of open water or deep valleys and ravines (where vegetation growing at lower elevations does not threaten the transmission line). Therefore, TVA would never "clear-cut" the full width of the ROW throughout the entirety of the 16,000-mile transmission system.

c. *"They have your permission to wander into your back yards with chain saws and bulldozers and create an Agent Orange-like strip half a football field wide and 16,000 miles long across seven states and do it for reasons they cannot state."*

Clearly, TVA does not simply wander into back yards with chain saws and bulldozers to create an "Agent Orange" strip across the landscape. As noted in Chapter 3.1 of the PEIS, TVA has developed a stepwise process incorporated under all of the proposed vegetation management alternatives to ensure that vegetation management proactively protects environmental resources, considers land use and land ownership, and enhances health and safety. Although standard vegetation management work on ROW easements does not typically require notice, Step 2 of TVA's current process does include landowner notification. As part of this notification, TVA mails notices of herbicide treatments to individual landowners notifying them of affected transmission line segments approximately 60 days prior to the planned treatment. Emergent needs to address danger trees and vegetation that is a risk to the reliability of the transmission system and/or safety of the public are communicated to the landowner two weeks in advance whenever possible. Notification for standard tree work or mowing is done in more traditional ways such as knocking on doors, leaving door hangers, or the occasional letter, if necessary. Of course, TVA does not use "Agent Orange", nor any other defoliators. TVA does use herbicides predominantly during routine floor vegetation maintenance and a mix of manual and mechanical methods to remove trees (see Section 2.1.3 of the PEIS). TVA uses only herbicides that are approved by the U.S. Environmental Protection Agency and applies them in accordance with the product label and applicable state and federal laws. Tables 2-2 and 2-3 in the PEIS show the current list of herbicides used by TVA. Spot and localized use of herbicide is the most common application method used by TVA (see Section 2.1.3.1 of the PEIS); broadcast use of herbicides rarely occurs.

TVA has clearly stated its "reasons" for maintaining the vegetation on its ROWs in Section 1.3 of the PEIS, which details the purpose and need of TVA's transmission system vegetation management program.

d. *"[S]pending nearly a fifth of a billion dollars to clear-cut a 150-foot-wide path through 16,000 miles […] to solve a problem that doesn't exist and do it while raising rates."*

TVA considers safety, environmental impacts, and cost in determining the best vegetation management practices for its ROWs. Costs are always a priority for TVA to help reduce the burden on ratepayers. All vegetation management alternatives have associated costs. In other words, continuing with the current practices or going back to the "old way" costs money just as proceeding with a new vegetation management plan costs money. Much of the line maintenance costs are already built into existing rates. Table 3-3 in the PEIS summarizes the total estimated costs of vegetation management for each alternative projected over the next 20 years.

In light of the cost concerns raised, TVA re-evaluated the costs of each alternative based on its most recent cost data from fiscal years 2018 and 2019, and also revised the PEIS to reflect a less aggressive initial buffer clearing in Alternatives B, C, and D to occur over an eight-year period, as opposed to a three-year period.

This analysis re-affirmed that, of all alternatives, Alternative D has the highest cost (a net present value [NPV] of $223 million). Alternative A (i.e., the No Action or the current injunction) has the second highest cost ($205 million NPV). Alternative B has the lowest cost ($169 million NPV); however, this estimate assumes danger trees would be identified by field inspection in lieu of LIDAR. Field inspections reduce costs but increase risks. As such, costs may be underestimated for this alternative. Alterative C has the second lowest cost ($180 million NPV). The cost of maintaining the transmission ROW under Alternative C would potentially be higher than Alternative B in the near-term, because vegetation would most likely need to be controlled more often until low-growing plant communities are established. In the long-term, however, it would be less expensive to maintain the transmission ROW under this alternative because less vegetation removal would be needed.

e. *"TVA is currently [pursuing] officially changing their previously successful 80-year-old policy"*

TVA's current vegetation management policy is under a court injunction from *Sherwood v. TVA* and is not identical to the vegetation management policy that has historically been used. The language used by the injunction requires "TVA [to] maintain buffer zones on the edges of its ROW in a manner as described in its 1997 and 2008 Line Maintenance Manuals" and it has caused years of overgrowth in the ROW due to other limits to TVA's vegetation management policy. In the PEIS, TVA has not resurrected a vegetation management policy that has been rejected by the court, and which was referred to in the court case as "the 15-foot rule." TVA has studied several new alternatives for vegetation management and conducted extensive studies into the impact of each alternative on various environmental resources in accordance with NEPA. After conducting this analysis and holding Valley-wide public meetings on the results (see Table A1-1), TVA has arrived at a preferred alternative (Alternative C) that it feels best balances the competing needs of maintaining vegetation that might interfere with the provision of safe and reliable electric service, creating environmentally friendly habitat for natural resources, and respecting property owners.

2.2 General Responses to Public Comments

2.2.1 General Response to Comments Regarding the Need for New Policy

Summary of Comments: TVA received 40 comments from 44 people questioning the need for TVA to change its existing vegetation management policy. *(Commenters: L. Brown; R. and J. Burris; J. Cartor; B. Cook; J. and E. Crossno; B. Dailey; C. DeLauder; D. Dodson; D. Drewly; L. and D. Eklund; C. and W. Evans; C. Forman; K. Freeman; A. Greene; D. Hillon; L. Hobson; L. Ingle; A. Kirk; D. Lingie; B. MacGillivray; L. Massingale; C. Mccoy; M. McVeigh; M. Ogle; P. Pennebaker; T. Peterson; J. Ray; D. Revora; W. Rogers; C. Spratley; K. Stone; R. Stouder; K. Thompson; R. Vanelli; M. Weber; S. Weeks; C. Wetzel; M. Williams; R. Williams; and one anonymous.)*

Response: TVA's approach to maintaining its ROW has evolved over its greater than 80-year history due to changing regulations and improved methods of vegetation management. For example, the PEIS (Section 1.3) describes the 2003 Ohio blackout that led to increased federal scrutiny of vegetation management practices for electrical distributors. TVA's traditional methods of vegetation management have had to improve to meet these new reliability standards. Last year's wildfires in the Western United States have also placed more scrutiny on vegetation maintenance programs, as they have demonstrated the devastating effects that the combination of uncontrolled vegetation and transmission lines can have. Additionally, advancing technologies help to identify potential hazards and are adopted into existing vegetation management programs to improve them. Technology such as LIDAR better enables TVA to manage vegetation to prevent future outages while allowing compatible vegetation to remain. Additionally, new Integrated Vegetation Management (IVM) approaches allow TVA to consider the state of plant communities prior to maintenance. Vegetation maintenance plans for project sites are also now subject to TVA's office-level sensitive area review (O-SAR) process, which prescribes field surveys and particular vegetation controls based on sensitive environmental resources. These new tools help TVA better maintain vegetation on its ROWs in order to maintain and improve long-term reliability, safety, environmental management, and costs.

2.2.2 General Response to Comments Regarding the Current Court-Ordered Policy, the "Old" Policy of Vegetation Management and TVA's Preferred Policy

Summary of Comments: TVA received 32 comments from 35 people related to the current court-ordered policy, the "old" policy of vegetation management and TVA's preferred policy, which includes the initial woody vegetation removal in the buffer zone. Commenters questioned the need for TVA's reconsideration of the old policy of vegetation management and suggested that the "old policy" was sufficient. *(Commenters: A. Bass; G. Bettice; N. Carnes; G. Chanslow; L. and B. Chapman; K. Chesney; N. and M. Crowe; J. Eldridge; P. Eubanks; T. Foster-Allen; K. Fraser; B. Gregory; V. Hart; J. Hembree; D. Hillon; D. Howard; M. and N. Lofaro; B. MacGillivray; A. May; M. McPeters; S. Moss; A. Patten; C. Renier; W. Rogers; M. Sanders; F. Shaffer; K. Smith; M. Stephens; R. Stouder; M. Tabler; F. Tipton; and G. Williams.)*

Response: As a result of the on-going litigation in the case of *Sherwood v. TVA*, TVA has temporarily limited removal of woody vegetation in transmission line corridors to only those trees that pose an immediate hazard to the reliability of the transmission system. This is TVA's current vegetation management policy and is consistent with Alternative A as described in the PEIS (Section 3.2.3.1). Because of this more limiting policy regarding tree removal, buffer zones within the existing ROW continue to contain vegetation incompatible with TVA's transmission system. The volume of non-compatible woody vegetation is also increasing within the previously-cleared ROWs due to the court injunction order. This threatens long-term electric transmission safety and reliability.

The purpose of TVA's transmission system vegetation management program is to strategically manage TVA's existing transmission line ROWs consistent with applicable laws, orders, standards, practices and guidance while providing reliable energy and protecting environmental resources. The need for the proposed action includes:

- Enhance public safety through controlled vegetation management of TVA's transmission lines.
- Improve the effectiveness of TVA's vegetation management program to eliminate vegetation that interferes with the operation of the existing transmission system so that TVA can continue to provide safe and reliable electric power in a cost-effective and environmentally sound manner.
- Comply with all current and future North American Electric Reliability Corporation (NERC) Reliability Standards to maintain transmission lines in a safe and reliable

operating condition, thereby minimizing TVA's potential for costly fines or mitigation mandates for NERC noncompliance.

Alternative A is a strategy of reactive vegetation management, which increases risk to public safety and transmission system reliability; therefore, Alternative A does not fulfill the objectives of the project purpose and need. By comparison, Alternatives B, C, and D are more proactive vegetation management strategies that reduce risk and improve system reliability.

As noted in Section 3.4 of the PEIS, TVA's preferred alternative is Alternative C. This alternative provides the best balance of enhancing system reliability and safety, minimizing environmental impacts, and achieving cost effectiveness.

2.2.3 General Response to Comments Regarding Landowner Maintenance of the Transmission ROW

Summary of Comments: TVA received 11 comments from 11 people related to TVA's proposed change to no longer allow landowner maintenance of trees as part of its transmission ROW vegetation management policy. (*Commenters*: *L. Brown; N. Carnes; S. Crone; K. Freeman; J. Hylton; C. Jones; S. Raymond; R. Slavin; B. Taylor; G. Williams; and M. Wooten.)*

Response: TVA assumes comments referencing past landowner maintenance practices are referring to the guidance provided in TVA's 1997 and 2008 Line Maintenance Manuals mentioned in the *Sherwood v. TVA* injunction. Regarding tree maintenance, both manuals state that property owners could assume the responsibility and liability for tree maintenance on their property, although TVA would still retain all of its right(s) should other actions be required including the right to clear tall-growing trees.

Landowners were permitted to maintain trees in TVA's ROW because budget limitations often required TVA to do less than full vegetation removal and to leave some tall growing trees. Landowner maintenance was thought to be cheaper in the short-term than complete tree removal. This was a stop gap measure that left a tall tree in place until budget was available to completely address the threat. Thus, TVA's "old approach" of tree trimming and leaving tall trees on the ROW was not fully in line with the ideal maintenance outlined in its 1997 and 2008 guidance manuals. This approach often left threats to the integrity of the transmission lines unaddressed. This unreliable practice would no longer be allowed under TVA's preferred alternative for managing vegetation along its transmission ROW.

The draft PEIS presents comparative information for all alternatives under consideration across a wide range of factors related to cost, reliability and environmental impact (see Tables 3-3 and 4-24 in the PEIS).

2.2.4 General Response to Comments Related to Private Property and ROW Easement Concerns

Summary of Comments: TVA received 14 comments from 14 people related to vegetation management activities on privately-held land. Some of these comments noted that the impact to property values were not addressed in the PEIS. *(Commenters: P. Aviotti; J. Ballin; B. Boyd; C. Dalrymple; L. Ellis; P. Hargis; N. Hulley; S. Marion; J. Presnell; H. Russell; J. Sargent; F. Sloves; H. Sloves; and B. Ziemer.)*

Response: Impacts to individual landowner property values that result from vegetation management activities are outside of the scope of the PEIS. It is important to remember that TVA typically acquires perpetual rights through purchased easements to manage vegetation across the full width of an easement to protect transmission lines. Those easements are acquired by TVA at fair market value at the time of acquisition.

2.2.5 General Response to Comments Related to Costs of the Proposed Vegetation Management Policy

Summary of Comments: TVA received 27 comments from 30 people that indicated the costs for the proposed vegetation management programs were too high and they were concerned that these costs would be passed on to individual ratepayers. *(Commenters: R. and L. Albiston; G. Bettice; R. and J. Burris; J. Carroll; B. Cook; T. Eskew; B. Gibbons; A. Greene; M. Greenman; B. Gregory; J. Hembree; D. Hillon; D. Lingie; M. and N. Lofaro; A. May; M. McPeters; P. Pennebaker; T. Peterson; J. Ray; K. Scott; M. Sevotti; F. Shaffer; C. Spratley; K. Thompson; R. Vanelli; M. Wooten; and one anonymous.)*

Response: TVA considers a range of factors such as environmental impacts, economic issues, availability of resources, and the need to continue to provide safe and reliable electric power as part of its decision-making regarding the best vegetation management practices within its transmission system. Program costs are always a priority for TVA to help reduce the burden on ratepayers. Much of the line maintenance costs are already built into existing rates. All vegetation management alternatives have associated costs. Table 3-3 in the PEIS summarizes the total estimated costs of the vegetation management program for each alternative projected over the next 20 years. Alternative D has the highest cost ($223 million NPV); Alternative A (i.e., the No Action or the current injunction) has the second highest cost ($205 million NPV); Alternative B has the lowest cost ($169 million NPV); and Alterative C has the second lowest cost ($180 million NPV). Alternative C represents a savings of $25 million over the No Action Alternative. Although it is not the least expensive alternative, as noted in Section 3.4 of the PEIS, TVA considers Alternative C to provide the best balance of enhancing system reliability and safety, minimizing environmental impacts, and achieving cost effectiveness.

TVA remains committed to sound stewardship of its resources in a manner that provides for economic efficiency and responsible resource management in providing safe and reliable electric power at the lowest possible rate for consumers in the Valley.

2.2.6 General Response to Comments Regarding Herbicide Use

Summary of Comments: TVA received 23 comments from 25 people expressing general concerns related to potential impacts to human health and the environment of TVA's use of herbicides to manage vegetation within the transmission ROW. (*Commenters: R. and L. Albiston; J. Ballin; B. Boyd; J. Carroll; C. Dalrymple; C. Forman; M. Greenman; E. Halcomb; L. Ingle; S. Marion; J. McMekin; A. Patten; P. Pennebaker; J. Presnell; S. Raymond; H. Russell; J. Sargent; F. Sloves; T. and R. Swann; L. Turner; J. Vaughn; J. Westbrook Jr.; and B. Ziemer.)*

Response: TVA uses herbicides predominantly during routine floor vegetation maintenance and a mix of manual and mechanical methods to remove trees (see Section 2.1.3 of the PEIS). Tables 2-2 and 2-3 in the PEIS show the current list of herbicides used by TVA. TVA only uses herbicides that are approved by the U.S. Environmental Protection Agency and applies them in accordance with the product label and applicable state and federal laws. As noted in the PEIS, herbicides applied to the TVA transmission ROW have the potential to impact non-target vegetation, water sources, or fish and wildlife through inadvertent application, excess surface runoff, spray drift, and leaching through the soil profile. To minimize risk, TVA only applies each herbicide in conjunction with appropriate best management practices (BMPs) and uses standard protocols and procedures that reduce risk of non-target exposures. Spot and localized use of herbicide is the most common application method used by TVA (see Section 2.1.3.1 of the PEIS); broadcast use of herbicides rarely occurs. If herbicide treatments are needed, TVA mails notices to individual landowners notifying them of affected transmission line segments approximately 60 days prior to planned herbicide treatment.

2.2.7 General Response to Comments Related to TVA's Use of Best Management Practices

Summary of Comments: TVA received 11 comments from 11 people referencing general impacts to the environment (e.g., erosion, runoff, groundwater contamination and surface water contamination) that would occur as a result of implementation of the TVA's preferred alternative for vegetation maintenance. Commenters indicated TVA should adhere to regulations regarding avoiding impacts to these resources. (*Commenters*: *B. Boyd; J. Presnell; J. Sargent; H. Russell; F. Sloves; S. Marion; C. Dalrymple; J. Ballin; B. Ziemer; H. Sloves; and A. Patten.)*

Response: As stated in the PEIS, TVA's preferred alternative (Alternative C) includes impacts to natural resources associated with initial woody vegetation removal and repeated maintenance of vegetation within the transmission ROW. Impacts associated with initial woody vegetation removal would occur in the buffer zone of the previously established ROW and are expected to be limited to the first eight-year period of maintenance. After this period, other measures to control vegetation and dispose of debris would be conducted on a recurring basis within the entirety of the ROW. However, effects to resources would be minimized through sound planning, incorporation of TVA's O-SAR process as a BMP and use of other established TVA transmission-related environmental protection practices and BMPs. For instance, as described in TVA's "Guide for Environmental Protection and Best Management Practices for TVA Construction and Maintenance Activities," TVA leaves a minimum buffer zone of 50 feet for both perennial and intermittent streams. This buffer zone may increase depending on the watercourse, primary use of the water resource, topography, other physical barriers, and sensitivity of the aquatic resources within the waterbody. Additional information regarding environmental constraints in Streamside Management Zones has been added to the text box in Section 4.1.1. Federal, state, and local requirements are implemented when they are more restrictive than TVA's guidelines. Ultimately, TVA's desired end-state condition is a mix of herbaceous and low-growing shrub species that is compatible with the safe and reliable operation of the transmission line system. More information on TVA's BMPs for transmission line ROW can be found on TVA's website: https://www.tva.com/Energy/Transmission-System/Transmission-System-Projects.

2.2.8 General Response Related to Comments Related to Climate Change

Summary of Comments: TVA received 11 comments from 11 people concerned with the impacts on climate change of TVA's vegetation management policy, which includes vegetation removal within buffer areas (except grasses, forbs, and some small shrubs) within the full extent of the ROW. (*Commenters: B. Dailey; J. Eldridge; T. Eskew; K. Fraser; B. Gibbons; M. Sanders; R. Slavin; K. Smith; M. Stephens; M. Tabler; and F. Tipton.)*

Response: TVA has fully assessed the potential effects of vegetation removal on climate change under each of its management alternatives in the PEIS (Section 4.19). Further information and analysis is provided in Section 4.23 for Alternatives B, C and D. As noted in Section 4.23, the associated loss of forested lands would also result in a corresponding reduction in the capacity to sequester greenhouse gases (GHGs). TVA has adopted a climate adaptation plan that establishes adaptation planning goals and describes the challenges and opportunities climate change may present to its mission and operations. The plan can be found at:https://www.tva.gov/file_source/TVA/Site%20Content/About%20TVA/Guidelines%20and%20Reports/Sustainability%20Plans%20and%20Performance/pdf/tva_climate_adaptation_plan_2016__final.pdf. The goal of TVA's adaptation planning process is to ensure that TVA continues to achieve its mission and program goals and to operate in a secure, effective and efficient manner in a changing climate.

2.3 Specific Responses to Public Comments

This section identifies responses to comments from the public that are not contained in the general responses.

2.3.1 ROW Locations and Easement Questions

Comment: "We own TVA property where lines are located. I heard on the news you have ideas of what to do with the property but cannot find where those ideas are listed. Can we get that list? Also, how do we find out what restrictions we have on building on those properties in reference to [the proximity] of our home." *(Commenter: P. Hargis)*

Response: Information concerning authorized activities within the TVA transmission line ROW are subject to the actual easement grant. In addition, general information and frequently asked questions concerning the ROW can be found on TVA's web site: https://www.tva.gov/Energy/Transmission-System/Right-of-Way-Maintenance/Transmission-System-Rights-of-Way-Easements.

2.3.2 Hybrid Alternative Suggestion

Comment: "The proposed solutions focus on the reliability of the grid through well functioning of the Transmission Lines (TL). Reducing vegetation to meadow-like conditions (the agency's preferred maintenance plan) would significantly reduce the functioning of the targeted trees whose maintenance of water supply, flood control and networks of multiple communities of life—soil organisms and small animals—which have no focus in the plans—would be adversely affected. Kentucky as a state has been reduced to a meadow over centuries of clearing for human purposes. However, I recognize the issue for the power companies. Therefore, I recommend a plan somewhere in the middle—least harm to nature while assuring reasonable functioning of TL and human safety. And, let's use the harvested wood for something good." *(Commenter: S. Feathers)*

Response: Thank you for your comment. TVA believes that its preferred alternative, Alternative C, is the "middle plan" that you advocate. As noted in Section 3.4 of the PEIS, Alternative C would use an IVM approach to manage 8,094 acres of the total ROW area of 238,196 acres (approximately 3 percent of the total) is proposed for initial woody vegetation removal. The resulting meadow-like end-state, which would consist of a mix of herbaceous and low-growing shrub species, is expected to provide improved habitat value and minimize intensity of floor work over time. This alternative is thought to provide the best balance in enhancing system reliability and safety, minimization of environmental impacts, and striving for cost effectiveness.

Section 2.2 of the PEIS summarizes the debris management methods available for TVA use as part of transmission line vegetation maintenance. As summarized in Table 2-6 each method has both advantages and disadvantages related to benefits to wildlife, nutrient recycling, erosion control, visual intrusion, potential risk associated with wildfires, cost, and other factors. For each project location, TVA considers a balanced approach to bring about the best possible outcome for debris management in consideration of each of these factors.

2.3.3 Section 2.1 Newspaper Editorial Response High Quality Vegetation and Herbicides

Comment: "I agree with much of the meadow concept because historically much of the area, including the Cumberland Plateau, was Savannah grasslands. However, the indiscriminate spraying of herbicides affects more than just the target species and many times affects native species of plants. There are several acres of high quality Savannah grasses on a ROW near where I live that I am trying to preserve. In my observations, these grasslands had more bumblebees and other insects than all of the rest of the ROW that I walk regularly. I would like to have a hard copy of the PEIS." *(Commenter: J. Vaughn)*

Response: Many factors beyond the control of TVA can affect the quality of plant communities on TVA transmission ROW. These include soils, bedrock geology, aspect, landscape position, and land use (current and previous). In areas with quality native plant habitats, TVA uses our O-SAR process to restrict broadcast herbicide application. Broadcast herbicide application has been restricted from many sections of ROW near Crossville, Tennessee.

See Section 2.2.6 General Response to Comments Regarding Herbicide Use and Section 2.2.7 General Response to Comments Regarding TVA's Use of Best Management Practices. TVA mailed a hard copy of the PEIS to J. Vaughn.

2.3.4 Positive Observations on Herbicide Use in TVA ROW

Comment: "My home is located approximately 3 miles west of the Sequoyah nuclear plant and my property includes roughly 3 acres of land where TVA has ROW to control vegetation for 3 sets of 161 kv transmission lines. I have lived in my home for over 18 years and have witnessed various TVA vegetation control methods and am in favor of the most recent herbicide technique. From my personal observations, this technique has not had a negative impact on wildlife, brush & grass vegetation, or health issues within my family & friends. I would be in favor of adopting this technique for long term use. I would welcome environmental study of my property if it would benefit herbicide treatment in the future. *(Commenter: E. Halcomb)*

Response: Thank you for your comment. TVA has had to continually improved on its vegetation management policy to better control incompatible vegetation while best protecting the surrounding environment. New research and technology including new EPA-approved herbicides have helped TVA achieve this goal over its history and have led to the current preferred vegetation management policy. See Section 2.2.6 General Response to Comments Regarding Herbicide Use for more specifics on how TVA would use herbicides under the preferred alternative.

2.3.5 Industry Standards in Vegetation Management

Comment: "Unless TVA's proposed policy for tree-cutting is similar to the large majority of other utilities around the Country, I oppose it." *(Commenter: J. Carson)*

Response: TVA does compare its practices with those of other utilities to identify improved practices. It is common practice for other comparable utilities to clear transmission line easements to the full width of their property rights. TVA's vegetation management practices, including tree cutting, is in line with the large majority of other utilities. Examples include Ameren, https://www.ameren.com/Transmission/transmission; Bonneville Power Administration, https://www.bpa.gov/PublicInvolvement/Vegetation-Management/Pages/Vegetation-Management.aspx; and Duke, https://www.duke-energy.com/community/trees-and-rights-of-way/what-can-you-do-in-right-of-way/transmission-lines-guidelines-and-restrictions.

2.3.6 Site-Specific Assessments, BMPs, and Purpose and Need

Comment: "This correspondence is in response to TVA's draft EIS and TVA's expressed preference for Alternative C. Let me be clear: Not only is this unacceptable, but TVA's semantic dance is abhorrent. TVA references its adoption of an Integrated Vegetation Management (IVM) approach... If this is really true, then where is TVA's expressed commitment to a site-specific assessment as part of Alternative C as stipulated in IVM practices. TVA says "Trust us," which has never been a good idea. In fact, TVA's approach is simply a return to its policy of clear-cutting, with no respect for site-specific implications, soil erosion, the indefinite displacement of wildlife, homeowners' lifestyles, enjoyment of their property, nor the impact on property values. Indeed, TVA is cavalier about the environmental impacts of its preferred approach, actually stating that moderate long-term impacts were acceptable. With specific reference to Alternative C, TVA writes, "The effects of Alternative C include both short-term and long-term impacts"; (Chapter 4 page 246). Let me be clear: Only Alternative A is acceptable. Buried in this mammoth document is TVA's own admission that as a result of Alternative A, "impacts from this alternative on the natural environment are minor". (Chapter 4, page 241)." *(Commenter: H. Sloves)*

Response: As stated in Chapter 1.3.2 of the PEIS, TVA believes that the IVM process provides the greatest flexibility for decisions regarding transmission ROW management; thus, all of the alternatives it considered in this PEIS are based on the IVM concept. However, the EIS is written on a programmatic level to encompass transmission ROW vegetation management across TVA's transmission system. Site-specific assessments would be completed during the yearly vegetation management planning cycle for segments of ROW proposed to be maintained the following year.

As noted in your comment, TVA acknowledges that "the effects of Alternative C include both short-term and long-term impacts." However, sound planning and the incorporation of TVA's O-SAR process and other established TVA transmission ROW management BMPs and established transmission-related environmental protection practices would minimize the effects to resources from this alternative.

See Section 2.2.1 General Response to Comments Regarding the Need for the New Policy for clarification that Alternative A does not meet the purpose and need for this project.

See Section 2.2.7 General Response to Comments Regarding TVA's Use of Best Management Practices for information on TVA's site-specific practices to minimize impacts to the environment.

2.3.7 Replanting with Compatible Species

Comment: "We purchased our 13.5 acres piece of land three years ago and have been reacclimating it due to poor logging practices for the purpose of forest farming and homesteading. The "edges" where powerlines run are a sizeable portion of our focus due to collection of walnuts, acorns, elderberry, etc. Due to what I've witnessed thus far, I would like to suggest that if trees must be taken, that they are replaced by low growing shrub-like trees such as elderberry, hazelnut, willows, cattail and etc. These are examples of trees that don't reach above 10'-30' and like to be cut back and are good for holding the soil, honey-bee pollination, purifying runoff water and etc. These can be purchased for $0.30-$0.45 a tree from MO St. University Nursery. Many options such as elderberry can often be seeded for nearly no costs and grow in nearly every soil and weather condition and keep other things from growing there (like big trees) and won't need reseeding or planted again!! Plus it helps the land, ecology, and provides food!! I would be open to discussion about this proposal as well as others including individual property agreements, NRCS/USDA conservation working programs, and transition to renewable energy (cutting powerline costs, trails, and capitalizing on renewable energy) if contacted. Thank you!" *(Commenter: W. Huston)*

Response: Thank you for your comments and suggestions. TVA doesn't often replant because vegetation management activities rarely leave bare soil, but the goal of Alternative C is to create a self-sustaining meadow-like state on the ROW, and create, where possible, pollinator habitat. Other benefits of Alternative C include a relatively increased long-term habitat quality associated with floor end-state (relative to Alternatives A and B), the potential for reduced frequency of vegetative controls in localized areas of the transmission ROW that are established by inherently more compatible herbaceous and shrub communities, and the potential for recruitment of sensitive herbaceous plant species within suitable areas of the transmission ROW.

In addition, BMPs are put into place to help reduce any erosion. See Section 2.2.7 General Response to Comments Regarding TVA's Use of Best Management Practices for more information on methods TVA employs to minimize the impacts of vegetation management.

2.3.8 Benefits of Trees

Comment: "TVA's previous policy of only cutting trees and vegetation directly under transmission wires worked well and an expensive and expansive change to 150 feet is not necessary and is detrimental to the wellbeing of people and the environment. For your consideration, some facts about the importance of trees: Trees provide something called "attention restoration". There is a lot of research published through several studies from William Sullivan, professor of landscape architecture at the University of Illinois at Urbana - Champaign that document the beneficial effects of trees on the health of humans. Let me quote from an article that appeared in a Lions Club publication: "All of us have a limited capacity to pay attention during any period of time. As our attention runs out, we're more likely to be irritable, and abilities to solve and to plan ahead decrease. If you think that means a parent in this state is more likely to strike out in frustration, or a student is more likely to blow off an exam, you're right. when that happens, being near trees and other vegetation can help restore our ability to pay attention…a view of a green space…is a micro-resting spot for the mind. People function more effectively when they have a green view. In the 1990s, Sullivan and his colleague Frances Kuo, director of the University of Illinois at Urbana-Champaign's Landscape and Human Health Laboratory, found that residents of Chicago's public housing who had trees outside were less likely to threaten violence against their children, as compared with residents of the same housing project who did not have trees nearby. The more green space, the less mentally fatigued people were and the less they engaged in domestic violence..." This article goes on to document other critical benefits of trees: They produce oxygen, correctly placed - reduce air-conditioning costs, cool the air in a process called evapotranspiration, reduce street repaving costs because a tree shaded street needs only to be repaved 2.5 times in 30 years; whereas, an unshaded street needs to be repaved 6 times in 30 years. Any policy that removes trees unnecessarily is a bad policy and should be corrected. All people engaged in any project that involves tree removal should carefully consider the benefits of trees and should never remove trees that do not need to be removed. People are beginning to recognize the benefits of trees and vegetation and correctly insist that tree removal be as limited as possible." *(Commenter: A. Larrabee)*

Response: Thank you for your comments. Initial woody vegetation removal in the right-of way would only occur within the footprint of the existing purchased ROW easement. This ROW is currently managed within two primary zones: wire zone and border zone (see Figure 1-6 of the PEIS). Under all of the alternatives, TVA would continue to manage the ROW in a predominantly herbaceous state. However, under Alternatives B, C and D, TVA would enhance reliability and safety by removing vegetation within the buffer zone portion of the border zone (again, see Figure 1-6). Ultimately, only 8,094 acres of the total existing ROW area of 238,196 acres (approximately 3 percent of the total) is proposed for initial woody vegetation removal. After that, all areas within the transmission ROW thereafter would be managed as floor. Therefore, as it relates to the issue of green space raised by the commenter, Alternatives B, C and D would result in tree removal along the edges of the ROW but would not appreciably affect an observer's perception of green space or any of its related or perceived benefits. TVA would use a condition-based approach for identification and removal of trees. A TVA forester would use LIDAR and other assessment techniques to identify which trees should be removed to ensure the safe and reliable operation of the transmission line. Based upon this assessment approach, removal of trees would be undertaken in a careful manner that is based on tree condition and need for safety and reliability.

2.3.9 Past Experiences and Landowner Maintenance

Comment: "I am part of the lawsuit. TVA previously cleared the ROW on my property and did it incorrectly. They left logs in place in locations I could not get to them. TVA never notified anyone they were coming until the contractor showed up. They cut and then don't remove the cut vegetation until I call them and tell them I want it removed. In Kentucky, there was an orchard owner that had an agreement with TVA to self-maintain the orchard. TVA cut it down even though it would never have reached the power lines. I chose Alternative A to let landowners maintain the ROW ourselves. I disagree with TVA's philosophy on dealing with landowners and would like to be contacted before they come on my land." *(Commenter: F. Oakbreag)*

Response: As noted in Chapter 3.1 of the PEIS, TVA has developed a stepwise process that would be incorporated under all of the proposed vegetation management alternatives to ensure that vegetation management proactively protects environmental resources, considers land use and land ownership, and enhances health and safety. In addition, Step 2 of TVA's current process does include landowner notification. TVA mails notices of herbicide treatments to individual landowners notifying them of affected transmission line segments approximately sixty days prior to the planned treatment. The flyer provides an email address and a toll-free phone number for the customer to express concerns or alert TVA ROW to any special circumstances before the application. For example, a customer could alert TVA to a garden within the limits of the ROW, which would provide additional information. Emergent needs to address danger trees or vegetation that is a risk to the reliability of the transmission system, are communicated to the landowner two weeks in advance, whenever possible. Notification for standard tree work or mowing is done more traditionally, such as knocking on doors, leaving door hangers, and the occasional letter, if necessary.

Landowners that have issues or damage due to vegetation management should contact TVA at 1-844-812-2626 or email ROWcustomer@tva.gov for more information.

2.3.10 Opposed to Alternative C

Comment: "I am writing to associate myself with the comment submitted by [D.] Vowell. I am opposed to the choice of Alternative C as the preferred alternative policy. It is hard to fathom how TVA can claim that Alternative C will not have an extremely harmful impact on many aspects of the environment. It means continuing the cutting to the ground millions of trees and spraying herbicides on gardens, farmland, pastures, and landscaped property over many thousands of acres of land. The only vegetation it would allow can hardly be called a tree. There are alternatives to this proposed policy which would protect TVA's transmission lines and have a much less drastic impact on the environment. Instead, TVA prefers an unnecessary and expensive policy that will be very destructive. The Alabama tree that caused what I believe may be the only fine against TVA several years ago, was growing directly beneath the lines. I have copies of all of the relevant reports about that episode. TVA was negligent. TVA did not contest the fine because it knew it was guilty. TVA needed that $175,000 fine to attempt to justify the policy that followed. That fine, however, is no justification for clearing the entire width of the right of way of trees and other vegetation which will never interfere with the transmission lines. Such drastic action is not required by FERC and is not necessary, and yet will cause great destruction to private and public property and harm the environment. TVA's claim of greater discretion can be used on individual properties under Alternative C gives no comfort after what has been done in the past. TVA had told the U.S. District Court that it had stopped its policy. It was proven that TVA had not stopped its policy and TVA was ultimately forced to admit fault in Court after a lengthy litigation of the issues and two opinions by the 6th Circuit Court of Appeals. Plain and simply, TVA can not be trusted to do the right thing even when it tells the Court what it intends to do.

If TVA ends up with this policy of Alternative C, it will forever prove that TVA does not care about the environment. It will be another very shameful episode in TVA's once proud history. This result, following a very shameful period of the past 7 years with TVA's most recent policy, will truly be a travesty and will no doubt result in another round of litigation in the future.

The recent litigation should have sent a message to the leadership at TVA. Lessons should have been learned, but apparently have not been learned, and the proper instructions have not been given to those in charge of producing this EIS. The scathing opinions of the 6th

Circuit Court of Appeals have been ignored except for the requirement by the District court that has forced TVA to produce an EIS which must be approved by the District Court. TVA apparently believes this proposed Alternative C will be a license to continue doing whatever they want and to continue to lie to the public about its policy. TVA does not own the land it is destroying and does not have unlimited rights to destroy it. TVA should start telling the truth about this proposed policy and what the actual results would be if it goes into effect in the future.

I urge TVA to go back to the drawing board and to take into further consideration all comments which are submitted in opposition to Alternative C in the draft EIS." *(Commenter: L. Silverstein)*

Response: Please see response to Group Comment 2.4.1 "Plaintiffs in *Sherwood v. TVA"* submitted by Mr. Vowell. The PEIS has been undertaken in accordance with all applicable laws, regulations and court orders. Moreover, TVA's staff of zoologists, botanists, aquatic ecologists, biologists, foresters, waste and water specialists, archaeologists, geologists, civil engineers, and health and safety experts have contributed their expertise to analyze various vegetation management approaches to arrive at the best alternative for balancing the needs of the environment and landowners with the imperative to deliver reliable electricity.

2.3.11 Forestry Division

Comment: "If the TVA worked with the Forestry Division on how to clear lines and area environmentally, there would be no fires like there is in the Western area of our country. TVA is supposed to be conservation wise, but like MLGW [Memphis Light, Gas, & Water], they are not. I have lived in TVA area most of my life and they CAN be good. They can also be devastatingly bad." *(Commenter: C. Strobush)*

Response: TVA employs professional foresters to do site-specific assessments on the ROW. However, a "Forestry Division" is either part of the USFS or part of a state land management agency (e.g., Tennessee Department of Agriculture), and these public agencies only have jurisdiction on publicly-owned lands. TVA works with the USFS and state agencies when crossing their lands. In addition, the USFS has agreed to serve as a cooperating agency for the PEIS and will participate in the following ways: assure that laws and regulations governing operation of their lands are appropriately considered as applicable to TVA; respond to requests for existing information and review of written material; provide TVA copies of pertinent planning documents, data, and resource information relating to management of resources in the study area; provide technical expertise and input on matters relating to their primary areas of responsibility; assist in the development of mitigation measures and monitoring plans; conduct appropriate technical and or administrative reviews of the preliminary draft and preliminary final EIS; and provide written comments for use in subsequent revisions.

2.3.12 Extension and Other Concerns

Comment: "Though I would like to make more extensive comments, the current timeframe does not allow me to do so. Therefore, I would respectfully request that more time in the form of an extension be afforded for those in the impacted areas to more thoroughly review the draft EIS and thoughtfully comment. Based upon what I've reviewed to date, I would prefer that the most selective approach is chosen for managing vegetation along ROWs. Specifically, that only vegetation posing a substantial and imminent danger be managed, even if the cost of electing this option is passed on to me as a consumer. The more certain threats to human health and well-being and disruption to wildlife through such a far-reaching vegetation management program appear to far outweigh the cost of a projected or actual temporary inconvenience. I have a number of questions about the project: 1) The cost over 20 years of each plan has been made available. How much of this cost will be borne by individual consumers on an annual basis? 2) Which right of ways will be impacted and how much notice will residents in those areas receive? 3) Will TVA be willing to re-plant compatible trees in the instance that trees in a right of way are cleared? It is presently my understanding that re-planting will be up to the consumer. 4) Has TVA consulted third party organizations specializing in the most sustainable practices for vegetation management? Thank you for your consideration of these comments." *(Commenter: A. Townsend)*

Response: To solicit public comment on this management program TVA issued a Notice of Intent on January 23, 2017, which was followed by a 30-day public scoping period that concluded on April 1, 2017. In addition, a notice of availability was published in the Federal Register and provided a 45-day public comment period for the Draft PEIS, from August 13 to October 1, 2018. TVA announced the availability of the Draft PEIS in regional and local newspapers; traditional media, and via TVA's social media. The document was available on TVA's website (www.tva.com/Environment/Environmental-Stewardship/Environmental-Reviews), and hard copies were available by request. TVA also held seven public meetings at various locations in the study area during the public comment period for the Draft PEIS.

As noted in Chapter 3.1 of the PEIS, TVA has developed a stepwise process incorporated under all of the proposed vegetation management alternatives to ensure that vegetation management would proactively protect environmental resources, consider land use and land ownership, and enhance health and safety. Although performing standard vegetation management work on purchased ROW easements does not typically require notice by TVA, Step 2 of the current process does include landowner notification. As part of this notification, TVA mails notices of herbicide treatments to individual landowners notifying them of affected transmission line segments approximately sixty days prior to the planned treatment. Emergent needs to address vegetation that is a risk to the reliability of the transmission system and danger trees are communicated to the landowner two weeks in advance whenever possible. Notification for standard tree work or mowing is done more traditionally, such as knocking on doors, leaving door hangers, and the occasional letter, if necessary.

See Section 2.2.5 General Response to Comments related to Costs of the Proposed Vegetation Management Policy regarding your comment on costs.

See Section 2.2.2 Current Court-Ordered or "Old" Policy of Vegetation Management and TVA's Preferred Policy for more detail on the amount of ROW that would be subject to initial woody vegetation removal as part of TVA's preferred alternative and compatible vegetation in the ROW.

See Section 2.2.4 General Response to Private Property and ROW Easement Concerns for more information on TVA's access to the ROW.

The NPS and the USFS are serving as cooperating agencies in this review.

2.3.13 Tennessee Natural Heritage Program

Comment: "I've read the four options, but I'm not overly familiar with the specifics. I'd just like to suggest that whatever plan TVA goes with, we work in conjunction with the TN's Dept. of Environment & Conservation's "Natural Heritage Program" to help promote the proliferation of vulnerable, rare, and threatened natural plant life. With the sheer scale of this project, I also think there could be a good opportunity to partner with a local university in establishing test sites to help with future environmental mgmt. Last, I think TVA should set clearly defined goals of what success would look like. Such metrics could be erosion, short-term impact to local vegetation and wildlife, long-term impact to vegetation and wildlife, proliferation of endangered natural species, percent reduction in invasive non-native species. Thank you for the opportunity to provide feedback!" *(Commenter: A. Wright)*

Response: Thank you for your comment. TVA maintains our own natural heritage database and shares information regularly with the Tennessee Natural Heritage program as well as with other state heritage programs and the U.S. Fish & Wildlife Service. TVA tracks hundreds of occurrences of federally and state-listed plant species that occur on TVA ROW. TVA also understands that rare plant species are about ten times more likely to occur on ROW than in the surrounding landscape. In areas where these species occur, TVA uses the O-SAR process to avoid adversely impacting the populations.

See Section 2.2.7 General Response to Comments Regarding TVA's Use of Best Management Practices for more detail on TVA's environmental protection mechanisms.

2.3.14 Retain the "Old Policy" and Bury Lines

Comment: "We respectfully request that TVA reject proposed changes in its vegetation management policy which would result in huge scars in the yards of Tennesseans and incur major costs in the process. It is our understanding that the Federal Electric Regulatory Commission did not demand that such clearing take place and that no one in the TVA has admitted to making such a decision, which suggests that whoever thought this was a good idea is not willing to face the ire of TVA's customers. Please leave your earlier policy (managing vegetation directly under the power lines) in place rather than destroying vegetation that is unlikely to ever cause problems with the power lines. If TVA really feels the need to spend nearly a fifth of a billion dollars, perhaps it should put the lines underground, which would seem a better option to protect them." *(Commenter: N. and M. Crowe)*

Response: Although transmission lines can be buried, most buried transmission lines tend to be low-voltage distribution lines (lines that are 13-kV or less) rather than high-voltage lines, which tend to be 69-kV and above. See Sections 1.1.1 and 1.2.2 of the PEIS for more information on low-voltage versus high-voltage lines. Although buried transmission lines are much less susceptible to catastrophic storm damage, especially wind damage, they tend to be very expensive to install and maintain. Low-voltage distribution lines can be laid into trenches and buried without the need for special conduits, but burying higher voltage transmission lines require extensive excavation as these lines must be encased in special conduits or tunnels. Underground higher voltage transmission lines require additional measures to ensure proper cooling and to provide adequate access for maintenance. Usually, a road along or within the ROW for buried transmission lines must be maintained for routine inspection and maintenance. Similarly, they must be protected from flooding, which could cause an outage. Repairs of buried transmission lines may require excavation, and the precise location of problem areas can be difficult to determine. The potential adverse environmental effects of constructing and operating a buried high voltage transmission line would likely be greater overall than those associated with a traditional aboveground transmission line. In addition, the expense of a buried high-voltage transmission lines would be prohibitive.

See Section 2.2.2 General Response to Comments Regarding the Current Court-Ordered or "Old" Policy of Vegetation Management and TVA's Preferred Policy for more information on TVA's vegetation management policy

See Section 2.2.5 General Response to Comments Related to Costs of the Proposed Vegetation Management Policy Concerns General Response for more information on the costs.

2.3.15 Herbicides and Landowner Gardens

Comment: "I would have gone to the meeting in Bowling Green had I known about it before but saw it in the paper the night after. Your group had sprayed my garden tomatoes, okra, and squash plus part of my grass the week before. I don't think you have the right to destroy my property because there is no way that it was going to interfere with the lines. Now I have no garden and a bare spot that washes every time it rains. You are over stepping when you destroy property that will not hurt anything. I can understand you cutting trees that are tall enough to get in the lines but leave everything else alone." *(Commenter: Lousep)*

Response: TVA regrets that this happened to your garden and grass. TVA's ROW herbicide application program only targets the woody stems existing in the ROW corridor. If a private landowner maintains a garden within the ROW that does not contain plants with woody stems, it would not be treated. In addition, the timeframe that you have provided does not coincide with TVA's herbicide season. Thus, it appears that the damage to your garden and grass was not due to any TVA action. However, if you live on a TVA right-of-way and have remaining concerns about your garden, TVA mails notices of herbicide treatments to individual landowners notifying them of affected transmission line segments approximately sixty days prior to the planned treatment. The flyer provides an email address and a toll-free phone number for the landowner to express concerns or alert TVA of any special circumstances before the application. In cases where a landowner is maintaining a garden within the limits of the ROW, alerting TVA to the garden would provide additional information.

TVA's ROW vegetation management program uses only U.S. Environmental Protection Agency-approved and registered herbicides to keep tall-growing plants from endangering our transmission line wires. TVA uses only non-restricted herbicides that are applied by licensed professional applicators, and they are applied according to the manufacturers' labels and TVA specifications. Herbicides are used to control woody vegetation that re-seeds or re-sprouts after mowing. Without herbicide applications, these sprouts grow quickly and require repetitive mowing. Over time, the use of herbicides results in the growth of favorable low-growing, non-woody plants, such as grasses and other native plants. In addition, herbicides selectively manage the undesirable hardwoods, such as sweet gums, without killing other vegetation that is desirable for wildlife such as quail.

2.3.16 Don't Cut My Trees

Comment: "I do not want my trees cut. They are beautiful and provide a tremendous value to my home, my neighborhood, and the planet. Regardless of whether TVA determines (for its own purposes) that there is no or low-impact—it is a huge impact to me and my family. I DO NOT WANT MY TREES CUT—my beautiful magnolia, my evergreen tree, and my big maple. Stay out of my trees and off my property, please." *(Commenter: N. Arrowood)*

Response: Most of TVA's transmission system is located on private lands. TVA typically acquires perpetual rights through purchased easements to manage vegetation to protect transmission lines, and TVA retains rights for vegetation management within its transmission line easements. Trees tall enough to fall within or grow to an unsafe distance from transmission lines under maximum sag and blowout conditions are managed on all lands within and adjacent to the ROW. Alternative C (TVA's Preferred Alternative) includes an initial removal of incompatible woody vegetation in buffer areas—leaving existing grasses, forbs, and some small shrubs. Following initial removal, the full extent of the ROW would be maintained to a meadow-like state; however, compatible trees and shrubs would be allowed in areas maintained by others. Under TVA's preferred alternative, TVA would commit to work with landowners regarding removal of incompatible trees on private landowner property.

See Section 2.2.1 General Response to Comments Regarding the Need for the New Policy for information on TVA's need for vegetation maintenance along its ROW.

See Section 2.2.2 General Response to Comments Regarding the Current Court-Ordered or "Old" Policy of Vegetation Management and TVA's Preferred Policy for more information on TVA's vegetation management policy.

See Section 2.2.4 General Response to Comments Related to Private Property and ROW Easement Concerns for more information on easements and access to TVA's ROW.

2.3.17 Use of Livestock to Control Vegetation

Comment: "Goats. They eat everything and fit every terrain. If you were to get cashmere goats you could also sell their fur and make more than enough money to cover their upkeep. It's a win-win situation." *(Commenter: D. Cook)*

"Thanks for allowing me the opportunity to share information about our environmentally friendly service, utilizing goats and sheep, that provides TVA another option to help achieve their preferred Alternative C Plan. Goats are another tool available for Land Managers to mitigate vegetation in fragile ecosystems, preventing harm to the biota. Utilizing sheep, in solar farms, eliminates panel damage from projectiles thrown by power equipment and also eliminate debris from accumulating on panels creating higher labor cost of cleaning panels. We're here for Land Managers and Companies that want to make a commitment to the environment by utilizing sustainability practices using goats and sheep to mitigate their vegetational concerns. Also, utilizing animals compliments their environmental principles, creating positive Public Relations for their advertising efforts. Logistics and difficultly of browse determines cost which widely varies up to $5000.00+ per acre. Studies and reports will be forwarded in a following e-mail (attachments Dilley a-g)." *(Commenter: A. Dilley)*

Response: Thank you for your comments. The PEIS was completed at a programmatic level to encompass vegetation management across TVA's transmission system where TVA manages ROW easements. Three methods were identified to manage vegetation on TVA transmission line ROWs including: manual, mechanical, and herbicides. TVA determined that control measures such as livestock grazing by TVA-owned livestock on lands that are not managed as existing pasture were not consistent with TVA objectives and were not practicable (see PEIS Section 2.4.1). However, the use of goats or other livestock may be utilized on a smaller scale on lands maintained by others. That decision would be made by the individual land manager in conjunction with the property owner. Any TVA decisions regarding proposed vegetation maintenance actions for individual transmission line segments would tier from the methods presented in the PEIS and be addressed in site-specific NEPA reviews.

2.3.18 Preference for Alternative C

Comment: "Thank you for the information I was given and the opportunity to comment. I tend to agree with the TVA Alt C as the best way to maintain the vegetation, wildlife, and landowners." *(Commenter: K. McDonald)*

Response: Thank you for your comment.

2.4 Group Comments

This section identifies responses to comments from local groups and industry representatives.

2.4.1 Plaintiffs in *Sherwood v. TVA*

Comment: "I submitted a Comment and Supplemental Comment on the scope of the environmental impact statement on behalf of the plaintiffs in *Sherwood v. TVA*. The draft environmental impact statement did not address or did not adequately address the points made in the Comment and Supplemental Comment, so I am re-submitting (by attachment to this email) the very same Comment and Supplemental Comment in response to the draft environmental impact statement. Thank you for your consideration. Attached comments submitted during scoping." *(Commenter: D. Vowell – Plaintiffs in Sherwood v. TVA)*

Response: As identified in Chapter 1.6 of the PEIS, the public scoping period for this project was initiated on January 23, 2017 and concluded on April 1, 2017. TVA considered comments received during the public scoping period in determining the scope and content of the PEIS. For example, the PEIS evaluates impacts to air quality, climate change, streams, wildlife, costs, herbicide use, and identifies a list of preparers, etc.

The comments submitted during the scoping period noted that TVA should address the 15-foot rule and litigation in the PEIS. The PEIS was undertaken in part in response to the *Sherwood v. TVA* litigation, and this is acknowledged in the description of Alternative A in the PEIS (Chapter 3.2.3.1). In addition, the litigation is described in the Summary, which states: "TVA is currently subject to a court injunction issued by the U.S. District Court for the Eastern District of Tennessee in the lawsuit, *Sherwood v. TVA*, No. 3-12-cv-156, which requires 'TVA [to] maintain buffer zones on the edges of its ROW in a manner as described in its 1997 and 2008 Line Maintenance Manuals' until TVA prepares and publishes a thorough Environmental Impact Statement pursuant to the National Environmental Policy Act (NEPA) analyzing TVA's ROW vegetation management program. Thus, the successful completion of this PEIS will enable TVA to fulfill its legal obligations in this court action." The case citation was provided in the text of the PEIS so that interested parties could look further into the lawsuit. However, the lawsuit and its details are not the purpose or subject of the PEIS, which is to “develop a vegetation control policy to strategically manage TVA’s existing transmission line ROWs in a manner consistent with applicable laws, orders, standards, practices and guidance while providing reliable energy and protecting environmental resources to the extent possible.”

TVA’s past vegetation management practices are discussed in Section 1.2.5 of the PEIS. The current practices, mandated by the lawsuit injunction, are discussed under the description of the No Action Alternative (see Section 1.2.6).

We acknowledge that you requested TVA to discuss certain facts about the lawsuit in the PEIS. Those facts are not pertinent to the scope of the PEIS analysis but are appropriately dealt with in the lawsuit itself. We have nevertheless included your comments in the Comment and Response section of this PEIS so that your requests are made public as part of this PEIS.

2.4.2 Tennessee Chapter Sierra Club

Comment: “The Tennessee Chapter Sierra Club appreciates the opportunity to provide comments on behalf of our more than 9,000 members and more than 100,000 supporters on TVA’s draft Programmatic Environmental Impact Statement programmatically addressing the impacts of system-wide vegetation management practices along its rights-of-way (“ROW”). For more than 75 years TVA managed vegetation on its right-of-ways (ROW) by keeping vegetation in the “wire zone” or “floor” in early successional habitat limited to herbaceous and grass species, with some selected low-growing trees allowed in cooperation with partnering landowners. Likewise, TVA kept a portion of what they label the “border zone” under the same management regime. However, TVA allowed trees to remain in the “buffer” zone as long as they did pose a hazard or danger to the transmission lines. The guiding principle was to keep vegetation further than, or potentially further than, 10 feet from the lines. This was considered to be the minimum distance required to prevent flashover. During all that time, TVA did not experience any instances of trees interfering with or falling on transmission lines and causing power outages. However, following an incident in Ohio in August 2003, in which a tree fell onto a transmission line and initiated a cascade of events resulting in blackouts over most of northeastern North America, the Federal Energy Regulatory Commission issued rules designed to prevent a re-occurrence of such an event. TVA has interpreted the FERC policy as a mandate to clear the full extent of their deeded ROWs from all woody vegetation. TVA justified this new scorched earth policy by promoting the public perception that any transmission line incident would result in fines of millions of dollars. Fortunately, following the *Sherwood vs. TVA* litigation, TVA agreed to go back to their historic vegetation management practices and develop a PEIS to reach a decision on how to manage their ROWs in the future. The Sierra Club opposes the preferred alternative C identified in the PEIS. We do not believe the history of TVA vegetation management, nor the rules set forth by NERC or the guidance set forth in ANSI A300 (Part 7) Integrated Vegetation Management Draft 4 Version 1 warrant or justify such a draconian vegetation management policy. We recommend instead the adoption of alternative D, with the modification that the buffer zone not be initially cleared, but that only “incompatible”, i.e., trees actually capable of coming within the minimum required distance to transmission lines be removed. We note that NERC FAC-003-4 Transmission Vegetation Management states that, contrary to TVA’s assertion that a minimum distance of 10 feet is necessary to prevent flashovers, a varying distance from vegetation is required depending on the voltage of the line. For example, for a 161 kV line the distance is only approximately

3 feet. Using the 161 kV line example again with a 150 foot ROW and a buffer zone of 25 feet, there would be a distance of at least 50 feet from the center line of the ROW to the nearest tree. There are few tree species in TVA's service area that exceed 50 feet in height at maturity that could potentially fall onto the transmission line, and those exceptions could be easily identified and controlled without destroying what is an ecologically, environmentally, and culturally significant ecosystem. We disagree with TVA's assertion that the loss of forested land over 16,000 miles of ROW in the buffer zones, totaling almost 100,000 acres, is insignificant. For the flora and fauna that inhabit that land, it is highly significant. Furthermore, the loss of carbon sequestration resulting from TVA's adoption of alternative C is also significant. We do agree with and approve TVA's selection of IVM, or integrated vegetation management practices, as a best management practice for managing the vegetation within their ROWs, with the caveat that the selection of herbicides used be governed by their toxicity, teratogenicity, and compatibility with the use of the land by the landowner. In conclusion, again, we recommend the adoption of a modified alternative D, as detailed in the above paragraph." *(Commenter: A. Ringe – Tennessee Chapter Sierra Club)*

Response: Many of your comments contain mistaken assumptions that are largely addressed in Sections 2.1 Newspaper Editorial Response and 2.2.2 Current Court-Ordered Policy, the "Old" Policy of Vegetation Management and TVA's Preferred Policy. Please refer to those responses. In brief, the subject lines are substantially cleared in their current condition and any additional woody vegetation removal would be limited to the buffer zones outside of the existing maintained wire zone, but within the ROW easement (see Figure 3-8 of the PEIS). There are multiple areas subject to initial woody vegetation removal in various locations along the 16,000-mile transmission system. However, under Alternatives B, C, and D, only 8,094 acres of the total ROW area of 238,196 acres (approximately 3 percent of the total) are proposed for tree removal and not the full width of the ROW throughout the entirety of the 16,000-mile transmission system.

Chapter 4 of the PEIS presents the evaluation of impacts to biological resources and climate change associated with all management alternatives. TVA respectfully disagrees that impacts to biological resources and climate change would be significant.

See Section 2.2.5 General Response to Comments Related to Costs for more information on the cost differences between Alternative D and TVA's Preferred Alternative (Alternative C).

See Section 2.2.6 General Response to Comments Regarding Herbicide Use for more information on TVA's use of herbicides in the ROW.

2.4.3 Tennessee Citizens for Wilderness Planning

Comment: "Thanks for the opportunity to comment on the Draft Programmatic Environmental Impact Statement for vegetation management practices along the transmission line Rights of Way (ROW). These comments are submitted on behalf of Tennessee Citizens for Wilderness Planning, an Oak Ridge-based environmental and conservation not-for-profit organization. TCWP partners with TVA on the maintenance of Whites Creek Trail and the Worthington Cemetery Ecological Study Area. Additionally, with the help of TVA personnel, TCWP has been able to offer Kids in the Creek programs in rural areas. TCWP appreciates opportunities to work with TVA. TCWP endorses Alternative

D: Condition-Based Control Strategy (End State: Variable by Zone).” *(Commenter: A. Ringe – Edison Electrical Institute)*

Response: Thank you for your comment.

2.4.4 Packaging Corporation of America

Comment: “I attended the TVA Public Meeting on the Vegetation Management EIS in Memphis today. After reviewing the alternatives, I recommend TVA proceed with Alternative C.” *(Commenter: R. Holland – Packaging Corporation of America)*

Response: Comment noted. Alternative C is TVA’s preferred alternative.

2.4.5 Edison Electrical Institute

Comment: “Support Alternative C.” *(Commenter: R. Loughery – Edison Electrical Institute)*

Response: Comment noted. Alternative C is TVA’s preferred alternative.

2.5 Agency Comments

This section identifies responses to comments from state and federal agencies. TVA has also prepared a Programmatic Agreement (PA) in coordination with the Advisory Council on Historic Preservation (ACHP); the State Historic Preservation Officers (SHPO); and federally recognized Indian tribes with an interest in the region, pursuant to Section 106 of the NHPA, for existing operation and maintenance activities, including vegetation management. The PA reflects the concurrence by each of the SHPOs regarding management measures integrated within TVA’s transmission vegetation management program that are protective of cultural resources and designed to minimize environmental impact. For vegetation management activities not covered by the PA or in the event that TVA does not have an executed PA with a particular SHPO, TVA would follow the Section 106 process for specific undertakings.

2.5.1 Alabama Historical Commission

Comment: “Section 4.14.1.1 of the PEIS states, ‘The majority of activities associated with the transmission ROW vegetative management are covered with this PA. Which activities are covered/not covered by the proposed PA? Are the activities not covered limited to those listed in the EIS? Please note that consultation for the potential PA is ongoing and may not result in signatures of all parties. If this is the case for Alabama, all activities regarding ROW vegetative management should be addressed in a separate document.” *(Commenter: L. Woffard – Alabama Historical Commission)*

Response: TVA, in consultation with the ACHP, SHPOs within TVA’s Power Service Area and federally recognized Indian tribes with an interest in the region, developed a PA for alternative procedures for undertakings that are small and repetitive in nature. Activities covered in the PA relative to transmission vegetation maintenance include: hazard tree removal, use of herbicides (except for aerial applications), hand removal of vegetation using a weed wrench, hand pruning, bush hog, mulcher, mower, and other light-duty equipment to control vegetation and establish or maintain ROW width. For vegetation management activities not covered by the PA or in the event that TVA does not have an executed PA with a particular SHPO, TVA would follow the Section 106 process for specific undertakings.

Comment: "Section 4.14.2.1 - Have the transmission ROWs all been surveyed or significantly disturbed as to preclude the possibility of intact cultural features? It is noted in the text that pulling methods have a greater potential effect to cultural resources and will be conducted on a limited basis. We do not consider the potential impacts from the method to be minor based solely on the infrequency of the method's utilization." *(Commenter: L. Woffard – Alabama Historical Commission)*

Response: TVA's transmission line ROW have varying degrees of disturbance. During consultation with the SHPOs and federally recognized tribes, TVA determined that hand removal of vegetation using a weed wrench and hand pruning were not the type of activity that has the potential to cause effects to historic properties provided that the activity does not take place in cemeteries or previously flagged highly sensitive areas.

Comment: "Section 4.14.2.4- We do not agree with the use of wetland mats." *(Commenter: L. Woffard – Alabama Historical Commission)*

Response: TVA has successfully used wetland mats to avoid effects to historic properties for undertakings within the PSA. TVA has discussed with the Alabama Historical Commission that matting would only be used to access existing transmission lines and would only be used over short periods for construction activities. TVA's position is that mats are used as a protective measure to prevent rutting and compaction of resources when accessing transmission line ROW for construction work when conditions warrant. The practice is used as a standard measure elsewhere in the US.

Comment: "Section 4.14.2.5- Please define the term 'significant' in this context." *(Commenter: L. Woffard – Alabama Historical Commission)*

Response: We were not able to locate the word "significant" in this paragraph; however, we located the sentence "Do not cause significant soil disturbance" in PEIS Section 4.14.2.4 which has been changed to "unlikely to cause soil disturbance".

Comment: "Section 4.14.2.6 - In the event that the Alabama SHPO does not sign the proposed PA, mitigation measures should be addressed in a separate document." *(Commenter: L. Woffard – Alabama Historical Commission)*

Response: Comment noted. As stated in the PEIS, TVA has prepared a PA under NHPA in coordination with SHPOs, ACHP, and federally recognized Indian tribes within the study area. For vegetation management activities not covered by the PA or in the event that TVA does not have an executed PA with a particular SHPO, TVA would follow the Section 106 process for specific undertakings.

2.5.2 Virginia Department of Historic Resources

Comment: "Based on the documentation provided in the draft PEIS, DHR supports the TVA's preferred alternative, Alternative C: Condition-Based Control Strategy (End State: Meadow-Like). We have no additional comments." *(Commenter: E. Eaton – Virginia Department of Historic Resources)*

Response: Comment noted.

2.5.3 Georgia Historic Preservation Division

Comment: "Thank you for notifying us of this federal undertaking. We look forward to receiving Section 106 compliance documentation, as appropriate. If the federal agency intends to utilize NEPA to comply with Section 106, in lieu of the procedures set forth in 36 CFR Part 800, TVA should notify HPD and the Advisory Council on Historic Preservation of its intent." *(Commenter: J. Dixon – Georgia Historic Preservation Division)*

Response: The purpose of the letter was to notify the GA SHPO that TVA was fulfilling its Section 106 consultations responsibilities through the NEPA process. TVA also provided the letter to the ACHP and sought their comments. TVA received no comments from the ACHP.

2.5.4 Kentucky Heritage Council

Comment: "We do not have any comments on the EIS. Question on the status of the PA." *(Commenter: N. Laracuente – Kentucky Heritage Council)*

Response: Comment noted. TVA has prepared a PA under NHPA in coordination with SHPOs, ACHP, and federally recognized Indian tribes within the study area. For vegetation management activities not covered by the PA or in the event that TVA does not have an executed PA with a particular SHPO, TVA would follow the Section 106 process for specific undertakings.

2.5.5 Tennessee Department of Environment & Conservation

Comment: "Cultural Resources: Based on information provided in the Draft PEIS, the proposed action and its alternatives have the potential to disturb significant archaeological resources within the proposed project areas. Manual or mechanical vegetation clearing methods have the potential to adversely impact cultural resources. TDEC recommends that all un-surveyed locations to be disturbed by earthmoving activity from vegetation management be examined by a qualified professional archaeologist prior to project initiation; TVA should also adhere to best management practices where sites are known to exist." *(Commenter: Tennessee Department of Environment & Conservation)*

Response: All archaeological surveys would be conducted by professional archaeologists. The need for archaeological surveys would be governed by the nature and extent of prior cultural resource investigations of the area, documentation of previous disturbance, and the method of vegetation management. The types of activities that would require additional review from professional archaeologists are outlined in the PA.

Comment: "Air Resources: The preferred alternative could involve some level of open burning and if determined to be acceptable to use for a disposal method, would likely produce localized and insignificant air quality impacts that are of short term duration. TDEC recommends that all other disposal methods be evaluated before open burning is considered. In the event that open burning is to be undertaken, TDEC would propose that open burning on air quality alert days be avoided and that adequate planning and coordination with the local and state air programs and fire control agencies be established before undertaking any burning activities. TDEC encourages TVA to include these considerations in the Final PEIS." *(Commenter: Tennessee Department of Environment & Conservation)*

Response: TVA agrees with this comment and has incorporated it into the Final PEIS (See Section 4.19.2.3 Impacts to Air Quality from Debris Management).

Comment: "Solid Waste: TDEC recommends that the Final PEIS reflect that materials generated (intentionally or accidentally) that are determined to be wastes be evaluated and managed in accordance with the Solid and Hazardous Wastes Rules and Regulations of the State (TDEC Division of Solid Waste Management Rule 0400 Chapters 11 and 12, respectively) in addition to other applicable regulations (federal, state) and TVA's best management practices." *(Commenter: Tennessee Department of Environment & Conservation)*

Response: TVA concurs that all materials classified as wastes, including vegetation waste, would be managed in accordance with the Solid and Hazardous Wastes Rules and Regulations of the State (TDEC Division of Solid Waste Management Rule 0400 Chapters 11 and 12, respectively) and other applicable regulations (federal, state).

Comment: "Water Resources: All alternatives evaluated in the Draft PEIS include re-clearing of ROWs prior to the new maintenance phase. Depending on the scope of clearing, a Construction Stormwater General Permit (CGP) may be required in some cases (such as due to local terrain). Grubbing or bush-hogging would not necessarily require CGP coverage where root systems are left behind. If the machinery causes the vegetation to be ripped out, whereby ultimately disturbing the top layer of soil inadvertently, then coverage under a CGP would be necessary. TDEC encourages TVA to include additional information relating to its vegetation management practices, such as what equipment will be used, depth of disturbance, etc. in the Final PEIS to better identify the potential for impacts.

TDEC agrees that TVA must at a minimum identify site-specific characteristics and incorporate TVA's office-level sensitive area review (O-SAR) process to determine the selection of vegetation management methods employed. In some cases, O-SAR may be insufficient to determine the site-specific sensitivity. The sensitive environmental reviews should include potential for water supplies, springs, wetlands and streams to be impacted. In heavily karst topography, the presence and proliferation of sinkholes and other karst features need to be considered. Any herbicide spraying needs to include buffers near streams and other sensitive areas. The list of herbicides includes herbicides that public water systems are not required to monitor for. If the spraying is to occur in an area where it could potentially impact a public water system, TDEC and the water system should be informed prior to herbicide application. TDEC encourages TVA to include these considerations in the Final PEIS." *(Commenter: Tennessee Department of Environment & Conservation)*

Response: TVA notes the comment concerning taking karst features and sensitive areas into consideration during ROW maintenance activities. TVA acknowledges the sensitivity of these environments and has included a discussion of method impacts in Sections 4.2 and 4.9 of the PEIS. TVA would comply with CGP requirements if over one acre of soil is to be disturbed. TVA applies herbicide in accordance with General Pesticide permit number TNP100005. This permit requires that appropriate buffers be observed when applying herbicides and requires yearly reporting of usage.

2.5.6 North Carolina Department of Environmental Quality

Comment: "The Department of Environmental Quality has reviewed the proposal for the referenced project. Based on the information provided, several of our agencies have identified permits that may be required and offered some valuable guidance to reduce environmental impacts. The comments are attached for the applicant's review." *(Commenter: Environmental Assistance and Project Review Coordinator)*

Response: Comment and guidance noted.

Comment: "We support Alternative C or a hybrid between Alternative C and D. Alternative C emphasizes a meadow-like element that benefits many early successional habitat-dependent species and should promote native habitats, especially where larger ROW areas border forest, herbaceous vegetation and shrubs including pollinator-dependent species. However, a hybrid between Alternative C and D may be most ecologically beneficial, as it would allow for a feathered edge between the cleared ROW and forest. This larger shrub and small tree component is beneficial to many species that use both the forest and meadow or the edge itself. This feathered edge would be most beneficial in high conservation opportunity areas, such as in Golden-Winged Warbler (GWWA) focal areas and shrub-dependent rare plant or animal." *(Commenter:* North Carolina *Wildlife Resources Commission)*

Response: TVA agrees that ROWs benefit species adapted to early successional and edge habitats. The meadow-like aspect provided by ROWs provides habitat and species diversity in a region where forested habitat is abundant. Overall, plant and wildlife species diversity may be higher in ROWs than in surroundings forests. The PEIS evaluates impacts associated with Alternative C (meadow-like end state) and Alternative D where the end state goal is to promote a "feathered" edge. As noted in Section 4.23.4 of the PEIS Alternative D provides greater benefits for selective wildlife species relative to Alternative C, in terms of habitat quality in the end-state. However, because habitat alteration associated with initial vegetation removal is the same as Alternative C while the considered to be notable but not destabilizing of the associated resources, impacts to wildlife, forested land cover and related factors would be similar as described for Alternative C, while the cost of this alternative are greater than any other alternative. Therefore, Alternative C emerged as TVA's preferred alternative due to the additional staff, work hours, and associated costs of implementing Alternative D over Alternative C (see PEIS Section 4.23.4).

Comment: "We recommend that TVA use the Best Management Practices for Golden-Winged Warbler Habitats for Utility Rights-of- Way in the Appalachian Mountains (http://www.gwwa.org/resources/GWWA-Habitat-Appalachian-utility-130808_lo-res.pdf) for ROW management in GWWA focal areas as defined by the GWWA Working Group and Appalachian Mountains Joint Venture. More information on GWWA is available here: http://www.gwwa.org. NCWRC is available to provide technical guidance regarding GWWA management techniques and potential locations when TVA is considering implementation of the Best Management Practices." *(Commenter: North Carolina Wildlife Resources Commission)*

Response: TVA has noted this comment, and staff biologists have initiated a discussion with ROW management on the feasibility of incorporating BMPs in GWWA focal areas under Alternative C, if possible.

Comment: “In addition, we recommend that TVA minimize corridor maintenance and prohibit mowing/bush hogging between April 1 and October 1 to minimize impacts to nesting wildlife. We suggest a maintenance schedule that incorporates only a portion of the area- one third of the area, for example- each year instead of the entire project every 3 or 4 years” *(Commenter: North Carolina Wildlife Resources Commission)*

Response: Although a summer mowing prohibition was recommended in PEIS Sections 4.2.2.1 and 4.2.2.5, the logistics of maintaining the entire transmission system without summer mowing would be problematic. However, summer mowing would be minimized due to a low percent of use and extended maintenance schedules. Under TVA’s preferred alternative, Alternative C, mechanical methods like mowing account for only about six percent of floor work. In addition, ROW segments are maintained on a 3-year rotation with only a third of TVA’s ROW sectors receiving treatment in a given year, although maintenance frequencies may be adjusted based on field conditions.

Comment: “TVA uses a predetermined buffer zone of 50 ft along streams, where vegetation is maintained mechanically; only taller growing vegetation is removed within this zone. NCWRC recommends maintaining a minimum 100-foot native, woody buffer along perennial streams, and a 50-foot buffer along intermittent streams and wetlands. Maintaining woody buffers along these areas will minimize impacts to aquatic and terrestrial wildlife resources, water quality, and aquatic habitat both within and downstream of the project area.” *(Commenter: North Carolina Wildlife Resources Commission)*

Response: As described in TVA’s "Guide for Environmental Protection and Best Management Practices for TVA Construction and Maintenance Activities," TVA uses a minimum buffer zone of 50 feet for both perennial and intermittent streams. This buffer zone may increase depending on the watercourse, primary use of the water resource, topography, other physical barriers, and sensitivity of the aquatic resources within the waterbody. For example, the buffer zone width increases 20 feet for each 10 percent increase in site slope up to 170 feet (on each side). Federal, state, and local requirements are implemented when they are more restrictive than TVA’s guidelines. Ultimately, TVA’s desired end-state condition is a mix of herbaceous and low-growing shrub species that is compatible with the safe and reliable operation of the transmission line system. More information on TVA’s BMPs for transmission line ROW can be found on TVA's website: https://www.tva.com/Energy/Transmission-System/Transmission-System-Projects.

Comment: “The Superfund Section has reviewed the proximity of sites under its jurisdiction to the Tennessee Valley Authority project. Proposed project is for the management of vegetation within the transmission rights for way of the Tennessee Valley Authority. Seventy-two sites were identified within one mile of the project as shown on the attached report. The Superfund Section recommends that site files be reviewed to ensure that appropriate precautions are incorporated into any construction activities that encounter potentially contaminated soil or groundwater. Superfund Section files can be viewed at: http://deq.nc.gov/waste-management-laserfiche.” *(Commenter: North Carolina Division of Waste Management – Superfund Section)*

Response: Comment noted; however, this PEIS is concerned with vegetation management activities on existing lines rather than construction of new lines, which each received site-specific NEPA reviews.

Comment: "The Solid Waste Section has reviewed the Draft Programmatic Environmental Impact Statement environmental for the Tennessee Valley Authority project for the management of vegetation within the transmission rights for way of the Tennessee Valley Authority in Avery, Burke, Cherokee, McDowell, and Watauga Counties in North Carolina. The review has been completed and has found no adverse impact on the surrounding community and likewise knows of no situations in the community, which would affect this project from a solid waste perspective.

During the project, every feasible effort should be made to minimize the generation of waste, to recycle materials for which viable markets exist, and to use recycled products and materials in the development of this project where suitable. Any waste generated by this project that cannot be beneficially reused or recycled must be disposed of at a solid waste management facility approved to manage the respective waste type. The Section strongly recommends that any contractors are required to provide proof of proper disposal for all waste generated as part of the project. A list of permitted solid waste management facilities is available on the Solid Waste Section portal site at: http://deq.nc.gov/about/divisions/waste-management/waste-management-rules-data/solid-waste-management-annual-reports/solid-waste-permitted-facility-list." *(Commenter: North Carolina Division of Waste Management – Superfund Section)*

Response: Comment noted. Disposition of solid waste resulting from vegetation control is identified in Chapter 4.17.2 of the PEIS. Hazardous wastes and solid waste generated by TVA during vegetation control activities would be handled and disposed of according to the appropriate state and local regulations. Vegetative waste is typically mulched or placed in windrows along the transmission ROW boundary. Solid vegetative waste may be left in place for decomposition with approval from the local landowner/manager or could be mulched and spread throughout the transmission ROW. Larger woody debris not suitable for mulching may be placed as windrows along the edge of the transmission ROW.

2.5.7 North Carolina Department of Administration

Comment: "This project requires consultation with the Eastern Band of the Cherokee Indian tribe. Attached contact information." *(Commenter:* North Carolina Department of Administration*)*

Response: TVA provided to the federally recognized Indian tribes with an interest in the region, including the Eastern Band of the Cherokee Indians the opportunity to review and comment on the draft PEIS . TVA received no comments from any of the tribes. In addition, the majority of the activities associated with the PEIS are covered in TVA's Section 106 Programmatic Agreement that is being developed in consultation with the 7 SHPO's, ACHP, and the 20 interested federally recognized Indian tribes with an interest in TVA's power service area. TVA had two face to face meetings with the interested tribes and all of their comments have been incorporated into the Programmatic Agreement.

2.5.8 North Carolina Natural Heritage Program

Comment: "The NCNHP provided lists of records for rare species, important natural communities, natural areas, and/or conservation/managed areas within the proposed project boundary.

If a Federally-listed species is documented within the project area or indicated within a one-mile radius of the project area, the NCNHP recommends contacting the US Fish and

Wildlife Service (USFWS) for guidance. Contact information for USFWS offices in North Carolina is found here: https://www.fws.gov/offices/Directory/ListOffices.cfm?statecode=37

Please note that natural heritage element data are maintained for the purposes of conservation planning, project review, and scientific research, and are not intended for use as the primary criteria for regulatory decisions. Information provided by the NCNHP database may not be published without prior written notification to the NCNHP, and the NCNHP must be credited as an information source in these publications. Maps of NCNHP data may not be redistributed without permission. (TVA removed species list from comment).” *(Commenter: North Carolina Natural Heritage Program)*

Response: Comment noted. Prior to yearly vegetation management activities, TVA would identify records for rare species, important natural communities, natural areas, and/or conservation/managed areas within the proposed project boundary by consulting the TVA Regional Natural Heritage database. New records are routinely added to this database by TVA through coordination with the state heritage programs and the USFWS, as well as through findings by TVA surveys. TVA would consult with the USFWS as appropriate when federally listed species could be potentially affected by the proposed project. Guidance is provided by TVA environmental compliance staff to TVA vegetation management staff and contractors through the O-SAR process. This guidance includes avoidance and minimization measures designed to protect rare, threatened and endangered species, important natural communities, natural areas, and/or conservation/managed areas.

2.5.9 Virginia Department of Environmental Quality

Comment: “Please see the below comments from Virginia’s Department of Game and Inland Fisheries on the TVA Transmission System Vegetation Management draft PEIS. DEQ has already issued its formal report, however please take DGIF’s comments into consideration as you move forward.” *(Commenter: J. Howard – Virginia Department of Environmental Quality)*

Response: Comment noted.

2.5.10 Virginia Department of Game & Inland Fisheries

Comment: “We have reviewed the Environmental Impact Statement (EIS) for Tennessee Valley Authority’s (TVA) vegetation management plan, implemented in the right of ways under their electric lines (transmission, distribution, etc.). We support efforts to better manage the vegetation within TVA’s right of ways in a manner that improves wildlife habitat while also providing safety to the infrastructure and those who work on it. We are generally supportive of Alternative C: Condition-Based Control Strategy – End-State Meadow the Authority’s preferred alternative. We agree that meadow-like habitat provides suitable habitat for many pollinators, birds, and other wildlife and that such habitat should result in minimization of vegetation management over the long term.

However, we believe that Alternative D: Condition-Based Control Strategy – End-State Compatible Vegetation Variable by Zone, if implemented appropriately, would result in habitat suitable for a wider variety of wildlife species, reduce loss of forested habitat, and provide enhanced ecosystem services, such as temperature regulation, soil retention, and encroachment by invasive species. We find that creating a “soft edge” along a forest line, allowing for a more gradual vegetative transition from canopy to grasslands reduces wildlife impacts associated with forest fragmentation such as invasive species encroachment, modified predator/prey interactions, and increased temperature at the forest edge. It seems Alternative D may better allow for this type of habitat transition and diversity. We do understand that a management plan that requires site-specific design and management is not appropriate in all situations." *(Commenter: A. Ewing – Virginia Department of Game & Inland Fisheries)*

Response: Comment noted. However, Alternative C emerged as TVA's preferred alternative due to the additional staff, work hours, and associated costs of implementing Alternative D over Alternative C (see PEIS Section 4.23.4).

Comment: "The region of Virginia included within TVA's service area is known to support a number of federally and state listed species as well as a number of Species of Greatest Conservation Need (SGCN) as identified in Virginia's 2015 Wildlife Action Plan. We compiled a list of listed species and SGCN known from Tennessee drainages within Virginia, parts of which are located outside of TVA's service area and have attached that list. We recommend consideration of these species when assessing potential adverse impacts resulting from removal of existing vegetation, planting of native meadow-like habitat, and long-term management of that habitat. We also recommend TVA review Virginia's 2015 Wildlife Action Plan, accessible at www.bewildvirginia.org, to understand the species and habitats unique to this region." *(Commenter: A. Ewing – Virginia Department of Game & Inland Fisheries)*

Response: TVA is aware of Virginia's 2015 Wildlife Action Plan and has previously reviewed it. Prior to yearly vegetation management activities, TVA would identify records for rare species, important natural communities, natural areas, and/or conservation/managed areas within the proposed project boundary by consulting the TVA Regional Natural Heritage database. New records are routinely added to this database by TVA through coordination with the state heritage programs and the USFWS, as well as through findings by TVA surveys. TVA would consult with the USFWS as appropriate when federally listed species could be potentially affected by the proposed project. Guidance is provided by TVA environmental compliance staff to TVA vegetation management staff and contractors through the O-SAR process. This guidance includes avoidance and minimization measures designed to protect rare, threatened and endangered species, important natural communities, natural areas, and/or conservation/managed areas.

Comment: "We recommend that all tree removal and ground clearing adhere to a time of year restriction protective of resident and migratory songbird nesting from March 15 through August 15 of any year. We recommend coordination with the USFWS regarding potential impacts upon federally Threatened northern long-eared bats associated with tree removal." *(Commenter: A. Ewing – Virginia Department of Game & Inland Fisheries)*

Response: Although a summer mowing prohibition was recommended in PEIS Sections 4.2.2.1 and 4.2.2.5, logistics of maintaining a 110,752-acre system without summer mowing would be problematic. However, summer mowing would be minimized due to a low percent of use and extended maintenance schedules. Under TVA's preferred alternative, Alternative C, mechanical methods like mowing account for only about six percent of floor work. In addition, ROW segments are maintained on a 3-year rotation with only a third of TVA's ROW sectors receiving treatment in a given year, although maintenance frequencies may be adjusted based on field conditions.

In consultation with the USFWS, TVA prepared a programmatic Biological Assessment (BA) that evaluated impacts of 96 TVA routine activities on four species of federally listed bats present in the TVA Power Service Area. TVA's programmatic consultation was completed in April 2018 and will be carried out over a 20-year term. As a component of the BA, TVA committed to implementing conservation measures to avoid and minimize impacts associated with routine actions, as well as to continue conducting conservation measures that may benefit or promote the recovery of the Indiana bat, northern long-eared bat, gray bat, and Virginia big-eared bat.

Comment: "We recommend that the applicant avoid and minimize impacts to undisturbed forest, wetlands, and streams to the fullest extent practicable. We recommend maintaining undisturbed naturally vegetated buffers of at least 100 feet in width around all on-site wetlands and on both sides of all perennial and intermittent streams." *(Commenter: A. Ewing – Virginia Department of Game & Inland Fisheries)*

Response: As described in TVA's "Guide for Environmental Protection and Best Management Practices for TVA Construction and Maintenance Activities," TVA uses a minimum buffer zone of 50 feet for both perennial and intermittent streams. This buffer zone may increase depending on the watercourse, primary use of the water resource, topography, other physical barriers, and sensitivity of the aquatic resources within the waterbody. For example, the buffer zone width increases 20 feet for each 10 percent increase in site slope up to 170 feet (on each side). Federal, state, and local requirements are implemented when they are more restrictive than TVA's guidelines. TVA' s desired end-state condition is a mix of herbaceous and low-growing shrub species that is compatible with the safe and reliable operation of the transmission line system. BMPs for transmission line rights-of-way can be found on TVA's website at https://www.tva.com/Energy/Transmission-System/Transmission-System-Projects.

Comment: "This project is located within 2 miles of a documented occurrence of a state or federal threatened or endangered plant or insect species and/or other Natural Heritage coordination species. Therefore, we recommend coordination with VDCR-DNH regarding the protection of these resources." *(Commenter: A. Ewing – Virginia Department of Game & Inland Fisheries)*

Response: Comment noted. Prior to yearly vegetation management activities, TVA would identify records for rare species, important natural communities, natural areas, and/or conservation/managed areas within the proposed project boundary by consulting the TVA Regional Natural Heritage database. New records are routinely added to this database by TVA through coordination with the state heritage programs and the USFWS, as well as through findings by TVA surveys. TVA would consult with the USFWS as appropriate when federally listed species could be potentially affected by the proposed project. Likewise, Virginia Department of Game & Inland Fisheries (VDGIF) would be consulted should state-listed species be identified. Guidance is provided by TVA environmental compliance staff to TVA vegetation management staff and contractors through the O-SAR process. This guidance includes avoidance and minimization measures designed to protect rare, threatened and endangered species, important natural communities, natural areas, and/or conservation/managed areas.

Comment: "We recommend close coordination with VDGIF staff in the region, located in our Marion and Blacksburg's office, to ensure appropriate consideration of listed species and designated resources under our jurisdiction, including threatened and endangered wildlife and the habitats that support them. Contact information can be found at the following: https://www.dgif.virginia.gov/about/offices/." *(Commenter: A. Ewing – Virginia Department of Game & Inland Fisheries)*

Response: Comment noted. See previous response for more information.

2.5.11 Department of Interior

Comment: "The U.S. Department of the Interior (Department) has reviewed the Draft Environmental Impact Statement (DEIS) for the Transmission System Vegetation Management Program. Our comments and concerns pertaining to this action are being addressed during the on-going Section 7 consultation process. We have no further comments at this time. Thank you for the opportunity to review and comment on this DEIS. *(Commenter: J. Stanley – Department of Interior)*

Response: Comment noted.

2.6 Cooperating Agency Comments

2.6.1 National Park Service

2.6.1.1 National Park Service General Comments

General Comment 1: "Overall, the NPS is pleased with the preliminary Draft EIS references to the NPS and ROWs that cross NPS lands. However, it is important the EIS recognize that the NPS does not distinguish units of the National Park System as being 'natural areas' or 'recreation areas' as distinct from 'national parks'. Rather, as required by the General Authorities Act of 1970, units of the National Park System are treated equally and guided by the same NPS resource protection laws and regulations. As such, the EIS's groupings are of concern, especially since NPS units usually contain outstanding natural, recreational, and cultural resources that are central to their national significance and inclusion by federal law as units of the National Park System. The NPS recommends that the Draft EIS identify a general category for units of the National Park System or other ways to address this concern."

Response: TVA edited the PEIS in response to this comment. References to National Parks have been removed from the discussion of Recreational Resources. The PEIS includes an analysis of potential impacts to Natural Areas and Parks and Recreation. The PEIS defines Natural Areas to include ecologically significant sites and managed areas. Managed areas encompass a broad range of lands and typically include federal, state, or local park lands, national or state forests, wilderness areas, scenic areas, conservation easements, wildlife management areas, recreational areas, greenways, trails, Nationwide Rivers Inventory (NRI) streams, and designated Wild and Scenic Rivers. These areas consist of lands held in public ownership that are managed by an entity (e.g., TVA, NPS, USFS, state or county, or land trust) to protect and maintain certain ecological, cultural and/or recreational features. Accordingly, the discussion of NPS units crossed by TVA's transmission line ROW is included in this section.

General Comment 2: "The NPS supports TVA's effort to better conserve cultural resources through increased collaboration with stakeholders in maintaining ROWs. To that end, the NPS proposes to work with TVA to help ensure that data in TVA's Heritage Database is current and reflected in the Draft EIS. Additionally, the NPS would like to work with TVA to identify relevant sensitive cultural resource locations that would be needed for TVA's Office-level Sensitive Area Review (O-SAR) process in order to identify management options or develop appropriate mitigation measures in the Draft EIS. Identifying site-specific cultural resource issues at TVA ROWs within each park to inform maintenance will help reduce potential unintended damage to sensitive cultural resources."

Response: TVA thanks NPS for its offer and would work with the NPS to incorporate this information as part of its stepwise process to adhere to site specific agreements or regulations developed for National Parks included in the study area of the PEIS.

General Comment 3: "NPS has the responsibility for meeting federal laws and policies on NPS lands. As such, the NPS appreciates the inclusion of references in the preliminary draft EIS that acknowledge that transmission line vegetation management on NPS lands would be determined by any governing agency agreements, memorandum of agreement, and applicable law. Additionally, the NPS agrees with statements that a management plan or similar document from the NPS, or other land management agency, determines what activities are compatible with the intended use of their land. The NPS also thanks TVA for referencing the NPS's interest in developing a formal agreement that would guide management of ROWs on NPS lands. The NPS continues to have internal discussions on how a programmatic general agreement could address expectations for maintenance of TVA ROWs on NPS lands. Regardless of whether a general agreement is completed, NPS recommends that TVA continue to work with individual parks to ensure site-specific authorizations are in place as needed."

Response: TVA would continue to work with the NPS to ensure vegetation management of TVA's ROW would be compatible with all federal laws, policies, and site-specific plans of individual parks. The PEIS recognizes that vegetation management on NPS lands would follow guidelines established for that particular unit (Section 3.1 and 4.12). As this is a programmatic document, site-specific restrictions are not included.

General Comment 4: "Following completion of the EIS, park-specific agreements should be established and/or updated between TVA and park Superintendents that address specific issues, including protection of cultural resources, protection of state and federally listed species and habitats, and other relevant issues. Agreements should also specify access routes to TVA ROWs, access route gates, and route maintenance plans. Problems with ROW access in the past include contractors using inappropriate and unapproved backcountry routes that create social trails and access routes inconsistent with park management plans. This type of activity can damage NPS resources and pose a potential danger to park visitors. Furthermore, unauthorized resource damage could result in monetary damages and penalties. Where not already in place, the NPS proposes to work with TVA to identify and map future access routes and memorialize them in park-specific agreements."

Response: Although vegetation management along access roads was not addressed in the PEIS, TVA would continue to work with the NPS to ensure vegetation management of TVA's ROW would be compatible with site-specific plans for individual parks. For example, a site-specific NEPA review that tiers off this PEIS can be developed that addresses access routes.

General Comment 5: "The NPS's understanding is that the alternatives presented in the preliminary draft EIS would not be applicable to NPS land due to NPS land ownership and other agreements. Nonetheless, there are features of Alternative D that the NPS finds highly advantageous, especially for ROWs in proximity to NPS units. Where appropriate, having feathered edges would reduce the adverse impacts that ROWs have on habitat fragmentation and allow those areas to serve as important corridors for pollinators and wildlife. The NPS sees tremendous value in having additional staff botanists accompany each work crew to assess condition and prescribe selective treatment based on compatible species composition. Doing so will help maximize environmental contributions of TVA's ROWs and support TVA’s stated interest in managing for pollinator and wildlife habitat.”

Response: TVA agrees with NPS’s understanding of the applicability of alternatives on NPS lands. TVA would continue to work with the NPS to ensure vegetation management of TVA’s ROW would be compatible with all federal laws, policies, and site-specific plans of individual parks. The PEIS recognizes that vegetation management on NPS lands would follow guidelines established for that particular unit (Section 3.1 and 4.12). As this is a programmatic document, site-specific restrictions are not included. Under Alternative D, management of the floor is intended to result in a meadow-like condition similar to Alternative C. Notably however, this alternative would allow for the development of a compatible border zone in which herbs, shrubs and compatible trees are allowed to grow. However, Alternative C emerged as TVA’s preferred alternative due to the additional staff, work hours, and associated costs of implementing Alternative D over Alternative C (see PEIS Section 4.23.4).

General Comment 6: “The NPS notes that Alternative C, which proposes to manage areas in a meadow-like end-state, is TVA’s preferred alternative. Because of the broader environmental benefits associated with Alternative D, the NPS requests that TVA consider a hybrid of the two alternatives. Under the hybrid approach, TVA would manage ROWs on environmentally sensitive lands and adjacent to NPS units in accordance with Alternative D. These environmentally managed ROWs would have fewer invasive species and provide a network of wildlife and pollinator corridors that would support numerous conservation goals, including those of the NPS.”

Response: TVA would continue to work with the NPS to ensure vegetation management of TVA’s ROW would be compatible with all federal laws, policies, and site-specific plans of individual parks. Refer to the PEIS Section 4.23.4 and the response to General Comment 5 from the NPS above regarding TVA’s selection of Alternative C as the preferred alternative.

2.6.1.2 National Park Service Specific Comments

Specific Comment 1: *(Summary, Table S-2, Cost)* “Not conducting a complete initial clearing and allowing landscapes that already meet conditions called for in this alternative could save money.”

Response: TVA would not clear landscapes that already meet conditions required to satisfy the need for the safe and reliable operation of transmission facilities while improving the effectiveness of vegetation management. However, TVA would clear all vegetation from landscapes that contain both compatible vegetation and incompatible vegetation.

Specific Comment 2: *(Table 2.1, column three (Disadvantages) line 2 under "Chainsaw, machete, brush hooks, axes, bush blades")* “How is handwork ‘more intrusive than herbicide treatment’?”

Response: Herbicides can be applied at a distance via boom sprayer, backpack sprayer, or aerial application. TVA has added text to the draft PEIS methods table to clarify “some” herbicide treatments (under manual methods) and "distance" herbicide treatments (under herbicide methods) are less intrusive than handwork.

Specific Comment 3: *(Table 2.1, under "Herbicide Spraying and Growth Regulators")* "Big South Fork NRRA may consider allowing cut-stump and wick application but prefer that no foliar or broadcast spraying be allowed."

Response: Comment noted. The PEIS recognizes that vegetation management on NPS lands would follow guidelines established for that particular unit (Section 3.1 and 4.12). As this is a programmatic document, site-specific restrictions are not included.

Specific Comment 4: *(Table 2.1, under "Spot, Localized, Ground-based Broadcast, and Aerial Broadcast Spraying-Aerial Sprayers")* "Big South Fork NRRA does not allow aerial spraying in the park."

Response: See above response to NPS Specific Comment 3*(Table 2.1, under "Herbicide Spraying and Growth Regulators")*.

Specific Comment 5: *(Table 2.1, under "Resprout or Growth Control - Backpack sprayers, wick applicators")* "Cut-stump, hack and squirt & wick application may be considered by Big South Fork NRRA. Use of growth regulators is not allowed in the park. NPS requires that any herbicides proposed for use must be approved through the NPS Pesticide Use Proposal System."

Response: See above response to NPS Specific Comment 3 *(Table 2.1, under "Herbicide Spraying and Growth Regulators")*.

Specific Comment 6: *(2.1.3, paragraph 1, lines 8-9)* "The EIS includes a statement that, 'herbicides would be applied under the supervision of a licensed applicator in accordance with applicable state and federal laws and regulations': Will licensed supervisor be on site? Big South Fork NRRA would prefer that at least one on-site applicator will be required to be either licensed or certified to spray in rights-of-way."

Response: Licensed applicators are required to be onsite per state licensing requirements. Additional details have been added to the PEIS.

Specific Comment 7: *(2.1.3, paragraph 1, lines 9-10)* "Specific to 'only TVA-approved herbicides', NPS requires that any herbicides proposed for use must be approved through the NPS Pesticide Use Proposal System."

Response: Text has been added to the final PEIS as follows: "Additionally, only TVA-approved herbicides registered with the U.S. Environmental Protection Agency (EPA) or, those approved by another government agency (e.g., NPS or USFS), as appropriate, are used and applied in accordance with manufacturers' label directions".

Specific Comment 8: *(Table 2-3)* "Pre-emergent/bare ground applications are not currently allowed in Big South Fork NRRA. NPS has concerns about bare ground treatments based on drift issues observed at towers in the park in past years."

Response: See above response to NPS Specific Comment 3 *(Table 2.1, under "Herbicide Spraying and Growth Regulators")*.

Specific Comment 9: *(Table 2-4)* “Big South Fork NRRA does not currently allow the use of growth regulators in the park.”

Response: See above response to NPS Specific Comment 3 *(Table 2.1, under "Herbicide Spraying and Growth Regulators")*.

Specific Comment 10: *(Section 2.1.3, second to last paragraph)* “Specific to the ‘Aerial Broadcast’ application form, NPS does not allow aerial broadcast spraying in the park.”

Response: See above response to NPS Specific Comment 3 *(Table 2.1, under "Herbicide Spraying and Growth Regulators")*.

Specific Comment 11: *(Table 3.1, lines 3-4)* “Big South Fork NRRA policy imposes restrictions (buffers and selected herbicides) on herbicide use near streams that are known to contain T&E aquatic species.”

Response: See above response to NPS Specific Comment 3 *(Table 2.1, under "Herbicide Spraying and Growth Regulators")*.

Specific Comment 12: *(3.1.1 #7a)* “Please confirm whether the evaluation would be conducted in conjunction with the land management Agency.”

Response: This comment refers to Step 7 (Determine re-inspection requirements) in TVA’s stepwise vegetation management process. Additional detail regarding this step has been included in the EIS. TVA will make all efforts to coordinate with relevant land management agencies when evaluating whether vegetation treatments and mitigation measures are working properly on public lands, TVA will make all efforts to coordinate with the relevant land management agency.

Specific Comment 13: *(3.1.2)* “Cultural resources should be included as a Sensitive Resource Category and is missing from Table 3-1- Elements of TVA’s Office-Sensitive Area Review Database.”

Response: Reviews regarding impacts to cultural resources would be governed by the stipulations of the PA that was developed in consultation with the relevant SHPOs and federally recognized Indian tribes with an interest in the region. For vegetation management activities not covered by the PA or in the event that TVA does not have an executed PA with a particular SHPO, TVA would follow the Section 106 process for specific undertakings. The O-SAR process addressed in the document would be used for review of natural resources. TVA has discussed with NPS the importance of sharing cultural resources data.

Specific Comment 14: *(3.1.2)* “There needs to be a park-specific review of these data before the TVA personnel staff have ‘certainty and flexibility’.”

Response: As part of the O-SAR process, TVA biologists review all portions of all transmission lines using a suite of remote sensed data. These data include site-specific threatened and endangered (T&E) species information from TVA and state natural heritage databases as well as publicly available information such as aerial imagery, topographic maps, soils data, and National Wetlands Inventory data. This level of analysis is more refined than a park-specific review and attempts to define subsets of any given ROW where sensitive resources may be present. Local resource managers would also be contacted before on the ground work occurs, so NPS personnel can alert TVA to any known sensitive resources located near ROW before work commences.

Specific Comment 15: *(3.1.2.2)* “Pesticide needs to be approved for use in each park prior to application, so coordination with park staff is essential.”

Response: As defined by EPA, pesticides incorporate both herbicides and insecticides. Herbicides are used to kill undesirable plants, while insecticides are a type of pesticide to target insects. TVA only uses herbicides in its vegetation management. All herbicides used by TVA are EPA-approved and are applied according to label restrictions. Currently, TVA is coordinating with local land managers before applying herbicide on NPS lands. This coordination is mandated by the O-SAR process.

Specific Comment 16: *(3.1.2.2)* “In any cases involving the possible use of herbicides in Big South Fork NRRA, the NPS prefers that park personnel be involved in the decision-making process along with TVA.”

Response: Currently, TVA is coordinating with local land managers before applying herbicide on NPS lands. This coordination is mandated by the O-SAR process.

Specific Comment 17: *(3.1.2 .3 and 4.5.2.5)* “Recommend including in both sections: ‘A National Pollutant Discharge Elimination System permit is required for aquatic pesticide use; permit requirements vary by state (refer to https://www.epa.gov/npdes)’.”

Response: The suggested text regarding National Pollutant Discharge Elimination System permits has been added to Section 4.5.2.5 of the final PEIS. Please note permits are also addressed in Sections 1.8 and 4.4.1.1. No additional text was added to Section 3.1.2.3, as this section discusses the O-SAR database. All necessary permits would be obtained as part of TVA’s stepwise vegetation management process.

Specific Comment 18: *(3.1.2.5)* “Question: Do all NPS lands fall into this class as natural areas and there is a three-week window? If that includes the pesticide use proposal review, three weeks is a small window.”

Response: All NPS lands are included as Natural Areas, but the Natural Areas designation in O-SAR includes a much broader range of managed areas than just NPS units. The three-week window (before conducting initial maintenance activities on the ROW) is sufficient for most types of natural areas. TVA ROW Foresters overseeing vegetation management across the TVA Power Service Area are aware of the policies of local NPS units on herbicide application on ROW. TVA would not apply herbicides to NPS lands without approval of the local land managers but would seek to work with parks to develop cost-effective vegetation management strategies that maintain the reliability of the transmission system while protecting sensitive resources.

Specific Comment 19: *(3.1.2.6)* “Class 1 list should include cultural resources. For NPS lands, we would have to provide those locations, which are restricted data, so that may need to be a separate class as part of this review. A few paragraphs down there is mention of the PA, but as part of this cyclic review process, it is not clear how those two tie together.”

Response: Reviews regarding impacts to cultural resources would be governed by the stipulations of the PA developed in consultation with the relevant SHPOs and federally recognized tribes. For vegetation management activities not covered by the PA or in the event that TVA does not have an executed PA with a particular SHPO, TVA would follow the Section 106 process for specific undertakings. Reviews of regarding impacts to cultural resources would not be governed by the O-SAR process that is addressed in the document for review of natural resources. TVA has discussed with NPS the importance of sharing cultural resources data.

Specific Comment 20: *(4.1.2.4)* “NPS supports restoration efforts; however, NPS is required to plant only native species. TVA will need to consult with NPS on a case-by-case basis and use only NPS-approved plant materials.”

Response: See above response to NPS Specific Comment 3 *(Table 2.1, under "Herbicide Spraying and Growth Regulators")*.

Specific Comment 21: *(4.12.1)* “Here and throughout the document, the EIS states that TVA, NPS, USFS, state, county, and land trust lands are ‘Natural Areas’ held in public ownership to ‘protect and maintain certain ecological and/or recreational features. However, lands that fall under the ‘Natural Areas’ category also protect and maintain cultural resources as well. As such, we recommend referencing cultural resources whenever there is discussion of ‘Natural Areas’.”

Response: Text of the description of Natural Areas in the PEIS was edited as suggested.

Specific Comment 22: *(4.13.1 Paragraph 3)* “Please change ‘regulations’ to ‘regulations and policies’.”

Response: Edits made as suggested. Please note text has been incorporated into the discussion of Natural Areas.

Specific Comment 23: *(4.23.1 Paragraph 1 following first set of bullets)* “Please change second sentence to ‘For large public lands (NPS, USFS etc.), methods would be subject to the terms of any special agreements and authorizations with each agency’.”

Response: Edits made as suggested.

Specific Comment 24: *(4.23.4)* “NPS strongly supports Alternative D and the requirement for, ‘additional staff botanist to accompany each work crew to assess condition and prescribe selective treatment based on compatible species composition’. Assuming these botanists would consult with NPS and ideally a vegetation management plan, this would significantly reduce unauthorized application of herbicides and other treatment actions undertaken by TVA contractors on NPS lands.”

Response: Comment noted.

2.6.2 U.S. Forest Service

2.6.2.1 U.S. Forest Service General Comments

General Comment 1: “DEIS should clearly reflect that vegetation management plans that are a requirement of existing Forest Service Special Use Permits (SUPs) will not be changed by the Final Record of Decision for the EIS. Any changes to the terms of existing SUPs will need site specific review and approval by the Forest Service."

Response: The PEIS states that vegetation management on state and federal land must adhere to existing Land and Resource Management Plans, Special Use Permits, as well as programmatic or related agreements.

General Comment 2: "DEIS should acknowledge that TVA vegetation management activities will be consistent with applicable Forest Service Land and Resource Management Plans."

Response: As stated in the description of TVA's stepwise vegetation management process (Section 3.1.1 of the PEIS), TVA would address ROW vegetation maintenance within special-use lands associated with NPS, USFS, tribal lands, or other special-use/conservation lands in accordance with any existing agreements or regulations.

General Comment 3: "DEIS should recognize the cultural significance of the Trail of Tears National Historic Trail/Unicoi Turnpike and the need for collaboration between TVA, the Forest Service, and consulting tribes to address Tribal concerns related to vegetation management for those portions of the TVA transmission ROWs that impact the Trail of Tears/Unicoi Turnpike Corridor."

Response: TVA added the following text to the PEIS: "the Congressionally designated Trail of Tears National Historic Trail is a prominent cultural resource within the analysis area. This is a transportation route of great antiquity and a landscape of great historical, cultural, and spiritual significance to the consulting federally recognized Indian tribes and local communities. Analysis indicates that there are approximately 278 incidences where the Trail of Tears crosses TVA's transmission ROW. In some locations intact, original segments of this part of this trail may be present such as the Unicoi Turnpike or Overhill Path, located in southeastern Tennessee, western North Carolina and northern Georgia."

2.6.2.1 U.S. Forest Service Specific Comments

Specific Comment 1: *(Figure 1)* "Areas involved in this PEIS are not viewable – it is impossible to zoom in to actually see affected areas and line locations in each study area."

Response: Comment noted. However, the EIS is programmatic and adopts a regional perspective, and it presents impacts in a comparative manner. The figure in the PEIS illustrates the entire area where TVA maintains ROW or could acquire and build transmission line within the newly acquired ROW. It is not intended to identify specific line locations.

Specific Comment 2: *(Summary)* "What type of herbicide application? Ground-based and aerial? Table S-1 is first place aerial application is addressed."

Response: Comment noted. A description of herbicide application methods is provided in Chapter 2 of the PEIS. The Summary section provides an identification of key elements evaluated in that section.

Specific Comment 3: *(Summary)* "The O-SAR process is cited throughout the document as a way to mitigate effects; yet a description of the process wasn't provided for review."

Response: Comment noted. The O-SAR process is discussed in detail in Section 3.12 of the PEIS.

Specific Comment 4: *(Summary of Impacts)* “In the bulleted list include ‘periodic intrusions into the immediate view shed and across portions of original route of the Trail of Tears National Historic Trail and Unicoi Turnpike Trail for vegetation maintenance activities’”.

This is about more than just potential ground disturbance. Portions of the Unicoi Turnpike in TN and NC, an ancient and often deeply entrenched trail used for thousands of years, was the route used for the 1836-1838 Removal of Cherokee and Creek peoples and those enslaved African Americans owned by some Tribal members at that time (the Trail of Tears, a Congressionally designated National Historic Trail). In addition, in 2016, the USFS was formally notified by two of the federally recognized Cherokee tribes and verbally notified by several tribes that compose the Creek Confederacy of tribes that those portions of the Trail of Tears/Unicoi Turnpike located on federally owned lands is a Native American Sacred Site per Executive Order 13007. There are Tribal concerns related to more than just immediate potential physical impact or ground disturbance. The USFS is currently conducting a cultural landscape inventory and consulting with the three federally recognized Cherokee tribes and seven tribes of the Creek Confederacy (those for which we have archival documentation of use of this route for the removal of lineal descendants) regarding long-term, multiple resource management of national forest system lands within ½ mile either side of the Trail of Tears/Unicoi Turnpike (including utility ROW corridors) in order to protect and enhance this resource as much as practicable. The USFS recently initiated discussions with TVA regarding this situation and developing a collaborative approach to meeting TVA’s requirements while improving the visual quality of the trail where it crosses or underlies the ROW.

The USFS recommends that TVA, USFS, and consulting tribes work together to develop a practicable, low-growing native vegetation restoration plan (including plants of traditional cultural importance) and long term vegetation management plan for those portions of the TVA utility corridor that are visible within the one mile wide Trail of Tears/Unicoi Turnpike Corridor.”

Response: TVA added the following text to the discussion of impacts of management alternatives in Chapter 4.23 of the PEIS: “periodic intrusions into the immediate viewshed of sacred sites.”

TVA is committed to working with USFS and consulting tribes to develop a vegetation plan in those portions of the TVA utility corridor that fall within the Trail of Tears.

Specific Comment 5: *(Summary of Impacts)* Incorporate suggested changes to include references to Native American Sacred sites and the congressionally designed national Historic Trail to Table S-1, Summary of Impacts Associated with Vegetation Management Methods in the summaries related to parks, cultural resources, noise and visual resources.

Response: TVA added the following text to PEIS Table S-1 – Cultural “include with aboveground historic remains and sacred sites. Note these edits were carried over to the associated table (Table 3-3) in the body of the PEIS. Visual impacts on cultural resources are assessed in the cultural resources section and therefore are not included in the summary of visual impacts. TVA addressed the suggested revisions related to the Trail of Tears National Historic Trail in the summary of impacts related to Management Alternatives

(Table S-2 and 4-24). TVA does not believe that temporary noise associated with methods used to manage vegetation would impact sacred sites.

Specific Comment 6: *(Table S.2)* Incorporate the suggested changes detailed in previous comment above in the Summary Table (Table S-2) Summary and Comparison of Management Alternatives by Resource Area, to the discussion of cultural resources, parks and visual resources.

Response: The following has been added to the summary of impacts of management alternatives to cultural resources: Provides flexibility in the improvement and management of visual quality of historic properties such as the Congressionally designated Trail of Tears National Historic Trail. Note, this change was carried over to the associated table (Table 4-24) in the body of the PEIS.

Specific Comment 7: *(Table S.1)* "Burning including pile burning is found in Table S-1 but nowhere before that as part of suite of treatments (floor treatments?). Is restoration of impacted sites with vegetation that is compatible a typical practice (connected action)? What about maintaining road access that may be within the ROW (connected action) – is mentioned in section 2.3."

Response: Pile burning is discussed in Section 2.2.3 – Other methods for Debris Management and a summary of this method is included in Table S-1. Methods of restoration are described in Section 2.3.1 and the advantages and disadvantages of each method are identified. Impacts of these methods are described in Chapter 4, are integrated as part of the management alternatives considered, and are not considered to be a separate connected action. Specific restoration measures as may be applicable for site-specific actions would be identified in future site-specific reviews.

The EIS programmatically address vegetation maintenance within the TVA ROW, which would include access roads located within the ROW. Methods used to maintain existing access roads are identified in Chapter 2 and impacts of these methods are identified in Chapter 4.

Specific Comment 8: *(Section 1.7)* "A site specific EIS for aerial application of pesticides on Land Between the Lakes National Recreation Area, as required by Forest Service Handbook 1909.15. (36 CFR 220.5(a))."

Response: See responses to U.S. Forest Service General Comments 1 and 2.

Specific Comment 9: *(Section 1.9 and Appendix B)* "Coordinate the integrated sensitive area review process with Land Between the Lakes National Recreation Area of the USDA Forest Service. This includes: 1) review of the design criteria, sometimes known as best management practices, in the Land Between the Lakes Area Plan dated December, 2004, 2) incorporation of the conservation measures in the biological opinion dated March 25, 2015 between Land Between the Lakes and the US Fish and Wildlife Service for Indiana and northern long-eared bats and Price's potato bean, 3) incorporation of the conservation measures in the biological opinion dated July 24, 2015 between the USDA Forest Service and the US Fish and Wildlife Service for northern long-eared bat, 4) review of sensitive species known as regional forester sensitive species or species of conservation concern as required by Forest Service Manual 2670, 5) programmatic agreement between Land Between the Lakes and the KY and TN state historic preservation offices, 6) Woodlands

Trace Scenic Highway Management Plan. Note: this applies to all sections within 3.1.2 and am not sure where to include it, at the beginning of the section on page 52 or the end on page 58."

Response: See responses to U.S. Forest Service General Comments 1 and 2.

Specific Comment 10: *(Table 2-1)* "Manual Removal- Disadvantages. Fifth bullet, 'Not effective...' The word 'noxious' is a legal term identifying those plants legally deemed problems by either the federal government or state government plant boards. This appears to target only those spp. which I'm sure is not the desire. Invasive plants or non-native invasive plants is more correct."

Response: TVA replaced the word "noxious" with "invasive" where appropriate throughout the document.

Specific Comment 11: *(Table 2-1)* "Spot, Localized, Ground-based and Aerial Broadcast. R8 Veg. Mgt. EIS allows for only helicopter application for ROW with certain stipulations. FSH 6709? Requires aerial plan, spill plan, pesticide treatment plan, etc."

Response: See responses to U.S. Forest Service General Comments 1 and 2.

Specific Comment 12: *(Section 2.1.1.2)* "Term 'noxious' weeds. See comment No. 10 on Table 2-1 page 20."

Response: See response to U.S. Forest Service Specific Comment 10.

Specific Comment 13: *(Section 2.1.1.2)* "Ground based Broadcast Herbicide Application. Use of noxious weeds in first paragraph. See comment No. 10 regarding same on p. 20."

Response: See response to U.S. Forest Service Specific Comment 10.

Specific Comment 14: *(Section 2.1.3.1.4)* "For aerial applications to FS ROW, helicopter application is the only aerial platform allowed. No fixed wing."

Response: See responses to U.S. Forest Service General Comments 1 and 2.

Specific Comment 15: *(Section 2.1.3.1.4)* "A site specific EIS for aerial application of pesticides on Land Between the Lakes National Recreation Area, as required by Forest Service Handbook 1909.15. (36 CFR 220.5(a))."

Response: See responses to U.S. Forest Service General Comments 1 and 2.

Specific Comment 16: *(Section 2.1.3.1.4)* "Adjuvants help to maintain large droplet sizes. The nozzles actually create the droplet sizes and help maintain a certain droplet size spectrum. The adjuvants prevent the droplets from evaporating or shearing into smaller particles.."

Response: TVA replaced "the use of adjuvants to enlarge the herbicide droplet size" to "the use of adjuvants to maintain herbicide droplet size".

Specific Comment 17: *(Section 2.3 – Restoration)* "The draft EIS described reseeding for restoration. Forest Service policy requires that no invasive species are used (FSM 2900) and first choice should always be native species (FSM 2070). The referenced 2017 Best Management Practices contains a native seed mix that (pg. 84) that would be appropriate, however, the permanent non-native crops may not (pg. 83). Each Forest maintains a list of invasive species. Site-specific vegetation plans would need to adhere to those policies."

Response: Comment noted. As noted in Chapter 3.1, TVA has developed a stepwise process incorporated under all of the proposed vegetation management alternatives to ensure that vegetation management proactively protects environmental resources, considers land use and land ownership, and enhances health and safety. Step 2 of that process includes the coordination with existing regulations related to vegetation maintenance on USFS land.

Specific Comment 18: *(Section 2.4.1)* "Chapter 2.4.1 says prescribed fire was eliminated from consideration yet page 58 includes impacts to T&E from prescribed fire"

Response: This section notes that the use of prescribed burning was eliminated as a method for controlling vegetation. However, as noted in Table 2-6, burning is retained as a means by which debris may be managed. Section 2.4.1 also notes that three routine activities identified in the programmatic BA could affect bat species. However, of these three activities, only tree removal could occur during vegetation management. The BA specifically notes that prescribed burning is limited to portions of TVA Reservoir Lands. Additional text has been added to the PEIS to help clarify.

Specific Comment 19: *(Table 2-9)* "Use of the word 'noxious' in the table (See comment No. 10). Recommend doing a word search in this document for 'noxious' and replace with something like invasive plants or non-native invasive plants."

Response: See response to U.S. Forest Service Specific Comment 10.

Specific Comment 20: *(Section 3.1.1)* "The Forest Service standards for SMZ's are more stringent. Please see Chattahoochee-Oconee National Forest Land and Resource Management Plan (LRMP) pg. 3-175 and 3-176. Ephemeral streams require a 25-foot buffer on each side."

Response: See responses to U.S. Forest Service Specific Comment 17 and U.S. Forest Service General Comments 1 and 2.

Specific Comment 21: *(Section 3.1.2)* "Coordinate the integrated sensitive area review process with Land Between the Lakes National Recreation Area of the USDA Forest Service. This includes: 1) review of the design criteria, sometimes known as best management practices, in the Land Between the Lakes Area Plan dated December, 2004, 3) list of acceptable herbicides and design criteria approved at Land Between the Lakes, 2) incorporation of the conservation measures in the biological opinion dated March 25, 2015 between Land Between the Lakes and the US Fish and Wildlife Service for Indiana and northern long-eared bats and Price's potato bean, 3) incorporation of the conservation measures in the biological opinion dated July 24, 2015 between the USDA Forest Service and the US Fish and Wildlife Service for northern long-eared bat, 4) review of sensitive species known as regional forester sensitive species or species of conservation concern as required by Forest Service Manual 2670, 5) programmatic agreement between Land Between the Lakes and the KY and TN state historic preservation offices 6) Woodlands Trace Scenic Highway Management Plan. Note: this applies to all sections within 3.1.2 and am not sure where to include it, at the beginning of the section on page 52 or the end on page 58.”

Response: Note: same comment as U.S. Forest Service Specific Comment 9.

Specific Comment 22: *(Table 3-1)* “The document uses a variety of terms to address rare plant species. Table 3-1 defines the information that is tracked in the Office-Sensitive Area Review Databases and for plants it includes locations (documented or potential) of federally or state-listed plant species or unique plant communities. However, section 3.1.2. discusses how the “class” designation is applied to protect rare species when federally or state-listed plants, or uniquely diverse plant communities are likely to occur. Forest Service also manages rare plants as Regional Forest Service sensitive or Species of Concern and individual forest may have locally rare species. Are the Forest Service designation considered under rare natural areas (pg. 58) or unique plant communities (pg. 56) or not yet considered?”

Response: The O-SAR process considers federally listed (or candidate) plants and plants tracked by individual state natural heritage programs that overlap the TVA Power Service Area. While TVA does not explicitly consider USFS species of concern, there is significant overlap between species that are tracked by state natural heritage programs and the USFS. USFS land is not automatically considered a unique plant community under O-SAR because that designation is reserved for lands with a unique assemblage of plant species, often following the convention of NatureServe associations. These are distinct plant communities that have been defined by ecologists who work in those systems; data on these communities is collected and curated by the global conservation organization NatureServe. However, USFS parcels would always be included as a Natural Area under O-SAR because those lands are managed for ecological and/or recreational purposes. Though it can depend on the type of managed area crossed by a given TVA ROW, many Natural Areas under O-SAR receive similar protections to ROW where listed species are thought to occur.

Specific Comment 23: *(Section 3.1.2.2)* “Management of plants requires coordination with the USDA Forest Service Threatened and Endangered Species Coordinator at Land Between the Lakes for protection the endangered species Price’s potato bean and potential habitat and other regionally sensitive species protected by the USDA Forest Service.”

Response: See responses to U.S. Forest Service Specific Comment 17.

Specific Comment 24: *(Table 3-3; Section on Cultural Resources)* “Alternative A – No Action add: ‘Adverse effects, specifically visual impacts, would continue to occur to the Trail of Tears National Historic Trail / Unicoi Turnpike unless a separate method is devised through Section 106 and Tribal consultation to minimize impacts.

Alternative B – Cyclic Based add: ‘Adverse visual impacts would continue to occur to the Trail of Tears National Historic Trail / Unicoi Turnpike unless a separate method is devised through Section 106 and Tribal consultation to minimize impacts.’

Alternative C – add: ‘Provides some flexibility in the improvement and management of visual quality of the Trail of Tears National Historic Trail / Unicoi Turnpike.’

Alternative D – add: ‘Provides the greatest flexibility in the improvement and management of visual quality of the Trail of Tears National Historic Trail / Unicoi Turnpike’.”

Response: Comment noted. TVA does not agree that Alternative A and B fits under the criteria of adverse effect but added the following text to Alternatives C and D: “Provides flexibility in the improvement and management of visual quality of historic properties such as the Congressionally designated Trail of Tears National Historic Trail.”

Specific Comment 25: (*Table 3-3; Section on Visual Resources)* “See above regarding impacts to cultural resources – specifically the Trail of Tears / Unicoi Turnpike (a Traditional Cultural Property).”

Response: Comment noted. Visual impacts to cultural resources are addressed in the discussion of cultural resources and are therefore not repeated in the discussion of impacts to visual resources.

Specific Comment 26: *(Section 3.5)* “Could not easily find the BMPs and mitigation that was used in effects tables that cite 2017a – A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities Revision 3-2107 (TVA 2017a) bring forward into an appendix for one-stop shopping? Mitigation for restoration? Mitigation for scenery? Not clear to me that the 2017 document is subject to being revised based on this decision. Is any edit to the 2017 practices off the table?”

Response: The BMP manual is too large to be included in this appendix. A hyperlink has been added to the text in the EIS in Chapter 3. In addition, a hyperlink to the document is included in Chapter 7 (Literature Cited). TVA does not plan to revise the BMP manual based on results of the PEIS. Revisions have been completed within the past few years.

Specific Comment 27: *(Section 4.1.1.6 – Invasive Species)* “The draft EIS describes treatment of invasive plant species in the right-of-way. Each Forest will maintain a list of high-priority species that should be maintained. Prevention measures were lacking from both the mitigation and 2017 Best Management Practices such as weed-free material when possible (except for seeds) or equipment washing. The Forest Service also has reporting requirements from approval through the use of Pesticide Use Proposals and pesticide spray records (FSM 2070, 2150) for any invasive plant control activity that occurs on Forest Service land.”

Response: As stated in Section 1.8, when specific actions are proposed on TVA transmission ROW, additional site-specific environmental reviews for these actions would be undertaken as necessary to address potential project-specific impacts.

Specific Comment 28: *(Section 4.5.2.5)* “Disturbed ground limits - The Forest standard FW-065 for bare ground coverage is: on all soils dedicated to maintaining forest cover, the organic layers, topsoil, and root mat will be left intact over at least 80% of the project or activity area (Chattahoochee-Oconee National Forest Land and Resource Management Plan LRMP pg. 2-22).”

Response: See responses to U.S. Forest Service Specific Comment 17 and U.S. Forest Service General Comments 1 and 2.

Specific Comment 29: *(Section 4.5.2.5)* "According to Forest standard FW-067 mitigation of bare soil exposure must take place prior to any suspension of project activity for 30 days or longer (Chattahoochee-Oconee National Forest Land and Resource Management Plan LRMP2-22)."

Response: See responses to U.S. Forest Service Specific Comment 17 and U.S. Forest Service General Comments 1 and 2.

Specific Comment 30: *(Section 4.10.2)* "In Table 4-19, I would disclose in the line for US Forest Service how many crossing and acres are by each state on National Forest lands. I would like to disclose to the public how many crossing and acres are in the Chattahoochee-Oconee NFs by county if possible. You can add a table with this specifics in the appendix."

Response: See Tables J-1 and J-2 in Appendix J "TVA ROW Crossings in U.S. Forest Service Lands".

Specific Comment 31: *(Section 4.10.2)* "In paragraph beginning with 'State and federal lands often have….' Add these specific policies to an appendix. Specifically, national forests each have Land and Resource Management Plans and at Land Between the Lakes National Recreation Area this plan is dated December 2004. The plans contain specific requirements for land and resource management as required by the National Forest Management Act. Or, in this section 4.10.2, refer to the coordination with federal and state agencies will be complete as described in section 3.1.2 and site specific effects will be disclosed as required by that coordination."

Response: TVA edited the text in Section 4.10.2 as follows: "State and federal lands often have specific policies governing land use and management by which other land users must adhere. As described in Section 3.1.2, additional reviews by appropriate agency staff is required prior to the implementation of vegetation management practices. Transmission line vegetation management on lands managed by the USFS, NPS, or other special use/conservation lands would be determined by any governing agency agreements, memoranda of agreement and applicable law".

Specific Comment 32: *(Section 4.12.1)* "Delete 'Kentucky State Wildlife Management Area' from The Land Between the Lakes National Recreation Area/Kentucky State Wildlife Management Area in the first sentence. Land Between the Lakes National Recreation Area is federal land managed by the USDA Forest Service, not by the states of KY or TN. If the intent is to name Land Between the Lakes in addition to state management areas in KY and TN, then reword the sentence to Land Between the Lakes National Recreation Area and adjoining Kentucky and Tennessee State Wildlife Management Areas to be clear that Land Between the Lakes is not a KY State Wildlife Management Area. Also, change the reference name in the Figure 4-7 to Land Between the Lakes National Recreation Area and adjoining state management areas."

Response: Edits made as suggested.

Specific Comment 33: *(Section 4.12.2.2.3)* "Add the following sentence from this section to pages 17 and 32 for clarity: 'Throughout natural areas, aerial herbicide application is not permissible due to the larger impact it would have on non-target, potentially sensitive plants and animals.' That would address the comment for a site specific EIS mentioned in this table for pages 17 and 32 above."

Response: Comment noted. See response to U.S. Forest Service Specific Comment 17.

Specific Comment 34: *(Section 4.12.2.5)* "Add the use of herbicides would be coordinated following the process in section 3.1.2."

Response: Comment noted. However, the section notes that mitigation measures are conducted in accordance with TVA's O-SAR process, which is described in Section 3.1.2. No change was made.

Specific Comment 35: *(Section 4.13.2.3)* "If aerial application of herbicide is not permissible in 'natural areas' such as Land Between the Lakes and other USDA forests, then there would be no risk of accidentally spraying a recreation user."

Response: Comment noted. See response to U.S. Forest Service Specific Comment 17.

Specific Comment 36: *(Section 4.14.1.2.2)* "Second paragraph a little more than half-way in: 'The Trail of Tears consisted of many routes and sub-routes that involved the removal of Native Americans from their ancestral homelands.' Add information: 'Intact, original segments of this part of this trail, also known as the Unicoi Turnpike or Overhill Path, are still present in southeastern TN, western NC and northern GA. This is a transportation route of great antiquity and a landscape of historical and cultural significance to the consulting tribes. Analysis indicates that there are approximately 278 incidences where the Trail of Tears crosses TVA's transmission ROW and [X] incidences where the original Unicoi Turnpike/Overhill Path/Trail of Tears crosses TVA's transmission ROW'."

Response: Text in the PEIS was edited as follows. "Analysis indicates that there are approximately 278 incidences where the Trail of Tears crosses TVA's transmission ROW. In some locations intact, original segments of this part of the trail may be present such as the Unicoi Turnpike or Overhill Path, located in southeastern Tennessee, western North Carolina, and northern Georgia. This is a transportation route of great antiquity and a landscape of historical and cultural significance to the consulting tribes."

Specific Comment 37: *(Section 4.14.2.1)* "Second sentence: 'As described above a range of cultural resources have the potential to be present within the transmission line ROW including prehistoric Native American archaeological sites, historic era archaeological sites, and TCPs, including intact original Unicoi Turnpike/Trail of Tears segment."

Response: Text in the PEIS was edited as suggested.

Specific Comment 38: *(Section 4.14.2.1)* "Regarding the statement that the potential adverse effect to TCPs from vegetation maintenance activities within the ROW is low – If the proposed selected alternative/decision is that the ROW vegetation within the mile-wide Unicoi Turnpike/Trail of Tears corridor on National Forest System lands will continue to have its current composition [mostly mowed down grasses and very short plants [8 to 10 inches tall]) and will continue to be maintained using the same equipment (bush hogs and mowers), then the effect will be adverse. There are Tribal cultural resource concerns related to more than just immediate potential physical impact or ground disturbance. The USFS recently initiated discussions with TVA regarding the development of a collaborative approach to meeting TVA's ROW management requirements while improving the visual quality of the trail where the Trail of Tears/Unicoi Turnpike, particularly original entrenched segments of it, cross or underlie the ROW.

The USFS recommends that TVA, USFS, and consulting tribes work together to develop a practicable, low-growing native vegetation restoration plan (including plants of traditional cultural importance) and long term vegetation management plan for those portions of the TVA utility ROW that are visible within the one mile wide Trail of Tears/Unicoi Turnpike Corridor, while allowing for the safe and reliable operation of the transmission line.

The USFS has resources, including access to Youth Conservation Crews (some made up of Tribal youth) who could assist with vegetation restoration and management activities on National Forest System lands within TVA's ROW at low cost."

Response: Comment noted. TVA is committed to working with USFS and consulting tribes to develop a vegetation plan in those portions of the TVA utility corridor that fall within the Trail of Tears.

Specific Comment 39: *(Section 4.14.2.2.1)* "However, cutting in areas containing above-ground resources such as standing historic structures, historic foundations, privies, historic wells, remains of historic cemeteries, and entrenched original historic trail segments, may also disturb these resources as thick vegetation can often adhere to these resources."

Response: Based on the comment, TVA changed the following text: "cutting in areas containing above-ground/surface resources such as standing historic structures, historic foundations, privies, historic wells, remains of historic cemeteries, and sacred sites, may also disturb these resources as thick vegetation can often adhere to these resources."

Specific Comment 40: *(Section 4.14.2.2.2)* "Mechanical methods for vegetation removal would involve the use of heavy machinery such as bull dozers, track hoes, mowers, brush hogs, and tree saws that have the potential to adversely impact cultural resources by disturbing cultural deposits, compaction, displacing soils, collapsing intact side walls of entrenched original segments of the Unicoi Turnpike/Trail of Tears, leaving areas subject to erosion, or mixing the soil layers. These effects may be exacerbated under wet soil conditions or in fragile soils such as sandy river levees and terraces. Maneuvering heavy machinery within the transmission line ROW has the potential to disturb sensitive above-ground historic resources if present, for example above-ground historic structural remains, cemetery components, entrenched historic trails, and stone mounds."

Response: Based on the comment, TVA added the following text: "entrenched historic trails"; "collapsing intact side walls"; and "is covered in displacing soils".

Specific Comment 41: *(Section 4.14.2.2.3)* "Broadcast and aerial spray, which is rarely used, has the potential to affect cultural resources, including culturally significant and traditionally used native plants found within TCPs in TVAs ROW, should they be present."

Response: Edits made as suggested.

Specific Comment 42: *(Section 4.14.2.6)* "At the end of the paragraph, add the following: 'TVA has initiated discussions with the USFS and consulting tribes to develop a practicable, low-growing vegetation restoration and management plan for those portions of the TVA ROW that are visible within the one mile wide Trail of Tears/Unicoi Turnpike Corridor on National Forest System lands'."

Response: Based on the comment, TVA added the following text: “TVA and the USFS recently initiated discussions with each other and the consulting tribes regarding the development of a collaborative approach to meeting TVA’s ROW management requirements for the safe and reliable operation of the transmission line, while improving the visual quality of the Trail of Tears National Historic Trail particularly the original entrenched segments that cross or underlie a TVA transmission ROW.”

Specific Comment 43: *(Section 4.14.2.6)* “Thousands of archaeological and historic resources are present on Land Between the Lakes National Recreation Area. Some of these have been surveyed and some are known in records with the USDA Forest Service. Land Between the Lakes has a programmatic agreement with the Advisory Council on Historic Preservation, the TN and KY state historic preservation officers, federally recognized tribes. Therefore, any transmission work needs to be coordinated as part of the process outlined in section 3.1.2 to avoid, mitigate, or documents effects to heritage resources. Also, coordination with descendants of families connected with some of these resources is often necessary and USDA Forest Service Land Between the Lakes archeologist maintains the contacts with family descendants.”

Response: Comment noted. See response to General Comment 2.

Specific Comment 44: *(Section 4.15.1)* “In the affected environment, add equestrian trails and hike/bike trails cross the corridor at Land Between the Lakes National Recreation Area. Then address effects to visuals of recreation users as part of the analysis.”

Response: Visual impacts associated with methods of vegetation control are discussed on a broad, programmatic basis. As stated in Section 1.8, when specific actions are proposed on TVA transmission ROW additional environmental reviews for these actions would be undertaken as necessary to address potential project-specific impacts.

Specific Comment 45: *(Section 4.15.1)* “Two sections of the corridor pass along the Woodland Trace Scenic Byway in Land Between the Lakes National Recreation Area. Add this to the affected environment. The effects to visuals along the scenic byway needs to be considered in the visual analysis. Scenic driving is one of the top recreation uses at Land Between the Lakes National Recreation Area so any short term effect to visuals directly affects recreation.”

Response: See response to U.S. Forest Service Specific Comment 44.

Specific Comment 46: *(Section 4.15.1)* “Handbook for Scenery Management, Agriculture Handbook Number 701 (USFS 1995) is cited on page 195 but it is not mentioned in Chapter 7.0 Literature Cited.”

Response: The text was cited in Section 4.15.1 as (USDA 1995) and listed in Chapter 7 as ‘U.S. Department of Agriculture, Forest Service. 1995. Landscape Aesthetics. A Handbook for Scenery Management. Agriculture Handbook Number 701’.

Specific Comment 47: *(Section 4.15.1)* “At the end of the section, add the following: ‘As mentioned in the cultural resources section, the Congressionally designated Trail of Tears National Historic Trail is a prominent cultural resource within the analysis area where associated visual resources are important. Intact, original segments of this part of this trail, also known as the Unicoi Turnpike or Overhill Path, are still present in southeastern TN, western NC and northern GA. This is a transportation route of great antiquity and a landscape of historical and cultural significance to the consulting tribes and local communities. Analysis indicates that there are approximately 278 incidences where the Trail of Tears crosses TVA's transmission ROW and [X] incidences where the original Unicoi Turnpike/Overhill Path/Trail of Tears crosses TVA's transmission ROW'."

Response: Text was edited as follows: "Analysis indicates that there are approximately 278 incidences where the Trail of Tears crosses TVA's transmission ROW. In some locations intact, original segments of this part of the trail may be present such as the Unicoi Turnpike or Overhill Path, located in southeastern Tennessee, western North Carolina, and northern Georgia. This is a transportation route of great antiquity and a landscape of historical and cultural significance to the consulting tribes and local communities."

Specific Comment 48: *(Section 4.15.2)* "Could you add a separate section just for the Trail of Tears/Unicoi Turnpike mile-wide corridor - - even if only for applicability on federal lands or National Forest System lands? Here is some suggested text: TVA and the USFS recently initiated discussions with each other and the consulting tribes regarding the development of a collaborative approach to meeting TVA's ROW management requirements for the safe and reliable operation of the transmission line, while improving the visual quality of the Trail of Tears National Historic Trail / Unicoi Turnpike mile-wide corridor where the trail, particularly original entrenched segments of it, cross or underlie a TVA transmission ROW."

Response: Edits made to section 4.14.2.5 as suggested.

Specific Comment 49: *(Section 4.16.2.3)* "Add transmission work will be coordinated as part of the process outlined in section 3.1.2 with Land Between the Lakes National Recreation Area to protect health and safety of recreation users during recreation special events that might be planned for the transmission work area such as off road and trail events or quota hunts."

Response: Comment noted. See response to U.S. Forest Service Specific Comment 17.

Specific Comment 50: *(Section 4.17.2.1)* "Any accidental spill will be reported to the landowner in addition to the appropriate regulatory agency."

Response: Text was added to the last paragraph of general Impacts.

Specific Comment 51: *(Section 4.18.1)* "Some of the access roadways also provide access to active family cemeteries in Land Between the Lakes National Recreation Area. Family reunions and funerals occur at these cemeteries. Therefore, any transmission work needs to be coordinated as part of the process outlined in section 3.1.2 to prevent conflicts with family descendants, as described under the comment for page 195 in this table above."

Response: Based on the comment, TVA edited the text as follows: "Some roadways are within lands managed by other Federal agencies such as the USFS or NPS and as such access may require special authorization or coordination with these agencies that would occur as part of TVA's stepwise vegetation management process described in Section 3.1."

Specific Comment 52: *(Section 4.18.1)* "Part of the corridor passes along the Woodlands Trace Scenic Byway in Land Between the Lakes National Recreation Area so impacts to the vegetation along the highway needs to be kept to a minimum to maintain the scenic integrity of the highway.”

Response: Comment noted. See responses to U.S. Forest Service Specific Comments 51 and 17.

Specific Comment 53: *(Table 4-24)* “’Potential impact…’ This should not occur. Pesticide mixing and loading should not be performed in or near groundwater. There should be BMPs in place to mitigate.”

Response: Comment noted. BMPs are referenced in the summary table. The text further explains TVA practices that avoid or minimize impacts to groundwater.

Specific Comment 54: *(Table 4-24)* “Public and worker safety: Does ‘use conditions’ mean ‘application methods’? If there will be backpack treatments, these types of treatments expose workers more than any other application method. However, if label and agency PPE requirements are met, then this sentence is OK.”

Response: TVA edited the text as follows: "Low potential for public exposure to herbicides, selectively higher risk to workers based on herbicide active ingredient, tool use, and environmental conditions. Potential adverse effects mitigated and minimized by training, safety equipment, and adherence to labeling guidelines." *Note: this change was also made to Summary Table S-1.*

Specific Comment 55: *(Section 4.23.1)* “In the bulleted list add: ‘Visual impacts to the Trail of Tears National Historic Trail /Unicoi Turnpike, a sacred site and Traditional Cultural Property.’ However, I agree that a separate management plan for these areas can be devised through the Section 106 and government to government consultation process to improve the visual quality/setting.”

Response: Comment noted. The bulleted list identifies potential disturbances to cultural resource sites and visual intrusions as potential impacts. As the EIS is programmatic in nature, specific references to the potential impacts to Trail of Tears National Historic Trail/Unicoi Turnpike would be evaluated in future site-specific environmental reviews.

Specific Comment 56: *(Section 4.23.2)* “In the bulleted list add: ‘increased risk of damage to intact, original segments of the Trail of Tears/Unicoi Turnpike’ and ‘visual impacts to the Trail of Tears National Historic Trail /Unicoi Turnpike’. However, I agree that a separate management plan for areas containing TOT segments can be devised through the Section 106 and government to government consultation process to improve the visual quality/setting. On site monitoring of original, intact Trail of Tears / Unicoi Turnpike segments during the re-clearing activities is recommended.”

Response: Comment noted. The bulleted list identifies potential disturbances to cultural resource sites and visual intrusions as potential impacts. As the EIS is programmatic in nature, specific references to the potential impacts to Trail of Tears National Historic Trail/Unicoi Turnpike would be evaluated in future site-specific environmental reviews.

Specific Comment 57: *(Section 4.23.3)* “In the bulleted list add: ‘Potential to significantly improve the visual quality and reduce visual impacts to the Trail of Tears National Historic Trail Unicoi Turnpike.’ This alternative more easily allows for low-growing vegetation restoration and improvement of the visual quality of those portions of the TVA ROW that are visible within the one mile wide Trail of Tears/Unicoi Turnpike Corridor on National Forest System lands and other land ownerships."

Response: Comment noted. However, as the EIS is programmatic in nature, specific references to the potential impacts to Trail of Tears National Historic Trail/Unicoi Turnpike would be evaluated in future site-specific environmental reviews.

Specific Comment 58: *(Section 4.23.3)* "Impacts on factors related to the human environment (land use, socioeconomics, air, noise, cultural resources, solid/hazardous waste, public and worker safety, etc.) and land owners/managers (residential, recreational, agricultural, commercial, industrial, NPS, USFS, city, county, and state) specific to this management approach would be similar to that described for Alternative B." - - actually, no they would be better than that described for Alternative B - - see above entry. This alternative more easily allows for low-growing vegetation restoration and improvement of the visual quality of those portions of the TVA ROW that are visible within the one mile wide Trail of Tears/Unicoi Turnpike Corridor on National Forest System lands and other land ownerships."

Response: Comment noted. However, as the EIS is programmatic in nature, specific references to the potential impacts to Trail of Tears National Historic Trail/Unicoi Turnpike would be evaluated in future site-specific environmental reviews.

Specific Comment 59: *(Section 4.23.4)* "In the bulleted list add: 'Highest potential to facilitate a consistent approach to improving and managing the visual aspects of the Trail of Tears National Historic Trail/Unicoi Turnpike.' (Outside of developing a separate Section 106 programmatic agreement for the Trail of Tears.)"

Response: Comment noted. However, as the EIS is programmatic in nature, specific references to the potential impacts to Trail of Tears National Historic Trail/Unicoi Turnpike would be evaluated in future site-specific environmental reviews.

Specific Comment 60: *(Section 4.23.4)* "Impacts on factors related to the human environment (land use, socioeconomics, air, noise, cultural resources, solid/hazardous waste, public and worker safety, etc.) and land owners/managers (residential, recreational, agricultural, commercial, industrial, NPS, USFS, city, county, and state) specific to this management approach would be similar to those described for Alternative C. Additionally as described for Alternative C, Alternative D would result in greater coordination and interaction with local land owner to identify vegetation that is compatible with the safe and reliable operation of the transmission system." Add Of all of the alternatives, Alternative D would most easily allow for the development of a consistent restoration and visual quality management plan for those portions of the TVA ROW that are visible within the one mile wide Trail of Tears/Unicoi Turnpike Corridor on National Forest System lands and other land ownerships. Note that the USFS has resources, including access to Youth Conservation Crews (some made up of Tribal youth) who could assist with vegetation restoration and management activities on National Forest System lands within TVA's ROW at low cost."

Response: Comment noted. However, as the EIS is programmatic in nature, specific references to the potential impacts to Trail of Tears National Historic Trail/Unicoi Turnpike would be evaluated in future site-specific environmental reviews.

Appendix B – Agency Correspondence

United States Department of the Interior

NATIONAL PARK SERVICE
Southeast Regional Office
Atlanta Federal Center
1924 Building
100 Alabama St., SW.
Atlanta, Georgia 30303

IN REPLY REFER TO:
1.A.2. (SERO-PC)

JUN 22 2018

Ms. Holly LeGrand
Environmental Compliance and Operations
Tennessee Valley Authority
400 West Summit Hill Drive, WTK11-C
Knoxville, TN 37902

Dear Ms. LeGrand:

The National Park Service (NPS) appreciates Tennessee Valley Authority (TVA) allowing us to be a cooperating agency for the development of the Transmission System Vegetation Management Programmatic Environmental Impact Statement (EIS) and affording us the opportunity to review the preliminary Draft EIS. As noted in the document, TVA transmission line rights-of-way (ROWs) cross NPS lands 97 times, which is greater than any other agency. Additionally, TVA ROWs traverse 11 units of the National Park System located within the TVA service area. NPS offers the following general comments for your consideration in the development of the Draft EIS for the project, along with a comment matrix that has additional questions and comments relating to the preliminary Draft EIS.

Overall, the NPS is pleased with the preliminary Draft EIS references to the NPS and ROWs that cross NPS lands. However, it is important the EIS recognize that the NPS does not distinguish units of the National Park System as being "natural areas" or "recreation areas" as distinct from "national parks." Rather, as required by the General Authorities Act of 1970, units of the National Park System are treated equally and guided by the same NPS resource protection laws and regulations. As such, the EIS's groupings are of concern, especially since NPS units usually contain outstanding natural, recreational, and cultural resources that are central to their national significance and inclusion by federal law as units of the National Park System. The NPS recommends that the Draft EIS identify a general category for units of the National Park System or other ways to address this concern.

The NPS supports TVA's effort to better conserve cultural resources though increased collaboration with stakeholders in maintaining ROWs. To that end, the NPS proposes to work with TVA to help ensure that data in TVA's Heritage Database is current and reflected in the Draft EIS. Additionally, the NPS would like to work with TVA to identify relevant sensitive cultural resource locations that would be needed for TVA's Office-level Sensitive Area Review (O-SAR) process in order to identify management options or develop appropriate mitigation measures in the Draft EIS. Identifying site-specific cultural resource issues at TVA ROWs within each park to inform maintenance will help reduce potential unintended damage to sensitive cultural resources.

NPS has the responsibility for meeting federal laws and policies on NPS lands. As such, the NPS appreciates the inclusion of references in the preliminary draft EIS that acknowledge that transmission line vegetation management on NPS lands would be determined by any governing agency agreements, memorandum of agreement, and applicable law. Additionally, the NPS agrees with statements that a management plan or similar document from the NPS, or other land management agency, determines what activities are compatible with the intended use of their land. The NPS also thanks TVA for referencing the NPS's interest in developing a formal agreement that would guide management of ROWs on NPS lands. The NPS continues to have internal discussions on how a programmatic general agreement could address expectations for maintenance of TVA ROWs on NPS lands. Regardless of whether a general agreement is completed, NPS recommends that TVA continue to work with individual parks to ensure site-specific authorizations are in place as needed.

Following completion of the EIS, park-specific agreements should be established and/or updated between TVA and park Superintendents that address specific issues, including protection of cultural resources, protection of state and federally listed species and habitats, and other relevant issues. Agreements should also specify access routes to TVA ROWs, access route gates, and route maintenance plans. Problems with ROW access in the past include contractors using inappropriate and unapproved backcountry routes that create social trails and access routes inconsistent with park management plans. This type of activity can damage NPS resources and pose a potential danger to park visitors. Furthermore, unauthorized resource damage could result in monetary damages and penalties. Where not already in place, the NPS proposes to work with TVA to identify and map future access routes and memorialize them in park-specific agreements.

The NPS's understanding is that the alternatives presented in the preliminary draft EIS would not be applicable to NPS land due to NPS land ownership and other agreements. Nonetheless, there are features of Alternative D that the NPS finds highly advantageous, especially for ROWs in proximity to NPS units. Where appropriate, having feathered edges would reduce the adverse impacts that ROWs have on habitat fragmentation and allow those areas to serve as important corridors for pollinators and wildlife. The NPS sees tremendous value in having additional staff botanists accompany each work crew to assess condition and prescribe selective treatment based on compatible species composition. Doing so will help maximize environmental contributions of TVA's ROWs and support TVA's stated interest in managing for pollinator and wildlife habitat.

The NPS notes that Alternative C, which proposes to manage areas in a meadow-like end-state, is TVA's preferred alternative. Because of the broader environmental benefits associated with Alternative D, the NPS requests that TVA consider a hybrid of the two alternatives. Under the hybrid approach, TVA would manage ROWs on environmentally sensitive lands and adjacent to NPS units in accordance with Alternative D. These environmentally managed ROWs would have fewer invasive species and provide a network of wildlife and pollinator corridors that would support numerous conservation goals, including those of the NPS.

Thank you for your consideration of our comments. If you have any questions or need additional information regarding our comments, please contact Bryan Faehner, Energy & Environmental Protection Specialist, who can be reached at 202-513-7256 or bryan_faehner@nps.gov.

Sincerely,

Ben West
Chief, Planning and Compliance

TVA Transmission System Vegetation Management Preliminary Draft Programmatic Environmental Impact Statement – NPS Comments

Section & Page	Comment
3.1.1 # 7.a (Word P. 52)	Please confirm whether the evaluation would be conducted in conjunction with the land management agency.
3.1.2 (Word P. 53)	Cultural resources should be included as a Sensitive Resource Category and is missing from Table 3-1 Elements of TVA's Office-Sensitive Area Review Database.
3.1.2 (Word P. 55)	There needs to be a park-specific review of these data before the TVA personnel staff have "certainty and flexibility."
3.1.2.2 (Word P. 56)	Pesticide needs to be approved for use in each park prior to application, so coordination with park staff is essential.
3.1.2.3 (Word P. 57) and 4.5.2.5 (P.157)	Recommend including in both sections: "A National Pollutant Discharge Elimination System permit is required for aquatic pesticide use; permit requirements vary by state (refer to https://www.epa.gov/npdes)."
3.1.2.5 (Word P. 58)	Question: Do all NPS lands fall into this class as natural areas and there is a three-week window? If that includes the pesticide use proposal review, three weeks is a small window.
3.1.2.6 (Word P. 58)	Class 1 list should include cultural resources. For NPS lands, we would have to provide those locations, which are restricted data, so that may need to be a separate class as part of this review. A few paragraphs down there is mention of the PA, but as part of this cyclic review process, it is not clear how those two tie together.
Summary, Table S-2, Cost (Word P. 13)	Not conducting a complete initial clearing and allowing landscapes that already meet conditions called for in this alternative could save money.
4.12.1 (Word P. 183)	Here and throughout the document, the EIS states that TVA, NPS, USFS, state, county, and land trust lands are "Natural Areas" held in public ownership to "protect and maintain certain ecological and/or recreational features." However, lands that fall under the "Natural Areas" category also protect and maintain cultural resources as well. As such, we recommend referencing cultural resources whenever there is discussion of "Natural Areas."
4.23.4 (Word P. 244)	NPS strongly supports Alternative D and the requirement for, "additional staff botanist to accompany each work crew to assess condition and prescribe selective treatment based on compatible species composition." Assuming these botanists would consult with NPS and ideally a vegetation management plan, this would significantly reduce unauthorized application of herbicides and other treatment actions undertaken by TVA contractors on NPS lands.
4.13.1, paragraph 3 (Word P. 187)	Please change "regulations" to "regulations and policies"
4.23.1, first paragraph AFTER the first set of bullets (Word P. 235)	Please change second sentence to "For large public lands (NPS, USFS, etc.), methods would be subject to the terms of any special agreements and authorizations with each agency."

Table 2.1, column three (Disadvantages) line 2 under "Chainsaw, machete, brush hooks, axes, bush blades"	How is handwork "more intrusive than herbicide treatment"?
Table 2.1. , under "Herbicide Spraying and Growth Regulators"	Big South Fork NRRA may consider allowing cut-stump and wick application, but prefer that no foliar or broadcast spraying be allowed.
Table 2.1. , under "Spot, Localized, Ground-based Broadcast, and Aerial Broadcast Spraying – Aerial Sprayers"	Big South Fork NRRA does not allow aerial spraying in the park.
Table 2.1. , under "Resprout or Growth Control – Backpack sprayers, wick applicators"	Cut-stump, hack and squirt & wick application may be considered by Big South Fork NRRA. Use of growth regulators is not allowed in the park. NPS requires that any herbicides proposed for use must be approved through the NPS Pesticide Use Proposal System, as mentioned above.
2.1.3, paragraph 1, lines 8-9 (Word P. 29)	The EIS includes a statement that, "herbicides would be applied under the supervision of a licensed applicator in accordance with applicable state and federal laws and regulations": Will licensed supervisor be on site? Big South Fork NRRA would prefer that at least one on-site applicator will be required to be either licensed or certified to spray in rights-of-way.
2.1.3, paragraph 1, lines 9-10 (Word P. 29)	Specific to "only TVA-approved herbicides ", NPS requires that any herbicides proposed for use must be approved through the NPS Pesticide Use Proposal System.
Table 2-3	Pre-emergent/bare ground applications are not currently allowed in Big South Fork NRRA: NPS has concerns about bare ground treatments based on drift issues observed at towers in the park in past years.
Table 2-4	Big South Fork NRRA does not currently allow the use of growth regulators in the park.
Section 2.1.3 H, second to last paragraph (Word P. 30)	Specific to the "Aerial Broadcast" application form, NPS does not allow aerial broadcast spraying in the park.
Table 3.1, lines 3-4	Big South Fork NRRA policy imposes restrictions (buffers and selected herbicides) on herbicide use near streams that are known to contain T&E aquatic species.
3.1.2.2 (Word P. 56)	In any cases involving the possible use of herbicides in Big South Fork NRRA, the NPS prefers that park personnel be involved in the decision-making process along with TVA.
4.1.2.4, whole paragraph (Word P. 103)	NPS supports restoration efforts; however, NPS is required to plant only native species. TVA will need to consult with NPS on a case-by-case basis and use only NPS-approved plant materials.

FOREST SERVICE REVIEW AND COMMENTS
on
TRANSMISSION SYSTEM VEGETATION MANAGEMENT
PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

General Comments:

- **DEIS should clearly reflect that vegetation management plans that are a requirement of existing Forest Service Special Use Permits (SUPs) will not be changed by the Final Record of Decision for the EIS. Any changes to the terms of existing SUPs will need site specific review and approval by the Forest Service.**
- **DEIS should acknowledge that TVA vegetation management activities will be consistent with applicable Forest Service Land and Resource Management Plans**
- **DEIS should recognize the cultural significance of the Trail of Tears National Historic Trail/Unicoi Turnpike and the need for collaboration between TVA, the Forest Service, and consulting Tribes to address Tribal concerns related to vegetation management for those portions of the TVA transmission ROWs that impact the Trail of Tears/Unicoi Turnpike Corridor.**

Specific Comments:

Section	Page	Comments
Figure 1	**1**	Areas involved in this PEIS are not viewable – it is impossible to zoom in to actually see affected areas and line locations in each study area.
Floor Work/Methods Evaluated	**4,5**	What type of herbicide application? Ground-based and aerial? Table S-1 is first place aerial application is addressed
Summary	**6**	The O-SAR process is cited throughout the document as a way to mitigate effects; yet a description of the process wasn't provided for review.
Summary of Impacts	**7**	In the bulleted list include "periodic intrusions into the immediate view shed and across portions of original route of the Trail of Tears National Historic Trail and Unicoi Turnpike Trail for vegetation maintenance activities." <u>Explanation</u>: This is about more than just potential ground disturbance. Portions of the Unicoi Turnpike in TN and NC, an ancient and often deeply entrenched trail used for thousands of years, was the route used for the

		1836-1838 Removal of Cherokee and Creek peoples and those enslaved African Americans owned by some Tribal members at that time (the Trail of Tears, a Congressionally designated National Historic Trail). In addition, in 2016, the USFS was formally notified by two of the federally recognized Cherokee Tribes and verbally notified by several Tribes that compose the Creek Confederacy of Tribes that those portions of the Trail of Tears/Unicoi Turnpike located on federally owned lands is a Native American Sacred Site per Executive Order 13007. There are Tribal concerns related to more than just immediate potential physical impact or ground disturbance. The USFS is currently conducting a cultural landscape inventory and consulting with the three federally recognized Cherokee Tribes and seven Tribes of the Creek Confederacy (those for which we have archival documentation of use of this route for the removal of lineal descendants) regarding long-term, multiple resource management of national forest system lands within ½ mile either side of the Trail of Tears/Unicoi Turnpike (including utility ROW corridors) in order to protect and enhance this resource as much as practicable. The USFS recently initiated discussions with TVA regarding this situation and developing a collaborative approach to meeting TVA's requirements while improving the visual quality of the trail where it crosses or underlies the ROW. The USFS recommends that TVA, USFS, and consulting Tribes work together to develop a practicable, low-growing native vegetation restoration plan (including plants of traditional cultural importance) and long term vegetation management plan for those portions of the TVA utility corridor that are visible within the one mile wide Trail of Tears/Unicoi Turnpike Corridor.
Table S-1	**10,11, 12**	Section on Parks - - see above - - Native American Sacred Site – congressionally designated National Historic Trail. Sections in table on cultural resources and visual resources - -- see above. Section on noise - - see above-- Native American Sacred Site – congressionally designated National Historic Trail.
Table S-2	**16,17, 18**	Sections in table on cultural resources and parks - - see above. Section on visual resources – see above. Section on noise - Native American Sacred Site – congressionally designated National Historic Trail.
Table S-1	**10,12**	Burning including pile burning is found in Table S-1 but nowhere before that as part of suite of treatments (floor treatments? Is restoration of impacted sites with vegetation that is compatible a typical practice

		(connected action)? What about maintaining road access that may be within the ROW (connected action) – is mentioned in section 2.3
1.7	**17**	A site specific EIS for aerial application of pesticides on Land Between the Lakes National Recreation Area, as required by Forest Service Handbook 1909.15. (36 CFR 220.5(a))
1.9 and Appendix B	**18**	Coordinate the integrated sensitive area review process with Land Between the Lakes National Recreation Area of the USDA Forest Service. This includes: 1) review of the design criteria, sometimes known as best management practices, in the Land Between the Lakes Area Plan dated December, 2004, 2) incorporation of the conservation measures in the biological opinion dated March 25, 2015 between Land Between the Lakes and the US Fish and Wildlife Service for Indiana and northern long-eared bats and Price's potato bean, 3) incorporation of the conservation measures in the biological opinion dated July 24, 2015 between the USDA Forest Service and the US Fish and Wildlife Service for northern long-eared bat, 4) review of sensitive species known as regional forester sensitive species or species of conservation concern as required by Forest Service Manual 2670, 5) programmatic agreement between Land Between the Lakes and the KY and TN state historic preservation offices, 6) Woodlands Trace Scenic Highway Management Plan. Note: this applies to all sections within 3.1.2 and am not sure where to include it, at the beginning of the section on page 52 or the end on page 58.
Table 2-1	**20**	Manual Removal- Disadvantages. Fifth bullet, "Not effective..." The word "noxious" is a legal term identifying those plants legally deemed problems by either the federal government or state government plant boards. This appears to target only those spp. which I'm sure is not the desire. Invasive plants or non-native invasive plants is more correct.
Table 2-1	**22**	Spot, Localized, Ground-based and Aerial Broadcast. R8 Veg. Mgt. EIS allows for only helicopter application for ROW with certain stipulations. FSH 6709? Requires aerial plan, spill plan, pesticide treatment plan, etc.
2.1.1.3	**25**	Term "noxious" weeds. See comment on Table 2-1 page 20.
2.1.3.1.3	**32**	Ground based Broadcast Herbicide Application. Use of noxious weeds in first paragraph. See comment regarding same on p. 20.
2.1.3.1.4	**32**	For aerial applications to FS ROW, helicopter application is the only aerial platform allowed. No fixed wing.

2.1.3.1.4	**32**	A site specific EIS for aerial application of pesticides on Land Between the Lakes National Recreation Area, as required by Forest Service Handbook 1909.15. (36 CFR 220.5(a))
2.1.3.1.4	**33**	Adjuvants help to maintain large droplet sizes. The nozzles actually create the droplet sizes and help maintain a certain droplet size spectrum. The adjuvants prevent the droplets from evaporating or shearing into smaller particles. I know, this is nitpicking.
2.3 Restoration	**43-45**	The draft EIS described reseeding for restoration. Forest Service policy requires that no invasive species are used (FSM 2900) and first choice should always be native species (FSM 2070). The referenced 2017 Best Management Practices contains a native seed mix that (pg. 84) that would be appropriate, however, the permanent non-native crops may not (pg. 83). Each Forest maintains a list of invasive species. Site-specific vegetation plans would need to adhere those policies.
2.41	**46,58**	Chapter 2.4.1 says prescribed fire was eliminated from consideration yet page 58 includes impacts to T&E from prescribed fire
Table 2-9	**48**	Use of the word “noxious” in the table. Recommend doing a word search in this document for “noxious” and replace with something like invasive plants or non-native invasive plants.
3.1.1	**51**	The Forest Service standards for SMZ’s are more stringent. Please see Chattahoochee-Oconee National Forest Land and Resource Management Plan (LRMP) pg. 3-175 and 3-176. Ephemeral streams require a 25 foot buffer on each side.
3.1.2	**52**	Coordinate the integrated sensitive area review process with Land Between the Lakes National Recreation Area of the USDA Forest Service. This includes: 1) review of the design criteria, sometimes known as best management practices, in the Land Between the Lakes Area Plan dated December, 2004, 3) list of acceptable herbicides and design criteria approved at Land Between the Lakes, 2) incorporation of the conservation measures in the biological opinion dated March 25, 2015 between Land Between the Lakes and the US Fish and Wildlife Service for Indiana and northern long-eared bats and Price’s potato bean, 3) incorporation of the conservation measures in the biological opinion dated July 24, 2015 between the USDA Forest Service and the US Fish and Wildlife Service for northern long-eared bat, 4) review of sensitive species known as regional forester sensitive species or species of conservation concern as required by Forest Service Manual 2670, 5)

		programmatic agreement between Land Between the Lakes and the KY and TN state historic preservation offices 6) Woodlands Trace Scenic Highway Management Plan. Note: this applies to all sections within 3.1.2 and am not sure where to include it, at the beginning of the section on page 52 or the end on page 58.
Table 3-1	**53**	The document uses a variety of terms to address rare plant species. Table 3-1 defines the information that is tracked in the Off0ce-Sensitive Area Review Databases and for plants include locations (documented or potential) of federally or state-listed plant species or unique plant communities. However, section 3.1.2. Discussed how the "class" designation is applied to protect rare species when federally or state-listed plants, or uniquely diverse plant communities are likely to occur. Forest Service also manages a rare plants as Regional Forest Service sensitive or Species of Concern and individual forest may have locally rare species. Are the Forest Service designation considered under rare natural areas (pg. 58) or unique plant communities (pg. 56) or not yet considered?
3.1.2.2	**56**	Management of plants requires coordination with the USDA Forest Service Threatened and Endangered Species Coordinator at Land Between the Lakes for protection the endangered species Price's potato bean and potential habitat and other regionally sensitive species protected by the USDA Forest Service.
Table 3-3	**77**	Is short term and long term (re: impacts) defined anywhere?
2.2.3	**80**	Pile Burning – Consider mitigating the risk of soil sterilization, use this treatment when soil moisture is sufficient to limit soil impacts.
Table 3-3	**81**	Section on Cultural Resources: Alternative A – No action: add ***Adverse effects, specifically visual impacts, would continue to occur to the Trail of Tears National Historic Trail / Unicoi Turnpike unless a separate method is devised through Section 106 and Tribal consultation to minimize impacts.*** Alternative B – Cyclic Based: add ***Adverse visual impacts would continue to occur to the Trail of Tears National Historic Trail / Unicoi Turnpike unless a separate method is devised through Section 106 and Tribal consultation to minimize impacts.***

		Alternative C – add ***Provides some flexibility in the improvement and management of visual quality of the Trail of Tears National Historic Trail / Unicoi Turnpike.*** Alternative D – add ***Provides the greatest flexibility in the improvement and management of visual quality of the Trail of Tears National Historic Trail / Unicoi Turnpike.***
Table 3-3	**81,82**	Section of Visual Resources: See above regarding impacts to cultural resources – specifically the Trail of Tears / Unicoi Turnpike (a Traditional Cultural Property)
4.1.1.6 Invasive Species	**98**	The draft EIS describes treatment of invasive plant species in the right-of-way. Each Forest will maintain a list of high-priority species that should be maintained. Prevention measures were lacking from both the mitigation and 2017 Best Management Practices such as weed-free material when possible (except for seeds) or equipment washing. The Forest Service also has reporting requirements from approval through the use of Pesticide Use Proposals and pesticide spray records (FSM 2070, 2150) for any invasive plant control activity that occurs on Forest Service land.
3.5		Could not easily find the BMPs and mitigation that was used in effects tables that cite 2017a – *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities Revision 3-2107* (TVA 2017a) bring forward into an appendix for one-stop shopping? Mitigation for restoration? Mitigation for scenery? Not clear to me that the 2017 document is subject to being revised based on this decision. Is any edit to the 2017 practices off the table?
4.5.2.5	**157**	Disturbed ground limits - The Forest standard FW-065 for bare ground coverage is: on all soils dedicated to maintaining forest cover, the organic layers, topsoil, and root mat will be left intact over at least 80% of the project or activity area (Chattahoochee-Oconee National Forest Land and Resource Management Plan LRMP pg. 2-22).
4.5.2.5	**158**	According to Forest standard FW-067 mitigation of bare soil exposure must take place prior to any suspension of project activity for 30 days or

		longer (Chattahoochee-Oconee National Forest Land and Resource Management Plan LRMP2-22).
	181	In Table 4-19, I would disclose in the line for US Forest Service how many crossing and acres are by each state on National Forest lands. I would like to disclose to the public how many crossing and acres are in the Chattahoochee-Oconee NFs by county if possible. You can add a table with this specifics in the appendix.
4.10.2	**181**	In paragraph beginning with "State and federal lands often have…." Add these specific policies to an appendix. Specifically, national forests each have Land and Resource Management Plans and at Land Between the Lakes National Recreation Area this plan is dated December 2004. The plans contain specific requirements for land and resource management as required by the National Forest Management Act. Or, in this section 4.10.2, refer to the coordination with federal and state agencies will be complete as described in section 3.1.2 and site specific effects will be disclosed as required by that coordination.
4.12.1	**185**	Delete "Kentucky State Wildlife Management Area" from The Land Between the Lakes National Recreation Area/Kentucky State Wildlife Management Area in the first sentence. Land Between the Lakes National Recreation Area is federal land managed by the USDA Forest Service, not by the states of KY or TN. If the intent is to name Land Between the Lakes in addition to state management areas in KY and TN, then reword the sentence to Land Between the Lakes National Recreation Area and adjoining Kentucky and Tennessee State Wildlife Management Areas to be clear that Land Between the Lakes is not a KY State Wildlife Management Area. Also, change the reference name in the Figure 4-7 to Land Between the Lakes National Recreation Area and adjoining state management areas.
4.12.2.2.3	**186**	Add the following sentence from this section to pages 17 and 32 for clarity: "Throughout natural areas, aerial herbicide application is not permissible due to the larger impact it would have on non-target, potentially sensitive plants and animals." That would address the comment for a site specific EIS mentioned in this table for pages 17 and 32 above. Add the use of herbicides would be coordinated following the process in section 3.1.2.
4.12.2.5	**186**	Add the use of herbicides would be coordinated following the process in section 3.1.2.

4.13.2.3	**188**	If aerial application of herbicide is not permissible in "natural areas" such as Land Between the Lakes and other USDA forests, then there would be no risk of accidentally spraying a recreation user.
4.13.2.3	**189**	At Land Between the Lakes National Recreation Area, the mitigation measures for recreation need to be part of the coordination process in section 3.1.2 because the transmission corridor passes along the Woodland Trace Scenic Byway and equestrian and hike/bike trails cross the transmission lines. Add that the corridor traverses Land Between the Lakes National Recreation Area to the affected environment section to note the impact to this USDA recreation focused national forest unit.
4.14.1.2.2	**193**	Second paragraph a little more than half-way in : "The Trail of Tears consisted of many routes and sub-routes that involved the removal of Native Americans from their ancestral homelands." <u>*Add information*</u>: ***Intact, original segments of this part of this trail, also known as the Unicoi Turnpike or Overhill Path, are still present in southeastern TN, western NC and northern GA. This is a transportation route of great antiquity and a landscape of historical and cultural significance to the consulting tribes.*** "Analysis indicates that there are approximately 278 incidences where the Trail of Tears crosses TVA's transmission ROW" ***and x incidences where the original Unicoi Turnpike/Overhill Path/Trail of Tears crosses TVA's transmission ROW.*** (add the language shown in bold, italics)
4.14.2.1	**193**	Second sentence: "As described above a range of cultural resources have the potential to be present within the transmission line ROW including prehistoric Native American archaeological sites, historic era archaeological sites, and TCPs", ***including intact original Unicoi Turnpike/Trail of Tears segments***. (add language in bold, italics)
4.14.2.1	**194**	Regarding the statement that the potential adverse effect to TCPs from vegetation maintenance activities within the ROW is low – If the proposed selected alternative/decision is that the ROW vegetation within the mile-wide Unicoi Turnpike/Trail of Tears corridor on National Forest System lands will continue to have its current composition [mostly mowed down grasses and very short plants [8 to 10 inches tall]) and will continue to be maintained using the same equipment (bush hogs and mowers), then the effect will be adverse. There are Tribal cultural resource concerns related to more than just immediate potential physical impact or ground disturbance. The USFS recently initiated discussions with TVA regarding the development of a collaborative approach to meeting TVA's ROW management

		requirements while improving the visual quality of the trail where the Trail of Tears/Unicoi Turnpike, particularly original entrenched segments of it, cross or underlie the ROW. The USFS recommends that TVA, USFS, and consulting Tribes work together to develop a practicable, low-growing native vegetation restoration plan (including plants of traditional cultural importance) and long term vegetation management plan for those portions of the TVA utility ROW that are visible within the one mile wide Trail of Tears/Unicoi Turnpike Corridor, while allowing for the safe and reliable operation of the transmission line. The USFS has resources, including access to Youth Conservation Crews (some made up of Tribal youth) who could assist with vegetation restoration and management activities on National Forest System lands within TVA's ROW at low cost.
4.14.2.2.1	**194**	"However, cutting in areas containing above-ground resources such as standing historic structures, historic foundations, privies, historic wells, remains of historic cemeteries, ***and entrenched original historic trail segments***, may also disturb these resources as thick vegetation can often adhere to these resources." (add language in bold, italics)
4.14.2.2.2	**194**	"Mechanical methods for vegetation removal would involve the use of heavy machinery such as bull dozers, track hoes, mowers, brush hogs, and tree saws that have the potential to adversely impact cultural resources by disturbing cultural deposits, compaction, displacing soils, ***collapsing intact side walls of entrenched original segments of the Unicoi Turnpike/Trail of Tears***, leaving areas subject to erosion, or mixing the soil layers. These effects may be exacerbated under wet soil conditions or in fragile soils such as sandy river levees and terraces. Maneuvering heavy machinery within the transmission line ROW has the potential to disturb sensitive above-ground historic resources if present, for example above-ground historic structural remains, cemetery components, ***entrenched historic trails,*** and stone mounds." (add language in bold, italics)
4.14.2.3	**194**	"Broadcast and aerial spray, which is rarely used, has the potential to affect cultural resources***, including culturally significant and traditionally used native plants found within TCPs in TVAs ROW,*** should they be present." (add language in bold, italics)

4.14.2.6	**195**	At the end of the paragraph, add the following: ***TVA has initiated discussions with the USFS and consulting Tribes to develop a practicable, low-growing vegetation restoration and management plan for those portions of the TVA ROW that are visible within the one mile wide Trail of Tears/Unicoi Turnpike Corridor on National Forest System lands.***
4.14.2.6	**195**	Thousands of archaeological and historic resources are present on Land Between the Lakes National Recreation Area. Some of these have been surveyed and some are known in records with the USDA Forest Service. Land Between the Lakes has a programmatic agreement with the Advisory Council on Historic Preservation, the TN and KY state historic preservation officers, federally recognized tribes. Therefore, any transmission work needs to be coordinated as part of the process outlined in section 3.1.2 to avoid, mitigate, or documents effects to heritage resources. Also, coordination with descendants of families connected with some of these resources is often necessary and USDA Forest Service Land Between the Lakes archeologist maintains the contacts with family descendants.
4.15.1	**195**	In the affected environment, add equestrian trails and hike/bike trails cross the corridor at Land Between the Lakes National Recreation Area. Then address effects to visuals of recreation users as part of the analysis.
4.15.1	**195**	Two sections of the corridor pass along the Woodland Trace Scenic Byway in Land Between the Lakes National Recreation Area. Add this to the affected environment. The effects to visuals along the scenic byway needs to be considered in the visual analysis. Scenic driving is one of the top recreation uses at Land Between the Lakes National Recreation Area so any short term effect to visuals directly affects recreation.
4.15	**195**	Handbook for Scenery Management, Agriculture Handbook Number 701 (USFS 1995) is cited on page 195 but it is not mentioned in Chapter 7.0 Literature Cited
4.15.1	**196**	At the end of the section, add the following: ***As mentioned in the cultural resources section, the Congressionally designated Trail of Tears National Historic Trail is a prominent cultural resource within the analysis area where associated visual resources are important. Intact, original segments of this part of this trail, also known as the Unicoi Turnpike or Overhill Path, are still present in southeastern TN, western NC and northern GA. This is a transportation route of great antiquity***

		and a landscape of historical and cultural significance to the consulting tribes and local communities. Analysis indicates that there are approximately 278 incidences where the Trail of Tears crosses TVA's transmission ROW and x incidences where the original Unicoi Turnpike/Overhill Path/Trail of Tears crosses TVA's transmission ROW.
4.15.2	**196**	Could you add a separate section just for the Trail of Tears/Unicoi Turnpike mile-wide corridor - - even if only for applicability on federal lands or National Forest System lands? Here is some suggested text: ***TVA and the USFS recently initiated discussions with each other and the consulting Tribes regarding the development of a collaborative approach to meeting TVA's ROW management requirements for the safe and reliable operation of the transmission line, while improving the visual quality of the Trail of Tears National Historic Trail / Unicoi Turnpike mile-wide corridor where the trail, particularly original entrenched segments of it, cross or underlie a TVA transmission ROW.***
4.16.2.6	**206**	Add transmission work will be coordinated as part of the process outlined in section 3.1.2 with Land Between the Lakes National Recreation Area to protect health and safety of recreation users during recreation special events that might be planned for the transmission work area such as off road and trail events or quota hunts.
4.17.2.1	**209**	Any accidental spill will be reported to the landowner in addition to the appropriate regulatory agency.
4.18.1	**210**	Some of the access roadways also provide access to active family cemeteries in Land Between the Lakes National Recreation Area. Family reunions and funerals occur at these cemeteries. Therefore, any transmission work needs to be coordinated as part of the process outlined in section 3.1.2 to prevent conflicts with family descendants, as described under the comment for page 195 in this table above.
4.18.1	**210**	Part of the corridor passes along the Woodlands Trace Scenic Byway in Land Between the Lakes National Recreation Area so impacts to the vegetation along the highway needs to be kept to a minimum to maintain the scenic integrity of the highway.
Table 4-24	**231**	"Potential impact…" This should not occur. Pesticide mixing and loading should not be performed in or near groundwater. There should be BMPs in place to mitigate.
Table 4-24	**232**	Public and worker safety: Does "use conditions" mean "application methods?" If there will be backpack treatments, these types of

		treatments expose workers more than any other application method. However, if label and agency PPE requirements are met, then this sentence is OK.
4.23.1	**236**	In the bulleted list add: • ***Visual impacts to the Trail of Tears National Historic Trail / Unicoi Turnpike, a sacred site and Traditional Cultural Property*** However, I agree that a separate management plan for these areas can be devised through the Section 106 and government to government consultation process to improve the visual quality/setting.
4.23.2	**239**	In the bulleted list add: • ***increased risk of damage to intact, original segments of the Trail of Tears/Unicoi Turnpike*** • ***visual impacts to the Trail of Tears National Historic Trail / Unicoi Turnpike*** However, I agree that a separate management plan for areas containing TOT segments can be devised through the Section 106 and government to government consultation process to improve the visual quality/setting. On site monitoring of original, intact Trail of Tears / Unicoi Turnpike segments during the initial re-clearing activities is recommended.
4.23.3	**241**	In the bulleted list add: • ***Potential to significantly improve the visual quality and reduce visual impacts to the Trail of Tears National Historic Trail Unicoi Turnpike*** ***This alternative more easily allows for low-growing vegetation restoration and improvement of the visual quality of those portions of the TVA ROW that are visible within the one mile wide Trail of Tears/Unicoi Turnpike Corridor on National Forest System lands and other land ownerships.***
4.23.3	**242**	"Impacts on factors related to the human environment (land use, socioeconomics, air, noise, cultural resources, solid/hazardous waste, public and worker safety, etc.) and land owners/managers (residential, recreational, agricultural, commercial, industrial, NPS, USFS, city,

		county, and state) specific to this management approach would be similar to that described for Alternative B." - - actually, no they would be better than that described for Alternative B - - see above entry. ***This alternative more easily allows for low-growing vegetation restoration and improvement of the visual quality of those portions of the TVA ROW that are visible within the one mile wide Trail of Tears/Unicoi Turnpike Corridor on National Forest System lands and other land ownerships.***
4.23.4	**243**	In the bulleted list add: • ***Highest potential to facilitate a consistent approach to improving and managing the visual aspects of the Trail of Tears National Historic Trail/Unicoi Turnpike.*** (outside of developing a separate Section 106 programmatic agreement for the Trail of Tears)
4.23.4	**244**	"Impacts on factors related to the human environment (land use, socioeconomics, air, noise, cultural resources, solid/hazardous waste, public and worker safety, etc.) and land owners/managers (residential, recreational, agricultural, commercial, industrial, NPS, USFS, city, county, and state) specific to this management approach would be similar to those described for Alternative C. Additionally as described for Alternative C, Alternative D would result in greater coordination and interaction with local land owner to identify vegetation that is compatible with the safe and reliable operation of the transmission system." Add ***Of all of the alternatives, Alternative D would most easily allow for the development of a consistent restoration and visual quality management plan for those portions of the TVA ROW that are visible within the one mile wide Trail of Tears/Unicoi Turnpike Corridor on National Forest System lands and other land ownerships.*** Note that the USFS has resources, including access to Youth Conservation Crews (some made up of Tribal youth) who could assist with vegetation restoration and management activities on National Forest System lands within TVA's ROW at low cost.

United States Department of the Interior

OFFICE OF THE SECRETARY

Office of Environmental Policy and Compliance
Richard B. Russell Federal Building
75 Ted Turner Drive, S.W., Suite 1144
Atlanta, Georgia 30303

ER 18/0375
9043.1

September 24, 2018

Anita E. Masters
NEPA Project Manager
1101 Market Street, BR 4A
Chattanooga, TN 37402

Re: Comments on the Draft Environmental Impact Statement (DEIS) for the Transmission System Vegetation Management Program

Dear Ms. Masters:

The U.S. Department of the Interior (Department) has reviewed the Draft Environmental Impact Statement (DEIS) for the Transmission System Vegetation Management Program. Our comments and concerns pertaining to this action are being addressed during the on-going Section 7 consultation process. We have no further comments at this time.

Thank you for the opportunity to review and comment on this DEIS. If you have questions, I can be reached on (404) 331-4524 or via email at joyce_stanley@ios.doi.gov.

Sincerely,

Joyce Stanley, MPA
Regional Environmental Officer

cc: Christine Willis – FWS
Michael Norris - USGS
Anita Barnett – NPS
Chester McGhee – BIA
Michelle Fishburne
OEPC – WASH

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

SEP 2 5 2019

Ms. Anita E. Masters
NEPA Compliance Project Manager
Tennessee Valley Authority
1101 Market Street, BR 4A
Chattanooga, Tennessee 37402

Re: Programmatic Final Environmental Impact Statement (PFEIS) for the Tennessee Valley Authority Transmission System Vegetation Management; CEQ No.: 20190204

Dear Ms. Masters:

The U.S. Environmental Protection Agency has reviewed the referenced document in accordance with Section 309 of the Clean Air Act and Section 102(2)(C) of the National Environmental Policy Act (NEPA). The purpose of this PFEIS is for the Tennessee Valley Authority (TVA) to address potential impacts associated with the proposed management of vegetation within its transmission right-of-way (ROW). TVA's transmission system serves nearly ten million residents in an 82,000-square-mile area spanning seven states: Tennessee, Alabama, Georgia, Mississippi, Kentucky, North Carolina, and Virginia. For vegetation management purposes, this area is divided into six regions consisting of a total of 12 sectors. TVA developed a plan to maintain active transmission line ROWs within each of the 12 sectors. TVA's transmission system consists of a network of more than 16,000 miles of electric transmission lines and approximately 500 power substations all contained within approximately 238,000 acres of utility ROW.

The EPA has reviewed the PFEIS and the four alternatives for the transmission system vegetation management. In addition to the No Action alternative, Alternative A, TVA has considered three action alternatives (i.e. Alternatives B, C, and D) that identified several vegetation management strategies. The EPA understands that TVA's preferred alternative is Alternative C, which would include implementing a process of vegetation community conversion within the full extent of the actively managed transmission ROW which promotes the establishment of a low-growing herbaceous plant community with a meadow like end state. Although the EPA preferred Alternative D, which includes a 'variable by zone' approach, the EPA has not identified any significant environmental impacts to the proposed action and TVA's selected alternative that would require substantive changes to the PFEIS.

The EPA reviewed the Programmatic Draft Environmental Impact Statement (PDEIS) and provided comments in a letter dated September 19, 2018. It should be noted that the TVA did not include the EPA's comment letter in the PFEIS appendices, nor does it appear that the comments and recommendations were addressed in the final document.

For your convenience, the referenced letter is included as an enclosure (See enclosure). If you wish to discuss the matter further, please contact Ms. Alya Singh-White at (404) 562-9339 or by email at singh-white.alya@epa.gov.

Sincerely,

Christopher A. Militscher
Chief, NEPA Section
Strategic Programs Office

Enclosure

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

September 19, 2018

Ms. Anita E. Masters
NEPA Compliance Project Manager
Tennessee Valley Authority
1101 Market Street, BR 4A
Chattanooga, Tennessee 37402

Re: Programmatic Draft Environmental Impact Statement (PDEIS) for the Tennessee Valley Authority Transmission System Vegetation Management; CEQ No.: 20180183

Dear Ms. Masters:

The U.S. Environmental Protection Agency has reviewed the referenced document in accordance with Section 309 of the Clean Air Act and Section 102(2)(C) of the National Environmental Policy Act (NEPA). The purpose of this PDEIS is for the Tennessee Valley Authority (TVA) to address potential impacts associated with the proposed transmission system management of vegetation within its transmission rights-of-way (ROW). TVA's transmission system spans six states (Tennessee, Alabama, Georgia, Kentucky, Mississippi, North Carolina, and Virginia) and serves approximately nine million residents in a more than 82,000-square-mile area. TVA's transmission system consists of a network of more than 16,000 miles of electric transmission lines and approximately 500 power substations all contained within approximately 238,000 acres of utility ROW. For vegetation management purposes this area is divided into six regions consisting of 12 sectors. TVA will further develop a plan to maintain active transmission line ROWs within each of the 12 sectors.

The EPA has reviewed the PDEIS and the four alternatives for the transmissions system vegetation management. In addition to the no action alternative, Alternative A, TVA has considered three action alternatives (i.e. Alternative B, C, and D as described below) that identified several vegetation management strategies. The No Action Alternative would not cause a change to the current process by which TVA manages vegetation along the transmission line ROW. No re-clearing of the buffer would be conducted under this alternative and TVA would leave existing trees in the maintained area of the ROW so long as they do not pose an immediate hazard to the transmission lines or structures. Alternative B would result in the full extent of the transmission ROW subject to TVA vegetation management being cleared on a recurring cycle (typically every 3 years) to ensure that vegetation would not threaten transmission lines or structures until the next cycle of treatment. Alternative C would implement a process of vegetation community conversion within the full extent of the actively-managed transmission ROW which promotes the establishment of a low-growing herbaceous plant community with a meadow like end state. Alternative D manages the vegetation within the transmission ROW using a wire zone/border zone approach. This alternative would promote the establishment of low-growing compatible herbaceous and shrub-scrub dominated plant communities that do not interfere with the safe and reliable operation of the transmission system. However, under Alternative D, the buffer zone would be allowed to redevelop with compatible species of shrubs and trees promoting a soft or "feathered" edge which could be used to provide a transition from forested habitat into the meadow-like habitat of the wire zone.

The EPA understands that TVA's preferred alternatives for the transmission system vegetation management is Alternative C. Vegetation management under this alternative would be accomplished with an integrated vegetation management approach to promote the establishment of a low-growing herbaceous plant community that is compatible with the safe and reliable operation of the transmission system. This alternative entails re-clearing of incompatible vegetation (7,336 acres) in the first three years to remove trees that either remained or have redeveloped within the transmission ROW since the initial construction of the ROW. All areas within the transmission ROW thereafter would be managed as floor. TVA would also use an approach that is condition based for identification and removal of danger trees that would use Light Detection and Ranging (LIDAR) and other assessment techniques. Routine vegetation maintenance would include identification and removal of vegetation within the transmission ROW that is incompatible with TVA's desired end-state condition. Within lands primarily managed by TVA, floor work would continue on an established cycle. The resulting end-state, consisting of a mix of herbaceous and low growing shrub species, is expected to provide improved habitat value that over time is also expected to minimize intensity of maintaining the floor. Additionally, TVA would work with local property owners to evaluate the compatibility of vegetation within or near the transmission ROW. Vegetation compatible with the safe and reliable operation of the transmission system may be allowed to remain within the ROW.

The EPA has rated the PDEIS as Lack of Objections ('LO'). Although TVA has identified Alternative C as the preferred alternative, EPA prefers Alternative D from a habitat enhancement standpoint. Under Alternative D, the EPA understands that TVA would manage vegetation within the transmission ROW using a wire zone/border zone approach and that this alternative would promote the establishment of low-growing compatible herbaceous and shrub-scrub dominated plant communities that do not interfere with the safe and reliable operation of the transmission system. However, under Alternative D, the buffer zone would be allowed to redevelop with compatible species of shrubs and trees promoting a soft or "feathered" edge which could be used to provide a transition from forested habitat into the meadow-like habitat of the wire zone. Alternative D will increase long-term habitat quality associated with border zone regrowth consisting of compatible herb, shrub and tree species. This alternative also increases potential habitat and support for pollinator and wildlife species more so than Alternative C.

The EPA has not identified any significant environmental impacts to the proposed action that would require substantive changes to the DPEIS or require the TVA's consideration of different alternatives for the management of vegetation in TVA ROW. The EPA has enclosed detailed technical comments and recommendations for your consideration (See enclosure).

The EPA appreciates the opportunity to review the TVA's transmission system vegetation management PDEIS. If you wish to discuss the matter further, please contact Ms. Amanetta Somerville, or Mr. Larry Gissentanna, at 404-562-9025 or 404-562-8248, respectively, or by e-mail at somerville.amanetta@epa.gov or gissentanna.larry@epa.gov.

Sincerely,

Christopher A. Militscher
Chief, NEPA Program Office
Resource Conservation and Restoration Division

Enclosure: Detailed Technical Recommendations

Enclosure
EPA's Detailed Technical Recommendations
Programmatic Draft Environmental Impact Statement for the Tennessee Valley Authority
Transmission System Vegetation Management
CEQ No.: 20180183

- Alternative Vegetation Management Strategies: The EPA acknowledges that TVA has considered three action alternatives (i.e. Alternative B, C, and D) which include various vegetation management strategies.

Recommendation: The EPA recommends the that TVA consider the ROW vegetation management strategy of disking. Strip disking is one of the simplest, most effective and inexpensive techniques for cutting up grassy vegetation, and preventing an area from maturing into briars, shrubs, and trees. Disking involves the purposeful disturbance of the soil to release sod-bound fields, reduce litter accumulation, create bare ground, stimulate germination of desirable seed-producing plants, and increase insect populations for birds to feed upon. This strategy would also fulfill TVA's objective of managing vegetation and allowing for larger intervals between recurring cycles (4-6 years versus 3 years). Additionally, the use of disking as a vegetation management strategy encourages the natural re-vegetation of annual grasses and forbs (native broadleaf plants) that are a major wildlife food source and provide important brood rearing habitat.

- Climate Change: TVA has adopted a climate adaptation plan that establishes adaptation planning goals and describes the challenges and opportunities a challenging climate may present to its mission and operations. TVA's 'Environmental Policy' includes the specific objective of stopping the growth in volume of emissions and reducing the rate of carbon emissions by 2020 by supporting a full slate of reliable, affordable, lower-CO_2 energy supply opportunities and energy efficiency. Although clearing of vegetation releases CO_2 from cleared vegetation into the atmosphere, the TVA will implement vegetation control activities that offset CO_2 emissions including the re-growth of low-growing vegetation and the permanent storage of carbon in any trees marketed as lumber.

Recommendation: The EPA acknowledges TVA's efforts on its climate adaption plan and recommends that the opportunities identified in the plan are carried forward in the 12 sector plans.

- Endangered Species: TVA acknowledges that 162 species listed under the Endangered Species Act (ESA) as endangered, threatened, proposed for listing, or candidates for listing have been reported from within the study area. Additionally, approximately 1,350 individual plant and animal species have been formally listed as protected species by one or more of the states, or otherwise identified as a species of conservation concern. Furthermore, critical habitats for 43 federally-listed species has also been identified within the study area. Many species listed under the ESA occur in the immediate vicinity of the TVA transmission system ROWs and would potentially be affected by its vegetation management activities. The major habitats supporting federally-listed species in the TVA study area include free-flowing rivers and streams, caves, limestone cedar glades, high elevation areas, shorelines, and bluff/rock outcrops. The EPA acknowledges that TVA has taken multiple actions to minimize the adverse effects of vegetation management on federally-listed species (e.g., seasonal restrictions on select activities to avoid impacts to federally listed roosting bats and nesting turtles and an established best management practice for the management of vegetation) and has taken steps to conserve listed species occurring in other habitats.

Recommendation: The EPA would like to emphasize the importance of TVA developing a vegetation re-clearing plan as stated in section 3.1.1 and 3.1.2 of the DPEIS that states that a specific vegetation re-clearing plan would be established for each transmission line project area based on local terrain conditions, species composition, growth form, and vegetative density to assist in the preservation of the diverse plant and animal species that exists within the TVA ROW (including potentially ESA species).

ALABAMA HISTORICAL COMMISSION

468 South Perry Street
P.O. Box 300900
Montgomery, Alabama 36130-0900
334-242-3184 / Fax: 334-240-3477

Lisa D. Jones
Executive Director
State Historic Preservation Officer

July 3, 2018

Clinton E. Jones
Manager
Cultural Compliance
TVA
400 West Summit Drive
Knoxville, Tennessee 37902

Re: AHC 2018-0948
Transmission System Vegetation Management Program
Programmatic EIS
Statewide

Dear Mr. Jones:

Upon review of the above-referenced project forwarded by your office, we offer the following comments:

Section 4.14.1.1
"The majority of the activities associated with transmission ROW vegetative management are covered within this PA." Which activities are covered/not covered by the proposed PA? Are the activities not covered limited to those listed in this EIS? Please note that consultation for the potential PA is ongoing and may not result in signatures of all parties. If this is the case for Alabama, all activities regarding ROW vegetative management should be addressed in a separate document.

Section 4.4.14.2.1
Have the transmission ROW's all been surveyed or significantly disturbed as to preclude the possibility of intact cultural features? It is noted in the text that pulling methods have a greater potential effect to cultural resources and will be conducted on a limited basis. We do not consider the potential impacts from this method to be minor based solely on the infrequency of the method's utilization.

Section 4.14.2.4
We do not agree with the use of wetland mats.

Section 4.14.2.5
Please define the term "significant" in this context.

Section 4.14.2.6
In the event that the Alabama SHPO does not sign the proposed PA, mitigation measures should be addressed in a separate document.

We appreciate your commitment to helping us preserve Alabama's historic archaeological and architectural resources. Should you have any questions, please contact Amanda McBride at 334.230.2692 or Amanda.McBride@ahc.alabama.gov. Have the AHC tracking number referenced above available and include it with any future correspondence.

Sincerely,

Lee Anne Wofford

Lee Anne Wofford
Deputy State Historic Preservation Officer

LAW/AMH/amh

GEORGIA
DEPARTMENT OF NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION

MARK WILLIAMS
COMMISSIONER

DR. DAVID CRASS
DIVISION DIRECTOR

June 29, 2018

Clinton E. Jones
Manager, Cultural Compliance
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, Tennessee 37902

RE: TVA: EIS for Transmission System Vegetation Management
Statewide, Georgia
HP-180604-010

Dear Mr. Jones:

The Historic Preservation Division (HPD) has received initial information concerning the above referenced project requesting comments pursuant to the National Environmental Policy Act of 1969 (NEPA). Our comments are offered to assist the Tennessee Valley Authority (TVA) in complying with the provisions of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA).

Thank you for notifying us of this federal undertaking. We look forward to receiving Section 106 compliance documentation, as appropriate. If the federal agency intends to utilize NEPA to comply with Section 106, in lieu of the procedures set forth in 36 CFR Part 800, TVA should notify HPD and the Advisory Council on Historic Preservation of its intent.

Please refer to project number **HP 180604-010** in future correspondence regarding this project. If we may be of further assistance, please contact Meg R. Pagán, Environmental Review Historian, at (770) 389-7852 or meg.pagan@dnr.ga.gov.

Sincerely,

Jennifer Dixon, MHP, LEED Green Associate
Program Manager
Environmental Review & Preservation Planning

JAD/mrp

Harle, Michaelyn S

From: Harle, Michaelyn S
Sent: Monday, July 02, 2018 9:39 AM
To: 'Laracuente, Nicolas (Heritage Council)'
Subject: RE: Vegetation Management / PA question

Nick,
Yes, our goal is to have the PA executed before signing the ROD. We have incorporated all of the 7 SHPOs comments and the consulting Tribes. The second draft was sent to the ACHP review. We are currently meeting internally with all of TVA's Business Units to discuss the second draft. The plan is to have the second draft sent back out to your offices by mid-late August.
Michaelyn

Michaelyn Harle, Ph.D
Archaeologist
Biological and Cultural Compliance

400 W. Summit Hill Drive
WT 11A-K
Knoxville, TN 37902

865-632-2248 (w)
mharle@tva.gov

From: Laracuente, Nicolas (Heritage Council) <Nicolas.Laracuente@ky.gov>
Sent: Monday, July 02, 2018 9:19 AM
To: Harle, Michaelyn S <mharle@tva.gov>
Subject: Vegetation Management / PA question

Michaelyn,

Just checking in to say that we don't have any comments on the EIS Clinton sent us on June 1. But it did prompt a question about the status of the PA. It hasn't been executed yet, correct? Are we on track for that to be executed before the actions in this EIS come into play?

Nick

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
NASHVILLE, TENNESSEE 37243-0435

SHARI MEGHREBLIAN, PhD
COMMISSIONER

BILL HASLAM
GOVERNOR

September 24, 2018

<u>Via Electronic Mail to aemasters@tva.gov</u>
Attn: Anita E. Masters, NEPA Project Manager
Tennessee Valley Authority
1101 Market St., BR2
Chattanooga, TN 37402

Dear Ms. Masters:

The Tennessee Department of Environment and Conservation (TDEC) appreciates the opportunity to provide comments on the Tennessee Valley Authority (TVA) *Draft Programmatic Environmental Impact Statement* (PEIS) which considers the potential environmental, social, and economic effects associated with the proposed management of vegetation within TVA's transmission rights-of-way (ROW). The purpose of TVA's transmission system vegetation management program is to strategically manage TVA's existing transmission line ROW consistent with applicable laws, orders, standards, practices and guidance while providing reliable energy and protecting environmental resources. According to the Draft PEIS, the need for the proposed action includes; to improve the effectiveness of TVA's vegetation management program to eliminate vegetation that interferes with the operation of the existing transmission system so that TVA can continue to provide safe and reliable electric power in a cost-effective and environmentally sound manner; to comply with all current and future North American Electric Reliability Corporation (NERC) Reliability Standards to maintain transmission lines in a safe and reliable operating condition, thereby minimizing TVA's potential for costly fines for NERC noncompliance; and to enhance public safety through controlled vegetation management of TVA's transmission lines.[1]

Actions considered in detail within the Draft PEIS include:

- **Alternative A – No Action Alternative**. Under the No Action Alternative, there would be no change to the current process by which TVA manages vegetation along the transmission line ROW pursuant to the injunction entered in the *Sherwood v. TVA* lawsuit. No re-clearing of the buffer would be conducted under this alternative. This vegetation management process is prescribed by the court injunction order currently in place in the *Sherwood v. TVA* litigation. Under the Order, TVA must leave existing trees in the maintained area of the ROW so long as they do not pose an immediate hazard to the transmission lines or structures. Additionally, TVA may remove or trim any tree in the previously maintained areas of ROW, or in the non-maintained areas of ROW, or any danger tree outside the transmission ROW, in accordance

[1] TVA's current vegetation management practices are identified in a July 31, 2017 injunction Order from the U.S. District Court. This injunction requires "TVA [to] maintain buffer zones on the edges of its ROW in a manner as described in its 1997 and 2008 Line Maintenance Manuals" until TVA prepares and publishes a thorough Environmental Impact Statement pursuant to the National Environmental Policy Act (NEPA) analyzing TVA's ROW vegetation management program.

with its contract rights, that TVA deems to present an immediate hazard to its transmission line or structures. Tree work in remaining buffer areas would be limited subject to the terms of the court-ordered injunction.[2] Floor work would continue to be managed on a nominal 3-year cycle in previously cleared areas.

According to TVA's assessment, the No Action Alternative does not adequately address the potential for service outages from trees growing into the line, falling into the line, or creating a fire hazard to the transmission lines and structures and as such creates an increasing risk to reliability.[3] The net present value (NPV) of the cost to maintain the transmission ROW for the next 20 years under the No Action Alternative is estimated to be approximately $206 million. The cost for initial re-clearing is not included under this alternative, as it is in all of the other alternatives, as that action is not permitted under the injunction.[4] However, tree work costs are higher for this alternative and will increase over time due to the inefficiencies inherent in removal of only immediate hazard trees, as opposed to removal of all incompatible trees during the vegetation maintenance activity. This increase would be a direct result of continued vegetation growth until the vegetation grows sufficiently to meet the definition of immediate hazard, which would necessitate addressing that imminent hazard in the next maintenance cycle. In addition, the increased costs include management of new trees that sprout and grow as a result of the less aggressive vegetation maintenance under the injunction. Consequently, TVA does not believe this alternative would satisfy the project purpose and need and, therefore, is not considered a viable or reasonable vegetation management alternative.

- **Alternative B – Cyclical-Based Control Strategy**. Under Alternative B, the full extent of the transmission ROW subject to TVA vegetation management would be cleared on a recurring cycle (typically every 3 years) to ensure that vegetation would not threaten transmission lines or structures until the next cycle of treatment. Re-clearing all buffer vegetation would be conducted under this alternative using a mix of mechanical (about 85 percent) and manual (about 15 percent) methods. Vegetation within the floor of the ROW on lands primarily managed by TVA would be controlled using a mix of approximately 90 percent herbicide, 6 percent mechanical and 4 percent manual methods. However, under this alternative TVA would continue to use a context sensitive approach to tool selection for vegetation maintenance. All vegetation with the potential to interfere with the safe and reliable operation of the transmission system would be removed using a combination of mechanical or manual methods depending on the specific site condition. TVA would continue to use all assessment techniques under Alternative B except LIDAR.[5]

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[2] For more details, Pages 69 and 70 of the PEIS describe the trimming terms of the court-ordered injunction.
[3] In addition, this approach would lead to a marked increase in worker safety concerns, due to the increased risk of serious injuries and fatalities associated with the increased need to undertake manual removal of large danger trees.
[4] The cost to maintain the floor remains constant assuming an annual inflation rate of 2.5 percent.
[5] Because no LIDAR assessment would be used under this alternative, incompatible vegetation would be determined by field inspections. During a ground inspection, the transmission ROW would be visually evaluated to identify vegetation that could interfere with the safe and reliable operation of the transmission system. The process first would require the inspector to visually identify a potential threat and then to utilize a range finder to measure the clearance between the transmission line and the vegetation to confirm its status. The clearance would be measured against the closest point in the transmission line at its current state without consideration of the potential change in vertical or horizontal positioning of the transmission line from thermal (ambient heat dissipation of the electricity in line from wind velocity/direction, ambient air temperature and precipitation) or physical loading (factors such as ice and wind loading that affect sag and sway of the line). In addition, due to the yearly volume of transmission lines to be inspected and the allotted timeframe, the inspections would be performed by multiple inspectors – leading to potential inconsistencies due to subjectivity in evaluation. Although ground inspection provides another perspective of the conditions, it is limited to the individual inspector's ability to identify potential threats while navigating the diverse terrain, dealing with environmental factors and coordinating with property owners.

TVA previously has allowed property owners to maintain trees on their property within the transmission ROW. However, this practice is unsafe for the landowner as well as for the reliability of the transmission system because implementation, timing and consistency of owner maintenance can be unreliable. Accordingly, this practice would no longer be allowed under this alternative. The NPV of the cost to maintain the transmission ROW for the next 20 years under Alternative B is estimated to be approximately $171 million.[6] This cost estimate assumes that danger trees would be identified by field inspection in lieu of LIDAR, which reduces cost but which also increases the risk of missing a higher priority threat compared to a LIDAR inspection. As such, danger tree costs are strictly budget-based and may be underestimated for this alternative as this estimate does not address danger trees outside of the transmission ROW.

- **Alternative C – Condition-Based Control Strategy – End-State Meadow-like, Except for Areas Actively Maintained by Others (Compatible Trees Allowed)**. Under Alternative C, TVA would implement a process of vegetation community conversion within the full extent of the transmission ROW actively maintained by TVA. TVA would use an Integrated Vegetation Management (IVM) approach to promote the establishment of a plant community dominated by low-growing herbaceous and shrub-scrub species that do not interfere with the safe and reliable operation of the transmission system. The goal of this vegetation management alternative would be to allow compatible vegetation to establish and propagate to reduce the presence of woody species. TVA would continue to use all assessment techniques, including LIDAR.

  Re-clearing of all buffer vegetation (the buffer zone is a subset of the border zone) would be conducted under this alternative using a mix of mechanical (about 85 percent) and manual (about 15 percent) methods. Routine vegetation management includes the identification and removal of vegetation within the transmission ROW incompatible with TVA's desired end-state condition. Within transmission ROWs primarily maintained by TVA, floor work would continue on an established cycle and in general, vegetation within the ROW would be controlled using a mix of approximately 90 percent herbicide, 6 percent mechanical and 4 percent manual methods. All danger trees would be removed using a combination of mechanical or manual methods depending on the specific site conditions. However, under this alternative, TVA would continue to use a context sensitive approach to tool selection for vegetation maintenance. In the long-run, the frequency of vegetation maintenance within the entire transmission system may be the same as under Alternative B because the continual growth of vegetation will require routine maintenance. However, Alternative C is expected to result in the establishment of a stable, low-growing plant community that would reduce the intensity of vegetation control once the desired end state in each location has been achieved.

  Under this alternative TVA would have the option to allow compatible trees to remain in areas actively maintained by others (such as residential lands, orchards, forest plantations, agricultural lands or other similar areas). The maintenance of trees in these areas would be optimized with the use of various inspection methods. These methods include aerial patrols, ground patrols, photogrammetry, and LIDAR surveys to identify the extent of any tree removal needed[7]. The NPV of the cost to maintain the transmission ROW for the next 20 years under this alternative is estimated to be approximately $183 million.[8] The cost of maintaining the transmission ROW under a condition-based strategy would

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[6] The cost to maintain the floor remains constant assuming an annual inflation rate of 2.5 percent.
[7] These tools allow TVA to implement a targeted approach through the identification of categories that define the risk of current and future danger trees.
[8] The cost to maintain the floor remains constant assuming an annual inflation rate of 2.5 percent.

potentially be higher than Alternative B in the near-term. This is because vegetation would most likely need to be controlled more often until low-growing plant communities are established. In the long-term, however, it would be less expensive to maintain the transmission ROW under this alternative because less re-clearing would be needed.

- **Alternative D – Condition-Based Control Strategy – End-State Compatible Vegetation Variable by Zone, Except for Areas Actively Maintained by Others (Compatible Trees Allowed)**. Under Alternative D, TVA would manage vegetation within the transmission ROW using a wire zone/border zone approach. This alternative was formulated based upon input during the scoping process. As with Alternative C, TVA would implement a process of vegetation community conversion within the transmission ROW wire zone using an IVM approach. This alternative would promote the establishment of low-growing compatible herbaceous and shrub-scrub dominated plant communities that do not interfere with the safe and reliable operation of the transmission system. However, under Alternative D, the buffer zone would be allowed to redevelop with compatible species of shrubs and trees. The goal of this vegetation management alternative is to promote a soft or "feathered" edge which could be used to provide a transition from forested habitat into the meadow-like habitat of the wire zone. TVA would continue to use all assessment techniques under Alternative D including LIDAR.

  Re-clearing of all buffer vegetation would be conducted under this alternative using a mix of mechanical (about 85 percent) and manual (about 15 percent) methods. Routine vegetation maintenance would include identification and removal of incompatible vegetation within the transmission ROW to achieve the desired end-state condition. Within lands primarily maintained by TVA, floor work would continue on an established cycle and in general, vegetation within the transmission ROW would be controlled using a mix of approximately 90 percent herbicide, 6 percent mechanical and 4 percent manual methods. However, under this alternative TVA would continue to use a context sensitive approach to tool selection for vegetation management.

  Under this alternative, TVA has the option to allow compatible trees to remain in areas actively maintained by others (such as residential lands, orchards, forest plantations, agricultural lands or other similar areas). Management of trees in these areas would be optimized with the use of various inspection methods including aerial patrols, ground patrols, photogrammetry, and LIDAR surveys to identify the extent of tree removal needed. These tools would provide information which would allow TVA to implement a targeted approach through the identification of categories that define the risk and accordingly the need for removal of danger trees in these areas. All danger trees would be removed using a combination of mechanical and manual methods depending on site-specific conditions. The NPV of the cost to maintain the transmission ROW for the next 20 years under this alternative is estimated to be approximately $225 million. The cost of this alternative is greater than Alternative C because of the increased effort required by field crews to include staff trained to identify plant species that require selective control based on species composition and growth form.

TDEC has reviewed the Draft PEIS and has the following comments regarding the proposed action and its alternatives:

Cultural Resources

Based on information provided in the Draft PEIS, the proposed action and its alternatives have the potential to disturb significant archaeological resources within the proposed project areas. Manual or mechanical vegetation clearing methods have the potential to adversely impact cultural resources. TDEC recommends that all un-surveyed locations to be disturbed by earthmoving activity from vegetation management be examined by a qualified professional archaeologist prior to project initiation; TVA should also adhere to best management practices where sites are known to exist.[9]

Air Resources

The preferred alternative could involve some level of open burning and if determined to be acceptable to use for a disposal method, would likely produce localized and insignificant air quality impacts that are of short term duration. TDEC recommends that all other disposal methods be evaluated before open burning is considered. In the event that open burning is to be undertaken, TDEC would propose that open burning on air quality alert days be avoided and that adequate planning and coordination with the local and state air programs and fire control agencies be established before undertaking any burning activities. TDEC encourages TVA to include these considerations in the Final PEIS.

Solid Waste

TDEC recommends that the Final PEIS reflect that materials generated (intentionally or accidentally) that are determined to be wastes be evaluated and managed in accordance with the Solid and Hazardous Wastes Rules and Regulations of the State (TDEC Division of Solid Waste Management Rule 0400 Chapters 11 and 12, respectively) in addition to other applicable regulations (federal, state) and TVA's best management practices.

Water Resources

All alternatives evaluated in the Draft PEIS include re-clearing of ROWs prior to the new maintenance phase. Depending on the scope of clearing, a Construction Stormwater General Permit (CGP) may be required in some cases (such as due to local terrain). Grubbing or bush-hogging would not necessarily require CGP coverage where root systems are left behind. If the machinery causes the vegetation to be ripped out, whereby ultimately disturbing the top layer of soil inadvertently, then coverage under a CGP would be necessary. TDEC encourages TVA to include additional information relating to its vegetation management practices, such as what equipment will be used, depth of disturbance, etc. in the Final PEIS to better identify the potential for impacts.

TDEC agrees that TVA must at a minimum identify site-specific characteristics and incorporate TVA's office-level sensitive area review (O-SAR) process to determine the selection of vegetation management methods employed. In some cases, O-SAR may be insufficient to determine the site-specific sensitivity. The sensitive environmental reviews should include potential for water supplies, springs, wetlands and streams to be impacted. In heavily karst topography, the presence and proliferation of sinkholes and other karst features need to be considered. Any herbicide spraying needs to include buffers near streams and other sensitive areas. The list of herbicides includes herbicides that public water systems are not required to monitor for. If the spraying is to occur in an area where it could potentially impact a public water system, TDEC and the water system should be informed prior to herbicide application. TDEC encourages TVA to include these considerations in the Final PEIS.

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[9] No comment can be made at this time concerning mitigation measures since the PA is still in negotiation. This is a state-level review only and cannot be substituted for a federal agency Section 106 review/response. Additionally, a court order from Chancery Court must be obtained prior to the removal of any human graves. If human remains are encountered or accidentally uncovered by earthmoving activities, all activity within the immediate area must cease. The county coroner or medical examiner, a local law enforcement agency, and the state archaeologist's office should be notified at once (Tennessee Code Annotated 11-6-107d).

TDEC appreciates the opportunity to comment on this Draft PEIS. Please note that these comments are not indicative of approval or disapproval of the proposed action or its alternatives, nor should they be interpreted as an indication regarding future permitting decisions by TDEC. Please contact me should you have any questions regarding these comments.

Sincerely,

Kendra Abkowitz

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September 12, 2018

Ms. Anita E. Masters
NEPA Project Manager
1101 Market St., BR2
Chattanooga, TN 37402

RE: Comments on the Draft Programmatic Environmental Impact Statement for the Tennessee Valley Authority Transmission System Vegetation Management, Lee, Scott, Washington and Wise Counties, Virginia (DEQ 18-120F).

Dear Ms. Masters:

The Commonwealth of Virginia has completed its review of the above-referenced document. The Department of Environmental Quality (DEQ) is responsible for coordinating Virginia's review of federal environmental documents submitted under the National Environmental Policy Act (NEPA) and responding to appropriate federal officials on behalf of the Commonwealth. This is in response to the August 2018 Draft Programmatic Environmental Impact Statement (PEIS) (received August 10, 2018) submitted by the Tennessee Valley Authority (TVA) for the above-referenced project. The following agencies participated in the review of this proposal:

Department of Environmental Quality
Department of Conservation and Recreation (DCR)
Department of Health (VDH)
Department of Transportation (VDOT)

In addition, the Department of Game and Inland Fisheries (DGIF), Department of Historic Resources, Department of Forestry, Department of Agriculture and Consumer Services, Lee, Scott, Washington and Wise counties, the Mount Rogers Planning District Commission (PDC), and the LENOWISCO PDC were invited to comment on the proposal.

PROJECT DESCRIPTION

The Tennessee Valley Authority has submitted a draft Programmatic Environmental Impact Statement for its Transmission System Vegetation Management project. TVA's transmission system serves nine million residents over an 82,000 square mile area. The system comprises a network of over 16,000 miles of transmission line, with over 500 substations and approximately 238,000 acres of right-of-way (ROW). Most of the system is located on private lands. TVA actively maintains approximately 46% of the transmission ROW; the remainder is used as cropland, golf courses, orchards or similar uses and is primarily maintained by the landowner. TVA conducts routine inspections and vegetation management of ditch banks, fence rows, and towers. TVA's service area in Virginia includes Lee, Scott, Washington and Wise counties. TVA has developed four alternatives for the management of vegetation within its active transmission right-of-way. The No Action Alternative (Alternative A) would be maintaining the current vegetation method as prescribed by the court injunction order in the *Sherwood vs. TVA* litigation. Under the existing conditions TVA has stopped removing woody vegetation except for trees that are an immediate hazard to the system. As a result, buffer zones within the ROW have grown up substantially with woody vegetation. Alternatives B, C, and D each include an initial re-clearing within buffer areas (except for grasses, forbs, and small shrubs) across the full extent of the ROW. After the initial re-clearing is completed, under Alternative B the ROW would be maintained to a low height on a recurring cycle. Under Alternative C the vegetation community would be converted to a meadow-like end state and under Alternative D the buffer zone would be managed to an end-state consisting of compatible vegetation that would vary depending on zone (compatible shrubs and trees in the border zone and low-growing herbaceous plants in the wire zone). Alternatives C and D would allow compatible trees and shrubs in areas actively maintained by others. TVA's preferred alternative is Alternative C. Vegetation generally would be managed using a combination of manual removal, mechanical cutting and trimming, and herbicide spraying and growth regulators. Integrated Vegetation Management would be a central component of TVA's strategy. The PEIS encompasses the ROW vegetation management across the entire TVA transmission system. The management of individual transmission line segments would tier from the PEIS as needed for more site-specific review and analysis.

ENVIRONMENTAL IMPACTS AND MITIGATION

1. Surface Waters and Wetlands. According to the PEIS (page 161), using National Wetlands Inventory (NWI) maps and further desktop reviews, approximately 20,348 acres of potential wetlands are found in the TVA ROW, comprising 8.5 percent of TVA's transmission ROW system. Palustrine emergent wetlands are the most abundant type of wetland likely to be found in the ROW. Transmission ROW vegetation maintenance in wetlands consists of completely removing or limiting woody wetland vegetation. Wetland avoidance, impact minimization, and mitigation measures will be in place. When wetland impacts cannot be avoided, compensatory mitigation may include the purchase of wetland credits from a mitigation bank (page 169). Direct and indirect impacts to wetlands may occur.

1(a) Agency Jurisdiction. The State Water Control Board promulgates Virginia's water regulations covering a variety of permits to include the Virginia Pollutant Discharge Elimination System Permit (VPDES) regulating point source discharges to surface waters, Virginia Pollution Abatement Permit regulating sewage sludge, storage and land application of biosolids, industrial wastes (sludge and wastewater), municipal wastewater, and animal wastes, the Surface and Groundwater Withdrawal Permit, and the Virginia Water Protection (VWP) Permit regulating impacts to streams, wetlands, and other surface waters. The VWP permit is a state permit which governs wetlands, surface water, and surface water withdrawals and impoundments. It also serves as §401 certification of the federal Clean Water Act §404 permits for dredge and fill activities in waters of the U.S. The VWP Permit Program is under the Office of Wetlands and Stream Protection, within the DEQ Division of Water Permitting. In addition to central office staff that review and issue VWP permits for transportation and water withdrawal projects, the six DEQ regional offices perform permit application reviews and issue permits for the covered activities:

- Clean Water Act, §401;
- Section 404(b)(i) Guidelines Mitigation Memorandum of Agreement (2/90);
- State Water Control Law, Virginia Code section 62.1-44.15:20 *et seq*.; and
- State Water Control *Regulations*, 9 VAC 25-210-10.

1(b) Agency Findings. The DEQ Southwest Regional Office (SWRO) notes that no long-term adverse impacts to water quality are anticipated to result from this project.

The transmission lines covered by this proposal for vegetative management are in Lee, Scott, Washington, and Wise Counties, Virginia. Watersheds in the area of these transmission lines include the Clinch River Subbasin of the Tennessee and Big Sandy River Basin, and the Holston River Subbasin of the Tennessee and Big Sandy River Basin. There are numerous Class V Stockable Trout Waters and Class VI Natural Trout Waters within these watersheds. There are also rivers and streams in these watersheds that do not currently meet Virginia Water Quality Standards. Such streams can be found in the 305(b)/303(d) Water Quality Assessment Integrated Report.

1(c) Agency Recommendation. Short-term water quality impacts resulting from surface runoff should be minimized by using Best Management Practices (BMPs). Coordinate with the DEQ SWRO (Martha Chapman, 276-676-4845) for more information about specific impairments.

In general, DEQ recommends that stream and wetland impacts be avoided to the maximum extent practicable. To minimize unavoidable impacts to wetlands and waterways, DEQ recommends the following practices:

- Operate machinery and construction vehicles outside of stream-beds and wetlands; use synthetic mats when in-stream work is unavoidable.
- Preserve the top 12 inches of trench material removed from wetlands for use as wetland seed and root-stock in the excavated area.
- Design erosion and sedimentation controls in accordance with the most current edition of the Virginia Erosion and Sediment Control Handbook. These controls should be in place prior to clearing and grading, and maintained in good working order to minimize impacts to State waters. The controls should remain in place until the area is stabilized.
- Place heavy equipment, located in temporarily impacted wetland areas, on mats, geotextile fabric, or use other suitable measures to minimize soil disturbance, to the maximum extent practicable.
- Restore all temporarily disturbed wetland areas to pre-construction conditions and plant or seed with appropriate wetlands vegetation in accordance with the cover type (emergent, scrub-shrub, or forested). The applicant should take all appropriate measures to promote revegetation of these areas. Stabilization and restoration efforts should occur immediately after the temporary disturbance of each wetland area instead of waiting until the entire project has been completed.
- Place all materials which are temporarily stockpiled in wetlands, designated for use for the immediate stabilization of wetlands, on mats, geotextile fabric in order to prevent entry in State waters. These materials should be managed in a manner that prevents leachates from entering state waters and must be entirely removed within thirty days following completion of that construction activity. The disturbed areas should be returned to their original contours, stabilized within thirty days following removal of the stockpile, and restored to the original vegetated state.
- Flag or clearly mark all non-impacted surface waters within the project or right-of-way limits that are within 50 feet of any clearing, grading, or filling activities for the life of the construction activity within that area. The project proponent should notify all contractors that these marked areas are surface waters where no activities are to occur.
- Employ measures to prevent spills of fuels or lubricants into state waters.

1(d) Requirement. Submit a Joint Permit Application (JPA) for impacts to surface waters and wetlands, as necessary. Upon receipt of the JPA, DEQ VWP staff will review the proposed project in accordance with VWP permit regulations and current VWP permit program guidance.

2. Erosion and Sediment Control and Stormwater Management. The PEIS notes (page Summary-6) that land disturbance due to vegetation removal may cause some increased erosion. However, in the long-term, restoration activities will reduce potential erosion and sedimentation into waterbodies (PEIS, page 150).

2(a) Agency Jurisdiction. The DEQ Office of Stormwater Management (OSWM) administers the following laws and regulations governing construction activities:

- Virginia Erosion and Sediment Control Law (§ 62.1-44.15:51 *et seq*.) and *Regulations* (9 VAC 25-840) (VESCL&R);
- Virginia Stormwater Management Act (VSMA, § 62.1-44.15:24 *et seq*.);
- Virginia Stormwater Management Program (VSMP) Regulation (9 VAC 25-870); and
- 2014 General Virginia Pollutant Discharge Elimination System (VPDES) Permit for Discharges of Stormwater from Construction Activities (9 VAC 25-880).

In addition, DEQ is responsible for the VSMP General Permit for Stormwater Discharges from Construction Activities related to Municipal Separate Storm Sewer Systems (MS4s) and construction activities for the control of stormwater discharges from MS4s and land disturbing activities under the Virginia Stormwater Management Program (9 VAC 25-890-40).

2(b) Requirements. The DEQ OSWM did not respond to the request for comments. Guidance on the regulatory requirements is provided below.

2(b)(i) Erosion and Sediment Control and Stormwater Management. TVA and its authorized agents conducting regulated land-disturbing activities on private and public lands in the state must comply with *VESCL&R* and Virginia Stormwater Management Laws and Regulations *(VSWML&R)*, including coverage under the general permit for stormwater discharges from construction activities, and other applicable federal non-point source pollution mandates (e.g. Clean Water Act-Section 313, federal consistency under the Coastal Zone Management Act). Clearing and grading activities, installation of staging areas, parking lots, roads, buildings, utilities, borrow areas, soil stockpiles, and related land-disturbing activities that result in the total land disturbance of equal to or greater than 10,000 square feet would be regulated by *VESCL&R*. Accordingly, TVA must prepare and implement an erosion and sediment control (ESC) plan to ensure compliance with state law and regulations. The ESC plan should be submitted to the DEQ for review for compliance. TVA is ultimately responsible for achieving project compliance through oversight of on-site contractors, regular field inspection, prompt action against non-compliant sites, and other mechanisms consistent with agency policy. A stormwater management plan may also be required.

2(b)(ii) Virginia Stormwater Management Program General Permit for Stormwater Discharges from Construction Activities (VAR10). The operator or owner of a construction activity involving land disturbance of equal to or greater than 1 acre is required to register for coverage under the General VPDES Permit for Discharges of Stormwater from Construction Activities and develop a project specific stormwater pollution prevention plan (SWPPP). The SWPPP must be prepared prior to submission of the registration statement for coverage under the General Permit, and it must address water quality and quantity in accordance with the *Virginia Stormwater Management Program (VSMP) Regulations*. General information and registration forms for the General Permit are available on DEQ's website at www.deq.virginia.gov/Programs/Water/StormwaterManagement/VSMPPermits/ConstructionGeneralPermit.aspx.

3. Air Pollution Control. Impacts to air quality from vegetation management are expected to be minor. Air emissions from the project would result from the operation of heavy equipment, fugitive dust and the burning of debris (PEIS, page 216).

3(a) Agency Jurisdiction. DEQ's Air Division, on behalf of the State Air Pollution Control Board, is responsible for the development of regulations that implement *Virginia's Air Pollution Control Law*. DEQ is charged to carry out mandates of the state law and related regulations as well as Virginia's federal obligations under the *Clean Air Act* as amended in 1990. The objective is to protect and enhance public health and quality of life through control and mitigation of air pollution. The Division ensures the safety and quality of air in Virginia by monitoring and analyzing air quality data, regulating sources of air pollution, and working with local, state and federal agencies to plan and implement strategies to protect Virginia's air quality. The appropriate regional office is directly responsible for the issuance of necessary permits to construct and operate all stationary sources in the region as well as to monitor emissions from these sources for compliance. As a part of this mandate, the environmental documents of new projects to be undertaken in the state are also reviewed. In the case of certain projects, additional evaluation and demonstration must be made under the general conformity provisions of state and federal law.

The Air Division regulates emissions of air pollutants from industries and facilities and implements programs designed to ensure that Virginia meets national air quality standards. The most common regulations associated with major State projects are:

- Open burning: 9 VAC 5-130 *et seq.*
- Fugitive dust control: 9 VAC 5-50-60 *et seq.*
- Permits for fuel-burning equipment: 9 VAC 5-80-1100 *et seq.*

3(b) Agency Findings. According to the DEQ Air Division, the TVA transmission corridor is located in a designated ozone attainment area within Virginia.

3(c) Requirements.

3(c)(i) Fugitive Dust. During future construction actions, fugitive dust must be kept to a minimum by using control methods outlined in 9 VAC 5-50-60 *et seq.* of the *Regulations for the Control and Abatement of Air Pollution*. These precautions include, but are not limited to, the following:

- Use, where possible, of water or chemicals for dust control;
- Installation and use of hoods, fans, and fabric filters to enclose and vent the handling of dusty materials;
- Covering of open equipment for conveying materials; and
- Prompt removal of spilled or tracked dirt or other materials from paved streets and removal of dried sediments resulting from soil erosion.

3(c)(ii) Open Burning. If future project activities include the open burning of construction material or the use of special incineration devices, this activity must meet the requirements under 9 VAC 5-130 *et seq.* of the *Regulations* for open burning, and may require a permit. The *Regulations* provide for, but do not require, the local adoption of a model ordinance concerning open burning. The applicant should contact county officials to determine what local requirements, if any, exist.

4. Solid and Hazardous Wastes and Hazardous Materials. The PEIS (page 210) indicates that the vegetation management activities may generate some solid waste and small quantities of hazardous waste (wastes associated with work vehicles and/or herbicide containers or leftover/outdated product).

4(a) Agency Jurisdiction. On behalf of the Virginia Waste Management Board, the DEQ Division of Land Protection and Revitalization is responsible for carrying out the mandates of the Virginia Waste Management Act (Virginia Code §10.1-1400 *et seq.*), as well as meeting Virginia's federal obligations under the Resource Conservation and Recovery Act and the Comprehensive Environmental Response Compensation Liability Act (CERCLA), commonly known as Superfund. The DEQ Division of Land Protection and Revitalization also administers those laws and regulations on behalf of the State Water Control Board governing Petroleum Storage Tanks (Virginia Code §62.1-44.34:8 *et seq.*), including Aboveground Storage Tanks (9VAC25-91 *et seq.*) and Underground Storage Tanks (9VAC25-580 *et seq.* and 9VAC25-580-370 *et seq.*), also known as 'Virginia Tank Regulations', and § 62.1-44.34:14 *et seq.* which covers oil spills.

Virginia:

- Virginia Waste Management Act, Virginia Code § 10.1-1400 *et seq.*
- Virginia Solid Waste Management Regulations, 9 VAC 20-81
    - (9 VAC 20-81-620 applies to asbestos-containing materials)
- Virginia Hazardous Waste Management Regulations, 9 VAC 20-60
    - (9 VAC 20-60-261 applies to lead-based paints)
- Virginia Regulations for the Transportation of Hazardous Materials, 9 VAC 20-110.

Federal:

- Resource Conservation and Recovery Act (RCRA), 42 U.S. Code sections 6901 *et seq.*

- U.S. Department of Transportation Rules for Transportation of Hazardous Materials, 49 Code of Federal Regulations, Part 107
- Applicable rules contained in Title 40, Code of Federal Regulations.

4(b) Agency Findings. DEQ's Division of Land Protection and Revitalization (DLPR) notes that, due to a lack of site-specific corridor information, a Geographic Information System (GIS) database search to identify specific waste sites in proximity to the project corridor could not be completed.

4(c) Recommendations. DLPR staff recommends a review of its data files to determine if there are any waste sites located in close proximity to a project site(s). Site searches would include the following categories: CERCLIS, RCRA/Hazardous Waste, Solid Waste, Voluntary Remediation Program (VRP) sites, Formerly Used Defense Sites (FUDS), and Petroleum Release sites.

More information related to hazardous wastes, RCRA/CERCLA sites can be accessed from EPA and DEQ websites at:

- https://www3.epa.gov/enviro/
- https://rcrainfopreprod.epa.gov/rcrainfoweb/action/main-menu/view
- https://www.epa.gov/superfund
- http://www.deq.virginia.gov/ConnectWithDEQ/VEGIS.aspx

DEQ encourages all construction projects and facilities to implement pollution prevention principles, including the reduction, reuse, and recycling of all solid wastes generated. All generation of hazardous wastes should be minimized and handled appropriately.

4(d) Requirements.

4(d)(i) Waste Management. Any soil that is suspected of contamination or wastes that are generated during construction-related activities must be tested and disposed of in accordance with applicable federal, state, and local laws and regulations. All demolition and construction waste, including excess soil, must be characterized in accordance with the *Virginia Hazardous Waste Management Regulations* prior to disposal at an appropriate facility. It is the generator's responsibility to determine if a solid waste meets the criteria of a hazardous waste and as a result be managed as such.

4(d)(ii) Asbestos-containing Material and Lead-based Paint*.* Any structures being demolished, renovated or removed should be checked for asbestos-containing materials (ACM) and lead-based paint (LBP) prior to construction. If ACM or LBP are found, in addition to the federal waste-related regulations mentioned above, state regulations 9 VAC 20-80-640 for ACM and 9 VAC 20-60-261 for LBP must be followed.

4(d)(iii) Petroleum Release Sites**.** If evidence of a petroleum release is discovered during implementation of this project, it must be reported to DEQ, as authorized by Virginia Code § 62.1-44.34.8 through 9 and 9 VAC 25-580-10 *et seq*. Petroleum contaminated soils generated during construction of this project must be characterized and disposed of properly.

4(d)(iv) Fuel Storage Tanks. The removal, relocation or closure or installation/operation of any regulated petroleum storage tanks, aboveground storage tank (AST) or underground storage tank (UST), must be conducted in accordance with the requirements of the Virginia Tank Regulations 9 VAC 25-91-10 *et seq.* (AST) and / or 9 VAC 25-580-10 *et seq*. (UST).

5. Natural Heritage Resources. According to the PEIS (page 110), direct impacts to wildlife habitat may occur as a result of vegetation management in the ROW. This change to habitat may be beneficial to some species and detrimental to others. Impacts can include disturbance due to human activity (noise) as well as habitat conversion, fragmentation, changes to soil and water, and the increased potential for invasive species.

5(a) Agency Jurisdiction.

5(a)(i) The Virginia Department of Conservation and Recreation's (DCR) Division of Natural Heritage (DNH). DNH's mission is conserving Virginia's biodiversity through inventory, protection and stewardship. The Virginia Natural Area Preserves Act (Virginia Code §10.1-209 through 217), authorized DCR to maintain a statewide database for conservation planning and project review, protect land for the conservation of biodiversity, and to protect and ecologically manage the natural heritage resources of Virginia (the habitats of rare, threatened and endangered species, significant natural communities, geologic sites, and other natural features).

5(a)(ii) The Virginia Department of Agriculture and Consumer Services (VDACS). The Endangered Plant and Insect Species Act of 1979 (Virginia Code Chapter 39 §3.1-1020 through 1030) authorizes VDACS to conserve, protect and manage endangered and threatened species of plants and insects. Under a Memorandum of Agreement established between VDACS and the DCR, DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species.

5(b) Agency Findings. According to the appendix in the Draft Programmatic Environmental Impact State for the TVA Transmission System Vegetation Management, numerous natural heritage resources are within or adjacent to the TVA powerlines in Virginia. Based on the below recommendations, Alternative B in the EIS appears to be the less intensive method for vegetation management with less reliance on herbicides and is DCR-DNH's preferred alternative.

5(c) Recommendations. DCR-DNH recommends continuing updates of the locations of documented natural heritage resources occurrences through the VA DCR-DNH and TVA data exchange agreement to avoid and minimize impacts to these resources.

Re-submit project information and map for an update on this natural heritage information if the scope of the project changes and/or six months has passed before it is utilized as new and updated information is continually added to Biotics.

***5(c)(i) Vegetation Management Best Management Practices*.** DCR-DNH also recommends the following best management practices for the vegetation management in the transmission lines:

1. DCR recommends documenting and avoiding Natural Heritage Resources (Rare, Threatened and Endangered) within the ROW. The maintenance of the ROW as early-successional habitats with open canopy provide suitable habitat for many rare resources.

2. All rare plant sites are marked with signs from the transmission towers just outside the rare plant populations so that the population(s) are contained entirely within the defined area.

3. DCR recommends maintenance of vegetation using annual mowing in the non-growing season between 15 October and April 1 and minimal to no use of chemicals especially in sensitive areas with documented natural heritage resources.

4. When woody plant management is required, the woody species at these sites are carefully treated with herbicide. This treatment is conducted under a different maintenance contract than used on non-rare plant lines. The different contract helps insure precise herbicide application with less accidental overspray.

5. An integrated method of mechanical and herbicide where needed is optimal, with areas containing rare plants treated mechanically.

6. When transmission lines intersect Virginia Natural Area Preserves, the same maintenance regime as defined in numbers 1-3 above is used and Natural Heritage staff are notified before management takes place.

7. A subset of rare plant populations are monitored carefully to make sure that this management prescription is effective in maintaining the rare plant populations.

8. DCR recommends the development and implementation of an invasive species plan to be included as part of the maintenance practices for the right-of-way (ROW). The invasive species plan should include an invasive species inventory

for the project area based on the current DCR Invasive Species List (http://www.dcr.virginia.gov/natural-heritage/document/nh-invasive-plant-list-2014.pdf) and methods for treating the invasives.

9. DCR also recommends the ROW restoration and maintenance practices planned include appropriate revegetation using native species in a mix of grasses and forbs, robust monitoring and adaptive management plan to provide guidance if initial revegetation efforts are unsuccessful or if invasive species outbreaks occur.

***5(c)(ii) Protected Species*.** Due to the legal status of some of the natural heritage resources in Virginia within the project area, DCR recommends coordination with United States Fish and Wildlife and Virginia Department of Game and Inland Fisheries to ensure compliance with protected species legislation.

6. Public Water Sources. The PEIS (page 179) states that none of the vegetation management methods would affect groundwater quality. In TVA's service area groundwater use is characterized by municipal public supply wells in areas of high population and private domestic wells in rural areas.

6(a) Agency Jurisdiction. The Virginia Department of Health (VDH) Office of Drinking Water reviews projects for the potential to impact public drinking water sources (groundwater wells, springs and surface water intakes). VDH administers both federal and state laws governing waterworks operation.

6(b) Agency Findings. VDH-ODW provided county-wide information on public water sources that may be impacted by the vegetation management activities for the four affected counties (Lee, Scott, Wise, and Washington). VDH identified:

- Twenty-nine public groundwater wells;
- Fifteen surface water intakes; and
- Three public water source watersheds (John Flannagan Water Authority, Bristol Virginia Utility Board, and the Washington County Service Authority).

See the attached VDH comments for specific details including the public water source (PWS) ID for the identified groundwater wells and public water sources in the vicinity of the transmission system.

6(c) Recommendations. The vegetation management activities should follow the following recommendations:

- Utilize BMPs on the project site including erosion and sedimentation controls and spill prevention and countermeasures.
- Carefully manage materials on site and during transport to prevent impacts to nearby surface waters.
- Field mark wells within a 1,000-foot radius from the project site to protect them

from accidental damage during project activities.

6(d) Requirement. Potential impacts to the public water distribution system or sanitary sewage collection system should be verified with the local utility.

7. Transportation. TVA's transmission system is serviced by both public and private roadways. The traffic volume generated by the proposed work is expected to be relatively minor (PEIS, page 212). Appropriate traffic control measures (signs and flaggers) will be utilized as needed to maintain the safety and flow of public travel in the vicinity of the ROW work.

7(a) Agency Jurisdiction. The Virginia Department of Transportation provides comments pertaining to potential impacts to existing and future transportation systems.

7(b) Comments. The VDOT Planning and Investment Management Division reviewed the proposal and determined that the project will have no known impacts to transportation infrastructure.

7(c) Requirements. All construction within the VDOT ROW must be in compliance with the Virginia Work Area Protection Manual, available at the following web page: http://www.virginiadot.org/Business/resources/Wrk_zone/2011_WAPM_Rev_1.pdf

Work within the VDOT ROW requires a Land Use Permit. Land Use Permits and associated costs are outlined in the Land Use Manual, available at the following web page: http://www.virginiadot.org/business/bu-landUsePermits.asp.

8. Pollution Prevention. DEQ advocates that principles of pollution prevention and sustainability be used in all construction projects as well as in facility operations. Effective siting, planning, and on-site Best Management Practices will help to ensure that environmental impacts are minimized. However, pollution prevention and sustainability techniques also include decisions related to construction materials, design, and operational procedures that will facilitate the reduction of wastes at the source.

8(a) Recommendations. We have several pollution prevention recommendations that may be helpful during construction and for operation of this facility:

- Consider development of an effective Environmental Management System (EMS). An effective EMS will ensure that the proposed facility is committed to complying with environmental regulations, reducing risk, minimizing environmental impacts, setting environmental goals, and achieving improvements in its environmental performance. DEQ offers EMS development assistance and recognizes facilities with effective Environmental Management Systems through its Virginia Environmental Excellence Program (VEEP). VEEP provides recognition, annual permit fee discounts, and the possibility for alternative compliance methods.

- Consider environmental attributes when purchasing materials. For example, the extent of recycled material content, toxicity level, and amount of packaging should be considered and can be specified in purchasing contracts.
- Consider contractors' commitment to the environment when choosing contractors. Specifications regarding raw materials and construction practices can be included in contract documents and requests for proposals.

DEQ's Office of Pollution Prevention provides information and technical assistance relating to pollution prevention techniques and EMS. If interested, please contact Meghann Quinn, (804) 698-4021.

REGULATORY AND COORDINATION NEEDS

1. Surface Waters and Wetlands. Should it be determined that surface water and/or wetland impacts would occur, a Virginia Water Protection Permit issued by the DEQ may be required pursuant to Virginia Code §62.1-44.15:20. If necessary, a Joint Permit Application may be obtained from and submitted to the VMRC which serves as a clearinghouse for the joint permitting process involving the VMRC, DEQ, Corps, and local wetlands boards. For additional information and coordination, contact DEQ SWRO, Clairise Shaheen at 276-676-4809.

2. Erosion and Sediment Control and Stormwater Management*.*

2(a) Erosion and Sediment Control and Stormwater Management*.* This project must comply with Virginia's *Erosion and Sediment Control Law* (Virginia Code § 62.1-44.15:61) and *Regulations* (9 VAC 25-840-30 *et seq*.) and *Stormwater Management Law* (Virginia Code § 62.1-44.15:31) and *Regulations* (9 VAC 25-870-210 *et seq*.) as administered by DEQ. Activities that disturb 10,000 square feet or more would be regulated by *VESCL&R* and *VSWML&R*. Erosion and sediment control, and stormwater management requirements should be coordinated with the appropriate county, city or town.

Questions may be directed to the DEQ SWRO, Kelly Miller at 276-676-4879.

2(b) Virginia Stormwater Management Program General Permit for Stormwater Discharges from Construction Activities (VAR10). For projects involving land-disturbing activities of equal to or greater than one acre the applicant is required to register for coverage under the Virginia Stormwater Management Program General Permit for Discharges of Stormwater from Construction Activities (9 VAC 25-870-1 *et seq.*). Specific questions regarding the Stormwater Management Program requirements should be directed to DEQ, Holly Sepety at (804) 698-4039.

3. Air Quality Regulations*.* This project is subject to air regulations administered by the Department of Environmental Quality. The following sections of the Code of Virginia and Virginia Administrative Code are applicable:

- fugitive dust and emissions control (9 VAC 5-50-60 *et seq*.); and
- open burning restrictions (9 VAC 5-130).

Contact local fire officials for information on any local requirements pertaining to open burning. Coordinate with the SWRO (Crystal Bazyk, 276-676-4829) with questions related to air regulations.

4. Solid and Hazardous Wastes*.* All solid waste, hazardous waste, and hazardous materials must be managed in accordance with all applicable federal, state, and local environmental regulations.

For additional information concerning location and availability of suitable waste management facilities in the project area or if free product, discolored soils, or other evidence of contaminated soils are encountered, contact DEQ SWRO, Daniel Manweiler at 276-676-4837.

4(a) Asbestos Containing Material. It is the responsibility of the owner or operator to thoroughly inspect any existing structures for the presence of asbestos, including Category I and Category II non-friable asbestos containing material (ACM). Upon classification as friable or non-friable, all waste ACM shall be disposed of in accordance with the Virginia Solid Waste Management Regulations (9 VAC 20-80-640), and transported in accordance with the Virginia regulations governing Transportation of Hazardous Materials (9 VAC 20-110-10 *et seq*.). Contact the Department of Labor and Industry, Doug Wiggins at 540-562-3580 extension 131 for additional information.

4(b) Lead-Based Paint. If applicable, this project must comply with the U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) regulations, and with the Virginia Lead-Based Paint Activities Rules and Regulations. For additional information regarding these requirements contact the Department of Professional and Occupational Regulation (804-367-8500).

4(c) Petroleum Releases/ Storage. If evidence of a petroleum release is discovered during construction, it must be reported to DEQ. Contact DEQ SWRO Daniel Manweiler at 276-676-4837 if evidence of a petroleum release is found during construction or with questions related to fuel storage tank registration.

5. Natural Heritage Resources. Contact DCR DNH, Rene Hypes at (804) 371-2708, to re-submit project information for an update on natural heritage information if the scope of the project changes and/or six months has passed before the project commences. Additionally, coordinate with DCR (Robbie Rhur, 804-371-2594) with questions regarding its recommended BMPs for vegetation management.

6. Public Water Supply and Sewer Infrastructure. Coordinate with the local utility regarding potential impacts to public water distribution systems or sanitary sewage collection systems. Contact VDH ODW (Arlene Fields Warren, 804-864-7781) with questions related to the recommendation's to protect public water supply sources.

7. Protected Species. Coordinate with FWS (Troy Andersen, troy_andersen@fws.gov) and DGIF (Amy Ewing, 804-367-2211) to ensure compliance with protected species legislation.

8. Historic Resources. TVA should coordinate directly with DHR (Roger Kirchen, 804-482-6091) pursuant to Section 106 of the National Historic Preservation Act (as amended) and its implementing regulations codified at 36 CFR Part 800 which require Federal agencies to consider the effects of their undertakings on historic properties.

9. Transportation Impacts. Coordinate with VDOT (Blake Ailor, 276-696-3420) with questions related to requirements for work within VDOT's ROW.

Thank you for the opportunity to review and respond to the Draft PEIS for the TVA Transmission System Vegetation Management project. Detailed comments of reviewing agencies are attached for your review. Please contact me at (804) 698-4204 or Janine Howard at (804) 698-4299 for clarification of these comments.

Sincerely,

Bettina Rayfield, Program Manager
Environmental Impact Review

Ec: Robbie Rhur, DCR
Amy Ewing, DGIF
Keith Tignor, VDACS
Arlene Warren, VDH
Roger Kirchen, DHR
Greg Evans, DOF
Elizabeth Jordan, VDOT
Duane Miller, LENOWISCO PDC
Aaron Sizemore, Mount Rogers PDC
Dane Poe, Lee County

Freda Starnes, Scott County
David Cox, Wise County
Jason Berry, Washington County

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
SOUTHWEST REGIONAL OFFICE
355-A Deadmore Street, Abingdon, Virginia 24210
Phone (276) 676-4800 Fax (276) 676-4899
www.deq.virginia.gov

Matt Strickler
Secretary of Natural Resources

David K. Paylor
Director

Jeffrey L. Hurst
Regional Director

August 21, 2018

Anita E. Masters
Tennessee Valley Authority
1101 Market Street, BRC 4A
Chattanooga, TN 37402

Re: Transmission System Vegetative Management

Dear Ms. Masters,

The Department of Environmental Quality – Southwest Regional Office supports the desire of TVA to manage vegetation within transmission line right-of-ways. Reliable electrical service is essential to the quality of life of Virginia's citizens.

The transmission lines covered by this proposal for vegetative management are in Lee, Scott, Washington, and Wise Counties, Virginia. Watersheds in the area of these transmission lines include the Clinch River Subbasin of the Tennessee and Big Sandy River Basin, and the Holston River Subbasin of the Tennessee and Big Sandy River Basin. There are numerous Class V Stockable Trout Waters and Class VI Natural Trout Waters within these watersheds. There are also rivers and streams in these watersheds that do not currently meet Virginia Water Quality Standards. Such streams can be found in the 305(b)/303(d) Water Quality Assessment Integrated Report. Please contact Martha Chapman at our Southwest Regional Office at (276) 676-4845 or email Martha.Chapman@deq.virginia.gov for information on specific impairments.

The following discussion is provided as a guideline of programs administered by the Department of Environmental Quality (DEQ) and other agencies of the Commonwealth, which could be applicable to the proposed action. Final determination concerning potential impacts on these programs rests with DEQ's Southwest Regional Office and the appropriate agency administering each program. It is the responsibility of the applicant to coordinate development with these agencies.

The Department of Environmental Quality has no objections to the project provided that the applicant abides by all applicable state, Federal, and local laws and regulations. Prior to construction, all permits and approvals must be obtained. In general, development must incorporate features which prevent significant adverse impacts on ambient air quality, water quality, wetlands, historic structures, fish wildlife, and species of plants, animals, or insects listed by state agencies as rare, threatened, or endangered.

1. Water Quality and Wetlands*.* Although no long-term adverse impacts to water quality are anticipated from this project, potential short-term adverse impacts resulting from surface runoff due to construction must be minimized. This can be achieved by using Best Management Practices (BMPs).

Federal and state governments regulate impacts to streams and wetlands. The Virginia Marine Resources Commission serves as the clearinghouse for the Joint Permit Application (JPA) used by: (1) U.S. Army Corps of Engineers for issuing permits pursuant to *§ 404 of the Clean Water Act* and *§ 10 of the Rivers and Harbors Act*; (2) Department of Environmental Quality for issuance of Virginia Water Protection Permit pursuant to *§ 401 of the Clean Water Act*, Virginia Code *§ 62.1-44.2 et seq.*, Virginia Code *§ 62.1-44.15:5*, and Virginia Administrative Code *9 VAC 25-210-10 et seq*.; and (3) Virginia Marine Resources Commission regulates encroachments on or over state-owned subaqueous beds as well as tidal wetlands pursuant to Virginia Code *§ 28.2-1200* through *1400.* Contact VMRC at (757) 247-2200 to determine the need for a JPA for this project. VMRC will distribute the application to the appropriate agencies. Each agency will conduct its review and respond.

In general, DEQ recommends that the amount of stream and wetland impacts be avoided to the maximum extent practicable. For unavoidable impacts, DEQ encourages the following practices to minimize the impacts to wetlands and waterways: use of directional drilling from upland locations; operation of machinery and construction vehicles outside of stream-beds and wetlands; use of synthetic mats when in-stream work is unavoidable; stockpiling of material excavated from the trench for replacement if directional drilling is not feasible; and preservation of the top 12 inches of trench material removed from wetlands for use as wetland seed and root stock in the excavated area. The Southwest Regional contact is Clairise Shaheen at (276) 676-4809 or email Clairise.Shaheen@deq.virginia.gov if a permit is necessary to go forward with the project.

2. Erosion and Sediment Control and Stormwater Management. Erosion and sediment control measures must be implemented in accordance with the current edition of the Virginia Erosion and Sediment Control Handbook and the Virginia Erosion and Sediment Control Regulations, which are available online: http://www.deq.virginia.gov/Programs/Water/LawsRegulationsGuidance.aspx. If the total land disturbance exceeds 10,000 square feet, an erosion and sediment control plan will be required. Erosion and sediment control requirements are regulated by the local government where your land disturbing activity is occurring. Please contact the appropriate county, city or town for information and compliance requirements. Stormwater management planning and permitting is required through our Department should your land disturbance be greater than one (1) acre or lie within the boundaries of a common plan of development. Information, permit application, and regulations on our stormwater management program are available online at: http://www.deq.virginia.gov/Programs/Water/StormwaterManagement.aspx.

Please contact Kelly Miller at our Southwest Regional Office at (276) 676-4879 or email Kelly.Miller@deq.virginia.gov for more information.

3. Air Quality. This project is not likely to adversely affect air quality. However, during construction fugitive dust must be kept at a minimum. This requires, but is not limited to, measures such as application of water to suppress dust and washing down construction vehicles and paved roadways immediately adjacent to the construction site. Please note any process equipment that prepares coal via breaking, crushing, screening, wet or dry cleaning, thermal drying, etc. should be evaluated for permit applicability. The following sections of Virginia Administrative Code (VAC) may be applicable: *9 VAC 5-50-60 et. seq.*, governs abatement of visible emissions and fugitive dust emissions, and *9 VAC 5-40-5600 et. seq.* addresses open burning. The Southwest Regional contact is Crystal Bazyk at (276) 676-4829 or email Crystal.Bazyk@deq.virginia.gov.

4. Solid and Hazardous Wastes, and Hazardous Substances. DEQ administers the Virginia Solid Waste Management Regulations and the Virginia Hazardous Waste Management Regulations. We recommend that all solid wastes generated at the site be reduced at the source, reused, or recycled. All hazardous wastes should be minimized. Otherwise, all solid waste and hazardous waste must be managed in accordance with all applicable federal, state, and local environmental regulations. The Southwest Regional Office contact is Daniel Manweiler at (276) 676-4837 or email Daniel.Manweiler@deq.virginia.gov concerning location and availability of waste management facilities in the project area.

5. Pesticides and Herbicides. DEQ recommends that the use of herbicides or pesticides for construction or landscape maintenance should be in accordance with the principles of integrated pest management. The least toxic pesticides that are effective in controlling the target species should be used. Please contact the Virginia Department of Agriculture and Consumer Services at (804) 786-3501 for more information.

6. Pollution Prevention. DEQ recommends that construction projects incorporate the principles of pollution prevention including the following recommendations:

- Consider environmental attributes when purchasing materials. For example, the extent of recycled material content and toxicity level should be considered.

- Consider contractors' commitments to the environment when choosing contractors. Also, specifications regarding raw material selection (alternative fuels and energy sources) and construction practices can be included in contract documents and requests for proposals.
- Choose sustainable practices and materials in infrastructure and construction and design. These could include asphalt and concrete containing recycled materials and integrated pest management in landscaping.
- Integrate pollution prevention techniques into maintenance and operation activities to include source reduction (fixing leaks, energy efficient products).

Pollution prevention measures are likely to reduce potential environmental impacts and reduce costs for material purchasing and waste disposal. For more information, contact Sharon Baxter at DEQ's Office of Pollution Prevention at (804) 698-4344 Sharon.Baxter@deq.virginia.gov.

7. Energy Conservation. Structures should be planned and designed to comply with state and federal guidelines and industry standards for energy conservation and efficiency. For example, energy efficiency of any structures can be enhanced by maximizing the use of the following

- thermally-efficient building shell components (roof, wall, floor, and insulation);
- high efficiency heating, ventilation, air conditioning systems; and
- high efficiency lighting systems.

Gerald Wilkes, Department of Mines, Minerals and Energy, at (434) 951-6364 should be contacted for assistance in meeting this challenge.

8. Natural Heritage Resources. The Department of Conservation and Recreation's Division of Natural Heritage (DNH) can search its Biotics Data System (BDS) for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered animal and plant species, unique or exemplary natural communities, and significant geologic communities.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the Department of Conservation and Recreation (DCR), DCR has the authority to report for VDACS on state-listed plant and insect species. We recommend that the DNH be contacted at (804) 786-7951, to secure updated information on natural heritage resources before the project is implemented.

9. Wildlife Resources. The Department of Game and Inland Fisheries (DGIF), as the Commonwealth's wildlife and freshwater fish management agency, exercises enforcement and regulatory jurisdiction over wildlife and freshwater fish, including state or federally listed endangered or threatened species, but excluding listed insects (*Virginia Code* Title 29.1). DGIF is a consulting agency under the U.S. Fish and Wildlife

Coordination Act (16 U.S.C. sections 661 *et seq*.), and provides environmental analysis of projects or permit applications coordinated through DEQ and several other state and federal agencies. DGIF determines likely impacts upon fish and wildlife resources and habitat, and recommends appropriate measures to avoid, reduce, or compensate for those impacts. For more information, see the DGIF website at www.dgif.state.va.us or contact Ray Fernald at (804) 367-6913.

10. Historic and Archaeological Resources. *Section 106 of the National Historic and Preservation Act of 1966*, as amended, requires that activities that receive federal funding must consider effects to properties that are listed or eligible for listing on the National Register of Historic Places. The Department of Historic Resources (DHR) conducts reviews of projects to determine their effect on historic structures or cultural resources. If applicable, contact DHR. In the event that archaeological resources are encountered during construction, immediately contact Ms. Ethel Eaton at (804) 367-2323.

Thank you for your inquiry. We appreciate your interest in complying with Virginia's environmental legislation. If you have any further questions please do not hesitate to call Michael Hutchison at (276) 676-4865.

Sincerely,

Jeffrey L. Hurst
Regional Director

cc. file

Howard, Janine <janine.howard@deq.virginia.gov>

Re: NEW PROJECT, TVA Transmission System Vegetation Management, 18-120F

1 message

Warren, Arlene <arlene.warren@vdh.virginia.gov> Mon, Sep 10, 2018 at 4:12 PM
To: Janine Howard <janine.howard@deq.virginia.gov>

No, they didn't; they wanted ODW to sign some type of letter about disclosure. What I provided them was county wide information for 4 counties; I am sure this is not what they needed and this one will probably show back up again.

Best Regards,

Arlene Fields Warren

GIS Program Support Technician

Office of Drinking Water

Virginia Department of Health

109 Governor Street

Richmond, VA 23219

(804) 864-7781

On Mon, Sep 10, 2018 at 1:46 PM Howard, Janine <janine.howard@deq.virginia.gov> wrote:

> Hi Arlene,
>
> Just curious, did TVA ultimately provide you a map of the project corridor or shapefiles for you to do your radius searches on? The last I heard they were looking into options but they never sent anything to me. Did they contact you directly?
>
> Janine Howard
> Environmental Impact Review Coordinator
> Virginia Department of Environmental Quality
> 1111 East Main Street, Suite 1400
> Richmond, VA 23219
> 804-698-4299
>
> For program updates and public notices please subscribe to the OEIR News Feed
>
> On Wed, Sep 5, 2018 at 3:02 PM Warren, Arlene <arlene.warren@vdh.virginia.gov> wrote:
>
>> **Project Name: Transmission System Vegetation Management**
>> **Project #: 18-120 F**
>> UPC #: N/A
>> **Location: Lee, Scott, Washington and Wise Counties**
>>
>> VDH – Office of Drinking Water has reviewed the above project. Below are our comments as they relate to proximity to **public drinking water sources** (groundwater wells, springs and surface water intakes). Potential

impacts to public water distribution systems or sanitary sewage collection systems **must be verified by the local utility.**

The following public groundwater wells are located within a 1-mile radius of the project site (wells within a 1,000 foot radius are formatted in **bold:**

PWS ID Number	City/County	System Name	Facility Name
1169200	**SCOTT**	**DUFFIELD_SCOTT CO PSA**	**FT BLACKMORE METHODIST CAMP WELL**
1169929	**SCOTT**	**TWIN SPRINGS HIGH SCHOOL**	**WELL**
1169725	**SCOTT**	**NICKELSVILLE, TOWN OF**	**WELL #4**
1169725	**SCOTT**	**NICKELSVILLE, TOWN OF**	**WELL #8**
1169725	**SCOTT**	**NICKELSVILLE, TOWN OF**	**WELL #5**
1169725	**SCOTT**	**NICKELSVILLE, TOWN OF**	**WELL #6**
1169725	**SCOTT**	**NICKELSVILLE, TOWN OF**	**WELL # 1**
1169725	**SCOTT**	**NICKELSVILLE, TOWN OF**	**WELL #3**
1169225	**SCOTT**	**DUNGANNON, TOWN OF**	**WELL #1**
1169225	**SCOTT**	**DUNGANNON, TOWN OF**	**WELL #2**
1169011	**SCOTT**	**BARK CAMP**	**WELL NO 1**
1169868	**SCOTT**	**SCOTT COUNTY PARK**	**WELL**
1169300	**SCOTT**	**ECV/SCOTT CO PSA**	**LYN MAR WELL**
1169015	**SCOTT**	**CLINCH RIVER FAMILY CAMP-GRD**	**WELL**
1105400	**LEE**	**LCPSA-BLUE SPRINGS**	**BLUE SPRING**
1105400	**LEE**	**LCPSA-BLUE SPRINGS**	**LCPSA-BLUE SPRINGS**
1105200	**LEE**	**JONESVILLE, TOWN OF**	**WYNN SPRING #1**
1195170	**WISE**	**COEBURN, TOWN OF**	**JENNY MINE**
1195376	**WISE**	**HIGH KNOB**	**WELL**
1191700	**WASHINGTON**	**RIVERSIDE CAMPGROUND**	**WELL**
1191070	**WASHINGTON**	**CALLEBS COVE CAMPGROUND**	**DRILLED WELL**
1191310	**WASHINGTON**	**MENDOTA**	**WELL NO. 1**
1191100	**WASHINGTON**	**CHILHOWIE_WCSA REGIONAL WTP**	**JONES SPRING**
1191100	**WASHINGTON**	**CHILHOWIE_WCSA REGIONAL WTP**	**COLE SPRING**
1191100	**WASHINGTON**	**CHILHOWIE_WCSA REGIONAL WTP**	**WIDNER SPRING**
1191316	**WASHINGTON**	**BEARTREE NO. 2**	**WELL**
1191317	**WASHINGTON**	**BEARTREE NO. 3**	**WELL**
1191883	**WASHINGTON**	**WASHINGTON CO SERVICE AUTHORITY**	**RESERVATION SPRING**
1195376	WISE	HIGH KNOB	WELL

The following surface water intakes are located within a 5-mile radius of the project site:

PWS ID Number	System Name	Facility Name
1169200	DUFFIELD_SCOTT CO PSA	INTAKE - NORTH FORK CLINCH RIVER
1169200	DUFFIELD_SCOTT CO PSA	INTAKE - SPURLOCK BRANCH
1169405	GATE CITY, TOWN OF	INTAKE - BIG MOCCASIN CREEK
1169650	MOCCASIN GAP_SCOTT CO PSA	BIG MOCASSIN CREEK INTAKE
1195100	BIG STONE GAP, TOWN OF	SOUTH FORK POWELL RIVER
1195900	WISE COUNTY REGIONAL WATER SYSTEM	CLINCH RIVER INTAKE
1720076	NORTON, CITY OF	UNNAMED TRIBUTARY TO BENGES BRANCH

1720076	NORTON, CITY OF	BENGES BRANCH
1195050	APPALACHIA, TOWN OF	BEN'S BRANCH IMPOUNDMENT
1105500	PENNINGTON GAP, TOWN OF	POWELL RIVER INTAKE FACILITY
1195170	COEBURN, TOWN OF	TOM'S CREEK IMPOUNDMENT
1195700	ST PAUL, TOWN OF	CLINCH RIVER
1195900	WISE COUNTY REGIONAL WATER SYSTEM	CLINCH RIVER INTAKE
1195950	WISE, TOWN OF	BEAR CREEK INTAKE
1195650	POUND, TOWN OF	NORTH FORK OF THE POUND RIVER LAKE

The project is within the watershed of the following public surface water sources:

PWS ID Number	System Name	Facility Name
1051377	JOHN FLANNAGAN WATER AUTHORITY	JOHN FLANNAGAN RESERVOIR PUMP STATION
1520070	BRISTOL VIRGINIA UTILITY BOARD	SOUTH HOLSTON LAKE
1191883	WASHINGTON COUNTY SERVICE AUTHORITY	SOUTH FORK HOLSTON RIVER INTAKE/PS

Best Management Practices should be employed, including Erosion & Sedimentation Controls and Spill Prevention Controls & Countermeasures on the project site.

Well(s) within a 1,000-foot radius from project site should be field marked and protected from accidental damage during construction.

Materials should be managed while on site and during transport to prevent impacts to nearby surface water.

The Virginia Department of Health – Office of Drinking Water appreciates the opportunity to provide comments. If you have any questions, please let me know.

Best Regards,

Arlene Fields Warren

GIS Program Support Technician

Office of Drinking Water

Virginia Department of Health

109 Governor Street

Richmond, VA 23219

(804) 864-7781

On Tue, Aug 14, 2018 at 2:19 PM Howard, Janine <janine.howard@deq.virginia.gov> wrote:

Good morning - this is a new OEIR review request/project:

Document Type: **Draft Programmatic Environmental Impact Statement**
Project Sponsor: **Tennessee Valley Authority**

Commonwealth of Virginia

Howard, Janine <janine.howard@deq.virginia.gov>

Re: NEW PROJECT, TVA Transmission System Vegetation Management, 18-120F

1 message

Ailor, Warren <blake.ailor@vdot.virginia.gov> Mon, Aug 27, 2018 at 1:51 PM
To: Janine Howard <Janine.Howard@deq.virginia.gov>, James Cromwell <james.cromwell@vdot.virginia.gov>, Elizabeth Jordan <elizabeth.jordan@vdot.virginia.gov>
Cc: "Necessary, Donald" <donald.necessary@vdot.virginia.gov>

Good Morning Ms. Howard,

The Virginia Department of Transportation Planning and Investment Management Division has reviewed all of the information you attached in a email related to vegetation clearance by TVA, located within Washington, Lee, Scott & Wise County, Virginia. At this time, it would appear that the project will have no known impacts to transportation infrastructure.

If needed, please see the following:

- All construction within the right of way must be in compliance with the Virginia Work Area Protection Manual. A link to the manual can be found at: http://www.virginiadot.org/Business/resources/Wrk_zone/2011_WAPM_Rev_1.pdf

- Land Use Permits and associated costs are outlined in the Land Use Manual. A link to land permits is as follows http://www.virginiadot.org/business/bu-landUsePermits.asp

Please don't hesitate to contact me if you have any questions or need further information.

Blake Ailor

Planning Specialist
870 Bonham Road
Bristol, VA 24201
Office: (276) 696-3420
Cell: (423) 791-5093

On Fri, Aug 24, 2018 at 9:21 PM, Necessary, Donald <donald.necessary@vdot.virginia.gov> wrote:

> Let's discuss this one and the next one I'm send in a separate email
>
> ---------- Forwarded message ---------
> From: **Jordan, Elizabeth** <elizabeth.jordan@vdot.virginia.gov>
> Date: Fri, Aug 24, 2018 at 2:57 PM
> Subject: Fwd: NEW PROJECT, TVA Transmission System Vegetation Management, 18-120F
> To: Necessary, Donald <donald.necessary@vdot.virginia.gov>
> CC: James Cromwell <james.cromwell@vdot.virginia.gov>, Angel Deem <angel.deem@vdot.virginia.gov>
>
> DATE: August 24, 2018
>
> TO: District Transportation Planning
>
> PROJECT: TVA: Draft Programmatic Environmental Impact Statement
>
> DEQ PROJECT: 18-120F
>
> LOCATION: Lee, Scott, Washington, and Wise Counties
>
> SUBJECT: Environmental Impact Review Request

DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR PROGRAM COORDINATION

ENVIRONMENTAL REVIEW COMMENTS APPLICABLE TO AIR QUALITY

TO: Janine L. Howard **DEQ - OEIR PROJECT NUMBER: DEQ #18-120F**

PROJECT TYPE: ☐ STATE EA / EIR **X FEDERAL EA / EIS** ☐ SCC

☐ CONSISTENCY DETERMINATION

PROJECT TITLE: Transmission System Vegetation Management

PROJECT SPONSOR: Tennessee Valley Authority

PROJECT LOCATION: X OZONE ATTAINMENT AREA

REGULATORY REQUIREMENTSMAY BE APPLICABLE TO: **X CONSTRUCTION**
☐ OPERATION

STATE AIR POLLUTION CONTROL BOARD REGULATIONS THAT MAY APPLY:

1. ☐ 9 VAC 5-40-5200 C & 9 VAC 5-40-5220 E – STAGE I
2. ☐ 9 VAC 5-45-760 et seq. – Asphalt Paving operations
3. **X 9 VAC 5-130 et seq. – Open Burning**
4. **X 9 VAC 5-50-60 et seq. Fugitive Dust Emissions**
5. ☐ 9 VAC 5-50-130 et seq. - Odorous Emissions; Applicable to____________________
6. ☐ 9 VAC 5-60-300 et seq. – Standards of Performance for Toxic Pollutants
7. ☐ 9 VAC 5-50-400 Subpart_____, Standards of Performance for New Stationary Sources, designates standards of performance for the______________________________
8. ☐ 9 VAC 5-80-1100 et seq. of the regulations – Permits for Stationary Sources
9. ☐ 9 VAC 5-80-1605 et seq. Of the regulations – Major or Modified Sources located in PSD areas. This rule may be applicable to the ______________________________
10. ☐ 9 VAC 5-80-2000 et seq. of the regulations – New and modified sources located in non-attainment areas
11. ☐ 9 VAC 5-80-800 et seq. Of the regulations – State Operating Permits. This rule may be applicable to ____

COMMENTS SPECIFIC TO THE PROJECT:

(Kotur S. Narasimhan)
Office of Air Data Analysis **DATE: August 16, 2018**

Matthew J. Strickler
Secretary of Natural Resources

Clyde E. Cristman
Director

COMMONWEALTH of VIRGINIA
DEPARTMENT OF CONSERVATION AND RECREATION

Rochelle Altholz
Deputy Director of Administration and Finance

Russell W. Baxter
Deputy Director of Dam Safety & Floodplain Management and Soil & Water Conservation

Thomas L. Smith
Deputy Director of Operations

MEMORANDUM

DATE: September 7, 2018

TO: Janine Howard, DEQ

FROM: Roberta Rhur, Environmental Impact Review Coordinator

SUBJECT: DEQ 18-120F TVA-Vegetation Management Draft Programmatic EIS

Division of Natural Heritage

The Department of Conservation and Recreation's Division of Natural Heritage's (DCR) mission is conserving Virginia's biodiversity through inventory, protection, and stewardship. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal, unique or exemplary natural communities, and significant geologic formations.

According to the appendix in the Draft Programmatic Environmental Impact State for Tennessee Valley Authority (TVA) Transmission System Vegetation Management numerous natural heritage resources are within or adjacent to the TVA powerlines in Virginia. DCR-DNH recommends continuing updates of the locations of these documented natural heritage resources occurrences through the VA DCR-DNH and TVA data exchange agreement to avoid and minimize impacts to these resources. Due to the legal status of some of the natural heritage resources in Virginia within the project area, DCR recommends coordination with United States Fish and Wildlife and Virginia Department of Game and Inland Fisheries to ensure compliance with protected species legislation.

DCR-DNH also recommends the following best management practices for the vegetation management in the transmission lines:

1. DCR recommends documenting and avoiding Natural Heritage Resources (Rare, Threatened and Endangered) within the ROW. The maintenance of the ROW as early-successional habitats with open canopy provide suitable habitat for many rare resources.

2. All rare plant sites are marked with signs from the transmission towers just outside the rare plant populations so that the population(s) are contained entirely within the defined area.

3. Right-of-Way Maintenance- Chemical Control of Vegetation -DCR recommends maintenance of vegetation using annual mowing in the non-growing season between 15 October and April 1 and minimal to no use of chemicals especially in sensitive areas with documented natural heritage resources.

4. When woody plant management is required, the woody species at these sites are carefully treated with herbicide. This treatment is conducted under a different maintenance contract than used on non-rare plant lines. The different contract helps insure precise herbicide application with less accidental overspray.

5. An integrated method of mechanical and herbicide where needed is optimal, with areas containing rare plants treated mechanically.

6. When transmission lines intersect Virginia Natural Area Preserves, the same maintenance regime as defined in numbers 1-3 above is used and Natural Heritage staff are notified before management takes place.

7. A subset of rare plant populations are monitored carefully to make sure that this management prescription is effective in maintaining the rare plant populations.

8. DCR recommends the development and implementation of an invasive species plan to be included as part of the maintenance practices for the right-of-way (ROW). The invasive species plan should include an invasive species inventory for the project area based on the current DCR Invasive Species List (http://www.dcr.virginia.gov/natural-heritage/document/nh-invasive-plant-list-2014.pdf) and methods for treating the invasives.

9. DCR also recommends the ROW restoration and maintenance practices planned include appropriate revegetation using native species in a mix of grasses and forbs, robust monitoring and adaptive management plan to provide guidance if initial revegetation efforts are unsuccessful or if invasive species outbreaks occur.

Based on the above recommendations, Alternative B in the EIS appears to be the less intensive method for vegetation management with less reliance on herbicides and is DCR-DNH's preferred alternative.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the DCR-DNH, DCR-DNH represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species.

New and updated information is continually added to Biotics. Please re-submit project information and map for an update on this natural heritage information if the scope of the project changes and/or six months has passed before it is utilized.

The Virginia Department of Game and Inland Fisheries (VDGIF) maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from http://vafwis.org/fwis/ or contact Ernie Aschenbach at 804-367-2733 or Ernie.Aschenbach@dgif.virginia.gov.

The remaining DCR divisions have no comments regarding the scope of this project. Thank you for the opportunity to comment.

CC: Ernie Aschenbach, VDGIF
Troy Andersen, USFWS

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

MEMORANDUM

TO: Janine Howard, DEQ/EIR Environmental Program Planner

FROM: Katy Dacey, Division of Land Protection & Revitalization Review Coordinator

DATE: August 22, 2018

COPIES: Sanjay Thirunagari, Division of Land Protection & Revitalization Review Manager; file

SUBJECT: Environmental Impact Review: EIR Project No. 18-120F Transmission System Vegetation Management, Counties of Lee, Scott, Washington and Wise, VA

The Division of Land Protection & Revitalization (DLPR) has completed its review of the August 2018 EIR for the Transmission System Vegetation Management project located in Counties of Lee, Scott, Washington and Wise in Virginia

Project Scope: removal of vegetation along transmission line corridor

DLPR staff has the following comments concerning the waste issues associated with such project(s):

No project locations have been identified within the submittal or by the project sponsor; therefore, a GIS database search could not be completed by DLPR staff to determine whether any waste sites might impact the project site(s). As project locations are identified, DLPR staff recommends a review of its data files to determine if there are any waste sites located in close proximity to a project site(s). Site searches would include the following categories: CERCLIS, RCRA/Hazardous Waste, Solid Waste, Voluntary Remediation Program (VRP) sites, Formerly Used Defense Sites (FUDS), and Petroleum Release sites.

The following websites would prove helpful in locating additional information as project locations are identified:

https://www3.epa.gov/enviro/
https://rcrainfopreprod.epa.gov/rcrainfoweb/action/main-menu/view
https://www.epa.gov/superfund
http://www.deq.virginia.gov/ConnectWithDEQ/VEGIS.aspx

GENERAL COMMENTS

Soil, Sediment, Groundwater, and Waste Management

Any soil, sediment or groundwater that is suspected of contamination or wastes that are generated must be tested and disposed of in accordance with applicable Federal, State, and local laws and regulations. Some of the applicable state laws and regulations are: Virginia Waste Management Act, Code of Virginia Section 10.1-1400 *et seq.*; Virginia Hazardous Waste Management Regulations (VHWMR) (9VAC 20-60); Virginia Solid Waste Management Regulations (VSWMR) (9VAC 20-81); Virginia Regulations for the Transportation of Hazardous Materials (9VAC 20-110). Some of the applicable Federal laws and regulations are: the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. Section 6901 *et seq.*, and the applicable regulations contained in Title 40 of the Code of Federal Regulations; and the U.S. Department of Transportation Rules for Transportation of Hazardous Materials, 49 CFR Part 107.

Asbestos and/or Lead-based Paint

All structures being demolished/renovated/removed should be checked for asbestos-containing materials (ACM) and lead-based paint (LBP) prior to demolition. If ACM or LBP are found, in addition to the federal waste-related regulations mentioned above, State regulations 9VAC 20-81-620 for ACM and 9VAC 20-60-261 for LBP must be followed.

Pollution Prevention – Reuse - Recycling

Please note that DEQ encourages all construction projects and facilities to implement pollution prevention principles, including the reduction, reuse, and recycling of all solid wastes generated. All generation of hazardous wastes should be minimized and handled appropriately.

If you have any questions or need further information, please contact Katy Dacey at (804) 698-4274.

North Carolina Wildlife Resources Commission

Gordon Myers, Executive Director

MEMORANDUM

TO: Lyn Hardison, Environmental Assistance and SEPA Coordinator
NCDEQ Division of Environmental Assistance and Customer Services

FROM: Andrea Leslie, Mountain Region Coordinator Andrea Leslie
Habitat Conservation

DATE: 27 September 2018

SUBJECT: TVA Draft Programmatic EIS for Transmission System Vegetation Management
Avery, Burke, Cherokee, McDowell & Watauga County
DEQ Project No. 19-0040

Biologists with the North Carolina Wildlife Resources Commission have reviewed Tennessee Valley Authority (TVA)'s draft Programmatic Environmental Impact Statement (PEIS) Transmission System Vegetation Management. Our comments are provided in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661-667e) and the North Carolina General Statutes (G.S. 113-131 et seq.).

TVA has developed a draft PEIS to guide the management of vegetation within its active transmission right-of-way (ROW). Currently, TVA operates under a court injunction order, which requires TVA to cease removing woody vegetation within its ROW with the exception of trees that are an immediate hazard; TVA is required to continue this maintenance prescription until it has determined a new prescription through a published EIS. The draft PEIS analyzes four alternatives – Alternative A, no action; Alternative B, maintain a low height within ROW with a recurring maintenance cycle; Alternative C, maintain a meadow-like end state within the ROW; and Alternative D, maintain a meadow-like end state within the center of the ROW and compatible shrubs and trees in the border zone. Alternatives B, C, and D would involve an initial clearing of the ROW with the exception of grasses, forbs, and some small shrubs.

TVA uses Integrated Vegetation Management (IVM), which allows the use of a range of methods depending on the target vegetation type; generally, IVM promotes desirable, stable, low-growing plant communities with the use of appropriate, environmentally sound, and cost-effective control methods. TVA also uses Office-Level Sensitive Area Review (O-SAR) to identify sensitive resources such as state and federally listed species to develop specialized

Mailing Address: Habitat Conservation • 1721 Mail Service Center • Raleigh, NC 27699-1721
Telephone: (919) 707-0220 • **Fax:** (919) 707-0028

vegetation management schemes to minimize impacts to these resources.

We support Alternative C or a hybrid between Alternative C and D. Alternative C emphasizes a meadow-like element that benefits many early successional habitat-dependent species and should promote native herbaceous vegetation and shrubs including pollinator-dependent species. However, a hybrid between Alternative C and D may be most ecologically beneficial, as it would allow for a feathered edge between the cleared ROW and forest. This larger shrub and small tree component is beneficial to many species that use both the forest and meadow or the edge itself. This feathered edge would be most beneficial in high conservation opportunity areas, such as in Golden-Winged Warbler (GWWA) focal areas and shrub-dependent rare plant or animal habitats, especially where larger ROW areas border forest.

We recommend that TVA use the Best Management Practices for Golden-Winged Warbler Habitats for Utility Rights-of-Way in the Appalachian Mountains (http://www.gwwa.org/resources/GWWA-Habitat-Appalachian-utility-130808_lo-res.pdf) for ROW management in GWWA focal areas as defined by the GWWA Working Group and Appalachian Mountains Joint Venture. More information on GWWA is available here: http://www.gwwa.org. NCWRC is available to provide technical guidance regarding GWWA management techniques and potential locations when TVA is considering implementation of the Best Management Practices.

In addition, we recommend that TVA minimize corridor maintenance and prohibit mowing/bush hogging between April 1 and October 1 to minimize impacts to nesting wildlife. We suggest a maintenance schedule that incorporates only a portion of the area – one third of the area, for example – each year instead of the entire project every 3 or 4 years.

TVA uses a predetermined buffer zone of 50 ft along streams, where vegetation is maintained mechanically; only taller growing vegetation is removed within this zone. NCWRC recommends maintaining a minimum 100-foot native, woody buffer along perennial streams, and a 50-foot buffer along intermittent streams and wetlands. Maintaining woody buffers along these areas will minimize impacts to aquatic and terrestrial wildlife resources, water quality, and aquatic habitat both within and downstream of the project area.

Thank you for the opportunity to review and comment on this project. If I can be of further assistance, please contact me at (828) 803-6054 or andrea.leslie@ncwildlife.org .

ec: Bryan Tompkins, US Fish and Wildlife Service
Kendrick Weeks, NCWRC

NORTH CAROLINA
Environmental Quality

ROY COOPER
Governor
MICHAEL S. REGAN
Secretary
MICHAEL SCOTT
Director

Date: September 14, 2018

To: Michael Scott, Director
Division of Waste Management

Through: Janet Macdonald
Inactive Hazardous Sites Branch – Special Projects Unit

From: Bonnie S. Ware
Inactive Hazardous Sites Branch

Subject: NEPA Project #19-0040, Tennessee Valley Authority, Avery, Burke, Cherokee, McDowell and Wataga Counties, North Carolina

The Superfund Section has reviewed the proximity of sites under its jurisdiction to the Tennessee Valley Authority project. Proposal is for the construction of White Oak Grove Apartments. Proposed project is for the management of vegetation within the transmission rights for way of the Tennessee Valley Authority.

Seventy-two sites were identified within one mile of the project as shown on the attached report. The Superfund Section recommends that site files be reviewed to ensure that appropriate precautions are incorporated into any construction activities that encounter potentially contaminated soil or groundwater. Superfund Section files can be viewed at: http://deq.nc.gov/waste-management-laserfiche.

Please contact Janet Macdonald at 919.707.8349 if you have any questions.

SEPA/NEPA Review Report

Area of Interest (AOI) Information

Area : 210,393.02 acres

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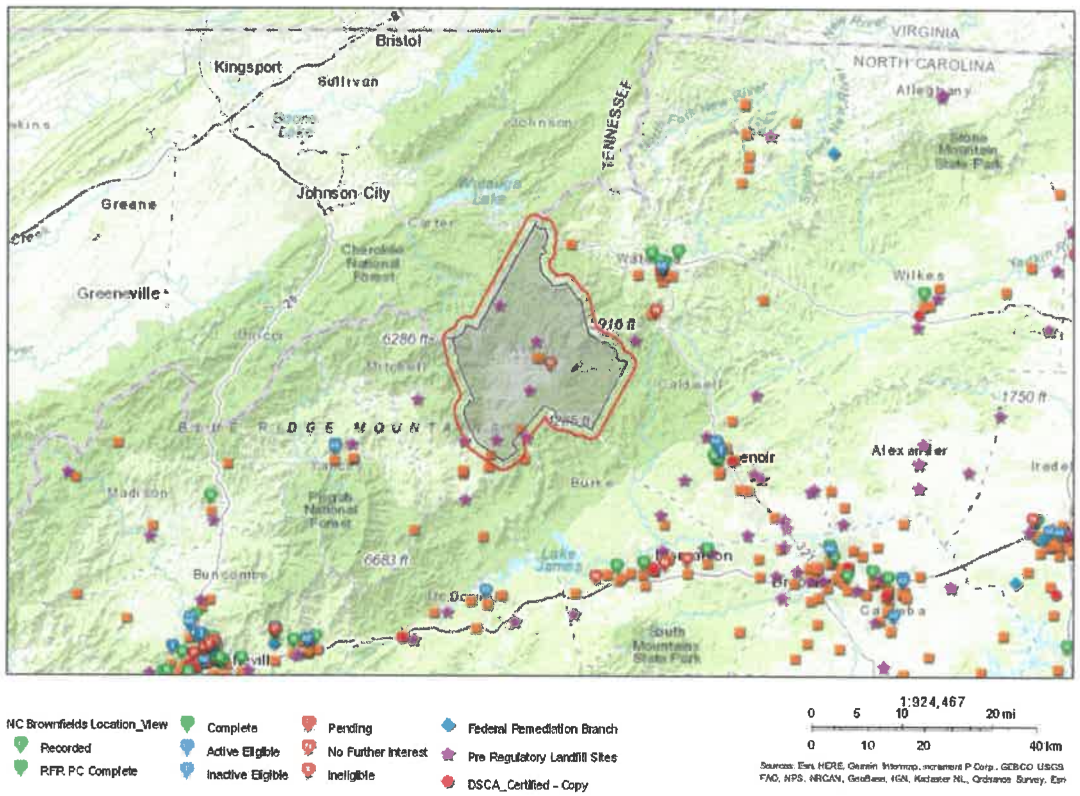


19-0040 Avery County

Summary

Name	Count	Area(acres)	Length(mi)
Certified DSCA Sites	0	N/A	N/A
Federal Remediation Branch Sites	0	N/A	N/A
Inactive Hazardous Sites	4	N/A	N/A
Pre-Regulatory Landfill Sites	5	N/A	N/A
Brownfields Program Sites	1	N/A	N/A

Inactive Hazardous Sites

#	EPAID	SITENAME	Count
1	NONCD0001102	BLUE RIDGE AUTO SALES	1
2	NONCD0002802	NEWLAND PESTICIDES SITE	1
3	NONCD0002192	NCDOT/FRANKLIN RESIDENCE	1
4	NCD991277724	MITCHELL SYSTEMS, INC.	1

Pre-Regulatory Landfill Sites

#	EPAID	SITENAME	Count
1	NONCD0000122	Crossnore Refuse Dump	1
2	NONCD0000123	Elk Park Dump	1
3	NONCD0000121	Green Valley Dump	1
4	NONCD0000423	Linville Falls Refuse Disposal	1
5	NONCD0000124	Newland Refuse Dump	1

Brownfields Program Sites

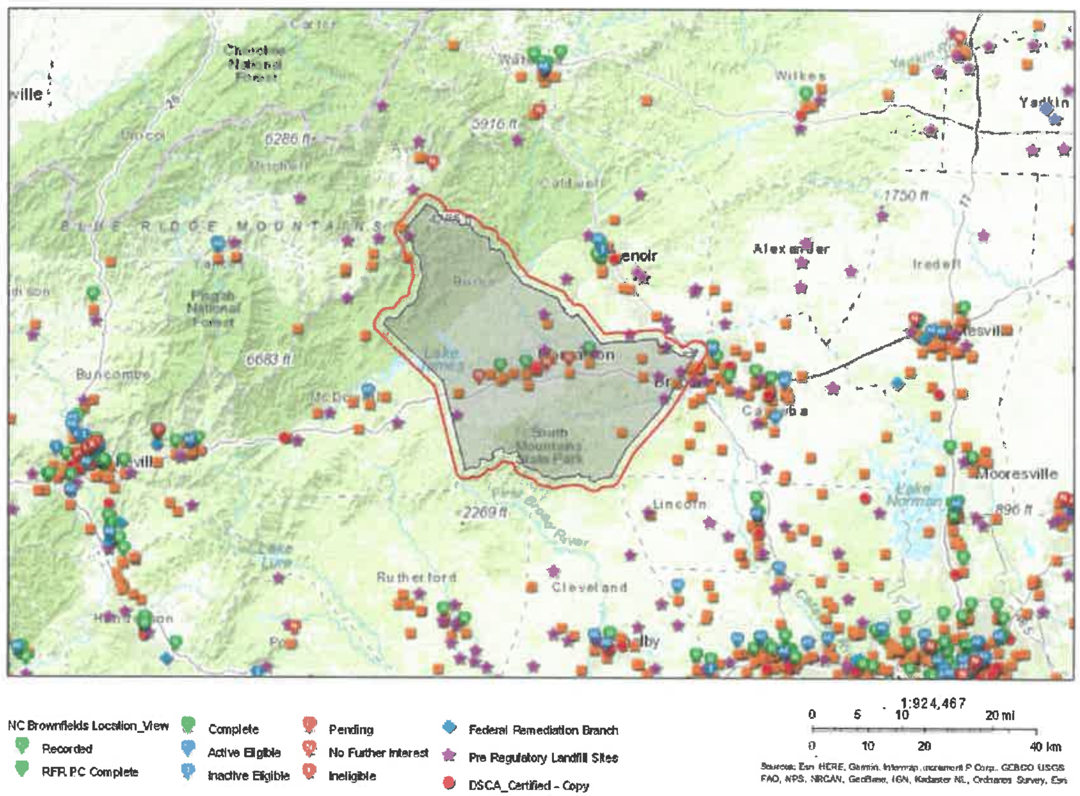
#	BF_ID	BF_Name	Count
1	190431506	C & E Manufacturing	1

SEPA/NEPA Review Report

Area of Interest (AOI) Information

Area : 403,142.83 acres

Sep 14 2018 14:46:51 Eastern Daylight Time



19-0040 Burke County

Summary

Name	Count	Area(acres)	Length(mi)
Certified DSCA Sites	0	N/A	N/A
Federal Remediation Branch Sites	0	N/A	N/A
Inactive Hazardous Sites	0	N/A	N/A
Pre-Regulatory Landfill Sites	11	N/A	N/A
Brownfields Program Sites	6	N/A	N/A

Pre-Regulatory Landfill Sites

#	EPAID	SITENAME	Count
1	NONCD0000651	Hickory Landfill	1
2	NONCD0000168	Bristol Creek Comm. Dump	1
3	NONCD0000169	Dysartsville Dump	1
4	NONCD0000191	Helton Refuse Dump	1
5	NONCD0000171	Henry River Comm. Dump	1
6	NONCD0000172	Drexel Dump	1
7	NONCD0000170	Hildebran Disposal Area	1
8	NONCD0000423	Linville Falls Refuse Disposal	1
9	NONCD0000177	Morgantown Dump	1
10	NONCD0000190	Rhodhiss Dump	1
11	NONCD0000174	Valdese Refuse Dump	1

Brownfields Program Sites

#	BF_ID	BF_Name	Count
1	140431012	Morganton Heights (RN)	1
2	40040012	National Textiles	1
3	130090912	Burke Mills	1
4	1004306012	Doblin Mastercraft	1
5	901050012	Rexnord Industries	1
6	1001106012	Knob Creek Property	1

SEPA/NEPA Review Report

Area of Interest (AOI) Information

Area : 371,666.2 acres

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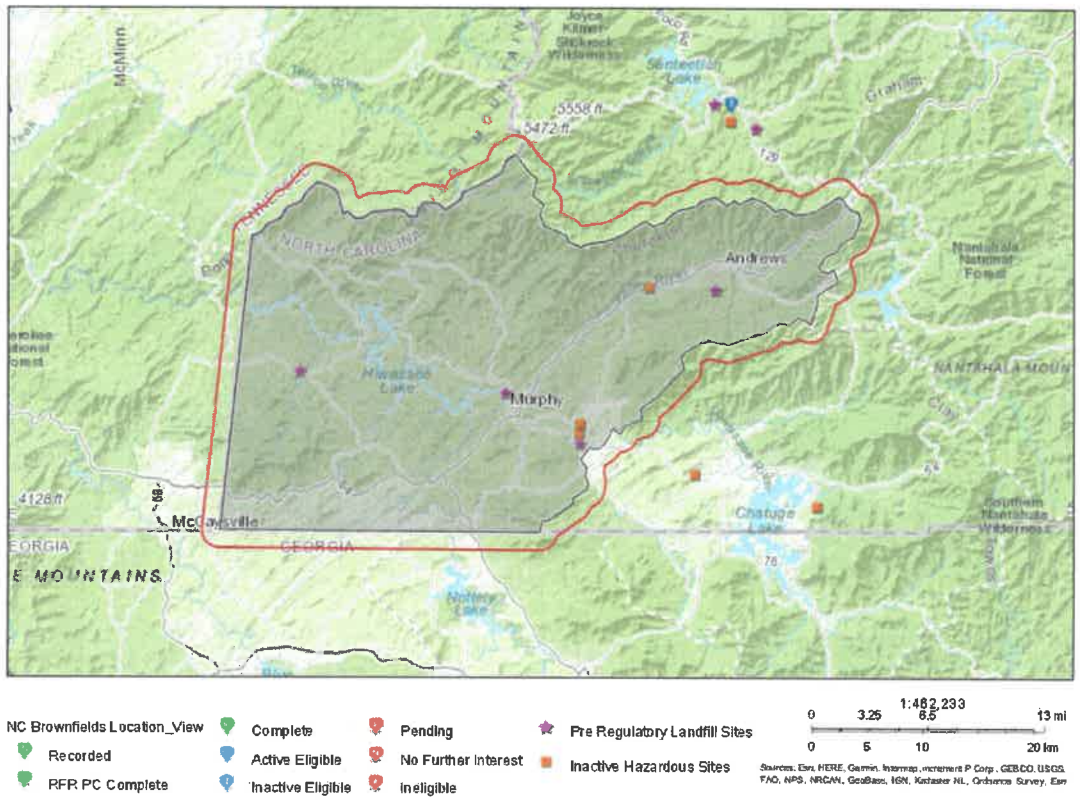

19-0040 Cherokee County

Summary

Name	Count	Area(acres)	Length(mi)
Certified DSCA Sites	0	N/A	N/A
Federal Remediation Branch Sites	0	N/A	N/A
Inactive Hazardous Sites	3	N/A	N/A
Pre-Regulatory Landfill Sites	4	N/A	N/A
Brownfields Program Sites	0	N/A	N/A

Inactive Hazardous Sites

#	EPAID	SITENAME	Count
1	NONCD0001934	BRP US INC (FRMR)	1
2	NCD038551263	TRI-COUNTY COMMUNITY COLLEGE	1
3	NCD089989917	EMERSON ELECTRIC COMPANY	1

Pre-Regulatory Landfill Sites

#	EPAID	SITENAME	Count
1	NONCD0000231	Andrews Dump	1
2	NONCD0000228	Lake Hiwassee Resort Dump	1
3	NONCD0000230	Murphy Refuse Dump	1
4	NONCD0000229	Peachtree Com. Dump	1

SEPA/NEPA Review Report

Area of Interest (AOI) Information

Area : 354,527.08 acres

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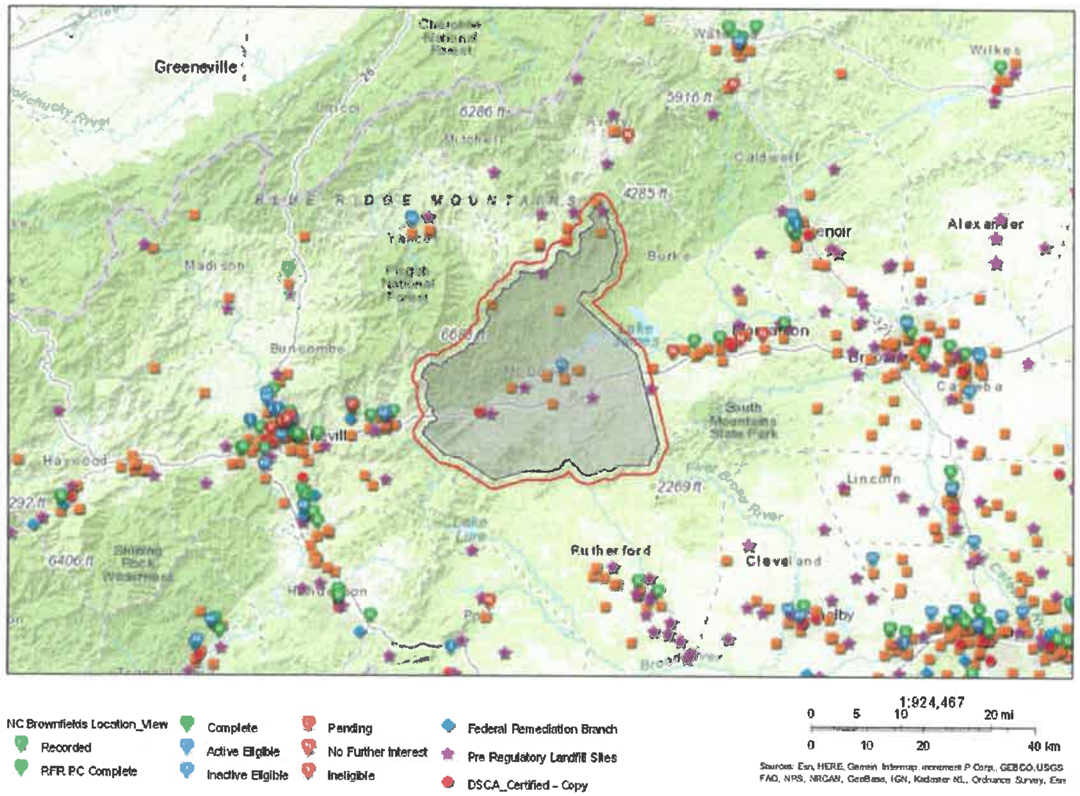

19-0040 McDowell County

Summary

Name	Count	Area(acres)	Length(mi)
Certified DSCA Sites	1	N/A	N/A
Federal Remediation Branch Sites	0	N/A	N/A
Inactive Hazardous Sites	10	N/A	N/A
Pre-Regulatory Landfill Sites	6	N/A	N/A
Brownfields Program Sites	1	N/A	N/A

Certified DSCA Sites

#	Site_ID	Site_Name	Count
1	DC560001	Nichols Laundry And Dry Cleaning	1

Inactive Hazardous Sites

#	EPAID	SITENAME	Count
1	NONCD0001102	BLUE RIDGE AUTO SALES	1
2	NONCD0001128	RESOLUTION PACKAGING	1
3	NONCD0002389	APACHE WELLS	1
4	NONCD0002435	MY FAVORITE MARTIN TRUCK ACCIDENT	1
5	NCD003157377	AMERICAN THREAD/SEVIER PLANT	1
6	NCD980838551	MCDOWELL FIREMAN ASSOCIATION SITE	1
7	NCD986232676	ROCK-TENN MARION FOLDING	1
8	NCN000410289	METAL INDUSTRIES	1
9	NONCD0000010	UNITED MERCHANTS/OLD FORT PLANT	1
10	NONCD0000021	CRABTREE MEADOWS DUMP	1

Pre-Regulatory Landfill Sites

#	EPAID	SITENAME	Count
1	NONCD0000169	Dysartsville Dump	1
2	NONCD0000795	Greenlee Potholes	1
3	NONCD0000423	Linville Falls Refuse Disposal	1
4	NONCD0000422	Little Switzerland Landfill	1
5	NONCD0000425	Marion Refuse Disposal	1
6	NONCD0000424	Old Fort Refuse Disposal	1

Brownfields Program Sites

#	BF_ID	BF_Name	Count
1	2007216056	Drexel Heritage	1

SEPA/NEPA Review Report

Area of Interest (AOI) Information

Area : 253,712.71 acres

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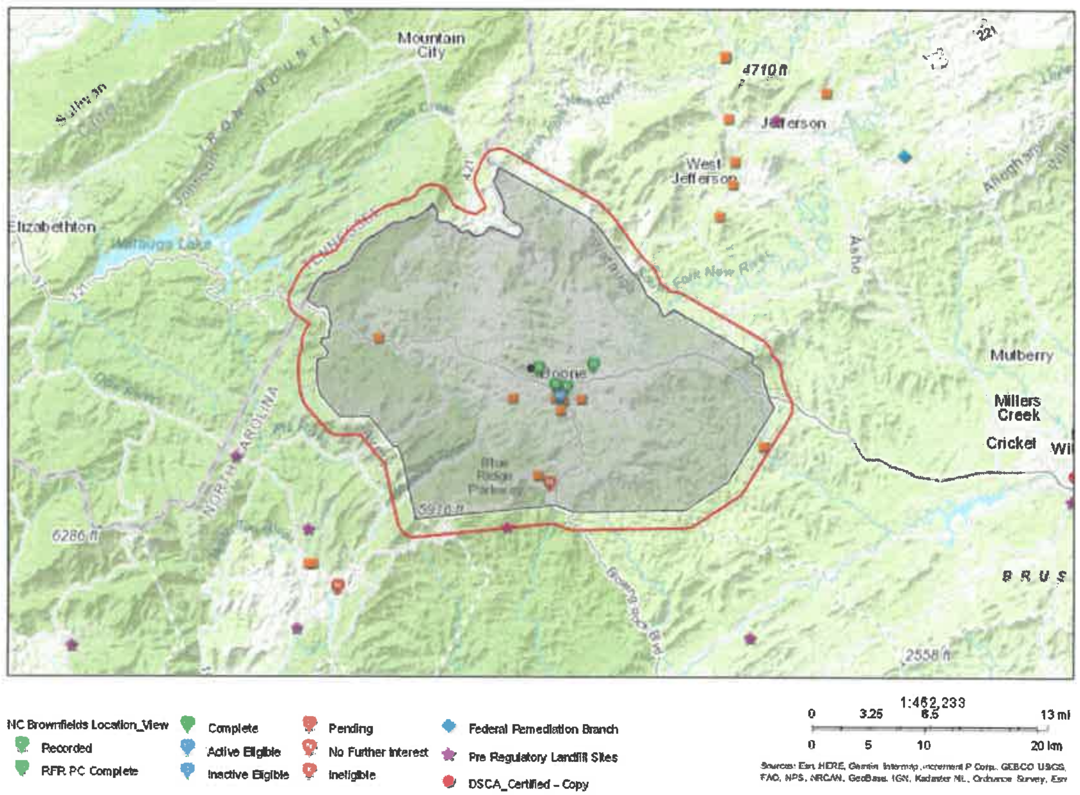

19-0040 Watauga County

Summary

Name	Count	Area(acres)	Length(mi)
Certified DSCA Sites	2	N/A	N/A
Federal Remediation Branch Sites	0	N/A	N/A
Inactive Hazardous Sites	11	N/A	N/A
Pre-Regulatory Landfill Sites	1	N/A	N/A
Brownfields Program Sites	6	N/A	N/A

Certified DSCA Sites

#	Site_ID	Site_Name	Count
1	DC950001	High Country Cleaners	1
2	DC950002	Trailway Cleaners, Inc.	1

Inactive Hazardous Sites

#	EPAID	SITENAME	Count
1	NONCD0001825	HARMON RESIDENCE, LARRY	1
2	NONCD0001086	NAPA AUTO REPAIR-TODD GREENE PROPERTY	1
3	NONCD0001095	MOSES CONE MEMORIAL PARK	1
4	NONCD0001139	VERMONT AMERICAN	1
5	NONCD0001205	TOYOTA OF BOONE	1
6	NONCD0001088	BOONE KAWASAKI POLARIS (FRMR)	1
7	NONCD0001907	INTERNATIONAL RESISTIVE CORP.	1
8	NONCD0001930	THE PANTRY #141	1
9	NONCD0002141	NCDOT - SITE #38 BROWN BROTHERS ASPHALT	1
10	NONCD0002370	Randall Honeycutt	1
11	NCD986211274	STONEY FORK CREEK DRUM DUMP SITE	1

Pre-Regulatory Landfill Sites

#	EPAID	SITENAME	Count
1	NONCD0000194	Blowing Rock LF	1

Brownfields Program Sites

#	BF_ID	BF_Name	Count
1	190161595	G & B Oil (RN)	1
2	190341595	IRC (RFR)	1
3	150391195	University Nissian	1
4	40050095	State Farm Road	1
5	180301495	The Standard at Boone (RN)	1
6	2008316095	Chestnut at Blowing Rock	1

ROY COOPER
Governor
MICHAEL S. REGAN
Secretary
MICHAEL SCOTT
Director

NORTH CAROLINA
Environmental Quality

DATE: September 14, 2018

TO: Michael Scott, Division Director through Sharon Brinkley

FROM: Deb Aja, Western District Supervisor - Solid Waste Section

RE: NEPA Project 19-0040, Avery, Burke, Cherokee, McDowell, and Watauga Counties
Tennessee Valley Authority Vegetation Management Project

The Solid Waste Section has reviewed the Draft Programmatic Environmental Impact Statement environmental for the Tennessee Valley Authority project for the management of vegetation within the transmission rights for way of the Tennessee Valley Authority in Avery, Burke, Cherokee, McDowell, and Watauga Counties in North Carolina. The review has been completed and has found no adverse impact on the surrounding community and likewise knows of no situations in the community, which would affect this project from a solid waste perspective.

During the project, every feasible effort should be made to minimize the generation of waste, to recycle materials for which viable markets exist, and to use recycled products and materials in the development of this project where suitable. Any waste generated by this project that cannot be beneficially reused or recycled must be disposed of at a solid waste management facility approved to manage the respective waste type. The Section strongly recommends that any contractors are required to provide proof of proper disposal for all waste generated as part of the project.

A list of permitted solid waste management facilities is available on the Solid Waste Section portal site at: http://deq.nc.gov/about/divisions/waste-management/waste-management-rules-data/solid-waste-management-annual-reports/solid-waste-permitted-facility-list

Please contact Mr. Kris Riddle, Environmental Senior Specialist, with any questions regarding solid waste management for this project. Mr. Riddle may be reached at (828) 296-4705 or by email at kris.riddle@ncdenr.gov.

Cc: Jason Watkins, Field Operations Branch Head
Kris Riddle, Environmental Senior Specialist
Lee Hill, Environmental Senior Specialist
Charles Gerstell, Environmental Senior Specialist

State of North Carolina Department of Environmental Quality
INTERGOVERNMENTAL REVIEW PROJECT COMMENTS

Reviewing Regional Office: Asheville
Project Number: 19-0040 Due Date: 09/17/2018
County: Avery

After review of this project it has been determined that the DEQ permit(s) and/or approvals indicated may need to be obtained in order for this project to comply with North Carolina Law. Questions regarding these permits should be addressed to the Regional Office indicated on the reverse of the form. All applications, information and guidelines relative to these plans and permits are available from the same Regional Office.

	PERMITS	SPECIAL APPLICATION PROCEDURES or REQUIREMENTS	Normal Process Time (statutory time limit)
☐	Permit to construct & operate wastewater treatment facilities, non-standard sewer system extensions & sewer systems that do not discharge into state surface waters.	Application 90 days before begins construction or award of construction contracts. On-site inspection may be required. Post-application technical conference usual.	30 days (90 days)
☐	Permit to construct & operate, sewer extensions involving gravity sewers, pump stations and force mains discharging into a sewer collection system	Fast-Track Permitting program consists of the submittal of an application and an engineer's certification that the project meets all applicable State rules and Division Minimum Design Criteria.	30 days (N/A)
☐	NPDES - permit to discharge into surface water and/or permit to operate and construct wastewater facilities discharging into state surface waters.	Application 180 days before begins activity. On-site inspection. Pre-application conference usual. Additionally, obtain permit to construct wastewater treatment facility-granted after NPDES. Reply time, 30 days after receipt of plans or issue of NPDES permit-whichever is later.	90-120 days (N/A)
☐	Water Use Permit	Pre-application technical conference usually necessary.	30 days (N/A)
☐	Well Construction Permit	Complete application must be received and permit issued prior to the installation of a groundwater monitoring well located on property not owned by the applicant, and for a large capacity (>100,000 gallons per day) water supply well.	7 days (15 days)
☐	Dredge and Fill Permit	Application copy must be served on each adjacent riparian property owner. On-site inspection. Pre-application conference usual. Filling may require Easement to Fill from N.C. Department of Administration and Federal Dredge and Fill Permit.	55 days (90 days)
☐	Permit to construct & operate Air Pollution Abatement facilities and/or Emission Sources as per 15 A NCAC (2Q.0100 thru 2Q.0300)	Application must be submitted and permit received prior to construction and operation of the source. If a permit is required in an area without local zoning, then there are additional requirements and timelines (2Q.0113).	90 days
☒	Any open burning associated with subject proposal must be in compliance with 15 A NCAC 2D.1900	N/A	60 days (90 days)
☐	Demolition or renovations of structures containing asbestos material must be in compliance with 15 A NCAC 20.1110 (a) (1) which requires notification and removal prior to demolition. Contact Asbestos Control Group 919-707-5950	Please Note - The Health Hazards Control Unit (HHCU) of the N.C. Department of Health and Human Services, must be notified of plans to demolish a building, including residences for commercial or industrial expansion, even if no asbestos is present in the building.	60 days (90 days)
☐	The Sedimentation Pollution Control Act of 1973 must be properly addressed for any land disturbing activity. An erosion & sedimentation control plan will be required if one or more acres are to be disturbed. Plan must be filed with and approved by applicable Regional Office (Land Quality Section) at least 30 days before beginning activity. A NPDES Construction Stormwater permit (NCG010000) is also usually issued should design features meet minimum requirements. A fee of $65 for the first acre or any part of an acre. An express review option is available with additional fees.		20 days (30 days)
☐	Sedimentation and erosion control must be addressed in accordance with NCDOT's approved program. Particular attention should be given to design and installation of appropriate perimeter sediment trapping devices as well as stable Stormwater conveyances and outlets.		(30 days)
☐	Sedimentation and erosion control must be addressed in accordance with _____ Local Government's approved program. Particular attention should be given to design and installation of appropriate perimeter sediment trapping devices as well as stable Stormwater conveyances and outlets.		Based on Local Program
☐	Compliance with 15A NCAC 2H .0126 - NPDES Stormwater Program which regulates three types of activities: Industrial, Municipal Separate Storm Sewer System & Construction activities that disturb ≥1 acre.		30-60 days (90 days)
☐	Compliance with 15A NCAC 2H 1000 -State Stormwater Permitting Programs regulate site development and post-construction stormwater runoff control. Areas subject to these permit programs include all 20 coastal counties, and various other counties and watersheds throughout the state.		45 days (90 days)

State of North Carolina Department of Environmental Quality
INTERGOVERNMENTAL REVIEW PROJECT COMMENTS

Reviewing Regional Office: Asheville
Project Number: 19-0040 Due Date: 09/17/2018
County: Avery

	PERMITS	SPECIAL APPLICATION PROCEDURES or REQUIREMENTS	Normal Process Time (statutory time limit)
☐	Mining Permit	On-site inspection usual. Surety bond filed with DEQ Bond amount varies with type mine and number of acres of affected land. Affected area greater than one acre must be permitted. The appropriate bond must be received before the permit can be issued.	30 days (60 days)
☐	Dam Safety Permit	If permit required, application 60 days before begin construction. Applicant must hire N.C. qualified engineer to: prepare plans, inspect construction, and certify construction is according to DEQ approved plans. May also require a permit under mosquito control program. And a 404 permit from Corps of Engineers. An inspection of site is necessary to verify Hazard Classification. A minimum fee of $200.00 must accompany the application. An additional processing fee based on a percentage or the total project cost will be required upon completion.	30 days (60 days)
☐	Oil Refining Facilities	N/A	90-120 days (N/A)
☐	Permit to drill exploratory oil or gas well	File surety bond of $5,000 with DEQ running to State of NC conditional that any well opened by drill operator shall, upon abandonment, be plugged according to DEQ rules and regulations.	10 days N/A
☐	Geophysical Exploration Permit	Application filed with DEQ at least 10 days prior to issue of permit. Application by letter. No standard application form.	10 days N/A
☐	State Lakes Construction Permit	Application fee based on structure size is charged. Must include descriptions & drawings of structure & proof of ownership of riparian property	15-20 days N/A
☐	401 Water Quality Certification	Compliance with the T15A 02H .0500 Certifications are required whenever construction or operation of facilities will result in a discharge into navigable water as described in 33 CFR part 323.	60 days (130 days)
☐	Compliance with Catawba, Goose Creek, Jordan Lake, Randleman, Tar Pamlico or Neuse Riparian Buffer Rules is required. Buffer requirements: http://deq.nc.gov/about/divisions/water-resources/water-resources-permits/wastewater-branch/401-wetlands-buffer-permits/401-riparian-buffer-protection-program		
☐	Nutrient Offset: Loading requirements for nitrogen and phosphorus in the Neuse and Tar-Pamlico River basins, and in the Jordan and Falls Lake watersheds, as part of the nutrient-management strategies in these areas. DWR nutrient offset information: http://deq.nc.gov/about/divisions/water-resources/planning/nonpoint-source-management/nutrient-offset-information		
☐	CAMA Permit for MAJOR development	$250.00 - $475.00 fee must accompany application	75 days (150 days)
☐	CAMA Permit for MINOR development	$100.00 fee must accompany application	22 days (25 days)
☐	Abandonment of any wells, if required must be in accordance with Title 15A. Subchapter 2C.0100.		
☒	Notification of the proper regional office is requested if "orphan" underground storage tanks (USTS) are discovered during any excavation operation.		
☐	Plans and specifications for the construction, expansion, or alteration of a public water system must be approved by the Division of Water Resources/Public Water Supply Section prior to the award of a contract or the initiation of construction as per 15A NCAC 18C .0300 et. seq., Plans and specifications should be submitted to 1634 Mail Service Center, Raleigh, North Carolina 27699-1634. All public water supply systems must comply with state and federal drinking water monitoring requirements. For more information, contact the Public Water Supply Section, (919) 707-9100.		30 days
☐	If existing water lines will be relocated during the construction, plans for the water line relocation must be submitted to the Division of Water Resources/Public Water Supply Section at 1634 Mail Service Center, Raleigh, North Carolina 27699-1634. For more information, contact the Public Water Supply Section, (919) 707-9100.		30 days
☐	Plans and specifications for the construction, expansion, or alteration of the _____ water system must be approved through the _____ delegated plan approval authority. Please contact them at _____ for further information.		

State of North Carolina Department of Environmental Quality
INTERGOVERNMENTAL REVIEW PROJECT COMMENTS

Reviewing Regional Office: Asheville
Project Number: 19-0040 Due Date: 09/17/2018
County: Avery

Other Comments (attach additional pages as necessary, being certain to comment authority)

Division	Initials	No comment	Comments	Date Review
DAQ	PVB	☐	Any open burning associated with this project shall be conducted within NC state open burning regulations.	9/4/18
DWR-WQROS (Aquifer & Surface)	ZP &ZP	☐	If the project scope includes any fill or modifications (e.g. culverts, etc) to wetlands and/or streams in North Carolina, contact Zan Price at 828 296-4662 to discuss 401 Water Quality Certification permitting. Use construction BMPs to prevent sediment laden runoff from entering streams, which would be a violation of Water Quality standards. Use only herbicides approved by EPA and follow label instructions for application rates and buffer distances from waters. Where feasible, maintain a woody buffer along stream and wetland areas. &	9/7/18 / /
DWR-PWS	MKW	☐	The maps of the study area indicate that the vegetation removal will take place within the French Broad River basin and, possibly, the Catawba River basin. Both river basins contain watersheds that serve as public drinking water supplies, specifically the Town of Spruce Pine, which has an intake on the North Toe River. The Public Water Supply Section recommends that only EPA-approved herbicides are used and that they are applied according to the manufacturer's guidelines.	9/11/18
DEMLR (LQ & SW)		☐		/ /
DWM – UST	CEL	☐	The Asheville Regional Office (ARO) UST Section recommends removal of any abandoned or out-of-use petroleum USTs or petroleum ASTs within the project area. The UST Section should be contacted regarding use of any proposed or on-site petroleum USTs or ASTs. We may be reached at (828) 296-4500. Any petroleum USTs or ASTs must be installed and maintained in accordance with applicable local, state, and federal regulations. For additional information on petroleum ASTs it is advisable that the North Carolina Department of Insurance at (919) 661-5880 ext. 239, USEPA (404) 562-8761, local fire department, and Local Building Inspectors be contacted. Any petroleum spills must be contained and the area of impact must be properly restored. Petroleum spills of significant quantity must be reported to the North Carolina Department of Environmental Quality (NCDEQ) – Division of Waste Management (DWM) UST Section in the ARO. Any soils excavated during demolition or construction that show evidence of petroleum contamination, such as stained soil, odors, or free product must be reported immediately to the local Fire Marshall to determine whether explosive or inhalation hazards exist. Also, notify the UST Section of the ARO. Petroleum contaminated soils must be handled in accordance with all applicable regulations. Any questions or concerns regarding spills from petroleum USTs, ASTs, or vehicles should be directed to the UST Section at (828) 296-4500. If you have any questions or need additional information, please contact me via email at caroline.lafond@ncdenr.gov or by phone at (828) 296-4644.	9/6/18
Other Comments		☐		/ /

REGIONAL OFFICES

Questions regarding these permits should be addressed to the Regional Office marked below.

☒ **Asheville Regional Office**
2090 U.S. 70 Highway
Swannanoa, NC 28778-8211
Phone: 828-296-4500
Fax: 828-299-7043

☐ **Fayetteville Regional Office**
225 Green Street, Suite 714,
Fayetteville, NC 28301-5043
Phone: 910-433-3300
Fax: 910-486-0707

☐ **Mooresville Regional Office**
610 East Center Avenue, Suite 301,
Mooresville, NC 28115
Phone: 704-663-1699
Fax: 704-663-6040

☐ **Raleigh Regional Office**
3800 Barrett Drive,
Raleigh, NC 27609
Phone: 919-791-4200
Fax: 919-571-4718

☐ **Washington Regional Office**
943 Washington Square Mall,
Washington, NC 27889
Phone: 252-946-6481
Fax: 252-975-3716

☐ **Wilmington Regional Office**
127 Cardinal Drive Ext.,
Wilmington, NC 28405
Phone: 910-796-7215
Fax: 910-350-2004

☐ **Winston-Salem Regional Office**
450 Hanes Mill Road, Suite 300,
Winston-Salem, NC 27105
Phone: 336-776-9800
Fax: 336-776-9797

ROY COOPER
Governor
MICHAEL S. REGAN
Secretary
JAMIE RAGAN
Director

NORTH CAROLINA
Environmental Quality

MEMORANDUM

To: Crystal Best
State Clearinghouse Coordinator
Department of Administration

From: Lyn Hardison
Division of Environmental Assistance and Customer Service
Environmental Assistance and Project Review Coordinator
Washington Regional Office

RE: 19-0040
Draft Programmatic Environmental Impact Statement (PEIS) – Proposed project is for the management of vegetation within the transmission rights for way of the Tennessee Valley Authority.
Avery, Burke, Cherokee, McDowell and Watauga Counties

Date: September 27, 2018

The Department of Environmental Quality has reviewed the proposal for the referenced project. Based on the information provided, several of our agencies have identified permits that may be required and offered some valuable guidance to reduce environmental impacts. The comments are attached for the applicant's review.

The Department agencies will be available to assist the applicant through the environmental review or permitting processes.

Thank you for the opportunity to respond.

Attachments

STATE OF NORTH CAROLINA
DEPARTMENT OF ADMINISTRATION

ROY COOPER
GOVERNOR

MACHELLE SANDERS
SECRETARY

September 28, 2018

Ms. Anita Masters
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, TN 37902

Re: SCH File # 19-E-0000-0040; Proposed project is for the management of vegetation within the transmission rights of way of the Tennessee Valley Authority

Dear Ms. Masters:

The above referenced environmental impact information has been submitted to the State Clearinghouse under the provisions of the National Environmental Policy Act. According to G.S. 113A-10, when a state agency is required to prepare an environmental document under the provisions of federal law, the environmental document meets the provisions of the State Environmental Policy Act. Attached to this letter for your consideration are comments made by the agencies in the review of this document.

If any further environmental review documents are prepared for this project, they should be forwarded to this office for intergovernmental review.

Should you have any questions, please do not hesitate to call.

Sincerely,

Crystal Best

Crystal Best
State Environmental Review Clearinghouse

Attachments
cc: Region D
Region E
Region A
Region C

Mailing Address:
NC DEPARTMENT OF ADMINISTRATION
1301 MAIL SERVICE CENTER
RALEIGH, NC 27699-1301

Telephone: (919) 807-2425
Fax: (919) 733-9571
COURIER #51-01-00
Email: state.clearinghouse@doa.nc.gov
Website: www.ncadmin.nc.gov

Location:
116 WEST JONES STREET
RALEIGH, NORTH CAROLINA

~~Brian Wert~~
~~Andy~~ Pam

NORTH CAROLINA STATE CLEARINGHOUSE
DEPARTMENT OF ADMINISTRATION
INTERGOVERNMENTAL REVIEW

COUNTY: AVERY
BURKE
CHEROKEE
MCDOWELL
WATAUGA

H12: OTHER

STATE NUMBER: 19-E-0000-0040
DATE RECEIVED: 08/22/2018
AGENCY RESPONSE: 09/17/2018
REVIEW CLOSED: 09/20/2018

MS CARRIE ATKINSON
CLEARINGHOUSE COORDINATOR
DEPT OF TRANSPORTATION
STATEWIDE PLANNING - MSC #1554
RALEIGH NC

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SOUTHWESTERN COMMISSION
WESTERN PIEDMONT COG

Transportation Planning Division
AUG 27 2018

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AUG 30 2018
Office
DOA

PROJECT INFORMATION

APPLICANT: Tennessee Valley Authority
TYPE: National Environmental Policy Act
Draft Environmental Impact Statement

DESC: Proposed project is for the management of vegetation within the transmission rights of way of the Tennessee Valley Authority - View documents at http://www.tva.gov/nepa

The attached project has been submitted to the N. C. State Clearinghouse for intergovernmental review. Please review and submit your response by the above indicated date to 1301 Mail Service Center, Raleigh NC 27699-1301.

If additional review time is needed, please contact this office at (919)807-2425.

AS A RESULT OF THIS REVIEW THE FOLLOWING IS SUBMITTED: ☑ NO COMMENT ☐ COMMENTS ATTACHED

SIGNED BY: Pam R. Cook DATE: 8/29/2018

AUG 2 4 2018

NORTH CAROLINA STATE CLEARINGHOUSE
DEPARTMENT OF ADMINISTRATION
INTERGOVERNMENTAL REVIEW

COUNTY: AVERY
BURKE
CHEROKEE
MCDOWELL
WATAUGA

H12: OTHER

STATE NUMBER: 19-E-0000-0040
DATE RECEIVED: 08/22/2018
AGENCY RESPONSE: 09/17/2018
REVIEW CLOSED: 09/20/2018

MS CINDY WILLIAMS
CLEARINGHOUSE COORDINATOR
DPS - DIV OF EMERGENCY MANAGEMENT
FLOODPLAIN MANAGEMENT PROGRAM
4218 MAIL SERVICE CENTER
RALEIGH NC

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AS A RESULT OF THIS REVIEW THE FOLLOWING IS SUBMITTED: ☑ NO COMMENT ☐ COMMENTS ATTACHED

SIGNED BY: David Harlow DATE: 8/27/18

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NORTH CAROLINA STATE CLEARINGHOUSE
DEPARTMENT OF ADMINISTRATION
INTERGOVERNMENTAL REVIEW

COUNTY: AVERY
BURKE
CHEROKEE
MCDOWELL
WATAUGA

H12: OTHER

STATE NUMBER: 19-E-0000-0040
DATE RECEIVED: 08/22/2018
AGENCY RESPONSE: 09/17/2018
REVIEW CLOSED: 09/20/2018

MR GREG RICHARDSON
CLEARINGHOUSE COORDINATOR
DOA - COMMISSION OF INDIAN AFFAIRS
1317 MAIL SERVICE CENTER
RALEIGH NC

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WESTERN PIEDMONT COG

RECEIVED
AUG 27 2018
By

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If additional review time is needed, please contact this office at (919)807-2425.

AS A RESULT OF THIS REVIEW THE FOLLOWING IS SUBMITTED: ☐ NO COMMENT ☑ COMMENTS ATTACHED

SIGNED BY: Gregory A. Richardson DATE: 8/27/18

This project Requires Consultation with the Eastern Band of the Cherokee Indian Tribe. The Contact Information is attached.

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TRIBES & ORGANIZATION
September 27, 2017
MODIFIED

Coharie Tribe
Tribal Administrator: Greg Jacobs
Mailing Address: 7531 N U.S. Hwy. 421, Clinton, NC 28328
Email: greg_jacobs53@yahoo.com
Phone: 910-564-6909
Fax: 910-564-2701
www.coharietribe.org

Cumberland County Association for Indian People
Executive Director: Gladys Hunt
Mailing Address: 2173 Downing Road
Fayetteville, NC 28301
Phone: 910-483-8442
Fax: 910-483-8742
ccaip@netzero.net
Email: huntsgkids@aol.com

Eastern Band of Cherokee
Tribal Administrators: Paxton Myer; 828-359-7029; and
Sarah Teesateskie; 828-359-7005
Mailing Address: P O Box 455
Cherokee, NC 28719
Phone: 828-3597029
Fax: 828-497-7000
paxtmyer@nc-cherokee.com
sarah.teesateskie@nc-cherokee.com

Guilford Native American Association
Director: Rick Oxendine
Mailing Address: P O Box 5623
1100 Revolution Mill Dr.,
Studio #10, Greensboro, NC 27435
Fax: 336-272-2925
www.guilfordnative.org
Email: roxbuddy58@gmail.com

Haliwa Saponi Indian Tribe
Tribal Administrator: Archie Lynch
Mailing Address: P O Box 99
Hollister, NC 27844
Phone: 252-586-4017
Fax: 252-586-3918
Email: alynch@haliwa-saponi.com
www.haliwa-saponi.com

Lumbee Tribe of North Carolina
Tribal Administrator: Dr. Freda Porter
Mailing Address: Turtle Building, 6984 NC Hwy 711W; P O Box 2709
Pembroke, NC 28372
Email: fporter@lumbeetribe.com
Phone: 910-522-2221
Phone: 910-521-7861
Phone: 800=-659-6585
Fax: 910-521-7790
Fax Adm.: 910-521-2278
www.lumbeetribe.com

Meherrin Indian Tribe
Chief & Tribal Administrator:
Wayne Brown
Address: P O Box 274
Ahoskie, NC 27910
Phone: 252-209-0934
Email:
chiefbrownmeherrin@yahoo.com
www.meherrinnation.org

Metrolina Native American Association
Executive Director: Toni Henderson
Mailing Address: 8001N. Tryon Street
Charlotte, NC 28262
Phone: 704-891-2610
Email: tonihenderson@gmail.com
www.metrolinanativeamericans.org

Occaneechi Band of the Saponi Nation
Tribal Administrator: Vickie Jefferies
Mailing Address: P O Box 356
Mebane, NC 27302
Phone: 336-421-1317
obsntribe@gmail.com
www.obsn.org

Sappony Indian Tribe
Executive Director: Dante Desiderio
Mailing Address: P O Box 3265,
Roxboro, NC 27573
Phone: 434-585-3352
Phone: 202-631-2003
Email: Sappony@msn.com
www.sapony.org

Triangle Native American Society
Address: P O Box 26841,
Raleigh, NC 27611

Email: tnaspresident@aol.com
www.tnasweb.org

Waccamaw Siouan Tribe
Housing Director: Brenda Moore
Address: P O Box 69,
Bolton, NC 28423
Phone: 910-655-8778
Fax: 910-655-8779
siouan@aol.com
www.waccamaw-siouan.com

Tribes & Organizations
Created by: Daphne Pinto
Revised Date: 020918

NORTH CAROLINA STATE CLEARINGHOUSE
DEPARTMENT OF ADMINISTRATION
INTERGOVERNMENTAL REVIEW

COUNTY: AVERY
BURKE
CHEROKEE
MCDOWELL
WATAUGA

H12: OTHER

STATE NUMBER: 19-E-0000-0(
DATE RECEIVED: 08/22/2018
AGENCY RESPONSE: 09/17/2018
REVIEW CLOSED: 09/20/2018

MR RODNEY BUTLER
CLEARINGHOUSE COORDINATOR
DNCR - NATURAL HERITAGE PROGRAM
1651 MAIL SERVICE CENTER
RALEIGH NC

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PROJECT INFORMATION

APPLICANT: Tennessee Valley Authority
TYPE: National Environmental Policy Act
Draft Environmental Impact Statement

DESC: Proposed project is for the management of vegetation within the transmission rights of way of the Tennessee Valley Authority - View documents at http://www.tva.gov/nepa

The attached project has been submitted to the N. C. State Clearinghouse for intergovernmental review. Please review and submit your response by the above indicated date to 1301 Mail Service Center, Raleigh NC 27699-1301.

If additional review time is needed, please contact this office at (919)807-2425.

AS A RESULT OF THIS REVIEW THE FOLLOWING IS SUBMITTED: ☐ NO COMMENT ☑ COMMENTS ATTACHE

SIGNED BY: M. Warf DATE: 9/17/18

North Carolina Department of Natural and Cultural Resources
Natural Heritage Program

Governor Roy Cooper | Secretary Susi H. Hamilton

NCNHDE-6949

September 17, 2018

Attn: Crystal Best
North Carolina Clearinghouse

RE: Clearinghouse 19-0040 - Avery County

Dear North Carolina Clearinghouse:

The North Carolina Natural Heritage Program (NCNHP) appreciates the opportunity to provide information about natural heritage resources for the project referenced above.

A query of the NCNHP database indicates that there are records for rare species, important natural communities, natural areas, and/or conservation/managed areas within the proposed project boundary. These results are presented in the attached 'Documented Occurrences' tables and map.

The attached 'Potential Occurrences' table summarizes rare species and natural communities that have been documented within a one-mile radius of the property boundary. The proximity of these records suggests that these natural heritage elements may potentially be present in the project area if suitable habitat exists. Tables of natural areas and conservation/managed areas within a one-mile radius of the project area, if any, are also included in this report.

If a Federally-listed species is documented within the project area or indicated within a one-mile radius of the project area, the NCNHP recommends contacting the US Fish and Wildlife Service (USFWS) for guidance. Contact information for USFWS offices in North Carolina is found here: https://www.fws.gov/offices/Directory/ListOffices.cfm?statecode=37.

Please note that natural heritage element data are maintained for the purposes of conservation planning, project review, and scientific research, and are not intended for use as the primary criteria for regulatory decisions. Information provided by the NCNHP database may not be published without prior written notification to the NCNHP, and the NCNHP must be credited as an information source in these publications. Maps of NCNHP data may not be redistributed without permission.

Also please note that the NC Natural Heritage Program may follow this letter with additional correspondence if a Dedicated Nature Preserve, Registered Heritage Area, Clean Water Management Trust Fund easement, or an occurrence of a Federally-listed species is documented near the project area.

If you have questions regarding the information provided in this letter or need additional assistance, please contact Rodney A. Butler at rodney.butler@ncdcr.gov or 919-707-8603.

Sincerely,
NC Natural Heritage Program

Natural Heritage Element Occurrences, Natural Areas, and Managed Areas Intersecting the Project Area
19-0040 - Avery County
September 17, 2018
NCNHDE-6949

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Amphibian	5337	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	2017-08-01	AB	3-Medium	---	Special Concern	G3G4T2	S3
Amphibian	8318	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	2017-05-12	B	3-Medium	---	Special Concern	G3G4T2	S3
Amphibian	35138	Desmognathus organi	Northern Pygmy Salamander	2007-05-12	E	3-Medium	---	Significantly Rare	G3	S2S3
Amphibian	20374	Desmognathus organi	Northern Pygmy Salamander	2016-09-14	A	3-Medium	---	Significantly Rare	G3	S2S3
Amphibian	9869	Hemidactylium scutatum	Four-toed Salamander	2006-04-11	B?	2-High	---	Special Concern	G5	S3
Amphibian	3888	Plethodon welleri	Weller's Salamander	2017-05-05	E	3-Medium	---	Special Concern	G3	S2
Arachnid	16555	Microhexura montivaga	Spruce-fir Moss Spider	2007	B?	2-High	Endangered	Significantly Rare	G1	S1
Bird	1775	Aegolius acadicus	Northern Saw-whet Owl	2006-04-15	H?	3-Medium	---	Threatened	G5	S2B,S2N
Bird	10641	Catharus guttatus	Hermit Thrush	2011-05-13	E	3-Medium	---	Significantly Rare	G5	S2B,S5N
Bird	24348	Certhia americana	Brown Creeper	2012	AB	3-Medium	---	Special Concern	G5	S3B,S5N
Bird	35629	Certhia americana	Brown Creeper	2015-06-15	E	2-High	---	Special Concern	G5	S3B,S5N
Bird	1256	Coccyzus erythropthalmus	Black-billed Cuckoo	1982	A	3-Medium	---	Significantly Rare	G5	S2B
Bird	4319	Empidonax alnorum	Alder Flycatcher	2015-06-15	B	3-Medium	---	Significantly Rare	G5	S2B
Bird	3918	Falco peregrinus anatum	American Peregrine Falcon	2015-06	E	3-Medium	---	Endangered	G4T4	S1B,S2N
Bird	37811	Loxia curvirostra	Red Crossbill	2013-05-20	E	2-High	---	Special Concern	G5	S2

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Bird	9775	Poecile atricapillus	Black-capped Chickadee	1990-04-21	E	3-Medium	---	Special Concern	G5	S3
Bird	17059	Pooecetes gramineus	Vesper Sparrow	2008-06-19	BC	3-Medium	---	Special Concern	G5	S2B,S2N
Bird	24910	Riparia riparia	Bank Swallow	2007-06-13	CD	3-Medium	---	Significantly Rare	G5	S1B
Bird	34517	Setophaga coronata	Yellow-rumped Warbler	2014-05-30	E	3-Medium	---	Significantly Rare	G5	S1B,S5N
Bird	34191	Sphyrapicus varius	Yellow-bellied Sapsucker	1974-06	H	3-Medium	---	Special Concern	G5	S2S3B, S5N
Bird	34268	Sphyrapicus varius	Yellow-bellied Sapsucker	2005-05-28	D	3-Medium	---	Special Concern	G5	S2S3B, S5N
Bird	37116	Sphyrapicus varius	Yellow-bellied Sapsucker	2016-06-06	E	2-High	---	Special Concern	G5	S2S3B, S5N
Bird	25911	Vermivora chrysoptera	Golden-winged Warbler	2017-06-04	E	3-Medium	---	Special Concern	G4	S2S3B
Bird	14035	Vireo gilvus	Warbling Vireo	1984-07-26	E	3-Medium	---	Significantly Rare	G5	S2B
Butterfly	7200	Euphydryas phaeton	Baltimore Checkerspot	1997-07	F	3-Medium	---	Significantly Rare	G4	S2
Butterfly	14320	Euphydryas phaeton	Baltimore Checkerspot	2002?	A?	2-High	---	Significantly Rare	G4	S2
Butterfly	2305	Polygonia progne	Gray Comma	1994-09-08	E	3-Medium	---	Significantly Rare	G5	S1
Butterfly	6626	Speyeria idalia	Regal Fritillary	1994-09-08	H?	3-Medium	---	Significantly Rare	G3	SX
Caddisfly	16934	Palaeagapetus celsus	a caddisfly	1984-08-28	H?	3-Medium	---	Significantly Rare	G5	S2
Crustacean	33733	Cambarus eeseeohensis	Grandfather Mountain Crayfish	2016-08-22	E	3-Medium	---	Significantly Rare	G1	S2S3
Crustacean	33731	Cambarus eeseeohensis	Grandfather Mountain Crayfish	2014-10-06	E	3-Medium	---	Significantly Rare	G1	S2S3
Dragonfly or Damselfly	32074	Aeshna tuberculifera	Black-tipped Darner	2016-09-27	E	3-Medium	---	Significantly Rare	G5	S1
Dragonfly or Damselfly	33132	Boyeria grafiana	Ocellated Darner	1969-09-30	H	3-Medium	---	Significantly Rare	G5	S2?

Element Occurrences Documented Within Project Area

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Dragonfly or Damselfly	33682	Gomphus descriptus	Harpoon Clubtail	1965-06-06	H	3-Medium	---	Significantly Rare	G4	S1
Dragonfly or Damselfly	33715	Somatochlora elongata	Ski-tipped Emerald	2009-07-27	E	3-Medium	---	Significantly Rare	G5	S2S3
Dragonfly or Damselfly	33381	Sympetrum obtrusum	White-faced Meadowhawk	2008-09-25	CD	3-Medium	---	Significantly Rare	G5	S1
Freshwater Fish	32460	Etheostoma thalassinum	Seagreen Darter	2014-07-24	E	3-Medium	---	Significantly Rare	G4	S3
Freshwater Fish	32515	Notropis volucellus	Mimic Shiner	2004-07-14	E	3-Medium	---	Threatened	G5	S2
Freshwater or Terrestrial Gastropod	37643	Discus bryanti	Sawtooth Disc	2005-10-15	E	2-High	---	Special Concern	G3	S2
Freshwater or Terrestrial Gastropod	37645	Discus bryanti	Sawtooth Disc	2000-07-26	E	3-Medium	---	Special Concern	G3	S2
Freshwater or Terrestrial Gastropod	37644	Discus bryanti	Sawtooth Disc	2000-07-26	E	3-Medium	---	Special Concern	G3	S2
Freshwater or Terrestrial Gastropod	37646	Discus bryanti	Sawtooth Disc	2003-07-31	E	3-Medium	---	Special Concern	G3	S2
Freshwater or Terrestrial Gastropod	37655	Inflectarius subpalliatus	Velvet Covert	2003-07-31	E	3-Medium	---	Special Concern	G2	S2S3
Freshwater or Terrestrial Gastropod	27536	Mesodon andrewsae	Balsam Globe	2008-03-28	E	2-High	---	Significantly Rare	G3	S2S3
Freshwater or Terrestrial Gastropod	37657	Mesodon andrewsae	Balsam Globe	2005-10-15	E	2-High	---	Significantly Rare	G3	S2S3
Freshwater or Terrestrial Gastropod	37661	Mesodon andrewsae	Balsam Globe	2000-07-26	E	3-Medium	---	Significantly Rare	G3	S2S3
Freshwater or Terrestrial Gastropod	37660	Mesodon andrewsae	Balsam Globe	1995-06-30	E	3-Medium	---	Significantly Rare	G3	S2S3

Element Occurrences Documented Within Project Area

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Freshwater or Terrestrial Gastropod	37662	Mesodon andrewsae	Balsam Globe	2003-07-31	E	3-Medium	---	Significantly Rare	G3	S2S3
Freshwater or Terrestrial Gastropod	37683	Paravitrea andrewsae	High Mountain Supercoil	2003-07-31	E	3-Medium	---	Special Concern	G2	S2
Freshwater or Terrestrial Gastropod	37682	Paravitrea andrewsae	High Mountain Supercoil	2005-09-09	E	2-High	---	Special Concern	G2	S2
Freshwater or Terrestrial Gastropod	37686	Paravitrea multidentata	Dentate Supercoil	2000-07-26	E	3-Medium	---	Significantly Rare	G5	S2S3
Freshwater or Terrestrial Gastropod	37688	Paravitrea placentula	Glossy Supercoil	2003-07-31	E	3-Medium	---	Special Concern	G3	S2S3
Freshwater or Terrestrial Gastropod	37690	Paravitrea umbilicaris	Open Supercoil	2004-09-09	E	2-High	---	Special Concern	G2	S2
Freshwater or Terrestrial Gastropod	37697	Ventridens coelaxis	Bidentate Dome	2005-10-15	E	2-High	---	Special Concern	G3	S3?
Freshwater or Terrestrial Gastropod	37698	Ventridens coelaxis	Bidentate Dome	2000-07-26	E	3-Medium	---	Special Concern	G3	S3?
Freshwater or Terrestrial Gastropod	37700	Ventridens coelaxis	Bidentate Dome	2003-07-31	E	3-Medium	---	Special Concern	G3	S3?
Freshwater or Terrestrial Gastropod	37706	Ventridens collisella	Sculptured Dome	1999-10-10	E	3-Medium	---	Significantly Rare	G4	S2?
Freshwater or Terrestrial Gastropod	37708	Ventridens decussatus	Crossed Dome	2005-10-15	E	2-High	---	Significantly Rare	G3	S3?
Freshwater or Terrestrial Gastropod	37711	Ventridens lawae	Rounded Dome	2004-09-17	E	2-High	---	Significantly Rare	G4	S2S3

Element Occurrences Documented Within Project Area

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Freshwater or Terrestrial Gastropod	37712	Ventridens suppressus	Flat Dome	2004-09-09	E	2-High	---	Significantly Rare	G5	S1S2
Grasshopper or Katydid	35053	Booneacris variegata	Variegated Wingless Locust	2009-07-23	E	3-Medium	---	Significantly Rare	G5	S2?
Grasshopper or Katydid	35146	Melanoplus eurycercus	a Spur-throat Grasshopper	2014-06-26	E	3-Medium	---	Significantly Rare	G4	S1
Grasshopper or Katydid	35145	Melanoplus eurycercus	a Spur-throat Grasshopper	2014-06-10	E	3-Medium	---	Significantly Rare	G4	S1
Lichen	11029	Cetraria arenaria	Sand-loving Iceland Lichen	1998-09-10	E	3-Medium	---	Special Concern Vulnerable	G4	S2
Lichen	3944	Cetraria arenaria	Sand-loving Iceland Lichen	1994-08-12	E	3-Medium	---	Special Concern Vulnerable	G4	S2
Lichen	20565	Gymnoderma lineare	Rock Gnome Lichen	2004-09-30	C	3-Medium	Endangered	Endangered	G3	S3
Lichen	16765	Gymnoderma lineare	Rock Gnome Lichen	1987-09-17	C	3-Medium	Endangered	Endangered	G3	S3
Lichen	2021	Gymnoderma lineare	Rock Gnome Lichen	2003-04-29	B	3-Medium	Endangered	Endangered	G3	S3
Lichen	6841	Gymnoderma lineare	Rock Gnome Lichen	2003-04-28	C	3-Medium	Endangered	Endangered	G3	S3
Lichen	1655	Gymnoderma lineare	Rock Gnome Lichen	1989	CD	3-Medium	Endangered	Endangered	G3	S3
Lichen	18973	Gymnoderma lineare	Rock Gnome Lichen	2003-04-27	A	3-Medium	Endangered	Endangered	G3	S3
Lichen	20161	Gymnoderma lineare	Rock Gnome Lichen	1991-07-24	D	2-High	Endangered	Endangered	G3	S3
Lichen	25673	Gymnoderma lineare	Rock Gnome Lichen	2004-12-02	AB	2-High	Endangered	Endangered	G3	S3
Lichen	33689	Gymnoderma lineare	Rock Gnome Lichen	2014-07-30	D	2-High	Endangered	Endangered	G3	S3
Lichen	28205	Gymnoderma lineare	Rock Gnome Lichen	2008	E	2-High	Endangered	Endangered	G3	S3
Lichen	11064	Melanelia stygia	Alpine Camouflage Lichen	1994-08-06	A	3-Medium	---	Significantly Rare Disjunct	G5	S1S2
Liverwort	21870	Bazzania nudicaulis	A Liverwort	1936-06-13	H	3-Medium	---	Significantly Rare Throughout	G2G3	S2
Liverwort	7835	Bazzania nudicaulis	A Liverwort	1999-08-12	E	3-Medium	---	Significantly Rare Throughout	G2G3	S2
Liverwort	21740	Bazzania nudicaulis	A Liverwort	1999-08-12	E	3-Medium	---	Significantly Rare Throughout	G2G3	S2

Element Occurrences Documented Within Project Area

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Liverwort	21739	Bazzania nudicaulis	A Liverwort	1999-08-12	E	2-High	---	Significantly Rare Throughout	G2G3	S2
Liverwort	21738	Bazzania nudicaulis	A Liverwort	1999-05-27	E	2-High	---	Significantly Rare Throughout	G2G3	S2
Liverwort	22154	Frullania appalachiana	A Liverwort	1961-Pre	H	3-Medium	---	Significantly Rare Limited	G1?	S1?
Liverwort	21746	Metzgeria temperata	A Liverwort	1999-08-12	E	3-Medium	---	Significantly Rare Disjunct	G4	S1S2
Liverwort	21744	Metzgeria temperata	A Liverwort	1999-08-12	E	2-High	---	Significantly Rare Disjunct	G4	S1S2
Liverwort	8875	Mylia taylorii	A Liverwort	1989-07-15	E	3-Medium	---	Significantly Rare Disjunct	G5	S1
Liverwort	6001	Plagiochila austinii	A Liverwort	1991-05-25	E	3-Medium	---	Significantly Rare Throughout	G3	S1S2
Liverwort	21732	Plagiochila corniculata	A Liverwort	1999-05-27	E	2-High	---	Significantly Rare Disjunct	G4?	S2
Liverwort	21733	Plagiochila corniculata	A Liverwort	1999-08-12	E	2-High	---	Significantly Rare Disjunct	G4?	S2
Liverwort	1751	Plagiochila sullivantii var. sullivantii	A Liverwort	1991-05-25	E	3-Medium	---	Significantly Rare Throughout	G2T2	S2
Liverwort	21759	Sphenolobopsis pearsonii	A Liverwort	1999-08-12	E	3-Medium	---	Significantly Rare Other	G2?	S2
Liverwort	5951	Sphenolobopsis pearsonii	A Liverwort	1999-08-12	E	3-Medium	---	Significantly Rare Other	G2?	S2
Liverwort	21758	Sphenolobopsis pearsonii	A Liverwort	1999-08-12	E	2-High	---	Significantly Rare Other	G2?	S2
Mammal	19283	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	2015-04-21	E	3-Medium	Endangered	Endangered	G3G4T2	S1
Mammal	17827	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	1992-05-15	E	3-Medium	Endangered	Endangered	G3G4T2	S1
Mammal	7519	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	2016-07-16	A	2-High	Endangered	Endangered	G3G4T2	S1

Element Occurrences Documented Within Project Area

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Mammal	9820	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	2016-02-04	E	2-High	Endangered	Endangered	G3G4T2	S1
Mammal	37782	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	2013-04-17	E	2-High	Endangered	Endangered	G3G4T2	S1
Mammal	33921	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	1989-12-11	E	2-High	Endangered	Endangered	G3G4T2	S1
Mammal	37779	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	2014-05-19	E	2-High	Endangered	Endangered	G3G4T2	S1
Mammal	37785	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	2013-04-23	E	2-High	Endangered	Endangered	G3G4T2	S1
Mammal	13831	Glaucomys sabrinus coloratus	Carolina Northern Flying Squirrel	2015-03-04	B?	2-High	Endangered	Endangered	G5T2	S2
Mammal	31621	Glaucomys sabrinus coloratus	Carolina Northern Flying Squirrel	2012-08-20	E	2-High	Endangered	Endangered	G5T2	S2
Mammal	1089	Microtus chrotorrhinus carolinensis	Southern Rock Vole	1988-11-09	H?	3-Medium	---	Special Concern	G4T3	S3
Mammal	37134	Mustela nivalis	Least Weasel	2009-08-04	E	2-High	---	Game Animal	G5	S2
Mammal	26859	Myotis leibii	Eastern Small-footed Bat	2008-06-16	E	3-Medium	---	Special Concern	G4	S2
Mammal	34095	Myotis leibii	Eastern Small-footed Bat	2016-07-07	E	2-High	---	Special Concern	G4	S2
Mammal	34116	Myotis leibii	Eastern Small-footed Bat	2007-06-07	E	2-High	---	Special Concern	G4	S2
Mammal	34114	Myotis leibii	Eastern Small-footed Bat	2016-07-14	E	2-High	---	Special Concern	G4	S2
Mammal	34115	Myotis leibii	Eastern Small-footed Bat	2007-01-30	D	2-High	---	Special Concern	G4	S2
Mammal	34823	Myotis leibii	Eastern Small-footed Bat	2011-07-12	E	2-High	---	Special Concern	G4	S2
Mammal	34800	Myotis leibii	Eastern Small-footed Bat	2011-06-23	E	2-High	---	Special Concern	G4	S2
Mammal	34826	Myotis lucifugus	Little Brown Bat	2016-07-07	E	2-High	---	Significantly Rare	G3	S2
Mammal	35999	Myotis lucifugus	Little Brown Bat	2011-08-02	E	1-Very High	---	Significantly Rare	G3	S2

Element Occurrences Documented Within Project Area

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Mammal	34824	Myotis lucifugus	Little Brown Bat	2011-08-03	E	2-High	---	Significantly Rare	G3	S2
Mammal	35998	Myotis lucifugus	Little Brown Bat	2015-02-03	E	1-Very High	---	Significantly Rare	G3	S2
Mammal	35997	Myotis lucifugus	Little Brown Bat	2004-08-02	E	1-Very High	---	Significantly Rare	G3	S2
Mammal	32171	Myotis septentrionalis	Northern Long-eared Bat	2011-01-20	D?	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	32141	Myotis septentrionalis	Northern Long-eared Bat	2014-01-20	D	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34373	Myotis septentrionalis	Northern Long-eared Bat	2011-08-03	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34374	Myotis septentrionalis	Northern Long-eared Bat	2011-08-02	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34364	Myotis septentrionalis	Northern Long-eared Bat	2004-08-02	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34370	Myotis septentrionalis	Northern Long-eared Bat	2011-08-02	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	36539	Myotis septentrionalis	Northern Long-eared Bat	2016-03-22	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34371	Myotis septentrionalis	Northern Long-eared Bat	2011-08-02	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34369	Myotis septentrionalis	Northern Long-eared Bat	2011-08-02	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34368	Myotis septentrionalis	Northern Long-eared Bat	2011-08-02	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34865	Myotis septentrionalis	Northern Long-eared Bat	2011-06-23	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34910	Myotis septentrionalis	Northern Long-eared Bat	2011-07-12	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	36130	Perimyotis subflavus	Tricolored Bat	1992-05-15	D	3-Medium	---	Significantly Rare	G2G3	S3
Mammal	36125	Perimyotis subflavus	Tricolored Bat	2016-07-07	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	36126	Perimyotis subflavus	Tricolored Bat	2011-08-02	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	36127	Perimyotis subflavus	Tricolored Bat	2011-08-02	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	36124	Perimyotis subflavus	Tricolored Bat	1986-08-16	H?	2-High	---	Significantly Rare	G2G3	S3
Mammal	36128	Perimyotis subflavus	Tricolored Bat	2011-08-01	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	34929	Perimyotis subflavus	Tricolored Bat	2011-08-03	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	36123	Perimyotis subflavus	Tricolored Bat	2016-01-26	E	1-Very High	---	Significantly Rare	G2G3	S3
Mammal	32944	Spilogale putorius	Eastern Spotted Skunk	2012-08-28	E	3-Medium	---	Game Animal	G4	S2
Mammal	3866	Sylvilagus obscurus	Appalachian Cottontail	1982	H?	3-Medium	---	Game Animal	G4	S3

Element Occurrences Documented Within Project Area

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Mammal	35149	Sylvilagus obscurus	Appalachian Cottontail	2014-06-08	E	2-High	---	Game Animal	G4	S3
Mammal	35139	Sylvilagus obscurus	Appalachian Cottontail	2010-09-22	E	2-High	---	Game Animal	G4	S3
Moss	7907	Dicranum undulatum	Bog Broom-moss	1977-04-28	F	3-Medium	---	Significantly Rare Disjunct	G5	S1
Moss	17641	Homalia trichomanoides	Lime Homalia	1991-05-25	E	3-Medium	---	Significantly Rare Peripheral	G5	S1
Moss	12959	Leptodontium excelsum	Grandfather Mountain Leptodontium	1999-08-12	E	3-Medium	---	Significantly Rare Limited	G2	S1
Moss	21753	Leptodontium excelsum	Grandfather Mountain Leptodontium	1999-08-12	E	3-Medium	---	Significantly Rare Limited	G2	S1
Moss	21752	Leptodontium excelsum	Grandfather Mountain Leptodontium	1999-08-12	E	2-High	---	Significantly Rare Limited	G2	S1
Moss	12516	Leptodontium flexifolium	Pale-margined Leptodontium	1989-07-15	E	3-Medium	---	Significantly Rare Disjunct	G5	S1
Moss	16741	Rhytidium rugosum	Golden Tundra-moss	1978	H	3-Medium	---	Significantly Rare Peripheral	G5	S2
Moss	7007	Rhytidium rugosum	Golden Tundra-moss	1998-09-10	E	3-Medium	---	Significantly Rare Peripheral	G5	S2
Moss	12718	Rhytidium rugosum	Golden Tundra-moss	1987-07-30	A	3-Medium	---	Significantly Rare Peripheral	G5	S2
Moss	9461	Rhytidium rugosum	Golden Tundra-moss	1994-08-06	B	3-Medium	---	Significantly Rare Peripheral	G5	S2
Moss	2628	Sphagnum fallax	Pretty Peatmoss	1989	F	3-Medium	---	Significantly Rare Peripheral	G5	S2
Moss	20572	Sphagnum subsecundum	Orange Peatmoss	2004-10-21	A	2-High	---	Significantly Rare Peripheral	G5	S1
Moss	1472	Splachnum pennsylvanicum	Southern Dung Moss	1934-05-06	X?	3-Medium	---	Significantly Rare Other	G4?	SH
Moss	22981	Warnstorfia fluitans	Floating Sickle-moss	1995-07-14	E	3-Medium	---	Significantly Rare Disjunct	G5	S1
Natural Community	20939	Acidic Cove Forest (High Elevation Subtype)	---	2010	B	2-High	---	---	G3G4Q	S2
Natural Community	3771	Acidic Cove Forest (High Elevation Subtype)	---	2010	B	2-High	---	---	G3G4Q	S2
Natural Community	21182	Acidic Cove Forest (High Elevation Subtype)	---	2010	B	2-High	---	---	G3G4Q	S2

Element Occurrences Documented Within Project Area

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Natural Community	31532	Acidic Cove Forest (High Elevation Subtype)	---	2011-08-10	B	2-High	---	---	G3G4Q	S2
Natural Community	25314	Acidic Cove Forest (Typic Subtype)	---	2010	C	3-Medium	---	---	G5	S4
Natural Community	32175	Acidic Cove Forest (Typic Subtype)	---	2013-06-19	A	2-High	---	---	G5	S4
Natural Community	25262	Acidic Cove Forest (Typic Subtype)	---	2010	BC	2-High	---	---	G5	S4
Natural Community	10950	Acidic Cove Forest (Typic Subtype)	---	2013-10-15	A	2-High	---	---	G5	S4
Natural Community	25341	Acidic Cove Forest (Typic Subtype)	---	2010	CD	3-Medium	---	---	G5	S4
Natural Community	20680	Acidic Cove Forest (Typic Subtype)	---	2010	B	2-High	---	---	G5	S4
Natural Community	34410	Acidic Cove Forest (Typic Subtype)	---	2014-07-30	C	2-High	---	---	G5	S4
Natural Community	32976	Acidic Cove Forest (Typic Subtype)	---	2013-11	B	2-High	---	---	G5	S4
Natural Community	25972	Acidic Cove Forest (Typic Subtype)	---	2010	C	2-High	---	---	G5	S4
Natural Community	20679	Canada Hemlock Forest (Typic Subtype)	---	2010	C	1-Very High	---	---	G3G4	S1S2
Natural Community	20952	Canada Hemlock Forest (Typic Subtype)	---	2010	C	1-Very High	---	---	G3G4	S1S2
Natural Community	20945	Canada Hemlock Forest (Typic Subtype)	---	2004-09-23	C	2-High	---	---	G3G4	S1S2
Natural Community	34416	Carolina Hemlock Forest (Typic Subtype)	---	2014-07-30	C	2-High	---	---	G2	S2
Natural Community	25260	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	A	2-High	---	---	G5	S5
Natural Community	25315	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	B	3-Medium	---	---	G5	S5
Natural Community	26410	Chestnut Oak Forest (Dry Heath Subtype)	---	2014-07-24	B	3-Medium	---	---	G5	S5
Natural Community	25264	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	BC	3-Medium	---	---	G5	S5

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	25342	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	CD	3-Medium	---	---	G5	S5
Natural Community	21183	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	B	2-High	---	---	G5	S5
Natural Community	20942	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	A	3-Medium	---	---	G5	S5
Natural Community	20960	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	A	3-Medium	---	---	G5	S5
Natural Community	34413	Chestnut Oak Forest (Dry Heath Subtype)	---	2014-07-30	C	3-Medium	---	---	G5	S5
Natural Community	32181	Chestnut Oak Forest (Dry Heath Subtype)	---	2018-05-17	E	3-Medium	---	---	G5	S5
Natural Community	30351	Chestnut Oak Forest (Herb Subtype)	---	2010	BC	3-Medium	---	---	G4G5	S4
Natural Community	30348	Chestnut Oak Forest (Mesic Subtype)	---	2010	CD	3-Medium	---	---	G4	S3S4
Natural Community	25991	Chestnut Oak Forest (Mesic Subtype)	---	2010	AC	2-High	---	---	G4	S3S4
Natural Community	33969	Chestnut Oak Forest (Mesic Subtype)	---	2014-08-12	BC	2-High	---	---	G4	S3S4
Natural Community	25973	Chestnut Oak Forest (Mesic Subtype)	---	2010	C?	2-High	---	---	G4	S3S4
Natural Community	9072	Fraser Fir Forest (Herb Subtype)	---	2006	B	3-Medium	---	---	G1	S1
Natural Community	30200	Fraser Fir Forest (Rhododendron Subtype)	---	2006	B	3-Medium	---	---	G1	S1
Natural Community	14854	Grassy Bald (Alder Subtype)	---	2010-04-26	A	3-Medium	---	---	G1	S1
Natural Community	19416	Grassy Bald (Grass Subtype)	---	2013-06-02	A	2-High	---	---	G1	S1
Natural Community	1792	Grassy Bald (Grass Subtype)	---	2008-06-23	A	2-High	---	---	G1	S1
Natural Community	21181	Grassy Bald (Grass Subtype)	---	2011-08-11	C?	1-Very High	---	---	G1	S1
Natural Community	16429	Grassy Bald (Grass Subtype)	---	1991-09-24	B	2-High	---	---	G1	S1

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	19695	Grassy Bald (Grass Subtype)	---	1991-09-24	C	2-High	---	---	G1	S1
Natural Community	25989	Heath Bald (Catawba Rhododendron Subtype)	---	2013-11	AB	3-Medium	---	---	G2	S2
Natural Community	2111	Heath Bald (Catawba Rhododendron Subtype)	---	2007	A	2-High	---	---	G2	S2
Natural Community	30167	Heath Bald (Catawba Rhododendron Subtype)	---	2013-06-01	B?	3-Medium	---	---	G2	S2
Natural Community	20678	Heath Bald (Low Elevation Subtype)	---	2004-10-09	CD	1-Very High	---	---	G2G3	S1
Natural Community	17660	Heath Bald (Low Elevation Subtype)	---	1988-11-16	A?	2-High	---	---	G2G3	S1
Natural Community	30357	Heath Bald (Sand Myrtle Subtype)	---	2010	A	3-Medium	---	---	G1	S1
Natural Community	29765	High Elevation Birch Boulderfield Forest	---	2013-10-08	B	2-High	---	---	G3	S2
Natural Community	32975	High Elevation Birch Boulderfield Forest	---	2013-11	B	3-Medium	---	---	G3	S2
Natural Community	29766	High Elevation Birch Boulderfield Forest	---	2012-08-01	B	2-High	---	---	G3	S2
Natural Community	20681	High Elevation Boggy Seep	---	2004-10-21	A	2-High	---	---	G2	S2
Natural Community	13271	High Elevation Boggy Seep	---	2008-03-24	C	2-High	---	---	G2	S2
Natural Community	16165	High Elevation Granitic Dome	---	2005-05-12	A	2-High	---	---	G2G3	S3
Natural Community	30070	High Elevation Red Oak Forest (Heath Subtype)	---	2013-11	A	3-Medium	---	---	G4	S3
Natural Community	30064	High Elevation Red Oak Forest (Heath Subtype)	---	2010	B	3-Medium	---	---	G4	S3
Natural Community	16793	High Elevation Red Oak Forest (Heath Subtype)	---	2008-03-24	B	3-Medium	---	---	G4	S3
Natural Community	32178	High Elevation Red Oak Forest (Heath Subtype)	---		NR	3-Medium	---	---	G4	S3
Natural Community	30025	High Elevation Red Oak Forest (Heath Subtype)	---	2010	C	3-Medium	---	---	G4	S3

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	32970	High Elevation Red Oak Forest (Orchard Forest Subtype)	---	2013-11	B	2-High	---	---	G2	S2
Natural Community	20957	High Elevation Red Oak Forest (Rich Subtype)	---	2012-07-31	A	2-High	---	---	G2	S3
Natural Community	30069	High Elevation Red Oak Forest (Rich Subtype)	---	2013-11	A	3-Medium	---	---	G2	S3
Natural Community	36648	High Elevation Red Oak Forest (Rich Subtype)	---	2016-05-28	C	2-High	---	---	G2	S3
Natural Community	20675	High Elevation Red Oak Forest (Stunted Woodland Subtype)	---	2014-07-24	B	2-High	---	---	G2	S2
Natural Community	25986	High Elevation Red Oak Forest (Typic Herb Subtype)	---	2014-07-24	A	3-Medium	---	---	G4	S3
Natural Community	6568	High Elevation Red Oak Forest (Typic Herb Subtype)	---	2010	A	3-Medium	---	---	G4	S3
Natural Community	14662	High Elevation Red Oak Forest (Typic Herb Subtype)	---	2010	B	3-Medium	---	---	G4	S3
Natural Community	9209	High Elevation Red Oak Forest (Typic Herb Subtype)	---	2010	A	3-Medium	---	---	G4	S3
Natural Community	16327	High Elevation Red Oak Forest (Typic Herb Subtype)	---	2010	C	3-Medium	---	---	G4	S3
Natural Community	29997	High Elevation Red Oak Forest (Typic Herb Subtype)	---	2008-03-24	B	2-High	---	---	G4	S3
Natural Community	3189	High Elevation Red Oak Forest (Typic Herb Subtype)	---	2010	C?	2-High	---	---	G4	S3
Natural Community	35680	High Elevation Red Oak Forest (Typic Herb Subtype)	---	2013-10-08	B	2-High	---	---	G4	S3

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	33968	High Elevation Red Oak Forest (Typic Herb Subtype)	---	2014-08-12	C	2-High	---	---	G4	S3
Natural Community	3804	High Elevation Red Oak Forest (Typic Herb Subtype)	---	2010-08-28	C	3-Medium	---	---	G4	S3
Natural Community	19877	High Elevation Rocky Summit (High Peak Subtype)	---	2006	A	2-High	---	---	G1	S1
Natural Community	6182	High Elevation Rocky Summit (High Peak Subtype)	---	1986-08-27	A	3-Medium	---	---	G1	S1
Natural Community	30676	High Elevation Rocky Summit (High Peak Subtype)	---	1988-08-16	A	2-High	---	---	G1	S1
Natural Community	20491	High Elevation Rocky Summit (Typic Subtype)	---	2004-11-08	B	3-Medium	---	---	G2	S2
Natural Community	18705	High Elevation Rocky Summit (Typic Subtype)	---	2012	A	2-High	---	---	G2	S2
Natural Community	17629	High Elevation Rocky Summit (Typic Subtype)	---	2017-07-12	AB	3-Medium	---	---	G2	S2
Natural Community	8544	High Elevation Rocky Summit (Typic Subtype)	---	2013-06-03	A	3-Medium	---	---	G2	S2
Natural Community	25995	High Elevation Rocky Summit (Typic Subtype)	---	2013-11	A	2-High	---	---	G2	S2
Natural Community	4789	High Elevation Rocky Summit (Typic Subtype)	---	1988-08-16	A	3-Medium	---	---	G2	S2
Natural Community	19537	High Elevation Rocky Summit (Typic Subtype)	---	2010-08-28	A	3-Medium	---	---	G2	S2
Natural Community	19720	High Elevation Rocky Summit (Typic Subtype)	---	1988-08-16	A	2-High	---	---	G2	S2
Natural Community	8251	High Elevation Rocky Summit (Typic Subtype)	---	1999-10-10	C	2-High	---	---	G2	S2
Natural Community	20956	High Elevation Rocky Summit (Typic Subtype)	---	2011	CD	1-Very High	---	---	G2	S2

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	31542	Low Elevation Rocky Summit (Acidic Subtype)	---	2013-11	B	2-High	---	---	G3?	S2
Natural Community	32962	Low Elevation Seep (Bedrock Subtype)	---	2014-06-27	B	2-High	---	---	G1	S1
Natural Community	18462	Montane Alluvial Forest (Small River Subtype)	---	2005-06-25	A	2-High	---	---	G3	S1
Natural Community	34415	Montane Cliff (Acidic Herb Subtype)	---	2014-07-30	A	2-High	---	---	G3G4	S3
Natural Community	18398	Montane Cliff (Acidic Herb Subtype)	---	1987-09-17	A	2-High	---	---	G3G4	S3
Natural Community	13253	Montane Cliff (Calcareous Subtype)	---	1988-08-18	A	2-High	---	---	G3G4	S1
Natural Community	32973	Montane Cliff (Mafic Subtype)	---	2015-09-17	A	3-Medium	---	---	G3	S3
Natural Community	22632	Montane Oak--Hickory Forest (Acidic Subtype)	---	2016-05-19	BC	3-Medium	---	---	G4G5	S4S5
Natural Community	8182	Montane Oak--Hickory Forest (Acidic Subtype)	---	2010	C	2-High	---	---	G4G5	S4S5
Natural Community	26411	Montane Oak--Hickory Forest (Acidic Subtype)	---	2014-06-26	B	3-Medium	---	---	G4G5	S4S5
Natural Community	34411	Montane Oak--Hickory Forest (Acidic Subtype)	---	2015-09-15	C	3-Medium	---	---	G4G5	S4S5
Natural Community	30131	Montane Oak--Hickory Forest (Basic Subtype)	---	2015-09-17	A	3-Medium	---	---	G3	S3
Natural Community	31175	Montane Oak--Hickory Forest (Basic Subtype)	---	2014-07-24	B	2-High	---	---	G3	S3
Natural Community	30117	Montane Oak--Hickory Forest (Low Dry Subtype)	---	2010	C	2-High	---	---	G2G3	S2
Natural Community	20490	Northern Hardwood Forest (Beech Gap Subtype)	---	2004-05-26	B	3-Medium	---	---	G1	S1S2
Natural Community	1642	Northern Hardwood Forest (Beech Gap Subtype)	---	2013-10-08	C	2-High	---	---	G1	S1S2

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	7445	Northern Hardwood Forest (Beech Gap Subtype)	---	1986	AC	3-Medium	---	---	G1	S1S2
Natural Community	29768	Northern Hardwood Forest (Beech Gap Subtype)	---	2014-07-17	BC	2-High	---	---	G1	S1S2
Natural Community	6186	Northern Hardwood Forest (Beech Gap Subtype)	---	1987-05-27	B?	3-Medium	---	---	G1	S1S2
Natural Community	30147	Northern Hardwood Forest (Rich Subtype)	---	2018-05-15	AB	3-Medium	---	---	G3	S3
Natural Community	30203	Northern Hardwood Forest (Rich Subtype)	---	2013-11	A	3-Medium	---	---	G3	S3
Natural Community	30177	Northern Hardwood Forest (Rich Subtype)	---	2010-08-28	AB	3-Medium	---	---	G3	S3
Natural Community	31549	Northern Hardwood Forest (Rich Subtype)	---	2012-08-01	A	2-High	---	---	G3	S3
Natural Community	8177	Northern Hardwood Forest (Rich Subtype)	---	2013-10-15	A	2-High	---	---	G3	S3
Natural Community	5612	Northern Hardwood Forest (Typic Subtype)	---	2013-10-08	A	3-Medium	---	---	G3G4	S3
Natural Community	2990	Northern Hardwood Forest (Typic Subtype)	---	2013-10-18	AB	3-Medium	---	---	G3G4	S3
Natural Community	18283	Northern Hardwood Forest (Typic Subtype)	---	2014-07-07	B	2-High	---	---	G3G4	S3
Natural Community	20489	Northern Hardwood Forest (Typic Subtype)	---	2010	A	2-High	---	---	G3G4	S3
Natural Community	25987	Northern Hardwood Forest (Typic Subtype)	---	2013-11	A	3-Medium	---	---	G3G4	S3
Natural Community	273	Northern Hardwood Forest (Typic Subtype)	---	2010-08-28	AB	3-Medium	---	---	G3G4	S3
Natural Community	32176	Northern Hardwood Forest (Typic Subtype)	---	2013-06-19	AB	2-High	---	---	G3G4	S3
Natural Community	16900	Northern Hardwood Forest (Typic Subtype)	---	2010	C	3-Medium	---	---	G3G4	S3

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	32961	Pine--Oak/Heath (High Elevation Subtype)	---	2013-11	B	2-High	---	---	G2	S2
Natural Community	25316	Pine--Oak/Heath (Typic Subtype)	---	2010	C	3-Medium	---	---	G3	S3
Natural Community	20676	Pine--Oak/Heath (Typic Subtype)	---	2010	B?	2-High	---	---	G3	S3
Natural Community	30249	Red Spruce--Fraser Fir Forest (Birch Transition Shrub Subtype)	---	2010	A	3-Medium	---	---	G1?	S1
Natural Community	9902	Red Spruce--Fraser Fir Forest (Herb Subtype)	---	2006	B	2-High	---	---	G2	S2
Natural Community	30246	Red Spruce--Fraser Fir Forest (Rhododendron Subtype)	---	2010	B	3-Medium	---	---	G1	S1S2
Natural Community	25988	Rich Cove Forest (Boulderfield Subtype)	---	2013-11	A	3-Medium	---	---	G3	S2
Natural Community	36649	Rich Cove Forest (Boulderfield Subtype)	---	2016-05-29	C?	2-High	---	---	G3	S2
Natural Community	20682	Rich Cove Forest (Boulderfield Subtype)	---	2010	B	2-High	---	---	G3	S2
Natural Community	26481	Rich Cove Forest (Boulderfield Subtype)	---	2010	B	2-High	---	---	G3	S2
Natural Community	20674	Rich Cove Forest (Montane Intermediate Subtype)	---	2015-10-14	AB	2-High	---	---	G4	S4
Natural Community	22631	Rich Cove Forest (Montane Intermediate Subtype)	---	2014-08-12	C	2-High	---	---	G4	S4
Natural Community	20955	Rich Cove Forest (Montane Intermediate Subtype)	---	2018-05-14	A	2-High	---	---	G4	S4
Natural Community	20943	Rich Cove Forest (Montane Intermediate Subtype)	---	2010	B	2-High	---	---	G4	S4

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	3892	Rich Cove Forest (Montane Intermediate Subtype)	---	2010	B	2-High	---	---	G4	S4
Natural Community	20959	Rich Cove Forest (Montane Intermediate Subtype)	---	2010	B	2-High	---	---	G4	S4
Natural Community	20677	Rich Cove Forest (Montane Intermediate Subtype)	---	2010	B	2-High	---	---	G4	S4
Natural Community	20683	Rich Cove Forest (Montane Intermediate Subtype)	---	2006	C	2-High	---	---	G4	S4
Natural Community	25971	Rich Cove Forest (Montane Intermediate Subtype)	---	2010	C	2-High	---	---	G4	S4
Natural Community	26284	Rich Cove Forest (Montane Intermediate Subtype)	---	2013-10-18	C	2-High	---	---	G4	S4
Natural Community	32951	Rich Cove Forest (Montane Rich Subtype)	---	2013-11	AB	2-High	---	---	G3G4	S3
Natural Community	32180	Rich Cove Forest (Montane Rich Subtype)	---	2013-06-19	AB	2-High	---	---	G3G4	S3
Natural Community	25998	Rich Montane Seep	---	2005-04-08	AC	2-High	---	---	G3	S3
Natural Community	30353	Rich Montane Seep	---	2011	A	3-Medium	---	---	G3	S3
Natural Community	15493	Rich Montane Seep	---	2018-05-15	A	3-Medium	---	---	G3	S3
Natural Community	7112	Rich Montane Seep	---	2018-05-14	AB	2-High	---	---	G3	S3
Natural Community	32950	Rich Montane Seep	---	2013-11	AB	2-High	---	---	G3	S3
Natural Community	1964	Rich Montane Seep	---	1988	A	3-Medium	---	---	G3	S3
Natural Community	29767	Rich Montane Seep	---	2013-10-08	BC	3-Medium	---	---	G3	S3

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	26283	Rich Montane Seep	---	2013-10-18	B	2-High	---	---	G3	S3
Natural Community	34417	Rocky Bar and Shore (Mixed Bar Subtype)	---	2014-07-30	BC	2-High	---	---	G4	S3
Natural Community	25996	Rocky Bar and Shore (Twisted Sedge Subtype)	---	2005-06-14	AC	3-Medium	---	---	G3G4	S3
Natural Community	3767	Southern Appalachian Bog (Low Elevation Subtype)	---	1990-08-30	CD	2-High	---	---	G1G2	S1S2
Natural Community	2827	Southern Appalachian Bog (Typic Subtype)	---	2009-07-27	A?	2-High	---	---	G1G2	S1S2
Natural Community	19474	Southern Appalachian Bog (Typic Subtype)	---	1992-11	B	3-Medium	---	---	G1G2	S1S2
Natural Community	14321	Southern Appalachian Bog (Typic Subtype)	---	2008-03-24	A	2-High	---	---	G1G2	S1S2
Natural Community	24621	Southern Appalachian Bog (Typic Subtype)	---	2005-05-27	B?	3-Medium	---	---	G1G2	S1S2
Natural Community	24113	Southern Appalachian Bog (Typic Subtype)	---	1990-06-09	C	2-High	---	---	G1G2	S1S2
Natural Community	8692	Southern Appalachian Bog (Typic Subtype)	---	1989-06-29	D	1-Very High	---	---	G1G2	S1S2
Natural Community	23326	Southern Appalachian Bog (Typic Subtype)	---	2009-07-27	B	2-High	---	---	G1G2	S1S2
Natural Community	24766	Southern Appalachian Bog (Typic Subtype)	---	2006-07-06	CD	2-High	---	---	G1G2	S1S2
Natural Community	18844	Southern Appalachian Bog (Typic Subtype)	---	1988	BC	2-High	---	---	G1G2	S1S2
Natural Community	27698	Spray Cliff	---	2014-07-24	A	2-High	---	---	G2	S2
Natural Community	28749	Spray Cliff	---	2008-04-30	B	2-High	---	---	G2	S2
Natural Community	6610	Swamp Forest--Bog Complex (Typic Subtype)	---	2005-08-10	B	2-High	---	---	G2	S2
Natural Community	20673	Swamp Forest--Bog Complex (Typic Subtype)	---	2004-08-05	C	3-Medium	---	---	G2	S2

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	16245	Swamp Forest--Bog Complex (Typic Subtype)	---	1990-06-10	B	3-Medium	---	---	G2	S2
Reptile	15627	Glyptemys muhlenbergii	Bog Turtle	2005	D	3-Medium	Threatened Similar Appearance	Threatened	G3	S2
Reptile	19311	Glyptemys muhlenbergii	Bog Turtle	1986-05-28	H?	3-Medium	Threatened Similar Appearance	Threatened	G3	S2
Reptile	9782	Glyptemys muhlenbergii	Bog Turtle	1989-06-04	D	3-Medium	Threatened Similar Appearance	Threatened	G3	S2
Reptile	703	Glyptemys muhlenbergii	Bog Turtle	1991-06-07	D	3-Medium	Threatened Similar Appearance	Threatened	G3	S2
Reptile	2070	Glyptemys muhlenbergii	Bog Turtle	1990-05-24	C	3-Medium	Threatened Similar Appearance	Threatened	G3	S2
Reptile	22418	Glyptemys muhlenbergii	Bog Turtle	2010-05-17	BC	3-Medium	Threatened Similar Appearance	Threatened	G3	S2
Reptile	23742	Plestiodon anthracinus	Coal Skink	1985-06-25	E	3-Medium	---	Significantly Rare	G5	S2S3
Stonefly	38267	Remenus kirchneri	Blueridge Springfly	2013-06-22	E	2-High	---	Significantly Rare	G2	S1
Vascular Plant	7780	Aconitum reclinatum	Trailing Wolfsbane	1995-07-13	AB	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	20560	Aconitum reclinatum	Trailing Wolfsbane	2004-08-19	C	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	2220	Aconitum reclinatum	Trailing Wolfsbane	1989	A	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	16778	Aconitum reclinatum	Trailing Wolfsbane	1984-07-05	H	3-Medium	---	Significantly Rare Throughout	G3	S3

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	18276	Aconitum reclinatum	Trailing Wolfsbane	1992-07-28	C	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	20561	Aconitum reclinatum	Trailing Wolfsbane	2004-08-10	C	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	7298	Aconitum reclinatum	Trailing Wolfsbane	2013-10-18	C?	2-High	---	Significantly Rare Throughout	G3	S3
Vascular Plant	10005	Agrostis mertensii	Arctic Bentgrass	1985-08	C	2-High	---	Endangered	G5	S1
Vascular Plant	4553	Arethusa bulbosa	Bog Rose	1985-06-05	F	3-Medium	---	Endangered	G5	S1
Vascular Plant	9550	Arethusa bulbosa	Bog Rose	1987-Pre	U	3-Medium	---	Endangered	G5	S1
Vascular Plant	1748	Arisaema stewardsonii	Bog Jack-in-the-pulpit	2015-05-19	A	3-Medium	---	Significantly Rare Peripheral	G5T4T5	S2
Vascular Plant	35471	Athyrium angustum	Northern Lady Fern	2015-06-13	A	2-High	---	Significantly Rare Peripheral	G5T5	S1
Vascular Plant	34746	Athyrium angustum	Northern Lady Fern	2013-09-10	E	2-High	---	Significantly Rare Peripheral	G5T5	S1
Vascular Plant	20520	Botrychium matricariifolium	Daisy-leaf Moonwort	2008-Pre	D	3-Medium	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	7624	Botrychium matricariifolium	Daisy-leaf Moonwort	1988-08-18	D	2-High	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	20084	Calamagrostis canadensis var. canadensis	Canada Reed Grass	1991-10-20	A	3-Medium	---	Significantly Rare Peripheral	G5T5	S1
Vascular Plant	698	Campanula aparinoides var. aparinoides	Marsh Bellflower	1991-06-07	X?	3-Medium	---	Significantly Rare Peripheral	G5TNR	S2
Vascular Plant	11001	Campanula aparinoides var. aparinoides	Marsh Bellflower	1989-06-29	D?	3-Medium	---	Significantly Rare Peripheral	G5TNR	S2
Vascular Plant	7141	Cardamine clematitis	Mountain Bittercress	2014-05-26	B	3-Medium	---	Significantly Rare Throughout	G3	S2S3
Vascular Plant	5387	Cardamine clematitis	Mountain Bittercress	1991-07-24	A	3-Medium	---	Significantly Rare Throughout	G3	S2S3

Element Occurrences Documented Within Project Area

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Vascular Plant	9253	Cardamine clematitis	Mountain Bittercress	1994-08-30	A	3-Medium	---	Significantly Rare Throughout	G3	S2S3
Vascular Plant	17038	Cardamine clematitis	Mountain Bittercress	1989	A	3-Medium	---	Significantly Rare Throughout	G3	S2S3
Vascular Plant	20482	Cardamine clematitis	Mountain Bittercress	2004-08-25	B	2-High	---	Significantly Rare Throughout	G3	S2S3
Vascular Plant	23573	Carex baileyi	Bailey's Sedge	2006-08	E	3-Medium	---	Significantly Rare Peripheral	G4	S2
Vascular Plant	25889	Carex buxbaumii	Brown Bog Sedge	2006-07-12	B?	3-Medium	---	Special Concern Vulnerable	G5	S2
Vascular Plant	5647	Carex oligosperma	Few-seeded Sedge	1987-07-25	E	3-Medium	---	Endangered	G5	S1
Vascular Plant	1622	Carex projecta	Necklace Sedge	2002	E	3-Medium	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	36229	Carex roanensis	Roan Sedge	2015-09-17	E	3-Medium	---	Significantly Rare Throughout	G2G3	S2
Vascular Plant	25091	Carex roanensis	Roan Sedge	1958-06-17	H	3-Medium	---	Significantly Rare Throughout	G2G3	S2
Vascular Plant	20521	Carex roanensis	Roan Sedge	2003-07-06	C	3-Medium	---	Significantly Rare Throughout	G2G3	S2
Vascular Plant	20624	Carex roanensis	Roan Sedge	2001-06-25	D	2-High	---	Significantly Rare Throughout	G2G3	S2
Vascular Plant	1151	Carex trisperma	Three-seeded Sedge	2008-06-06	A	3-Medium	---	Endangered	G5	S1
Vascular Plant	14396	Carex trisperma	Three-seeded Sedge	1990-06-09	E	3-Medium	---	Endangered	G5	S1
Vascular Plant	16911	Carex trisperma	Three-seeded Sedge	2006-07-27	A	2-High	---	Endangered	G5	S1
Vascular Plant	35440	Carex vesicaria	Inflated Sedge	2015-05-19	C	2-High	---	Significantly Rare Peripheral	G5	S1

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Vascular Plant	7588	Chelone cuthbertii	Cuthbert's Turtlehead	1990-06-09	D	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	4399	Conioselinum chinense	Hemlock-parsley	1995-07-13	A	3-Medium	---	Threatened	G5	S1
Vascular Plant	1915	Crocanthemum propinquum	Creeping Sunrose	1958-06	H	3-Medium	---	Threatened	G4	S1
Vascular Plant	31850	Dendrolycopodium dendroideum	Prickly Ground-pine	1989-06-05	E	2-High	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	33223	Deschampsia cespitosa ssp. glauca	Tufted Hairgrass	1989-08-16	E	3-Medium	---	Threatened	G5T5	S1
Vascular Plant	22623	Epilobium ciliatum ssp. ciliatum	American Willow-herb	2004-08-07	E	3-Medium	---	Significantly Rare Peripheral	G5T5	S2
Vascular Plant	5073	Epilobium ciliatum ssp. ciliatum	American Willow-herb	1994-08-08	B?	2-High	---	Significantly Rare Peripheral	G5T5	S2
Vascular Plant	13200	Epilobium ciliatum ssp. ciliatum	American Willow-herb	1985-08-30	E	3-Medium	---	Significantly Rare Peripheral	G5T5	S2
Vascular Plant	6353	Epilobium ciliatum ssp. ciliatum	American Willow-herb	1987-07-25	E	3-Medium	---	Significantly Rare Peripheral	G5T5	S2
Vascular Plant	19411	Epilobium ciliatum ssp. ciliatum	American Willow-herb	2002-06-15	C	3-Medium	---	Significantly Rare Peripheral	G5T5	S2
Vascular Plant	34747	Epilobium ciliatum ssp. ciliatum	American Willow-herb	2013-09-10	E	2-High	---	Significantly Rare Peripheral	G5T5	S2
Vascular Plant	28505	Gaylussacia orocola	Appalachian Dwarf Huckleberry	1936-08-21	H	3-Medium	---	Significantly Rare Limited	G1	S1
Vascular Plant	24136	Geum aleppicum	Yellow Avens	2003	E	3-Medium	---	Endangered	G5	S1
Vascular Plant	11886	Geum aleppicum	Yellow Avens	1958-07	H	3-Medium	---	Endangered	G5	S1
Vascular Plant	1235	Geum geniculatum	Bent Avens	2007-08-30	B	3-Medium	---	Special Concern Vulnerable	G2	S1S2
Vascular Plant	8499	Geum geniculatum	Bent Avens	2013-10-08	B	3-Medium	---	Special Concern Vulnerable	G2	S1S2
Vascular Plant	1022	Geum geniculatum	Bent Avens	2004-08-24	A	3-Medium	---	Special Concern Vulnerable	G2	S1S2

Element Occurrences Documented Within Project Area

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Vascular Plant	26482	Geum geniculatum	Bent Avens	2008-06-23	A	3-Medium	---	Special Concern Vulnerable	G2	S1S2
Vascular Plant	12204	Geum geniculatum	Bent Avens	1995-07-13	A	3-Medium	---	Special Concern Vulnerable	G2	S1S2
Vascular Plant	6360	Geum geniculatum	Bent Avens	1995-07-13	A	3-Medium	---	Special Concern Vulnerable	G2	S1S2
Vascular Plant	17601	Geum geniculatum	Bent Avens	2007-08-04	CD	3-Medium	---	Special Concern Vulnerable	G2	S1S2
Vascular Plant	3477	Geum geniculatum	Bent Avens	1992-08-29	C?	3-Medium	---	Special Concern Vulnerable	G2	S1S2
Vascular Plant	3682	Geum geniculatum	Bent Avens	1995-07-25	BC	3-Medium	---	Special Concern Vulnerable	G2	S1S2
Vascular Plant	4428	Geum geniculatum	Bent Avens	1987-07-27	C?	3-Medium	---	Special Concern Vulnerable	G2	S1S2
Vascular Plant	20468	Geum geniculatum	Bent Avens	2004-08-25	B	3-Medium	---	Special Concern Vulnerable	G2	S1S2
Vascular Plant	35677	Geum geniculatum	Bent Avens		NR	2-High	---	Special Concern Vulnerable	G2	S1S2
Vascular Plant	33760	Geum geniculatum	Bent Avens	2013-10-16	D	2-High	---	Special Concern Vulnerable	G2	S1S2
Vascular Plant	8500	Geum geniculatum	Bent Avens	2008-05-19	D	2-High	---	Special Concern Vulnerable	G2	S1S2
Vascular Plant	24135	Geum laciniatum	Rough Avens	2003	E	3-Medium	---	Endangered	G5	S1
Vascular Plant	4371	Geum laciniatum	Rough Avens	1985-07-08	A	3-Medium	---	Endangered	G5	S1
Vascular Plant	5839	Geum radiatum	Spreading Avens	2009-07-18	D	3-Medium	Endangered	Endangered	G2	S2

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Vascular Plant	646	Geum radiatum	Spreading Avens	1999-09-18	A	3-Medium	Endangered	Endangered	G2	S2
Vascular Plant	4032	Geum radiatum	Spreading Avens	2012-08-08	D	2-High	Endangered	Endangered	G2	S2
Vascular Plant	28207	Geum radiatum	Spreading Avens	2013-05-03	D	2-High	Endangered	Endangered	G2	S2
Vascular Plant	953	Geum radiatum	Spreading Avens	2008	CD	2-High	Endangered	Endangered	G2	S2
Vascular Plant	14113	Geum radiatum	Spreading Avens	1991-07-02	B	2-High	Endangered	Endangered	G2	S2
Vascular Plant	7594	Geum radiatum	Spreading Avens	2007-09	C	2-High	Endangered	Endangered	G2	S2
Vascular Plant	28206	Geum radiatum	Spreading Avens	2000s	F	2-High	Endangered	Endangered	G2	S2
Vascular Plant	3837	Geum radiatum	Spreading Avens	2001-09-09	Dr	2-High	Endangered	Endangered	G2	S2
Vascular Plant	25893	Geum radiatum	Spreading Avens	2008	C	2-High	Endangered	Endangered	G2	S2
Vascular Plant	27538	Glyceria laxa	Lax Mannagrass	2009-07-27	E	2-High	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	26317	Glyceria laxa	Lax Mannagrass	2008-08-04	AB	2-High	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	13808	Houstonia montana	Roan Mountain Bluet	2010-07-10	A	2-High	Endangered	Endangered	G5T2	S2
Vascular Plant	1723	Houstonia montana	Roan Mountain Bluet	1998-09-10	E	3-Medium	Endangered	Endangered	G5T2	S2
Vascular Plant	7989	Houstonia montana	Roan Mountain Bluet	1995-08-15	D	3-Medium	Endangered	Endangered	G5T2	S2
Vascular Plant	17319	Houstonia montana	Roan Mountain Bluet	2001-08-24	B	3-Medium	Endangered	Endangered	G5T2	S2
Vascular Plant	28219	Houstonia montana	Roan Mountain Bluet	2001-08-24	A	3-Medium	Endangered	Endangered	G5T2	S2
Vascular Plant	25887	Houstonia montana	Roan Mountain Bluet	1998-09-02	AC	3-Medium	Endangered	Endangered	G5T2	S2
Vascular Plant	3578	Houstonia montana	Roan Mountain Bluet	1999-09-18	A	3-Medium	Endangered	Endangered	G5T2	S2
Vascular Plant	8489	Houstonia montana	Roan Mountain Bluet	2012-08-08	BC	2-High	Endangered	Endangered	G5T2	S2
Vascular Plant	10891	Houstonia montana	Roan Mountain Bluet	1992-07-15	AB	2-High	Endangered	Endangered	G5T2	S2
Vascular Plant	28216	Houstonia montana	Roan Mountain Bluet	2006-07-11	D?	2-High	Endangered	Endangered	G5T2	S2
Vascular Plant	23712	Houstonia montana	Roan Mountain Bluet	1996-1997?	E	2-High	Endangered	Endangered	G5T2	S2
Vascular Plant	28218	Houstonia montana	Roan Mountain Bluet	1991-08-27	F	2-High	Endangered	Endangered	G5T2	S2
Vascular Plant	17498	Houstonia montana	Roan Mountain Bluet	2006-07-11	A	2-High	Endangered	Endangered	G5T2	S2
Vascular Plant	28215	Houstonia montana	Roan Mountain Bluet	1992-07-08	D?	2-High	Endangered	Endangered	G5T2	S2
Vascular Plant	19186	Houstonia montana	Roan Mountain Bluet	1992-08-08	A	2-High	Endangered	Endangered	G5T2	S2
Vascular Plant	25906	Houstonia montana	Roan Mountain Bluet	2001-09-05	D?r	2-High	Endangered	Endangered	G5T2	S2
Vascular Plant	14036	Houstonia montana	Roan Mountain Bluet	2001-09-09	D	2-High	Endangered	Endangered	G5T2	S2
Vascular Plant	28217	Houstonia montana	Roan Mountain Bluet	2008	E	2-High	Endangered	Endangered	G5T2	S2
Vascular Plant	28214	Houstonia montana	Roan Mountain Bluet	2017-07-12	B	2-High	Endangered	Endangered	G5T2	S2
Vascular Plant	15091	Liatris helleri	Heller's Blazing-star	1989-06-27	C	3-Medium	Threatened	Threatened	G2Q	S2
Vascular Plant	13595	Liatris helleri	Heller's Blazing-star	1990-09-18	D?	3-Medium	Threatened	Threatened	G2Q	S2
Vascular Plant	1627	Liatris helleri	Heller's Blazing-star	1998-09-10	E	3-Medium	Threatened	Threatened	G2Q	S2
Vascular Plant	10343	Liatris helleri	Heller's Blazing-star	2001-09-08	C	3-Medium	Threatened	Threatened	G2Q	S2

Element Occurrences Documented Within Project Area

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Vascular Plant	19047	Liatris helleri	Heller's Blazing-star	1991-08-27	A	3-Medium	Threatened	Threatened	G2Q	S2
Vascular Plant	7021	Liatris helleri	Heller's Blazing-star	1991-08-16	D	3-Medium	Threatened	Threatened	G2Q	S2
Vascular Plant	23176	Liatris helleri	Heller's Blazing-star	2009-09-07	AC	2-High	Threatened	Threatened	G2Q	S2
Vascular Plant	3096	Liatris helleri	Heller's Blazing-star	1981-08-04	F	2-High	Threatened	Threatened	G2Q	S2
Vascular Plant	8870	Liatris helleri	Heller's Blazing-star	2017-07-12	A	1-Very High	Threatened	Threatened	G2Q	S2
Vascular Plant	4964	Liatris helleri	Heller's Blazing-star	1994-07-20	D	2-High	Threatened	Threatened	G2Q	S2
Vascular Plant	25908	Liatris helleri	Heller's Blazing-star	2001-09-05	Er?	2-High	Threatened	Threatened	G2Q	S2
Vascular Plant	8920	Lilium canadense ssp. editorum	Red Canada Lily	1958-07-24	H	3-Medium	---	Endangered	G5T4	S1
Vascular Plant	24382	Lilium grayi	Gray's Lily	2008-06-06	C?	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	27073	Lilium grayi	Gray's Lily	2007	B	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	20542	Lilium grayi	Gray's Lily	2005-07-17	B	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	19219	Lilium grayi	Gray's Lily	2013-06-22	B	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	17394	Lilium grayi	Gray's Lily	2005-07-17	B	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	20464	Lilium grayi	Gray's Lily	2004-08-11	B	2-High	---	Threatened	G3	S1S2
Vascular Plant	20533	Lilium grayi	Gray's Lily	2005-07-17	C	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	19428	Lilium grayi	Gray's Lily	2005-06-06	D?	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	35144	Lilium grayi	Gray's Lily	2013-06-25	E	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	15737	Lilium grayi	Gray's Lily	2013-06-22	A	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	20507	Lilium grayi	Gray's Lily	2007-06-25	A	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	25963	Lilium grayi	Gray's Lily	2001-06-25	BC	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	13235	Lilium grayi	Gray's Lily	2003-07-12	A	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	33905	Lilium grayi	Gray's Lily	2007-06-27	E	2-High	---	Threatened	G3	S1S2
Vascular Plant	14936	Lilium grayi	Gray's Lily	1978-06-18	H?	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	15513	Lilium grayi	Gray's Lily	1989-06	CD	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	17415	Lilium grayi	Gray's Lily	2012-06-09	A	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	14804	Lilium grayi	Gray's Lily	1985-05-18	C	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	15445	Lilium grayi	Gray's Lily	1995-06-13	C	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	11076	Lilium grayi	Gray's Lily	1987-05-27	B	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	25958	Lilium grayi	Gray's Lily	2001-06-25	C	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	24144	Lilium grayi	Gray's Lily	2005-07-26	E	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	574	Lilium grayi	Gray's Lily	2008-06-18	A	2-High	---	Threatened	G3	S1S2
Vascular Plant	20512	Lilium grayi	Gray's Lily	2008-06-26	C	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	26058	Lilium grayi	Gray's Lily	2008-05-19	B	2-High	---	Threatened	G3	S1S2
Vascular Plant	11334	Lilium grayi	Gray's Lily	1997-06-28	D	2-High	---	Threatened	G3	S1S2

Element Occurrences Documented Within Project Area

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Vascular Plant	23507	Lilium grayi	Gray's Lily	1994	D	2-High	---	Threatened	G3	S1S2
Vascular Plant	26054	Lilium grayi	Gray's Lily	2007-08-04	D	2-High	---	Threatened	G3	S1S2
Vascular Plant	20503	Lilium grayi	Gray's Lily	2008-06-26	D?	2-High	---	Threatened	G3	S1S2
Vascular Plant	27070	Lilium grayi	Gray's Lily	2007-06-04	D	2-High	---	Threatened	G3	S1S2
Vascular Plant	20501	Lilium grayi	Gray's Lily	2003-07-03	C	2-High	---	Threatened	G3	S1S2
Vascular Plant	20504	Lilium grayi	Gray's Lily	1993	F	1-Very High	---	Threatened	G3	S1S2
Vascular Plant	20511	Lilium grayi	Gray's Lily	2008-06-23	D	1-Very High	---	Threatened	G3	S1S2
Vascular Plant	20506	Lilium grayi	Gray's Lily	2003-07-06	D	1-Very High	---	Threatened	G3	S1S2
Vascular Plant	20508	Lilium grayi	Gray's Lily	2015-06-13	B	1-Very High	---	Threatened	G3	S1S2
Vascular Plant	20510	Lilium grayi	Gray's Lily	1994-07-01	F	1-Very High	---	Threatened	G3	S1S2
Vascular Plant	20509	Lilium grayi	Gray's Lily	2008-06-26	B	1-Very High	---	Threatened	G3	S1S2
Vascular Plant	20505	Lilium grayi	Gray's Lily	2003-07-08	D	1-Very High	---	Threatened	G3	S1S2
Vascular Plant	20571	Lilium philadelphicum var. philadelphicum	Wood Lily	2017-07	A?	2-High	---	Endangered	G5T4T5	S2
Vascular Plant	18353	Liparis loeselii	Fen Orchid	1934-05	H	3-Medium	---	Endangered	G5	S1
Vascular Plant	9908	Lycopodiella inundata	Bog Clubmoss	2006-07-27	F	2-High	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	23394	Monarda media	Purple Bee-balm	2007	C	3-Medium	---	Significantly Rare Peripheral	G4?	S1?
Vascular Plant	34206	Monarda media	Purple Bee-balm	2014-07-17	C	2-High	---	Significantly Rare Peripheral	G4?	S1?
Vascular Plant	4007	Mononeuria groenlandica	Greenland Sandwort	2004-06-29	A	2-High	---	Threatened	G5	S2
Vascular Plant	4175	Mononeuria groenlandica	Greenland Sandwort	1998-06-26	F	3-Medium	---	Threatened	G5	S2
Vascular Plant	12032	Mononeuria groenlandica	Greenland Sandwort	2010-09-22	C?	3-Medium	---	Threatened	G5	S2
Vascular Plant	20573	Muhlenbergia glomerata	Spiked Muhly	2004-10-21	D	3-Medium	---	Special Concern Vulnerable	G5	S1

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Vascular Plant	34748	Muhlenbergia sobolifera	Rock Muhly	2013-06-05	E	2-High	---	Special Concern Vulnerable	G5	S2
Vascular Plant	18015	Packera schweinitziana	Schweinitz's Ragwort	2015-06-13	A	3-Medium	---	Threatened	G5?	S2
Vascular Plant	35678	Packera schweinitziana	Schweinitz's Ragwort	2013-10-08	A	2-High	---	Threatened	G5?	S2
Vascular Plant	35148	Platanthera grandiflora	Large Purple-fringed Orchid	2013-06-25	E	3-Medium	---	Threatened	G5	S2
Vascular Plant	8360	Platanthera grandiflora	Large Purple-fringed Orchid	1958-06-17	H	3-Medium	---	Threatened	G5	S2
Vascular Plant	3233	Platanthera grandiflora	Large Purple-fringed Orchid	2007-06-22	A	2-High	---	Threatened	G5	S2
Vascular Plant	29365	Poa paludigena	Bog Bluegrass	2008-06-06	E	3-Medium	---	Significantly Rare Throughout	G3	S1
Vascular Plant	4225	Poa paludigena	Bog Bluegrass	2005-06-06	E	3-Medium	---	Significantly Rare Throughout	G3	S1
Vascular Plant	19970	Poa palustris	Swamp Bluegrass	1992	E	3-Medium	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	35439	Poa palustris	Swamp Bluegrass	2015-05-19	B	2-High	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	3160	Rhododendron vaseyi	Pink-shell Azalea	1990-09-18	BC	3-Medium	---	Significantly Rare Limited	G3	S3
Vascular Plant	10674	Rhododendron vaseyi	Pink-shell Azalea	1991-09-04	C?	3-Medium	---	Significantly Rare Limited	G3	S3
Vascular Plant	24214	Sceptridium multifidum	Leathery Grape-fern	2006-Pre	E	3-Medium	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	3513	Sceptridium oneidense	Blunt-lobed Grape-fern	1970-08	H	3-Medium	---	Significantly Rare Peripheral	G4	S2
Vascular Plant	11227	Solidago spithamaea	Blue Ridge Goldenrod	1991-07-26	B	3-Medium	Threatened	Threatened	G2	S2
Vascular Plant	7010	Solidago spithamaea	Blue Ridge Goldenrod	1989-06-29	B	3-Medium	Threatened	Threatened	G2	S2
Vascular Plant	14410	Solidago spithamaea	Blue Ridge Goldenrod	1994-08-12	B	3-Medium	Threatened	Threatened	G2	S2
Vascular Plant	10659	Solidago spithamaea	Blue Ridge Goldenrod	1991-08-21	C	3-Medium	Threatened	Threatened	G2	S2
Vascular Plant	12374	Solidago spithamaea	Blue Ridge Goldenrod	2017-07-12	A	2-High	Threatened	Threatened	G2	S2
Vascular Plant	3827	Solidago spithamaea	Blue Ridge Goldenrod	1991-08-06	C	2-High	Threatened	Threatened	G2	S2
Vascular Plant	1396	Solidago spithamaea	Blue Ridge Goldenrod	1986-08-27	E	2-High	Threatened	Threatened	G2	S2

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Vascular Plant	4651	Solidago spithamaea	Blue Ridge Goldenrod	1991-08-01	BD	2-High	Threatened	Threatened	G2	S2
Vascular Plant	25894	Solidago spithamaea	Blue Ridge Goldenrod	2001-08-30	BCr	2-High	Threatened	Threatened	G2	S2
Vascular Plant	11238	Solidago spithamaea	Blue Ridge Goldenrod	1991-08-27	A	2-High	Threatened	Threatened	G2	S2
Vascular Plant	3024	Solidago spithamaea	Blue Ridge Goldenrod	1994-07-20	A	2-High	Threatened	Threatened	G2	S2
Vascular Plant	25895	Solidago spithamaea	Blue Ridge Goldenrod	1991-07-18	CD	2-High	Threatened	Threatened	G2	S2
Vascular Plant	10660	Solidago spithamaea	Blue Ridge Goldenrod	1991-07-24	B	2-High	Threatened	Threatened	G2	S2
Vascular Plant	10210	Spiranthes ochroleuca	Yellow Ladies'-tresses	1958-09-24	H	3-Medium	---	Threatened	G4	S1
Vascular Plant	20563	Spiranthes ochroleuca	Yellow Ladies'-tresses	2004-09-30	C	2-High	---	Threatened	G4	S1
Vascular Plant	24134	Stenanthium gramineum var. robustum	Bog Featherbells	2003	E	3-Medium	---	Threatened	G4G5T3T5	S1
Vascular Plant	24131	Stenanthium gramineum var. robustum	Bog Featherbells	2006-08-28	B?	3-Medium	---	Threatened	G4G5T3T5	S1
Vascular Plant	18038	Stenanthium leimanthoides	Pinebarren Death-camas	2013-06-17	C	3-Medium	---	Threatened	G4Q	S1
Vascular Plant	20060	Stenanthium leimanthoides	Pinebarren Death-camas	1991-08-17	AB	3-Medium	---	Threatened	G4Q	S1
Vascular Plant	16769	Stenanthium leimanthoides	Pinebarren Death-camas	1994-07-19	A	3-Medium	---	Threatened	G4Q	S1
Vascular Plant	19621	Stenanthium leimanthoides	Pinebarren Death-camas	1991-08-17	A	3-Medium	---	Threatened	G4Q	S1
Vascular Plant	18268	Stenanthium leimanthoides	Pinebarren Death-camas	1994-08-12	E	3-Medium	---	Threatened	G4Q	S1
Vascular Plant	32183	Stenanthium leimanthoides	Pinebarren Death-camas	2013-06-17	CD	2-High	---	Threatened	G4Q	S1
Vascular Plant	10126	Thelypteris simulata	Bog Fern	2010-08	A	3-Medium	---	Endangered	G4G5	S1
Vascular Plant	15786	Trichophorum cespitosum	Deerhair Bulrush	2017-07-12	A	2-High	---	Significantly Rare Disjunct	G5	S2S3
Vascular Plant	575	Trichophorum cespitosum	Deerhair Bulrush	1991-08-21	F	3-Medium	---	Significantly Rare Disjunct	G5	S2S3
Vascular Plant	7480	Trichophorum cespitosum	Deerhair Bulrush	1987-05-16	E	3-Medium	---	Significantly Rare Disjunct	G5	S2S3
Vascular Plant	13156	Trichophorum cespitosum	Deerhair Bulrush	2004-06-29	D	3-Medium	---	Significantly Rare Disjunct	G5	S2S3
Vascular Plant	17648	Trichophorum cespitosum	Deerhair Bulrush	1991-08-27	A	3-Medium	---	Significantly Rare Disjunct	G5	S2S3

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	15093	Trichophorum cespitosum	Deerhair Bulrush	1994-07-20	D	3-Medium	---	Significantly Rare Disjunct	G5	S2S3
Vascular Plant	4809	Trichophorum cespitosum	Deerhair Bulrush	1991-07-25	A	3-Medium	---	Significantly Rare Disjunct	G5	S2S3
Vascular Plant	18750	Trichophorum cespitosum	Deerhair Bulrush	1994-07-20	A	3-Medium	---	Significantly Rare Disjunct	G5	S2S3
Vascular Plant	7254	Trichophorum cespitosum	Deerhair Bulrush	1991-07-02	D?	3-Medium	---	Significantly Rare Disjunct	G5	S2S3
Vascular Plant	17184	Trichophorum cespitosum	Deerhair Bulrush	1991-09-17	B	3-Medium	---	Significantly Rare Disjunct	G5	S2S3
Vascular Plant	14393	Trichophorum cespitosum	Deerhair Bulrush	1991-08-01	B	3-Medium	---	Significantly Rare Disjunct	G5	S2S3
Vascular Plant	20035	Turritis glabra	Tower Mustard	1958-07	H	3-Medium	---	Endangered	G5	S1
Vascular Plant	4410	Turritis glabra	Tower Mustard	1997-06-28	C	3-Medium	---	Endangered	G5	S1
Vascular Plant	4508	Vaccinium macrocarpon	Cranberry	1987-05-22	A?	3-Medium	---	Threatened	G5	S2
Vascular Plant	10897	Vaccinium macrocarpon	Cranberry	2006	A	3-Medium	---	Threatened	G5	S2
Vascular Plant	10322	Vaccinium macrocarpon	Cranberry	1991-06-07	X?	3-Medium	---	Threatened	G5	S2
Vascular Plant	2609	Vaccinium macrocarpon	Cranberry	1990-06-09	D	3-Medium	---	Threatened	G5	S2
Vascular Plant	10027	Vaccinium macrocarpon	Cranberry	1990-06-09	B?	3-Medium	---	Threatened	G5	S2
Vascular Plant	1488	Vaccinium macrocarpon	Cranberry	2007-06-22	B?	2-High	---	Threatened	G5	S2
Vascular Plant	25880	Vaccinium macrocarpon	Cranberry	2007-Summer	Ei	2-High	---	Threatened	G5	S2
Vascular Plant	4361	Veronica americana	American Speedwell	1958-06	H	3-Medium	---	Threatened	G5	S2
Vascular Plant	15164	Veronica americana	American Speedwell	2011-09-26	C?	3-Medium	---	Threatened	G5	S2
Vascular Plant	12845	Veronica americana	American Speedwell	1987-07-25	E	3-Medium	---	Threatened	G5	S2
Vascular Plant	710	Veronica americana	American Speedwell	1988-07-10	B?	3-Medium	---	Threatened	G5	S2
Vascular Plant	18382	Veronica americana	American Speedwell	1989-08-01	B?	3-Medium	---	Threatened	G5	S2
Vascular Plant	15165	Veronica americana	American Speedwell	1985-08-30	E	2-High	---	Threatened	G5	S2

Natural Areas Documented Within Project Area

Site Name	Representational Rating	Collective Rating
Squirrel Creek Meadow	R5 (General)	C5 (General)
Anthony Creek Wetlands	R5 (General)	C5 (General)
Cranberry Iron Mine Bat Habitat	R2 (Very High)	C4 (Moderate)
Belview Mountain Slopes	R5 (General)	C5 (General)
Hemlock Hill	R3 (High)	C4 (Moderate)
Linville Gap Bog	R2 (Very High)	C3 (High)

Natural Areas Documented Within Project Area

Site Name	Representational Rating	Collective Rating
High Haven Natural Area	R4 (Moderate)	C4 (Moderate)
Beech Creek Natural Area	R1 (Exceptional)	C1 (Exceptional)
Flat Rock Mountain	R2 (Very High)	C4 (Moderate)
Linville River Wetlands	R4 (Moderate)	C5 (General)
Lost Cove Cliffs	R2 (Very High)	C3 (High)
Sugar Mountain Natural Area	R1 (Exceptional)	C2 (Very High)
Pineola South Natural Area	R2 (Very High)	C3 (High)
Hughes Marsh	R5 (General)	C4 (Moderate)
North Toe River Bluff	R3 (High)	C4 (Moderate)
Brier Knob	R5 (General)	C5 (General)
Little Buck Hill Forests and Seep	R2 (Very High)	C4 (Moderate)
Sassafras Creek Forests	R3 (High)	C4 (Moderate)
Pyatte Wetland	R3 (High)	C4 (Moderate)
Pineola Natural Area	R2 (Very High)	C3 (High)
Wilson Creek Gorge	R2 (Very High)	C3 (High)
Grandfather Mountain	R1 (Exceptional)	C1 (Exceptional)
Roan Mountain Massif	R1 (Exceptional)	C1 (Exceptional)
Yellow Mountain/Raven Cliffs	R1 (Exceptional)	C1 (Exceptional)
Wilson Creek Slopes/Lost Cove Creek/Thorps Creek	R2 (Very High)	C4 (Moderate)
Walker Hollow Ridge	R4 (Moderate)	C4 (Moderate)
Hanging Rock Mountain	R1 (Exceptional)	C2 (Very High)
Gragg Forests	R5 (General)	C5 (General)
Little Tablerock Mountain	R5 (General)	C4 (Moderate)
West Fork Forest	R3 (High)	C4 (Moderate)
Lutherock Natural Area	R2 (Very High)	C2 (Very High)
Harper Creek/Yellow Buck Mountain	R5 (General)	C4 (Moderate)
Big Yellow Mountain	R1 (Exceptional)	C1 (Exceptional)
Dun Vegan Mountain	R3 (High)	C3 (High)
Little Yellow Mountain and Hawk Mountain	R1 (Exceptional)	C1 (Exceptional)
CTB/Wilson Creek Aquatic Habitat	R1 (Exceptional)	C3 (High)
FRB/North Toe River/Nolichucky River Aquatic Habitat	R2 (Very High)	C2 (Very High)

Managed Areas Documented Within Project Area*

Managed Area Name	Owner	Owner Type
Pisgah National Forest - Grandfather Ranger District	US Forest Service	Federal
Pisgah National Forest - Appalachian Ranger District	US Forest Service	Federal
NC Clean Water Management Trust Fund Easement	NC DNCR, Clean Water Management Trust Fund	State

Managed Areas Documented Within Project Area*

Managed Area Name	Owner	Owner Type
NC Department of Transportation Mitigation Site	NC Department of Transportation	State
Blue Ridge Parkway	US National Park Service	Federal
NC Division of Mitigation Services Easement	NC DEQ, Division of Mitigation Services	State
Southern Appalachian Highlands Conservancy Easement	Southern Appalachian Highlands Conservancy	Private
Nature Conservancy Easement	The Nature Conservancy	Private
North American Land Trust Easement	North American Land Trust	Private
Blue Ridge Conservancy Easement	Blue Ridge Conservancy	Private
Roan Mountain Massif (USFS) Registered Heritage Area	US Forest Service	Federal
Yellow Mountain/Raven Cliffs Registered Heritage Area	130 of Chatham, LLC	Private
Southern Appalachian Highlands Conservancy Preserve	Southern Appalachian Highlands Conservancy	Private
Foothills Conservancy of North Carolina Preserve	Foothills Conservancy of North Carolina	Private
Pisgah Game Land	NC Wildlife Resources Commission	State
Pisgah Game Land Dedicated Nature Preserve	NC Wildlife Resources Commission	State
Yellow Mountain State Natural Area	NC DNCR, Division of Parks and Recreation	State
Foothills Conservancy of North Carolina Easement	Foothills Conservancy of North Carolina	Private
Grandfather Mountain State Park	NC DNCR, Division of Parks and Recreation	State
Grandfather Mountain State Park Dedicated Nature Preserve	NC DNCR, Division of Parks and Recreation	State
Blue Ridge Conservancy Preserve	Blue Ridge Conservancy	Private
Conservation Trust for North Carolina Preserve	Conservation Trust for North Carolina	Private
Blue Ridge Parkway Easement	US National Park Service	Federal
Grandfather Mountain Preserve	The Nature Conservancy	Private
Grandfather Mountain Preserve Dedicated Nature Preserve	The Nature Conservancy	Private
Grandfather Mountain Corridor Registered Heritage Area	US National Park Service	Federal
NC Division of Parks and Recreation Easement	NC DNCR, Division of Parks and Recreation	State
Avery County Open Space	Avery County: multiple local government	Local Government
Gill State Forest	NC Department of Agriculture, Forest Service	State
North Toe River Bluff Registered Heritage Area	130 of Chatham, LLC	Private
Big Yellow Mountain Preserve Dedicated Nature Preserve	The Nature Conservancy	Private
Big Yellow Mountain Preserve	The Nature Conservancy	Private
Cranberry Iron Mine	NC Wildlife Resources Commission	State
Beech Creek Bog State Natural Area	NC DNCR, Division of Parks and Recreation	State
NC Division of Parks and Recreation Conservation Land	NC DNCR, Division of Parks and Recreation	State
Roan Mountain Massif (SAHC) Registered Heritage Area	Southern Appalachian Highlands Conservancy	Private
Wilson Creek National Wild and Scenic River	US Forest Service	Federal
Flat Rock Mountain Registered Heritage Area	US National Park Service	Federal

Managed Areas Documented Within Project Area*

Managed Area Name	Owner	Owner Type
Beech Creek Bog State Natural Area Dedicated Nature Preserve	NC DNCR, Division of Parks and Recreation	State
High Haven Registered Heritage Area	Private Individual	Private
Sugar Mountain Bog State Natural Area	NC DNCR, Division of Parks and Recreation	State
Pineola Bog State Natural Area	NC DNCR, Division of Parks and Recreation	State
Mountain Bog State Natural Area Dedicated Nature Preserve	NC DNCR, Division of Parks and Recreation	State
North American Land Trust Preserve	North American Land Trust	Private

*NOTE: If the proposed project intersects with a conservation/managed area, please contact the landowner directly for additional information. If the project intersects with a Dedicated Nature Preserve (DNP), Registered Natural Heritage Area (RHA), or Federally-listed species, NCNHP staff may provide additional correspondence regarding the project.

Definitions and an explanation of status designations and codes can be found at https://ncnhde.natureserve.org/content/help. Data query generated on September 17, 2018; source: NCNHP, Q3 July 2018. Please resubmit your information request if more than one year elapses before project initiation as new information is continually added to the NCNHP database.

Natural Heritage Element Occurrences, Natural Areas, and Managed Areas Within a One-mile Radius of the Project Area
19-0040 - Avery County
September 17, 2018
NCNHDE-6949

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Amphibian	5337	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	2017-08-01	AB	3-Medium	---	Special Concern	G3G4T2	S3
Amphibian	8318	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	2017-05-12	B	3-Medium	---	Special Concern	G3G4T2	S3
Amphibian	27568	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	2016-07-11	BC	3-Medium	---	Special Concern	G3G4T2	S3
Amphibian	35138	Desmognathus organi	Northern Pygmy Salamander	2007-05-12	E	3-Medium	---	Significantly Rare	G3	S2S3
Amphibian	20374	Desmognathus organi	Northern Pygmy Salamander	2016-09-14	A	3-Medium	---	Significantly Rare	G3	S2S3
Amphibian	20344	Desmognathus organi	Northern Pygmy Salamander	2004-07-18	E	3-Medium	---	Significantly Rare	G3	S2S3
Amphibian	20326	Desmognathus organi	Northern Pygmy Salamander	1976-04-17	H?	4-Low	---	Significantly Rare	G3	S2S3
Amphibian	37408	Desmognathus organi	Northern Pygmy Salamander	1948-05-26	H	4-Low	---	Significantly Rare	G3	S2S3
Amphibian	20347	Desmognathus organi	Northern Pygmy Salamander	2005-07-21	E	3-Medium	---	Significantly Rare	G3	S2S3
Amphibian	9869	Hemidactylium scutatum	Four-toed Salamander	2006-04-11	B?	2-High	---	Special Concern	G5	S3
Amphibian	3888	Plethodon welleri	Weller's Salamander	2017-05-05	E	3-Medium	---	Special Concern	G3	S2
Amphibian	21074	Plethodon welleri	Weller's Salamander	2013-06-28	A	4-Low	---	Special Concern	G3	S2
Arachnid	16555	Microhexura montivaga	Spruce-fir Moss Spider	2007	B?	2-High	Endangered	Significantly Rare	G1	S1
Arachnid	12292	Nesticus carolinensis	Linville Caverns Spider	2011-2012-winter	E	3-Medium	---	Significantly Rare	G1?	S1

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Bird	18030	Accipiter striatus	Sharp-shinned Hawk	1984-07-11	E	4-Low	---	Significantly Rare	G5	S1B,S4N
Bird	16774	Aegolius acadicus	Northern Saw-whet Owl	1995-04-18	B	4-Low	---	Threatened	G5	S2B,S2N
Bird	6778	Aegolius acadicus	Northern Saw-whet Owl	2002-06-15	E	3-Medium	---	Threatened	G5	S2B,S2N
Bird	1775	Aegolius acadicus	Northern Saw-whet Owl	2006-04-15	H?	3-Medium	---	Threatened	G5	S2B,S2N
Bird	31685	Catharus guttatus	Hermit Thrush	2012-06	BC	4-Low	---	Significantly Rare	G5	S2B,S5N
Bird	1063	Catharus guttatus	Hermit Thrush	2012-06-05	E	3-Medium	---	Significantly Rare	G5	S2B,S5N
Bird	10641	Catharus guttatus	Hermit Thrush	2011-05-13	E	3-Medium	---	Significantly Rare	G5	S2B,S5N
Bird	29671	Catharus ustulatus	Swainson's Thrush	2011-06-19	CD	3-Medium	---	Significantly Rare	G5	S1B,S5N
Bird	13697	Certhia americana	Brown Creeper	2011-05-13	E	4-Low	---	Special Concern	G5	S3B,S5N
Bird	24348	Certhia americana	Brown Creeper	2012	AB	3-Medium	---	Special Concern	G5	S3B,S5N
Bird	28283	Certhia americana	Brown Creeper	2009-05	E	3-Medium	---	Special Concern	G5	S3B,S5N
Bird	35629	Certhia americana	Brown Creeper	2015-06-15	E	2-High	---	Special Concern	G5	S3B,S5N
Bird	11282	Coccyzus erythropthalmus	Black-billed Cuckoo	1984-Pre	E	5-Very Low	---	Significantly Rare	G5	S2B
Bird	2569	Coccyzus erythropthalmus	Black-billed Cuckoo	1985	B?	4-Low	---	Significantly Rare	G5	S2B
Bird	28603	Coccyzus erythropthalmus	Black-billed Cuckoo	2010-07-01	E	4-Low	---	Significantly Rare	G5	S2B
Bird	1256	Coccyzus erythropthalmus	Black-billed Cuckoo	1982	A	3-Medium	---	Significantly Rare	G5	S2B
Bird	28624	Dolichonyx oryzivorus	Bobolink	2010-06	B?	3-Medium	---	Significantly Rare	G5	S1B
Bird	14553	Empidonax alnorum	Alder Flycatcher	2012-05-16	A	4-Low	---	Significantly Rare	G5	S2B

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Bird	4319	Empidonax alnorum	Alder Flycatcher	2015-06-15	B	3-Medium	---	Significantly Rare	G5	S2B
Bird	26622	Empidonax alnorum	Alder Flycatcher	2008-06-19	BC	4-Low	---	Significantly Rare	G5	S2B
Bird	31688	Empidonax alnorum	Alder Flycatcher	2012-06	BC	4-Low	---	Significantly Rare	G5	S2B
Bird	15855	Empidonax alnorum	Alder Flycatcher	2002-06-15	BC	3-Medium	---	Significantly Rare	G5	S2B
Bird	3918	Falco peregrinus anatum	American Peregrine Falcon	2015-06	E	3-Medium	---	Endangered	G4T4	S1B,S2N
Bird	37722	Loxia curvirostra	Red Crossbill	1886-08-10	H	4-Low	---	Special Concern	G5	S2
Bird	37811	Loxia curvirostra	Red Crossbill	2013-05-20	E	2-High	---	Special Concern	G5	S2
Bird	2044	Poecile atricapillus	Black-capped Chickadee	1984-07	D	4-Low	---	Special Concern	G5	S3
Bird	9775	Poecile atricapillus	Black-capped Chickadee	1990-04-21	E	3-Medium	---	Special Concern	G5	S3
Bird	28604	Pooecetes gramineus	Vesper Sparrow	2010-07-01	B?	4-Low	---	Special Concern	G5	S2B,S2N
Bird	3714	Pooecetes gramineus	Vesper Sparrow	2012-05-16	B	3-Medium	---	Special Concern	G5	S2B,S2N
Bird	17059	Pooecetes gramineus	Vesper Sparrow	2008-06-19	BC	3-Medium	---	Special Concern	G5	S2B,S2N
Bird	24910	Riparia riparia	Bank Swallow	2007-06-13	CD	3-Medium	---	Significantly Rare	G5	S1B
Bird	34517	Setophaga coronata	Yellow-rumped Warbler	2014-05-30	E	3-Medium	---	Significantly Rare	G5	S1B,S5N
Bird	15521	Setophaga magnolia	Magnolia Warbler	1999-06	E	4-Low	---	Significantly Rare	G5	S2B
Bird	13996	Setophaga magnolia	Magnolia Warbler	2011-05-13	BC	4-Low	---	Significantly Rare	G5	S2B
Bird	15902	Setophaga magnolia	Magnolia Warbler	1989-07-02	B	4-Low	---	Significantly Rare	G5	S2B
Bird	34191	Sphyrapicus varius	Yellow-bellied Sapsucker	1974-06	H	3-Medium	---	Special Concern	G5	S2S3B, S5N

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Bird	34268	Sphyrapicus varius	Yellow-bellied Sapsucker	2005-05-28	D	3-Medium	---	Special Concern	G5	S2S3B, S5N
Bird	37116	Sphyrapicus varius	Yellow-bellied Sapsucker	2016-06-06	E	2-High	---	Special Concern	G5	S2S3B, S5N
Bird	4467	Thryomanes bewickii	Bewick's Wren	1970-07	X	4-Low	---	Endangered	G5	SXB
Bird	25911	Vermivora chrysoptera	Golden-winged Warbler	2017-06-04	E	3-Medium	---	Special Concern	G4	S2S3B
Bird	14035	Vireo gilvus	Warbling Vireo	1984-07-26	E	3-Medium	---	Significantly Rare	G5	S2B
Butterfly	2159	Erora laeta	Early Hairstreak	1999-07-03	E	4-Low	---	Significantly Rare	GU	S2S3
Butterfly	29496	Erora laeta	Early Hairstreak	2011-04-30	D?	4-Low	---	Significantly Rare	GU	S2S3
Butterfly	35817	Erora laeta	Early Hairstreak	2015-08-05	E	2-High	---	Significantly Rare	GU	S2S3
Butterfly	7200	Euphydryas phaeton	Baltimore Checkerspot	1997-07	F	3-Medium	---	Significantly Rare	G4	S2
Butterfly	14320	Euphydryas phaeton	Baltimore Checkerspot	2002?	A?	2-High	---	Significantly Rare	G4	S2
Butterfly	19837	Polygonia faunus	Green Comma	1938	H	4-Low	---	Significantly Rare	G5	S1S2
Butterfly	28790	Polygonia progne	Gray Comma	2008-09-13	E	5-Very Low	---	Significantly Rare	G5	S1
Butterfly	2305	Polygonia progne	Gray Comma	1994-09-08	E	3-Medium	---	Significantly Rare	G5	S1
Butterfly	6626	Speyeria idalia	Regal Fritillary	1994-09-08	H?	3-Medium	---	Significantly Rare	G3	SX
Caddisfly	16934	Palaeagapetus celsus	a caddisfly	1984-08-28	H?	3-Medium	---	Significantly Rare	G5	S2
Crustacean	33733	Cambarus eeseeohensis	Grandfather Mountain Crayfish	2016-08-22	E	3-Medium	---	Significantly Rare	G1	S2S3
Crustacean	33731	Cambarus eeseeohensis	Grandfather Mountain Crayfish	2014-10-06	E	3-Medium	---	Significantly Rare	G1	S2S3
Dragonfly or Damselfly	32074	Aeshna tuberculifera	Black-tipped Darner	2016-09-27	E	3-Medium	---	Significantly Rare	G5	S1

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Dragonfly or Damselfly	33132	Boyeria grafiana	Ocellated Darner	1969-09-30	H	3-Medium	---	Significantly Rare	G5	S2?
Dragonfly or Damselfly	33446	Calopteryx amata	Superb Jewelwing	2004-Pre	H?	5-Very Low	---	Significantly Rare	G4	S1S2
Dragonfly or Damselfly	33682	Gomphus descriptus	Harpoon Clubtail	1965-06-06	H	3-Medium	---	Significantly Rare	G4	S1
Dragonfly or Damselfly	33715	Somatochlora elongata	Ski-tipped Emerald	2009-07-27	E	3-Medium	---	Significantly Rare	G5	S2S3
Dragonfly or Damselfly	33783	Stylurus scudderi	Zebra Clubtail	2004-Pre	H?	5-Very Low	---	Significantly Rare	G4G5	S2?
Dragonfly or Damselfly	33381	Sympetrum obtrusum	White-faced Meadowhawk	2008-09-25	CD	3-Medium	---	Significantly Rare	G5	S1
Freshwater Bivalve	3754	Lasmigona subviridis	Green Floater	2004-08-11	E	3-Medium	---	Endangered	G3	S2
Freshwater Fish	32460	Etheostoma thalassinum	Seagreen Darter	2014-07-24	E	3-Medium	---	Significantly Rare	G4	S3
Freshwater Fish	32515	Notropis volucellus	Mimic Shiner	2004-07-14	E	3-Medium	---	Threatened	G5	S2
Freshwater or Terrestrial Gastropod	37643	Discus bryanti	Sawtooth Disc	2005-10-15	E	2-High	---	Special Concern	G3	S2
Freshwater or Terrestrial Gastropod	37645	Discus bryanti	Sawtooth Disc	2000-07-26	E	3-Medium	---	Special Concern	G3	S2
Freshwater or Terrestrial Gastropod	37644	Discus bryanti	Sawtooth Disc	2000-07-26	E	3-Medium	---	Special Concern	G3	S2
Freshwater or Terrestrial Gastropod	37646	Discus bryanti	Sawtooth Disc	2003-07-31	E	3-Medium	---	Special Concern	G3	S2
Freshwater or Terrestrial Gastropod	15197	Glyphyalinia vanattai	Honey Glyph	1946-Pre	H	4-Low	---	Special Concern	G2G3	S1
Freshwater or Terrestrial Gastropod	37652	Helicodiscus fimbriatus	Fringed Coil	2004-07-13	E	2-High	---	Special Concern	G4	S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

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Freshwater or Terrestrial Gastropod	10020	Inflectarius downieanus	Dwarf Globelet	2003-09-10	E	3-Medium	---	Significantly Rare	G3	S1S2
Freshwater or Terrestrial Gastropod	6943	Inflectarius subpalliatus	Velvet Covert	2003-09-10	E	3-Medium	---	Special Concern	G2	S2S3
Freshwater or Terrestrial Gastropod	1490	Inflectarius subpalliatus	Velvet Covert	1995-03	E	4-Low	---	Special Concern	G2	S2S3
Freshwater or Terrestrial Gastropod	37655	Inflectarius subpalliatus	Velvet Covert	2003-07-31	E	3-Medium	---	Special Concern	G2	S2S3
Freshwater or Terrestrial Gastropod	27536	Mesodon andrewsae	Balsam Globe	2008-03-28	E	2-High	---	Significantly Rare	G3	S2S3
Freshwater or Terrestrial Gastropod	37657	Mesodon andrewsae	Balsam Globe	2005-10-15	E	2-High	---	Significantly Rare	G3	S2S3
Freshwater or Terrestrial Gastropod	37661	Mesodon andrewsae	Balsam Globe	2000-07-26	E	3-Medium	---	Significantly Rare	G3	S2S3
Freshwater or Terrestrial Gastropod	37660	Mesodon andrewsae	Balsam Globe	1995-06-30	E	3-Medium	---	Significantly Rare	G3	S2S3
Freshwater or Terrestrial Gastropod	37662	Mesodon andrewsae	Balsam Globe	2003-07-31	E	3-Medium	---	Significantly Rare	G3	S2S3
Freshwater or Terrestrial Gastropod	18546	Paravitrea andrewsae	High Mountain Supercoil	1931-Pre	H	5-Very Low	---	Special Concern	G2	S2
Freshwater or Terrestrial Gastropod	16238	Paravitrea andrewsae	High Mountain Supercoil	1995-Pre	E	4-Low	---	Special Concern	G2	S2
Freshwater or Terrestrial Gastropod	7117	Paravitrea andrewsae	High Mountain Supercoil	2003-09-10	E	3-Medium	---	Special Concern	G2	S2

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Freshwater or Terrestrial Gastropod	37683	Paravitrea andrewsae	High Mountain Supercoil	2003-07-31	E	3-Medium	---	Special Concern	G2	S2
Freshwater or Terrestrial Gastropod	37682	Paravitrea andrewsae	High Mountain Supercoil	2005-09-09	E	2-High	---	Special Concern	G2	S2
Freshwater or Terrestrial Gastropod	37686	Paravitrea multidentata	Dentate Supercoil	2000-07-26	E	3-Medium	---	Significantly Rare	G5	S2S3
Freshwater or Terrestrial Gastropod	37688	Paravitrea placentula	Glossy Supercoil	2003-07-31	E	3-Medium	---	Special Concern	G3	S2S3
Freshwater or Terrestrial Gastropod	37690	Paravitrea umbilicaris	Open Supercoil	2004-09-09	E	2-High	---	Special Concern	G2	S2
Freshwater or Terrestrial Gastropod	19750	Ventridens coelaxis	Bidentate Dome	1899-04-Pre	H	4-Low	---	Special Concern	G3	S3?
Freshwater or Terrestrial Gastropod	37697	Ventridens coelaxis	Bidentate Dome	2005-10-15	E	2-High	---	Special Concern	G3	S3?
Freshwater or Terrestrial Gastropod	37696	Ventridens coelaxis	Bidentate Dome	2004-05-08	E	2-High	---	Special Concern	G3	S3?
Freshwater or Terrestrial Gastropod	37698	Ventridens coelaxis	Bidentate Dome	2000-07-26	E	3-Medium	---	Special Concern	G3	S3?
Freshwater or Terrestrial Gastropod	37700	Ventridens coelaxis	Bidentate Dome	2003-07-31	E	3-Medium	---	Special Concern	G3	S3?
Freshwater or Terrestrial Gastropod	1221	Ventridens collisella	Sculptured Dome	2003-09-10	E	3-Medium	---	Significantly Rare	G4	S2?
Freshwater or Terrestrial Gastropod	37706	Ventridens collisella	Sculptured Dome	1999-10-10	E	3-Medium	---	Significantly Rare	G4	S2?

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Freshwater or Terrestrial Gastropod	37708	Ventridens decussatus	Crossed Dome	2005-10-15	E	2-High	---	Significantly Rare	G3	S3?
Freshwater or Terrestrial Gastropod	37711	Ventridens lawae	Rounded Dome	2004-09-17	E	2-High	---	Significantly Rare	G4	S2S3
Freshwater or Terrestrial Gastropod	37710	Ventridens lawae	Rounded Dome	2004-07-13	E	2-High	---	Significantly Rare	G4	S2S3
Freshwater or Terrestrial Gastropod	37712	Ventridens suppressus	Flat Dome	2004-09-09	E	2-High	---	Significantly Rare	G5	S1S2
Grasshopper or Katydid	35053	Booneacris variegata	Variegated Wingless Locust	2009-07-23	E	3-Medium	---	Significantly Rare	G5	S2?
Grasshopper or Katydid	35146	Melanoplus eurycercus	a Spur-throat Grasshopper	2014-06-26	E	3-Medium	---	Significantly Rare	G4	S1
Grasshopper or Katydid	35145	Melanoplus eurycercus	a Spur-throat Grasshopper	2014-06-10	E	3-Medium	---	Significantly Rare	G4	S1
Lichen	17687	Cetraria arenaria	Sand-loving Iceland Lichen	1994-08-10	D	3-Medium	---	Special Concern Vulnerable	G4	S2
Lichen	3579	Cetraria arenaria	Sand-loving Iceland Lichen	1994-07-19	A	3-Medium	---	Special Concern Vulnerable	G4	S2
Lichen	19609	Cetraria arenaria	Sand-loving Iceland Lichen	1994-07-20	A	3-Medium	---	Special Concern Vulnerable	G4	S2
Lichen	11029	Cetraria arenaria	Sand-loving Iceland Lichen	1998-09-10	E	3-Medium	---	Special Concern Vulnerable	G4	S2
Lichen	3944	Cetraria arenaria	Sand-loving Iceland Lichen	1994-08-12	E	3-Medium	---	Special Concern Vulnerable	G4	S2
Lichen	20565	Gymnoderma lineare	Rock Gnome Lichen	2004-09-30	C	3-Medium	Endangered	Endangered	G3	S3
Lichen	16765	Gymnoderma lineare	Rock Gnome Lichen	1987-09-17	C	3-Medium	Endangered	Endangered	G3	S3
Lichen	10147	Gymnoderma lineare	Rock Gnome Lichen	2012-08-08	B	3-Medium	Endangered	Endangered	G3	S3

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Lichen	2021	Gymnoderma lineare	Rock Gnome Lichen	2003-04-29	B	3-Medium	Endangered	Endangered	G3	S3
Lichen	6841	Gymnoderma lineare	Rock Gnome Lichen	2003-04-28	C	3-Medium	Endangered	Endangered	G3	S3
Lichen	1655	Gymnoderma lineare	Rock Gnome Lichen	1989	CD	3-Medium	Endangered	Endangered	G3	S3
Lichen	18973	Gymnoderma lineare	Rock Gnome Lichen	2003-04-27	A	3-Medium	Endangered	Endangered	G3	S3
Lichen	20161	Gymnoderma lineare	Rock Gnome Lichen	1991-07-24	D	2-High	Endangered	Endangered	G3	S3
Lichen	29154	Gymnoderma lineare	Rock Gnome Lichen	2010-10-12	E	2-High	Endangered	Endangered	G3	S3
Lichen	25673	Gymnoderma lineare	Rock Gnome Lichen	2004-12-02	AB	2-High	Endangered	Endangered	G3	S3
Lichen	33689	Gymnoderma lineare	Rock Gnome Lichen	2014-07-30	D	2-High	Endangered	Endangered	G3	S3
Lichen	28205	Gymnoderma lineare	Rock Gnome Lichen	2008	E	2-High	Endangered	Endangered	G3	S3
Lichen	11064	Melanelia stygia	Alpine Camouflage Lichen	1994-08-06	A	3-Medium	---	Significantly Rare Disjunct	G5	S1S2
Lichen	9634	Xanthoparmelia monticola	A Rock-shield Lichen	1972	H	3-Medium	---	Significantly Rare Limited	G2?	S2?
Liverwort	21870	Bazzania nudicaulis	A Liverwort	1936-06-13	H	3-Medium	---	Significantly Rare Throughout	G2G3	S2
Liverwort	7835	Bazzania nudicaulis	A Liverwort	1999-08-12	E	3-Medium	---	Significantly Rare Throughout	G2G3	S2
Liverwort	21740	Bazzania nudicaulis	A Liverwort	1999-08-12	E	3-Medium	---	Significantly Rare Throughout	G2G3	S2
Liverwort	21739	Bazzania nudicaulis	A Liverwort	1999-08-12	E	2-High	---	Significantly Rare Throughout	G2G3	S2
Liverwort	21738	Bazzania nudicaulis	A Liverwort	1999-05-27	E	2-High	---	Significantly Rare Throughout	G2G3	S2
Liverwort	22154	Frullania appalachiana	A Liverwort	1961-Pre	H	3-Medium	---	Significantly Rare Limited	G1?	S1?
Liverwort	21905	Lejeunea blomquistii	A Liverwort	1994-06-13	E	3-Medium	---	Special Concern Vulnerable	G1G2	S1
Liverwort	22064	Mannia californica	A Liverwort	1990-Pre	U	3-Medium	---	Significantly Rare Throughout	G3?	S1

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Liverwort	21746	Metzgeria temperata	A Liverwort	1999-08-12	E	3-Medium	---	Significantly Rare Disjunct	G4	S1S2
Liverwort	21744	Metzgeria temperata	A Liverwort	1999-08-12	E	2-High	---	Significantly Rare Disjunct	G4	S1S2
Liverwort	8875	Mylia taylorii	A Liverwort	1989-07-15	E	3-Medium	---	Significantly Rare Disjunct	G5	S1
Liverwort	22176	Plagiochasma wrightii	A Liverwort	2006-04-18	E	3-Medium	---	Significantly Rare Disjunct	G3?	S1
Liverwort	6001	Plagiochila austinii	A Liverwort	1991-05-25	E	3-Medium	---	Significantly Rare Throughout	G3	S1S2
Liverwort	21732	Plagiochila corniculata	A Liverwort	1999-05-27	E	2-High	---	Significantly Rare Disjunct	G4?	S2
Liverwort	21733	Plagiochila corniculata	A Liverwort	1999-08-12	E	2-High	---	Significantly Rare Disjunct	G4?	S2
Liverwort	22191	Plagiochila sullivantii var. sullivantii	A Liverwort	1966	H	4-Low	---	Significantly Rare Throughout	G2T2	S2
Liverwort	22023	Plagiochila sullivantii var. sullivantii	A Liverwort	1994-06-12	E	2-High	---	Significantly Rare Throughout	G2T2	S2
Liverwort	1751	Plagiochila sullivantii var. sullivantii	A Liverwort	1991-05-25	E	3-Medium	---	Significantly Rare Throughout	G2T2	S2
Liverwort	18834	Plagiochila virginica var. caroliniana	A Liverwort	1961-Pre	H	4-Low	---	Significantly Rare Throughout	G3T2	S1
Liverwort	15085	Plagiochila virginica var. virginica	A Liverwort	2012-06-07	E	2-High	---	Significantly Rare Limited	G3T3	S1
Liverwort	21874	Porella wataugensis	A Liverwort	1994-06-12	E	3-Medium	---	Significantly Rare Limited	G1G2Q	S1
Liverwort	21759	Sphenolobopsis pearsonii	A Liverwort	1999-08-12	E	3-Medium	---	Significantly Rare Other	G2?	S2
Liverwort	5951	Sphenolobopsis pearsonii	A Liverwort	1999-08-12	E	3-Medium	---	Significantly Rare Other	G2?	S2

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Liverwort	21758	Sphenolobopsis pearsonii	A Liverwort	1999-08-12	E	2-High	---	Significantly Rare Other	G2?	S2
Mammal	22047	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	2005-08-23	E	3-Medium	Endangered	Endangered	G3G4T2	S1
Mammal	19283	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	2015-04-21	E	3-Medium	Endangered	Endangered	G3G4T2	S1
Mammal	17827	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	1992-05-15	E	3-Medium	Endangered	Endangered	G3G4T2	S1
Mammal	7519	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	2016-07-16	A	2-High	Endangered	Endangered	G3G4T2	S1
Mammal	9820	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	2016-02-04	E	2-High	Endangered	Endangered	G3G4T2	S1
Mammal	37776	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	2014-05-19	E	2-High	Endangered	Endangered	G3G4T2	S1
Mammal	37782	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	2013-04-17	E	2-High	Endangered	Endangered	G3G4T2	S1
Mammal	33921	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	1989-12-11	E	2-High	Endangered	Endangered	G3G4T2	S1
Mammal	37779	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	2014-05-19	E	2-High	Endangered	Endangered	G3G4T2	S1
Mammal	37785	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	2013-04-23	E	2-High	Endangered	Endangered	G3G4T2	S1
Mammal	13831	Glaucomys sabrinus coloratus	Carolina Northern Flying Squirrel	2015-03-04	B?	2-High	Endangered	Endangered	G5T2	S2
Mammal	6328	Glaucomys sabrinus coloratus	Carolina Northern Flying Squirrel	2011-09-01	B	3-Medium	Endangered	Endangered	G5T2	S2
Mammal	31621	Glaucomys sabrinus coloratus	Carolina Northern Flying Squirrel	2012-08-20	E	2-High	Endangered	Endangered	G5T2	S2
Mammal	1089	Microtus chrotorrhinus carolinensis	Southern Rock Vole	1988-11-09	H?	3-Medium	---	Special Concern	G4T3	S3
Mammal	5353	Mustela nivalis	Least Weasel	1982-Summer	H?	4-Low	---	Game Animal	G5	S2
Mammal	37134	Mustela nivalis	Least Weasel	2009-08-04	E	2-High	---	Game Animal	G5	S2
Mammal	7510	Mustela nivalis	Least Weasel	2003-09-20	E	3-Medium	---	Game Animal	G5	S2
Mammal	26859	Myotis leibii	Eastern Small-footed Bat	2008-06-16	E	3-Medium	---	Special Concern	G4	S2

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Mammal	34120	Myotis leibii	Eastern Small-footed Bat	2011-08-02	E	2-High	---	Special Concern	G4	S2
Mammal	34095	Myotis leibii	Eastern Small-footed Bat	2016-07-07	E	2-High	---	Special Concern	G4	S2
Mammal	34116	Myotis leibii	Eastern Small-footed Bat	2007-06-07	E	2-High	---	Special Concern	G4	S2
Mammal	34114	Myotis leibii	Eastern Small-footed Bat	2016-07-14	E	2-High	---	Special Concern	G4	S2
Mammal	34115	Myotis leibii	Eastern Small-footed Bat	2007-01-30	D	2-High	---	Special Concern	G4	S2
Mammal	34823	Myotis leibii	Eastern Small-footed Bat	2011-07-12	E	2-High	---	Special Concern	G4	S2
Mammal	34800	Myotis leibii	Eastern Small-footed Bat	2011-06-23	E	2-High	---	Special Concern	G4	S2
Mammal	36115	Myotis lucifugus	Little Brown Bat	2009-02-10	E	2-High	---	Significantly Rare	G3	S2
Mammal	34826	Myotis lucifugus	Little Brown Bat	2016-07-07	E	2-High	---	Significantly Rare	G3	S2
Mammal	36117	Myotis lucifugus	Little Brown Bat	2011-03-15	H?	1-Very High	---	Significantly Rare	G3	S2
Mammal	35999	Myotis lucifugus	Little Brown Bat	2011-08-02	E	1-Very High	---	Significantly Rare	G3	S2
Mammal	34824	Myotis lucifugus	Little Brown Bat	2011-08-03	E	2-High	---	Significantly Rare	G3	S2
Mammal	35998	Myotis lucifugus	Little Brown Bat	2015-02-03	E	1-Very High	---	Significantly Rare	G3	S2
Mammal	35997	Myotis lucifugus	Little Brown Bat	2004-08-02	E	1-Very High	---	Significantly Rare	G3	S2
Mammal	32140	Myotis septentrionalis	Northern Long-eared Bat	1992-06-22	B?	4-Low	T-4(d)	Threatened	G1G2	S2
Mammal	34363	Myotis septentrionalis	Northern Long-eared Bat	2001	E	4-Low	T-4(d)	Threatened	G1G2	S2
Mammal	32155	Myotis septentrionalis	Northern Long-eared Bat	2003-08-14	E	3-Medium	T-4(d)	Threatened	G1G2	S2
Mammal	32171	Myotis septentrionalis	Northern Long-eared Bat	2011-01-20	D?	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	32141	Myotis septentrionalis	Northern Long-eared Bat	2014-01-20	D	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34299	Myotis septentrionalis	Northern Long-eared Bat	2009-02-20	D	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34373	Myotis septentrionalis	Northern Long-eared Bat	2011-08-03	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34374	Myotis septentrionalis	Northern Long-eared Bat	2011-08-02	E	2-High	T-4(d)	Threatened	G1G2	S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

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Mammal	34364	Myotis septentrionalis	Northern Long-eared Bat	2004-08-02	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34370	Myotis septentrionalis	Northern Long-eared Bat	2011-08-02	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	36539	Myotis septentrionalis	Northern Long-eared Bat	2016-03-22	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34371	Myotis septentrionalis	Northern Long-eared Bat	2011-08-02	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34369	Myotis septentrionalis	Northern Long-eared Bat	2011-08-02	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34368	Myotis septentrionalis	Northern Long-eared Bat	2011-08-02	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34865	Myotis septentrionalis	Northern Long-eared Bat	2011-06-23	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34910	Myotis septentrionalis	Northern Long-eared Bat	2011-07-12	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	18384	Myotis sodalis	Indiana Bat	1962-Pre	F	4-Low	Endangered	Endangered	G2	S1S2
Mammal	10542	Neotoma magister	Allegheny Woodrat	1982-Pre	H?	5-Very Low	---	Special Concern	G3G4	S2S3
Mammal	38338	Neotoma magister	Allegheny Woodrat	1957-02-02	H	4-Low	---	Special Concern	G3G4	S2S3
Mammal	4116	Neotoma magister	Allegheny Woodrat	2000	E	4-Low	---	Special Concern	G3G4	S2S3
Mammal	25205	Neotoma magister	Allegheny Woodrat	2007-07-23	E	3-Medium	---	Special Concern	G3G4	S2S3
Mammal	36130	Perimyotis subflavus	Tricolored Bat	1992-05-15	D	3-Medium	---	Significantly Rare	G2G3	S3
Mammal	36125	Perimyotis subflavus	Tricolored Bat	2016-07-07	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	36126	Perimyotis subflavus	Tricolored Bat	2011-08-02	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	36127	Perimyotis subflavus	Tricolored Bat	2011-08-02	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	36124	Perimyotis subflavus	Tricolored Bat	1986-08-16	H?	2-High	---	Significantly Rare	G2G3	S3
Mammal	36200	Perimyotis subflavus	Tricolored Bat	2015-02-27	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	36128	Perimyotis subflavus	Tricolored Bat	2011-08-01	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	34929	Perimyotis subflavus	Tricolored Bat	2011-08-03	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	36198	Perimyotis subflavus	Tricolored Bat	2016-02-25	E	1-Very High	---	Significantly Rare	G2G3	S3

Element Occurrences Documented Within a One-mile Radius of the Project Area

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Mammal	36123	Perimyotis subflavus	Tricolored Bat	2016-01-26	E	1-Very High	---	Significantly Rare	G2G3	S3
Mammal	38351	Sorex dispar blitchi	Southern Rock Shrew	2012-06-08	E	3-Medium	---	Significantly Rare	G4T3T4	S3
Mammal	32944	Spilogale putorius	Eastern Spotted Skunk	2012-08-28	E	3-Medium	---	Game Animal	G4	S2
Mammal	5494	Sylvilagus obscurus	Appalachian Cottontail	1987-Pre	E	5-Very Low	---	Game Animal	G4	S3
Mammal	31201	Sylvilagus obscurus	Appalachian Cottontail	2012-05-16	E	4-Low	---	Game Animal	G4	S3
Mammal	3866	Sylvilagus obscurus	Appalachian Cottontail	1982	H?	3-Medium	---	Game Animal	G4	S3
Mammal	35149	Sylvilagus obscurus	Appalachian Cottontail	2014-06-08	E	2-High	---	Game Animal	G4	S3
Mammal	35139	Sylvilagus obscurus	Appalachian Cottontail	2010-09-22	E	2-High	---	Game Animal	G4	S3
Moss	19622	Brachythecium populeum	Matted Feather Moss	1891-07-25	H	4-Low	---	Significantly Rare Peripheral	G5	S1
Moss	22638	Brachythecium rotaeanum	Rota's Feather Moss	1923-06-16	H	5-Very Low	---	Significantly Rare Disjunct	G3G4	S1
Moss	22649	Buxbaumia minakatae	Hump-backed Elves	1965-04-10	H	4-Low	---	Significantly Rare Throughout	G2G4	SH
Moss	7907	Dicranum undulatum	Bog Broom-moss	1977-04-28	F	3-Medium	---	Significantly Rare Disjunct	G5	S1
Moss	23638	Didymodon fallax	Fallacious Screw Moss	1951-04-27	H	3-Medium	---	Significantly Rare Other	G5	SH
Moss	23639	Didymodon tophaceus	Three-ranked Didymodon	1951-04-27	H	3-Medium	---	Significantly Rare Other	G5	S1?
Moss	2421	Encalypta procera	Extinguisher Moss	2012-06-07	E	3-Medium	---	Significantly Rare Disjunct	G5	S1
Moss	8884	Entodon concinnus	Lime Entodon	1951-04-27	H	3-Medium	---	Significantly Rare Peripheral	G4G5	S1
Moss	5809	Eucladium verticillatum	Lime-seep Eucladium	2012-06-07	E	3-Medium	---	Significantly Rare Other	G4	S1
Moss	17641	Homalia trichomanoides	Lime Homalia	1991-05-25	E	3-Medium	---	Significantly Rare Peripheral	G5	S1
Moss	2784	Hygrohypnum closteri	Closter's Brook-hypnum	1950-08-26	H	3-Medium	---	Significantly Rare Throughout	G3	S1

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Moss	12959	Leptodontium excelsum	Grandfather Mountain Leptodontium	1999-08-12	E	3-Medium	---	Significantly Rare Limited	G2	S1
Moss	21753	Leptodontium excelsum	Grandfather Mountain Leptodontium	1999-08-12	E	3-Medium	---	Significantly Rare Limited	G2	S1
Moss	21752	Leptodontium excelsum	Grandfather Mountain Leptodontium	1999-08-12	E	2-High	---	Significantly Rare Limited	G2	S1
Moss	12516	Leptodontium flexifolium	Pale-margined Leptodontium	1989-07-15	E	3-Medium	---	Significantly Rare Disjunct	G5	S1
Moss	23557	Orthotrichum strangulatum	Drummond Moss	1951-04-27	H	3-Medium	---	Significantly Rare Peripheral	G4	SH
Moss	10229	Platydictya confervoides	Alga-like Matted-moss	1950-08-26	H	4-Low	---	Significantly Rare Peripheral	G4G5	S1
Moss	16741	Rhytidium rugosum	Golden Tundra-moss	1978	H	3-Medium	---	Significantly Rare Peripheral	G5	S2
Moss	434	Rhytidium rugosum	Golden Tundra-moss	1991	E	3-Medium	---	Significantly Rare Peripheral	G5	S2
Moss	7007	Rhytidium rugosum	Golden Tundra-moss	1998-09-10	E	3-Medium	---	Significantly Rare Peripheral	G5	S2
Moss	12718	Rhytidium rugosum	Golden Tundra-moss	1987-07-30	A	3-Medium	---	Significantly Rare Peripheral	G5	S2
Moss	9461	Rhytidium rugosum	Golden Tundra-moss	1994-08-06	B	3-Medium	---	Significantly Rare Peripheral	G5	S2
Moss	19398	Scopelophila ligulata	Copper Moss	1951-04-27	H	3-Medium	---	Significantly Rare Other	G5?	S1
Moss	17544	Sphagnum capillifolium	Northern Peatmoss	1845	H	4-Low	---	Significantly Rare Peripheral	G5	S1
Moss	2628	Sphagnum fallax	Pretty Peatmoss	1989	F	3-Medium	---	Significantly Rare Peripheral	G5	S2
Moss	4164	Sphagnum fallax	Pretty Peatmoss	2002-08-01	E	3-Medium	---	Significantly Rare Peripheral	G5	S2
Moss	20572	Sphagnum subsecundum	Orange Peatmoss	2004-10-21	A	2-High	---	Significantly Rare Peripheral	G5	S1
Moss	1472	Splachnum pennsylvanicum	Southern Dung Moss	1934-05-06	X?	3-Medium	---	Significantly Rare Other	G4?	SH
Moss	22981	Warnstorfia fluitans	Floating Sickle-moss	1995-07-14	E	3-Medium	---	Significantly Rare Disjunct	G5	S1

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	20939	Acidic Cove Forest (High Elevation Subtype)	---	2010	B	2-High	---	---	G3G4Q	S2
Natural Community	3771	Acidic Cove Forest (High Elevation Subtype)	---	2010	B	2-High	---	---	G3G4Q	S2
Natural Community	21182	Acidic Cove Forest (High Elevation Subtype)	---	2010	B	2-High	---	---	G3G4Q	S2
Natural Community	31532	Acidic Cove Forest (High Elevation Subtype)	---	2011-08-10	B	2-High	---	---	G3G4Q	S2
Natural Community	25261	Acidic Cove Forest (Typic Subtype)	---	2010	C	2-High	---	---	G5	S4
Natural Community	25314	Acidic Cove Forest (Typic Subtype)	---	2010	C	3-Medium	---	---	G5	S4
Natural Community	25930	Acidic Cove Forest (Typic Subtype)	---	2017-03-08	A	2-High	---	---	G5	S4
Natural Community	32175	Acidic Cove Forest (Typic Subtype)	---	2013-06-19	A	2-High	---	---	G5	S4
Natural Community	25262	Acidic Cove Forest (Typic Subtype)	---	2010	BC	2-High	---	---	G5	S4
Natural Community	10950	Acidic Cove Forest (Typic Subtype)	---	2013-10-15	A	2-High	---	---	G5	S4
Natural Community	26156	Acidic Cove Forest (Typic Subtype)	---	2018-05-17	A	2-High	---	---	G5	S4
Natural Community	28425	Acidic Cove Forest (Typic Subtype)	---	2010	B	3-Medium	---	---	G5	S4
Natural Community	25341	Acidic Cove Forest (Typic Subtype)	---	2010	CD	3-Medium	---	---	G5	S4
Natural Community	20680	Acidic Cove Forest (Typic Subtype)	---	2010	B	2-High	---	---	G5	S4
Natural Community	34410	Acidic Cove Forest (Typic Subtype)	---	2014-07-30	C	2-High	---	---	G5	S4
Natural Community	32976	Acidic Cove Forest (Typic Subtype)	---	2013-11	B	2-High	---	---	G5	S4
Natural Community	25972	Acidic Cove Forest (Typic Subtype)	---	2010	C	2-High	---	---	G5	S4
Natural Community	36632	Acidic Cove Forest (Typic Subtype)	---	2016-05-19	C	2-High	---	---	G5	S4

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	12140	Calcareous Oak-Walnut Forest	---	2004-08-25	B	2-High	---	---	G1Q	S1
Natural Community	4433	Calcareous Oak-Walnut Forest	---	2004-08-18	B?	3-Medium	---	---	G1Q	S1
Natural Community	9002	Canada Hemlock Forest (Typic Subtype)	---	2010	A?	4-Low	---	---	G3G4	S1S2
Natural Community	20679	Canada Hemlock Forest (Typic Subtype)	---	2010	C	1-Very High	---	---	G3G4	S1S2
Natural Community	20952	Canada Hemlock Forest (Typic Subtype)	---	2010	C	1-Very High	---	---	G3G4	S1S2
Natural Community	20945	Canada Hemlock Forest (Typic Subtype)	---	2004-09-23	C	2-High	---	---	G3G4	S1S2
Natural Community	30627	Carolina Hemlock Forest (Mesic Subtype)	---	1980	A	4-Low	---	---	G1G2	S1
Natural Community	284	Carolina Hemlock Forest (Typic Subtype)	---	1980	NR	4-Low	---	---	G2	S2
Natural Community	34416	Carolina Hemlock Forest (Typic Subtype)	---	2014-07-30	C	2-High	---	---	G2	S2
Natural Community	4776	Carolina Hemlock Forest (Typic Subtype)	---	1999-06-30	C?	2-High	---	---	G2	S2
Natural Community	25260	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	A	2-High	---	---	G5	S5
Natural Community	3015	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	C	4-Low	---	---	G5	S5
Natural Community	25315	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	B	3-Medium	---	---	G5	S5
Natural Community	26410	Chestnut Oak Forest (Dry Heath Subtype)	---	2014-07-24	B	3-Medium	---	---	G5	S5
Natural Community	25264	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	BC	3-Medium	---	---	G5	S5
Natural Community	25342	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	CD	3-Medium	---	---	G5	S5
Natural Community	21183	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	B	2-High	---	---	G5	S5
Natural Community	25929	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	B?	3-Medium	---	---	G5	S5

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	22654	Chestnut Oak Forest (Dry Heath Subtype)	---	2016-05-19	A	3-Medium	---	---	G5	S5
Natural Community	20942	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	A	3-Medium	---	---	G5	S5
Natural Community	20960	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	A	3-Medium	---	---	G5	S5
Natural Community	34413	Chestnut Oak Forest (Dry Heath Subtype)	---	2014-07-30	C	3-Medium	---	---	G5	S5
Natural Community	2590	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	B	3-Medium	---	---	G5	S5
Natural Community	32181	Chestnut Oak Forest (Dry Heath Subtype)	---	2018-05-17	E	3-Medium	---	---	G5	S5
Natural Community	29783	Chestnut Oak Forest (Dry Heath Subtype)	---	2011-09-14	CD	2-High	---	---	G5	S5
Natural Community	30281	Chestnut Oak Forest (Herb Subtype)	---	2010	C	4-Low	---	---	G4G5	S4
Natural Community	30350	Chestnut Oak Forest (Herb Subtype)	---	2010	B	4-Low	---	---	G4G5	S4
Natural Community	30351	Chestnut Oak Forest (Herb Subtype)	---	2010	BC	3-Medium	---	---	G4G5	S4
Natural Community	30348	Chestnut Oak Forest (Mesic Subtype)	---	2010	CD	3-Medium	---	---	G4	S3S4
Natural Community	25991	Chestnut Oak Forest (Mesic Subtype)	---	2010	AC	2-High	---	---	G4	S3S4
Natural Community	33969	Chestnut Oak Forest (Mesic Subtype)	---	2014-08-12	BC	2-High	---	---	G4	S3S4
Natural Community	32972	Chestnut Oak Forest (Mesic Subtype)	---	2013-11	B?	2-High	---	---	G4	S3S4
Natural Community	34412	Chestnut Oak Forest (Mesic Subtype)	---	2014-07-30	C	2-High	---	---	G4	S3S4
Natural Community	25973	Chestnut Oak Forest (Mesic Subtype)	---	2010	C?	2-High	---	---	G4	S3S4
Natural Community	28439	Chestnut Oak Forest (White Pine Subtype)	---	2010	B	2-High	---	---	G3	S3
Natural Community	8927	Chestnut Oak Forest (White Pine Subtype)	---	2010	C?	3-Medium	---	---	G3	S3

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	496	Dry-Mesic Basic Oak--Hickory Forest (Piedmont Subtype)	---	2004-08-25	C	4-Low	---	---	G3G4	S3
Natural Community	9072	Fraser Fir Forest (Herb Subtype)	---	2006	B	3-Medium	---	---	G1	S1
Natural Community	30200	Fraser Fir Forest (Rhododendron Subtype)	---	2006	B	3-Medium	---	---	G1	S1
Natural Community	14854	Grassy Bald (Alder Subtype)	---	2010-04-26	A	3-Medium	---	---	G1	S1
Natural Community	19416	Grassy Bald (Grass Subtype)	---	2013-06-02	A	2-High	---	---	G1	S1
Natural Community	1792	Grassy Bald (Grass Subtype)	---	2008-06-23	A	2-High	---	---	G1	S1
Natural Community	18195	Grassy Bald (Grass Subtype)	---	2017-07-11	A	3-Medium	---	---	G1	S1
Natural Community	16430	Grassy Bald (Grass Subtype)	---	2013-06-03	AC	2-High	---	---	G1	S1
Natural Community	21181	Grassy Bald (Grass Subtype)	---	2011-08-11	C?	1-Very High	---	---	G1	S1
Natural Community	16429	Grassy Bald (Grass Subtype)	---	1991-09-24	B	2-High	---	---	G1	S1
Natural Community	19695	Grassy Bald (Grass Subtype)	---	1991-09-24	C	2-High	---	---	G1	S1
Natural Community	31515	Grassy Bald (Sedge Subtype)	---	2013-06-03	A	3-Medium	---	---	G1	S1
Natural Community	25989	Heath Bald (Catawba Rhododendron Subtype)	---	2013-11	AB	3-Medium	---	---	G2	S2
Natural Community	2111	Heath Bald (Catawba Rhododendron Subtype)	---	2007	A	2-High	---	---	G2	S2
Natural Community	30167	Heath Bald (Catawba Rhododendron Subtype)	---	2013-06-01	B?	3-Medium	---	---	G2	S2
Natural Community	20678	Heath Bald (Low Elevation Subtype)	---	2004-10-09	CD	1-Very High	---	---	G2G3	S1
Natural Community	17660	Heath Bald (Low Elevation Subtype)	---	1988-11-16	A?	2-High	---	---	G2G3	S1

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	30357	Heath Bald (Sand Myrtle Subtype)	---	2010	A	3-Medium	---	---	G1	S1
Natural Community	12320	High Elevation Birch Boulderfield Forest	---	1988-08-18	A	4-Low	---	---	G3	S2
Natural Community	29765	High Elevation Birch Boulderfield Forest	---	2013-10-08	B	2-High	---	---	G3	S2
Natural Community	32975	High Elevation Birch Boulderfield Forest	---	2013-11	B	3-Medium	---	---	G3	S2
Natural Community	29766	High Elevation Birch Boulderfield Forest	---	2012-08-01	B	2-High	---	---	G3	S2
Natural Community	19501	High Elevation Boggy Seep	---	1988	A	4-Low	---	---	G2	S2
Natural Community	20681	High Elevation Boggy Seep	---	2004-10-21	A	2-High	---	---	G2	S2
Natural Community	13271	High Elevation Boggy Seep	---	2008-03-24	C	2-High	---	---	G2	S2
Natural Community	16165	High Elevation Granitic Dome	---	2005-05-12	A	2-High	---	---	G2G3	S3
Natural Community	30070	High Elevation Red Oak Forest (Heath Subtype)	---	2013-11	A	3-Medium	---	---	G4	S3
Natural Community	30064	High Elevation Red Oak Forest (Heath Subtype)	---	2010	B	3-Medium	---	---	G4	S3
Natural Community	16793	High Elevation Red Oak Forest (Heath Subtype)	---	2008-03-24	B	3-Medium	---	---	G4	S3
Natural Community	32178	High Elevation Red Oak Forest (Heath Subtype)	---		NR	3-Medium	---	---	G4	S3
Natural Community	30025	High Elevation Red Oak Forest (Heath Subtype)	---	2010	C	3-Medium	---	---	G4	S3
Natural Community	29465	High Elevation Red Oak Forest (Heath Subtype)	---	2010	C	2-High	---	---	G4	S3
Natural Community	30004	High Elevation Red Oak Forest (Heath Subtype)	---	2010-08-28	C	2-High	---	---	G4	S3
Natural Community	32970	High Elevation Red Oak Forest (Orchard Forest Subtype)	---	2013-11	B	2-High	---	---	G2	S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	20957	High Elevation Red Oak Forest (Rich Subtype)	---	2012-07-31	A	2-High	---	---	G2	S3
Natural Community	30069	High Elevation Red Oak Forest (Rich Subtype)	---	2013-11	A	3-Medium	---	---	G2	S3
Natural Community	36648	High Elevation Red Oak Forest (Rich Subtype)	---	2016-05-28	C	2-High	---	---	G2	S3
Natural Community	20675	High Elevation Red Oak Forest (Stunted Woodland Subtype)	---	2014-07-24	B	2-High	---	---	G2	S2
Natural Community	25986	High Elevation Red Oak Forest (Typic Herb Subtype)	---	2014-07-24	A	3-Medium	---	---	G4	S3
Natural Community	6568	High Elevation Red Oak Forest (Typic Herb Subtype)	---	2010	A	3-Medium	---	---	G4	S3
Natural Community	14662	High Elevation Red Oak Forest (Typic Herb Subtype)	---	2010	B	3-Medium	---	---	G4	S3
Natural Community	9209	High Elevation Red Oak Forest (Typic Herb Subtype)	---	2010	A	3-Medium	---	---	G4	S3
Natural Community	16327	High Elevation Red Oak Forest (Typic Herb Subtype)	---	2010	C	3-Medium	---	---	G4	S3
Natural Community	29997	High Elevation Red Oak Forest (Typic Herb Subtype)	---	2008-03-24	B	2-High	---	---	G4	S3
Natural Community	3189	High Elevation Red Oak Forest (Typic Herb Subtype)	---	2010	C?	2-High	---	---	G4	S3
Natural Community	35680	High Elevation Red Oak Forest (Typic Herb Subtype)	---	2013-10-08	B	2-High	---	---	G4	S3
Natural Community	33968	High Elevation Red Oak Forest (Typic Herb Subtype)	---	2014-08-12	C	2-High	---	---	G4	S3

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	3804	High Elevation Red Oak Forest (Typic Herb Subtype)	---	2010-08-28	C	3-Medium	---	---	G4	S3
Natural Community	19877	High Elevation Rocky Summit (High Peak Subtype)	---	2006	A	2-High	---	---	G1	S1
Natural Community	6182	High Elevation Rocky Summit (High Peak Subtype)	---	1986-08-27	A	3-Medium	---	---	G1	S1
Natural Community	16804	High Elevation Rocky Summit (High Peak Subtype)	---	1988-08-17	A	2-High	---	---	G1	S1
Natural Community	30676	High Elevation Rocky Summit (High Peak Subtype)	---	1988-08-16	A	2-High	---	---	G1	S1
Natural Community	20491	High Elevation Rocky Summit (Typic Subtype)	---	2004-11-08	B	3-Medium	---	---	G2	S2
Natural Community	18705	High Elevation Rocky Summit (Typic Subtype)	---	2012	A	2-High	---	---	G2	S2
Natural Community	17629	High Elevation Rocky Summit (Typic Subtype)	---	2017-07-12	AB	3-Medium	---	---	G2	S2
Natural Community	8544	High Elevation Rocky Summit (Typic Subtype)	---	2013-06-03	A	3-Medium	---	---	G2	S2
Natural Community	25995	High Elevation Rocky Summit (Typic Subtype)	---	2013-11	A	2-High	---	---	G2	S2
Natural Community	4789	High Elevation Rocky Summit (Typic Subtype)	---	1988-08-16	A	3-Medium	---	---	G2	S2
Natural Community	19537	High Elevation Rocky Summit (Typic Subtype)	---	2010-08-28	A	3-Medium	---	---	G2	S2
Natural Community	29464	High Elevation Rocky Summit (Typic Subtype)	---	1999-08-26	B	2-High	---	---	G2	S2
Natural Community	19720	High Elevation Rocky Summit (Typic Subtype)	---	1988-08-16	A	2-High	---	---	G2	S2
Natural Community	8251	High Elevation Rocky Summit (Typic Subtype)	---	1999-10-10	C	2-High	---	---	G2	S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	20956	High Elevation Rocky Summit (Typic Subtype)	---	2011	CD	1-Very High	---	---	G2	S2
Natural Community	25343	Low Elevation Rocky Summit (Acidic Subtype)	---	2007-10-07	C?	2-High	---	---	G3?	S2
Natural Community	31542	Low Elevation Rocky Summit (Acidic Subtype)	---	2013-11	B	2-High	---	---	G3?	S2
Natural Community	36228	Low Elevation Rocky Summit (Acidic Subtype)	---	2015-09-15	C	2-High	---	---	G3?	S2
Natural Community	25257	Low Elevation Rocky Summit (Basic Subtype)	---	2007-10-01	B	2-High	---	---	G1	S1
Natural Community	32962	Low Elevation Seep (Bedrock Subtype)	---	2014-06-27	B	2-High	---	---	G1	S1
Natural Community	30124	Low Montane Red Oak Forest	---	2010	B	3-Medium	---	---	G4?	S4?
Natural Community	18462	Montane Alluvial Forest (Small River Subtype)	---	2005-06-25	A	2-High	---	---	G3	S1
Natural Community	25932	Montane Cliff (Acidic Herb Subtype)	---	2007-10-09	C	2-High	---	---	G3G4	S3
Natural Community	34415	Montane Cliff (Acidic Herb Subtype)	---	2014-07-30	A	2-High	---	---	G3G4	S3
Natural Community	18398	Montane Cliff (Acidic Herb Subtype)	---	1987-09-17	A	2-High	---	---	G3G4	S3
Natural Community	25265	Montane Cliff (Acidic Herb Subtype)	---	2007-09-28	B?	2-High	---	---	G3G4	S3
Natural Community	22675	Montane Cliff (Acidic Herb Subtype)	---	2004-08-25	C?	2-High	---	---	G3G4	S3
Natural Community	32974	Montane Cliff (Acidic Lichen Subtype)	---	2013-11	B	2-High	---	---	G2?	S1
Natural Community	1073	Montane Cliff (Calcareous Subtype)	---	2004-08-25	A	4-Low	---	---	G3G4	S1
Natural Community	13253	Montane Cliff (Calcareous Subtype)	---	1988-08-18	A	2-High	---	---	G3G4	S1
Natural Community	32973	Montane Cliff (Mafic Subtype)	---	2015-09-17	A	3-Medium	---	---	G3	S3
Natural Community	22632	Montane Oak--Hickory Forest (Acidic Subtype)	---	2016-05-19	BC	3-Medium	---	---	G4G5	S4S5

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	29784	Montane Oak--Hickory Forest (Acidic Subtype)	---	2015-10-03	BC	3-Medium	---	---	G4G5	S4S5
Natural Community	8182	Montane Oak--Hickory Forest (Acidic Subtype)	---	2010	C	2-High	---	---	G4G5	S4S5
Natural Community	26411	Montane Oak--Hickory Forest (Acidic Subtype)	---	2014-06-26	B	3-Medium	---	---	G4G5	S4S5
Natural Community	34411	Montane Oak--Hickory Forest (Acidic Subtype)	---	2015-09-15	C	3-Medium	---	---	G4G5	S4S5
Natural Community	22674	Montane Oak--Hickory Forest (Acidic Subtype)	---	2010	C?	2-High	---	---	G4G5	S4S5
Natural Community	11091	Montane Oak--Hickory Forest (Basic Subtype)	---	2010	B	3-Medium	---	---	G3	S3
Natural Community	30131	Montane Oak--Hickory Forest (Basic Subtype)	---	2015-09-17	A	3-Medium	---	---	G3	S3
Natural Community	30143	Montane Oak--Hickory Forest (Basic Subtype)	---	2015-10-08	BC	3-Medium	---	---	G3	S3
Natural Community	31175	Montane Oak--Hickory Forest (Basic Subtype)	---	2014-07-24	B	2-High	---	---	G3	S3
Natural Community	30117	Montane Oak--Hickory Forest (Low Dry Subtype)	---	2010	C	2-High	---	---	G2G3	S2
Natural Community	20490	Northern Hardwood Forest (Beech Gap Subtype)	---	2004-05-26	B	3-Medium	---	---	G1	S1S2
Natural Community	1642	Northern Hardwood Forest (Beech Gap Subtype)	---	2013-10-08	C	2-High	---	---	G1	S1S2
Natural Community	7445	Northern Hardwood Forest (Beech Gap Subtype)	---	1986	AC	3-Medium	---	---	G1	S1S2
Natural Community	29768	Northern Hardwood Forest (Beech Gap Subtype)	---	2014-07-17	BC	2-High	---	---	G1	S1S2
Natural Community	6186	Northern Hardwood Forest (Beech Gap Subtype)	---	1987-05-27	B?	3-Medium	---	---	G1	S1S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	31172	Northern Hardwood Forest (Beech Gap Subtype)	---	2012-05-23	CD	2-High	---	---	G1	S1S2
Natural Community	30190	Northern Hardwood Forest (Rich Subtype)	---	2011-08-18	A	3-Medium	---	---	G3	S3
Natural Community	30147	Northern Hardwood Forest (Rich Subtype)	---	2018-05-15	AB	3-Medium	---	---	G3	S3
Natural Community	30203	Northern Hardwood Forest (Rich Subtype)	---	2013-11	A	3-Medium	---	---	G3	S3
Natural Community	30177	Northern Hardwood Forest (Rich Subtype)	---	2010-08-28	AB	3-Medium	---	---	G3	S3
Natural Community	31549	Northern Hardwood Forest (Rich Subtype)	---	2012-08-01	A	2-High	---	---	G3	S3
Natural Community	8177	Northern Hardwood Forest (Rich Subtype)	---	2013-10-15	A	2-High	---	---	G3	S3
Natural Community	5612	Northern Hardwood Forest (Typic Subtype)	---	2013-10-08	A	3-Medium	---	---	G3G4	S3
Natural Community	15939	Northern Hardwood Forest (Typic Subtype)	---	2010	A?	4-Low	---	---	G3G4	S3
Natural Community	2990	Northern Hardwood Forest (Typic Subtype)	---	2013-10-18	AB	3-Medium	---	---	G3G4	S3
Natural Community	18283	Northern Hardwood Forest (Typic Subtype)	---	2014-07-07	B	2-High	---	---	G3G4	S3
Natural Community	20489	Northern Hardwood Forest (Typic Subtype)	---	2010	A	2-High	---	---	G3G4	S3
Natural Community	25987	Northern Hardwood Forest (Typic Subtype)	---	2013-11	A	3-Medium	---	---	G3G4	S3
Natural Community	273	Northern Hardwood Forest (Typic Subtype)	---	2010-08-28	AB	3-Medium	---	---	G3G4	S3
Natural Community	32176	Northern Hardwood Forest (Typic Subtype)	---	2013-06-19	AB	2-High	---	---	G3G4	S3
Natural Community	16900	Northern Hardwood Forest (Typic Subtype)	---	2010	C	3-Medium	---	---	G3G4	S3

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	28348	Piedmont/Mountain Semipermanent Impoundment (Montane Marsh Subtype)	---	2009-07-28	E	2-High	---	---	G3	S3S4
Natural Community	32961	Pine--Oak/Heath (High Elevation Subtype)	---	2013-11	B	2-High	---	---	G2	S2
Natural Community	19740	Pine--Oak/Heath (Typic Subtype)	---	2010	C	4-Low	---	---	G3	S3
Natural Community	25316	Pine--Oak/Heath (Typic Subtype)	---	2010	C	3-Medium	---	---	G3	S3
Natural Community	25263	Pine--Oak/Heath (Typic Subtype)	---	2010	C	2-High	---	---	G3	S3
Natural Community	25344	Pine--Oak/Heath (Typic Subtype)	---	2010	CD	3-Medium	---	---	G3	S3
Natural Community	20676	Pine--Oak/Heath (Typic Subtype)	---	2010	B?	2-High	---	---	G3	S3
Natural Community	32960	Pine--Oak/Heath (Typic Subtype)	---	2013-11	B	2-High	---	---	G3	S3
Natural Community	30248	Red Spruce--Fraser Fir Forest (Birch Transition Herb Subtype)	---	2010	B	4-Low	---	---	G2	S2
Natural Community	30249	Red Spruce--Fraser Fir Forest (Birch Transition Shrub Subtype)	---	2010	A	3-Medium	---	---	G1?	S1
Natural Community	30247	Red Spruce--Fraser Fir Forest (Boulderfield Subtype)	---	2006	A	4-Low	---	---	G1	S1
Natural Community	9902	Red Spruce--Fraser Fir Forest (Herb Subtype)	---	2006	B	2-High	---	---	G2	S2
Natural Community	30246	Red Spruce--Fraser Fir Forest (Rhododendron Subtype)	---	2010	B	3-Medium	---	---	G1	S1S2
Natural Community	25988	Rich Cove Forest (Boulderfield Subtype)	---	2013-11	A	3-Medium	---	---	G3	S2
Natural Community	32954	Rich Cove Forest (Boulderfield Subtype)	---	2013-11	AB	2-High	---	---	G3	S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	31550	Rich Cove Forest (Boulderfield Subtype)	---	2011-08-19	B	2-High	---	---	G3	S2
Natural Community	36649	Rich Cove Forest (Boulderfield Subtype)	---	2016-05-29	C?	2-High	---	---	G3	S2
Natural Community	20682	Rich Cove Forest (Boulderfield Subtype)	---	2010	B	2-High	---	---	G3	S2
Natural Community	26481	Rich Cove Forest (Boulderfield Subtype)	---	2010	B	2-High	---	---	G3	S2
Natural Community	20674	Rich Cove Forest (Montane Intermediate Subtype)	---	2015-10-14	AB	2-High	---	---	G4	S4
Natural Community	304	Rich Cove Forest (Montane Intermediate Subtype)	---	2010-08-28	BC	2-High	---	---	G4	S4
Natural Community	22631	Rich Cove Forest (Montane Intermediate Subtype)	---	2014-08-12	C	2-High	---	---	G4	S4
Natural Community	20955	Rich Cove Forest (Montane Intermediate Subtype)	---	2018-05-14	A	2-High	---	---	G4	S4
Natural Community	20943	Rich Cove Forest (Montane Intermediate Subtype)	---	2010	B	2-High	---	---	G4	S4
Natural Community	3892	Rich Cove Forest (Montane Intermediate Subtype)	---	2010	B	2-High	---	---	G4	S4
Natural Community	2473	Rich Cove Forest (Montane Intermediate Subtype)	---	2010	B	2-High	---	---	G4	S4
Natural Community	36263	Rich Cove Forest (Montane Intermediate Subtype)	---	2015-10-03	C	3-Medium	---	---	G4	S4
Natural Community	20959	Rich Cove Forest (Montane Intermediate Subtype)	---	2010	B	2-High	---	---	G4	S4

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	20677	Rich Cove Forest (Montane Intermediate Subtype)	---	2010	B	2-High	---	---	G4	S4
Natural Community	22673	Rich Cove Forest (Montane Intermediate Subtype)	---	2010	C	2-High	---	---	G4	S4
Natural Community	20683	Rich Cove Forest (Montane Intermediate Subtype)	---	2006	C	2-High	---	---	G4	S4
Natural Community	32696	Rich Cove Forest (Montane Intermediate Subtype)	---	2013-10-15	C	2-High	---	---	G4	S4
Natural Community	25971	Rich Cove Forest (Montane Intermediate Subtype)	---	2010	C	2-High	---	---	G4	S4
Natural Community	26284	Rich Cove Forest (Montane Intermediate Subtype)	---	2013-10-18	C	2-High	---	---	G4	S4
Natural Community	34414	Rich Cove Forest (Montane Intermediate Subtype)	---	2015-09-15	C	3-Medium	---	---	G4	S4
Natural Community	32951	Rich Cove Forest (Montane Rich Subtype)	---	2013-11	AB	2-High	---	---	G3G4	S3
Natural Community	8003	Rich Cove Forest (Montane Rich Subtype)	---	2010	A	4-Low	---	---	G3G4	S3
Natural Community	32180	Rich Cove Forest (Montane Rich Subtype)	---	2013-06-19	AB	2-High	---	---	G3G4	S3
Natural Community	11331	Rich Montane Seep	---	1988	A	4-Low	---	---	G3	S3
Natural Community	25998	Rich Montane Seep	---	2005-04-08	AC	2-High	---	---	G3	S3
Natural Community	25990	Rich Montane Seep	---	2005-06-21	E	4-Low	---	---	G3	S3
Natural Community	30353	Rich Montane Seep	---	2011	A	3-Medium	---	---	G3	S3

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	15493	Rich Montane Seep	---	2018-05-15	A	3-Medium	---	---	G3	S3
Natural Community	7112	Rich Montane Seep	---	2018-05-14	AB	2-High	---	---	G3	S3
Natural Community	32950	Rich Montane Seep	---	2013-11	AB	2-High	---	---	G3	S3
Natural Community	1964	Rich Montane Seep	---	1988	A	3-Medium	---	---	G3	S3
Natural Community	29767	Rich Montane Seep	---	2013-10-08	BC	3-Medium	---	---	G3	S3
Natural Community	26283	Rich Montane Seep	---	2013-10-18	B	2-High	---	---	G3	S3
Natural Community	33967	Rich Montane Seep	---	2014-08-12	A	2-High	---	---	G3	S3
Natural Community	29787	Rich Montane Seep	---	1999-08-17	BC	2-High	---	---	G3	S3
Natural Community	8679	Rich Montane Seep	---	1986-06-16	A	2-High	---	---	G3	S3
Natural Community	19181	Rocky Bar and Shore (Alder-Yellowroot Subtype)	---	2010	A?	4-Low	---	---	G3G4	S3
Natural Community	34417	Rocky Bar and Shore (Mixed Bar Subtype)	---	2014-07-30	BC	2-High	---	---	G4	S3
Natural Community	30643	Rocky Bar and Shore (Twisted Sedge Subtype)	---	2010	A?	4-Low	---	---	G3G4	S3
Natural Community	25996	Rocky Bar and Shore (Twisted Sedge Subtype)	---	2005-06-14	AC	3-Medium	---	---	G3G4	S3
Natural Community	3767	Southern Appalachian Bog (Low Elevation Subtype)	---	1990-08-30	CD	2-High	---	---	G1G2	S1S2
Natural Community	2827	Southern Appalachian Bog (Typic Subtype)	---	2009-07-27	A?	2-High	---	---	G1G2	S1S2
Natural Community	19474	Southern Appalachian Bog (Typic Subtype)	---	1992-11	B	3-Medium	---	---	G1G2	S1S2
Natural Community	14321	Southern Appalachian Bog (Typic Subtype)	---	2008-03-24	A	2-High	---	---	G1G2	S1S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	24621	Southern Appalachian Bog (Typic Subtype)	---	2005-05-27	B?	3-Medium	---	---	G1G2	S1S2
Natural Community	18429	Southern Appalachian Bog (Typic Subtype)	---	2009-07-28	A	2-High	---	---	G1G2	S1S2
Natural Community	24113	Southern Appalachian Bog (Typic Subtype)	---	1990-06-09	C	2-High	---	---	G1G2	S1S2
Natural Community	8692	Southern Appalachian Bog (Typic Subtype)	---	1989-06-29	D	1-Very High	---	---	G1G2	S1S2
Natural Community	23326	Southern Appalachian Bog (Typic Subtype)	---	2009-07-27	B	2-High	---	---	G1G2	S1S2
Natural Community	6694	Southern Appalachian Bog (Typic Subtype)	---	2012	CD	2-High	---	---	G1G2	S1S2
Natural Community	24766	Southern Appalachian Bog (Typic Subtype)	---	2006-07-06	CD	2-High	---	---	G1G2	S1S2
Natural Community	18844	Southern Appalachian Bog (Typic Subtype)	---	1988	BC	2-High	---	---	G1G2	S1S2
Natural Community	25345	Spray Cliff	---	2007-10-09	CD	2-High	---	---	G2	S2
Natural Community	27698	Spray Cliff	---	2014-07-24	A	2-High	---	---	G2	S2
Natural Community	28749	Spray Cliff	---	2008-04-30	B	2-High	---	---	G2	S2
Natural Community	36633	Spray Cliff	---	2016-05-19	C	2-High	---	---	G2	S2
Natural Community	6610	Swamp Forest--Bog Complex (Typic Subtype)	---	2005-08-10	B	2-High	---	---	G2	S2
Natural Community	3805	Swamp Forest--Bog Complex (Typic Subtype)	---	2000-08-15	C?	3-Medium	---	---	G2	S2
Natural Community	20673	Swamp Forest--Bog Complex (Typic Subtype)	---	2004-08-05	C	3-Medium	---	---	G2	S2
Natural Community	16245	Swamp Forest--Bog Complex (Typic Subtype)	---	1990-06-10	B	3-Medium	---	---	G2	S2
Reptile	12246	Crotalus horridus	Timber Rattlesnake	1974-07-20	H	4-Low	---	Special Concern	G4	S3

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Reptile	15627	Glyptemys muhlenbergii	Bog Turtle	2005	D	3-Medium	Threatened Similar Appearance	Threatened	G3	S2
Reptile	19311	Glyptemys muhlenbergii	Bog Turtle	1986-05-28	H?	3-Medium	Threatened Similar Appearance	Threatened	G3	S2
Reptile	9782	Glyptemys muhlenbergii	Bog Turtle	1989-06-04	D	3-Medium	Threatened Similar Appearance	Threatened	G3	S2
Reptile	703	Glyptemys muhlenbergii	Bog Turtle	1991-06-07	D	3-Medium	Threatened Similar Appearance	Threatened	G3	S2
Reptile	2070	Glyptemys muhlenbergii	Bog Turtle	1990-05-24	C	3-Medium	Threatened Similar Appearance	Threatened	G3	S2
Reptile	22418	Glyptemys muhlenbergii	Bog Turtle	2010-05-17	BC	3-Medium	Threatened Similar Appearance	Threatened	G3	S2
Reptile	23742	Plestiodon anthracinus	Coal Skink	1985-06-25	E	3-Medium	---	Significantly Rare	G5	S2S3
Sawfly, Wasp, Bee, or Ant	37112	Bombus affinis	Rusty-patched Bumble Bee	1923-07-27	H	4-Low	Endangered	Significantly Rare	G1	S1
Sawfly, Wasp, Bee, or Ant	37143	Bombus affinis	Rusty-patched Bumble Bee	1908-09-11	H	4-Low	Endangered	Significantly Rare	G1	S1
Stonefly	4688	Bolotoperla rossi	Smoky Willowfly	1989-03-29	H?	3-Medium	---	Significantly Rare	G4	S3
Stonefly	38267	Remenus kirchneri	Blueridge Springfly	2013-06-22	E	2-High	---	Significantly Rare	G2	S1
Vascular Plant	7780	Aconitum reclinatum	Trailing Wolfsbane	1995-07-13	AB	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	20560	Aconitum reclinatum	Trailing Wolfsbane	2004-08-19	C	3-Medium	---	Significantly Rare Throughout	G3	S3

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	2220	Aconitum reclinatum	Trailing Wolfsbane	1989	A	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	3352	Aconitum reclinatum	Trailing Wolfsbane	1988-08-17	B	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	15447	Aconitum reclinatum	Trailing Wolfsbane	1994-08-12	BC	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	16778	Aconitum reclinatum	Trailing Wolfsbane	1984-07-05	H	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	18276	Aconitum reclinatum	Trailing Wolfsbane	1992-07-28	C	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	20561	Aconitum reclinatum	Trailing Wolfsbane	2004-08-10	C	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	29763	Aconitum reclinatum	Trailing Wolfsbane	2011-08-19	B	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	7298	Aconitum reclinatum	Trailing Wolfsbane	2013-10-18	C?	2-High	---	Significantly Rare Throughout	G3	S3
Vascular Plant	10005	Agrostis mertensii	Arctic Bentgrass	1985-08	C	2-High	---	Endangered	G5	S1
Vascular Plant	12811	Alnus viridis ssp. crispa	Green Alder	2013-06-03	A	4-Low	---	Special Concern Vulnerable	G5T5	S1
Vascular Plant	2924	Anticlea glauca	White Camas	2012-06-07	C	3-Medium	---	Significantly Rare Peripheral	G5T4T5	S1
Vascular Plant	4553	Arethusa bulbosa	Bog Rose	1985-06-05	F	3-Medium	---	Endangered	G5	S1
Vascular Plant	9550	Arethusa bulbosa	Bog Rose	1987-Pre	U	3-Medium	---	Endangered	G5	S1
Vascular Plant	1748	Arisaema stewardsonii	Bog Jack-in-the-pulpit	2015-05-19	A	3-Medium	---	Significantly Rare Peripheral	G5T4T5	S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	18316	Asplenium ruta-muraria var. cryptolepis	American Wall-rue	2012-06-07	A	3-Medium	---	Special Concern Vulnerable	G5T5	S1
Vascular Plant	11575	Asplenium ruta-muraria var. cryptolepis	American Wall-rue	2004-08-18	E	3-Medium	---	Special Concern Vulnerable	G5T5	S1
Vascular Plant	35471	Athyrium angustum	Northern Lady Fern	2015-06-13	A	2-High	---	Significantly Rare Peripheral	G5T5	S1
Vascular Plant	34746	Athyrium angustum	Northern Lady Fern	2013-09-10	E	2-High	---	Significantly Rare Peripheral	G5T5	S1
Vascular Plant	20520	Botrychium matricariifolium	Daisy-leaf Moonwort	2008-Pre	D	3-Medium	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	7624	Botrychium matricariifolium	Daisy-leaf Moonwort	1988-08-18	D	2-High	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	5211	Brachyelytrum aristosum	Northern Shorthusk	1995-07-13	E	4-Low	---	Significantly Rare Peripheral	G5	S3
Vascular Plant	17473	Brachyelytrum aristosum	Northern Shorthusk	1978-07-10	E	4-Low	---	Significantly Rare Peripheral	G5	S3
Vascular Plant	20084	Calamagrostis canadensis var. canadensis	Canada Reed Grass	1991-10-20	A	3-Medium	---	Significantly Rare Peripheral	G5T5	S1
Vascular Plant	8204	Campanula aparinoides var. aparinoides	Marsh Bellflower	1972-08	H	3-Medium	---	Significantly Rare Peripheral	G5TNR	S2
Vascular Plant	698	Campanula aparinoides var. aparinoides	Marsh Bellflower	1991-06-07	X?	3-Medium	---	Significantly Rare Peripheral	G5TNR	S2
Vascular Plant	11001	Campanula aparinoides var. aparinoides	Marsh Bellflower	1989-06-29	D?	3-Medium	---	Significantly Rare Peripheral	G5TNR	S2
Vascular Plant	24150	Cardamine clematitis	Mountain Bittercress	2004-05-26	C	4-Low	---	Significantly Rare Throughout	G3	S2S3
Vascular Plant	7141	Cardamine clematitis	Mountain Bittercress	2014-05-26	B	3-Medium	---	Significantly Rare Throughout	G3	S2S3
Vascular Plant	5387	Cardamine clematitis	Mountain Bittercress	1991-07-24	A	3-Medium	---	Significantly Rare Throughout	G3	S2S3

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	9253	Cardamine clematitis	Mountain Bittercress	1994-08-30	A	3-Medium	---	Significantly Rare Throughout	G3	S2S3
Vascular Plant	9254	Cardamine clematitis	Mountain Bittercress	1991-08-25	A	3-Medium	---	Significantly Rare Throughout	G3	S2S3
Vascular Plant	20002	Cardamine clematitis	Mountain Bittercress	1994-07-20	A	3-Medium	---	Significantly Rare Throughout	G3	S2S3
Vascular Plant	17038	Cardamine clematitis	Mountain Bittercress	1989	A	3-Medium	---	Significantly Rare Throughout	G3	S2S3
Vascular Plant	2114	Cardamine clematitis	Mountain Bittercress	2012-08-08	C	3-Medium	---	Significantly Rare Throughout	G3	S2S3
Vascular Plant	20482	Cardamine clematitis	Mountain Bittercress	2004-08-25	B	2-High	---	Significantly Rare Throughout	G3	S2S3
Vascular Plant	29781	Cardamine clematitis	Mountain Bittercress	2011-08-18	D	2-High	---	Significantly Rare Throughout	G3	S2S3
Vascular Plant	28517	Carex baileyi	Bailey's Sedge	2007-06-24	A	4-Low	---	Significantly Rare Peripheral	G4	S2
Vascular Plant	23573	Carex baileyi	Bailey's Sedge	2006-08	E	3-Medium	---	Significantly Rare Peripheral	G4	S2
Vascular Plant	25889	Carex buxbaumii	Brown Bog Sedge	2006-07-12	B?	3-Medium	---	Special Concern Vulnerable	G5	S2
Vascular Plant	5647	Carex oligosperma	Few-seeded Sedge	1987-07-25	E	3-Medium	---	Endangered	G5	S1
Vascular Plant	1622	Carex projecta	Necklace Sedge	2002	E	3-Medium	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	25090	Carex roanensis	Roan Sedge	1946-07-11	H	4-Low	---	Significantly Rare Throughout	G2G3	S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	26294	Carex roanensis	Roan Sedge	2006	B	4-Low	---	Significantly Rare Throughout	G2G3	S2
Vascular Plant	36229	Carex roanensis	Roan Sedge	2015-09-17	E	3-Medium	---	Significantly Rare Throughout	G2G3	S2
Vascular Plant	25091	Carex roanensis	Roan Sedge	1958-06-17	H	3-Medium	---	Significantly Rare Throughout	G2G3	S2
Vascular Plant	36227	Carex roanensis	Roan Sedge	2015-09-15	C	3-Medium	---	Significantly Rare Throughout	G2G3	S2
Vascular Plant	20521	Carex roanensis	Roan Sedge	2003-07-06	C	3-Medium	---	Significantly Rare Throughout	G2G3	S2
Vascular Plant	20624	Carex roanensis	Roan Sedge	2001-06-25	D	2-High	---	Significantly Rare Throughout	G2G3	S2
Vascular Plant	1151	Carex trisperma	Three-seeded Sedge	2008-06-06	A	3-Medium	---	Endangered	G5	S1
Vascular Plant	14396	Carex trisperma	Three-seeded Sedge	1990-06-09	E	3-Medium	---	Endangered	G5	S1
Vascular Plant	16911	Carex trisperma	Three-seeded Sedge	2006-07-27	A	2-High	---	Endangered	G5	S1
Vascular Plant	35440	Carex vesicaria	Inflated Sedge	2015-05-19	C	2-High	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	21236	Celastrus scandens	American Bittersweet	2012-06-07	D	2-High	---	Endangered	G5	S2?
Vascular Plant	11732	Chamerion platyphyllum	Fireweed	1941-08-30	H	4-Low	---	Endangered	G5T5	S1
Vascular Plant	25139	Chamerion platyphyllum	Fireweed	2011-06-28	B	2-High	---	Endangered	G5T5	S1
Vascular Plant	4513	Chamerion platyphyllum	Fireweed	2012-09-19	F?	3-Medium	---	Endangered	G5T5	S1
Vascular Plant	33188	Chamerion platyphyllum	Fireweed	2006-08-07	E	2-High	---	Endangered	G5T5	S1
Vascular Plant	7588	Chelone cuthbertii	Cuthbert's Turtlehead	1990-06-09	D	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	26309	Clematis catesbyana	Coastal Virgin's-bower	2012-06-07	E	2-High	---	Significantly Rare Peripheral	G4G5	S2
Vascular Plant	4399	Conioselinum chinense	Hemlock-parsley	1995-07-13	A	3-Medium	---	Threatened	G5	S1
Vascular Plant	1915	Crocanthemum propinquum	Creeping Sunrose	1958-06	H	3-Medium	---	Threatened	G4	S1

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	5439	Cystopteris fragilis	Fragile Fern	1994	E	3-Medium	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	15143	Dactylorhiza viridis	Long-bracted Frog Orchid	1958-07-24	H	4-Low	---	Endangered	G5T5	S1
Vascular Plant	21051	Delphinium exaltatum	Tall Larkspur	2012-06-07	B?	2-High	---	Endangered	G3	S2
Vascular Plant	27958	Delphinium exaltatum	Tall Larkspur	2009-09	D	2-High	---	Endangered	G3	S2
Vascular Plant	31850	Dendrolycopodium dendroideum	Prickly Ground-pine	1989-06-05	E	2-High	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	28925	Dendrolycopodium hickeyi	Pennsylvania Ground-pine	1975-07-25	H	4-Low	---	Significantly Rare Peripheral	G5	S2?
Vascular Plant	28939	Dendrolycopodium hickeyi	Pennsylvania Ground-pine	2004-05-24	E	4-Low	---	Significantly Rare Peripheral	G5	S2?
Vascular Plant	33223	Deschampsia cespitosa ssp. glauca	Tufted Hairgrass	1989-08-16	E	3-Medium	---	Threatened	G5T5	S1
Vascular Plant	22623	Epilobium ciliatum ssp. ciliatum	American Willow-herb	2004-08-07	E	3-Medium	---	Significantly Rare Peripheral	G5T5	S2
Vascular Plant	5073	Epilobium ciliatum ssp. ciliatum	American Willow-herb	1994-08-08	B?	2-High	---	Significantly Rare Peripheral	G5T5	S2
Vascular Plant	13200	Epilobium ciliatum ssp. ciliatum	American Willow-herb	1985-08-30	E	3-Medium	---	Significantly Rare Peripheral	G5T5	S2
Vascular Plant	6353	Epilobium ciliatum ssp. ciliatum	American Willow-herb	1987-07-25	E	3-Medium	---	Significantly Rare Peripheral	G5T5	S2
Vascular Plant	19411	Epilobium ciliatum ssp. ciliatum	American Willow-herb	2002-06-15	C	3-Medium	---	Significantly Rare Peripheral	G5T5	S2
Vascular Plant	34747	Epilobium ciliatum ssp. ciliatum	American Willow-herb	2013-09-10	E	2-High	---	Significantly Rare Peripheral	G5T5	S2
Vascular Plant	28505	Gaylussacia orocola	Appalachian Dwarf Huckleberry	1936-08-21	H	3-Medium	---	Significantly Rare Limited	G1	S1
Vascular Plant	24136	Geum aleppicum	Yellow Avens	2003	E	3-Medium	---	Endangered	G5	S1
Vascular Plant	11886	Geum aleppicum	Yellow Avens	1958-07	H	3-Medium	---	Endangered	G5	S1
Vascular Plant	26964	Geum geniculatum	Bent Avens	1975-07-25	H?	4-Low	---	Special Concern Vulnerable	G2	S1S2
Vascular Plant	1235	Geum geniculatum	Bent Avens	2007-08-30	B	3-Medium	---	Special Concern Vulnerable	G2	S1S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

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Vascular Plant	8499	Geum geniculatum	Bent Avens	2013-10-08	B	3-Medium	---	Special Concern Vulnerable	G2	S1S2
Vascular Plant	1022	Geum geniculatum	Bent Avens	2004-08-24	A	3-Medium	---	Special Concern Vulnerable	G2	S1S2
Vascular Plant	26482	Geum geniculatum	Bent Avens	2008-06-23	A	3-Medium	---	Special Concern Vulnerable	G2	S1S2
Vascular Plant	12204	Geum geniculatum	Bent Avens	1995-07-13	A	3-Medium	---	Special Concern Vulnerable	G2	S1S2
Vascular Plant	6360	Geum geniculatum	Bent Avens	1995-07-13	A	3-Medium	---	Special Concern Vulnerable	G2	S1S2
Vascular Plant	17601	Geum geniculatum	Bent Avens	2007-08-04	CD	3-Medium	---	Special Concern Vulnerable	G2	S1S2
Vascular Plant	3477	Geum geniculatum	Bent Avens	1992-08-29	C?	3-Medium	---	Special Concern Vulnerable	G2	S1S2
Vascular Plant	3682	Geum geniculatum	Bent Avens	1995-07-25	BC	3-Medium	---	Special Concern Vulnerable	G2	S1S2
Vascular Plant	16573	Geum geniculatum	Bent Avens	1995-07-25	A	3-Medium	---	Special Concern Vulnerable	G2	S1S2
Vascular Plant	12358	Geum geniculatum	Bent Avens	2007-07-27	D	3-Medium	---	Special Concern Vulnerable	G2	S1S2
Vascular Plant	4428	Geum geniculatum	Bent Avens	1987-07-27	C?	3-Medium	---	Special Concern Vulnerable	G2	S1S2
Vascular Plant	16200	Geum geniculatum	Bent Avens	2013-07-08	A	2-High	---	Special Concern Vulnerable	G2	S1S2

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Vascular Plant	20468	Geum geniculatum	Bent Avens	2004-08-25	B	3-Medium	---	Special Concern Vulnerable	G2	S1S2
Vascular Plant	35677	Geum geniculatum	Bent Avens		NR	2-High	---	Special Concern Vulnerable	G2	S1S2
Vascular Plant	33760	Geum geniculatum	Bent Avens	2013-10-16	D	2-High	---	Special Concern Vulnerable	G2	S1S2
Vascular Plant	8500	Geum geniculatum	Bent Avens	2008-05-19	D	2-High	---	Special Concern Vulnerable	G2	S1S2
Vascular Plant	29815	Geum geniculatum	Bent Avens	2011-10-04	D	2-High	---	Special Concern Vulnerable	G2	S1S2
Vascular Plant	24135	Geum laciniatum	Rough Avens	2003	E	3-Medium	---	Endangered	G5	S1
Vascular Plant	4371	Geum laciniatum	Rough Avens	1985-07-08	A	3-Medium	---	Endangered	G5	S1
Vascular Plant	35154	Geum radiatum	Spreading Avens	2008-08-04	E	4-Low	Endangered	Endangered	G2	S2
Vascular Plant	5839	Geum radiatum	Spreading Avens	2009-07-18	D	3-Medium	Endangered	Endangered	G2	S2
Vascular Plant	646	Geum radiatum	Spreading Avens	1999-09-18	A	3-Medium	Endangered	Endangered	G2	S2
Vascular Plant	4032	Geum radiatum	Spreading Avens	2012-08-08	D	2-High	Endangered	Endangered	G2	S2
Vascular Plant	28207	Geum radiatum	Spreading Avens	2013-05-03	D	2-High	Endangered	Endangered	G2	S2
Vascular Plant	953	Geum radiatum	Spreading Avens	2008	CD	2-High	Endangered	Endangered	G2	S2
Vascular Plant	14113	Geum radiatum	Spreading Avens	1991-07-02	B	2-High	Endangered	Endangered	G2	S2
Vascular Plant	7594	Geum radiatum	Spreading Avens	2007-09	C	2-High	Endangered	Endangered	G2	S2
Vascular Plant	28206	Geum radiatum	Spreading Avens	2000s	F	2-High	Endangered	Endangered	G2	S2
Vascular Plant	3837	Geum radiatum	Spreading Avens	2001-09-09	Dr	2-High	Endangered	Endangered	G2	S2
Vascular Plant	25893	Geum radiatum	Spreading Avens	2008	C	2-High	Endangered	Endangered	G2	S2
Vascular Plant	27538	Glyceria laxa	Lax Mannagrass	2009-07-27	E	2-High	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	26317	Glyceria laxa	Lax Mannagrass	2008-08-04	AB	2-High	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	23930	Hackelia virginiana	Virginia Stickseed	1952-08-08	H	4-Low	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	13808	Houstonia montana	Roan Mountain Bluet	2010-07-10	A	2-High	Endangered	Endangered	G5T2	S2
Vascular Plant	1723	Houstonia montana	Roan Mountain Bluet	1998-09-10	E	3-Medium	Endangered	Endangered	G5T2	S2

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Vascular Plant	7989	Houstonia montana	Roan Mountain Bluet	1995-08-15	D	3-Medium	Endangered	Endangered	G5T2	S2
Vascular Plant	17319	Houstonia montana	Roan Mountain Bluet	2001-08-24	B	3-Medium	Endangered	Endangered	G5T2	S2
Vascular Plant	28219	Houstonia montana	Roan Mountain Bluet	2001-08-24	A	3-Medium	Endangered	Endangered	G5T2	S2
Vascular Plant	19791	Houstonia montana	Roan Mountain Bluet	1994-08-10	C	3-Medium	Endangered	Endangered	G5T2	S2
Vascular Plant	25887	Houstonia montana	Roan Mountain Bluet	1998-09-02	AC	3-Medium	Endangered	Endangered	G5T2	S2
Vascular Plant	3578	Houstonia montana	Roan Mountain Bluet	1999-09-18	A	3-Medium	Endangered	Endangered	G5T2	S2
Vascular Plant	8489	Houstonia montana	Roan Mountain Bluet	2012-08-08	BC	2-High	Endangered	Endangered	G5T2	S2
Vascular Plant	10891	Houstonia montana	Roan Mountain Bluet	1992-07-15	AB	2-High	Endangered	Endangered	G5T2	S2
Vascular Plant	264	Houstonia montana	Roan Mountain Bluet	1994-07-20	A	2-High	Endangered	Endangered	G5T2	S2
Vascular Plant	5993	Houstonia montana	Roan Mountain Bluet	2004-07	A	2-High	Endangered	Endangered	G5T2	S2
Vascular Plant	28216	Houstonia montana	Roan Mountain Bluet	2006-07-11	D?	2-High	Endangered	Endangered	G5T2	S2
Vascular Plant	23712	Houstonia montana	Roan Mountain Bluet	1996-1997?	E	2-High	Endangered	Endangered	G5T2	S2
Vascular Plant	23713	Houstonia montana	Roan Mountain Bluet	1996-1997?	E	2-High	Endangered	Endangered	G5T2	S2
Vascular Plant	23711	Houstonia montana	Roan Mountain Bluet	1996-1997?	E	2-High	Endangered	Endangered	G5T2	S2
Vascular Plant	23710	Houstonia montana	Roan Mountain Bluet	1996-1997?	E	2-High	Endangered	Endangered	G5T2	S2
Vascular Plant	28218	Houstonia montana	Roan Mountain Bluet	1991-08-27	F	2-High	Endangered	Endangered	G5T2	S2
Vascular Plant	17498	Houstonia montana	Roan Mountain Bluet	2006-07-11	A	2-High	Endangered	Endangered	G5T2	S2
Vascular Plant	28215	Houstonia montana	Roan Mountain Bluet	1992-07-08	D?	2-High	Endangered	Endangered	G5T2	S2
Vascular Plant	29152	Houstonia montana	Roan Mountain Bluet	2010-10-18	D	2-High	Endangered	Endangered	G5T2	S2
Vascular Plant	19186	Houstonia montana	Roan Mountain Bluet	1992-08-08	A	2-High	Endangered	Endangered	G5T2	S2
Vascular Plant	25906	Houstonia montana	Roan Mountain Bluet	2001-09-05	D?r	2-High	Endangered	Endangered	G5T2	S2
Vascular Plant	14036	Houstonia montana	Roan Mountain Bluet	2001-09-09	D	2-High	Endangered	Endangered	G5T2	S2
Vascular Plant	28217	Houstonia montana	Roan Mountain Bluet	2008	E	2-High	Endangered	Endangered	G5T2	S2
Vascular Plant	28214	Houstonia montana	Roan Mountain Bluet	2017-07-12	B	2-High	Endangered	Endangered	G5T2	S2
Vascular Plant	15091	Liatris helleri	Heller's Blazing-star	1989-06-27	C	3-Medium	Threatened	Threatened	G2Q	S2
Vascular Plant	13595	Liatris helleri	Heller's Blazing-star	1990-09-18	D?	3-Medium	Threatened	Threatened	G2Q	S2
Vascular Plant	1627	Liatris helleri	Heller's Blazing-star	1998-09-10	E	3-Medium	Threatened	Threatened	G2Q	S2
Vascular Plant	7533	Liatris helleri	Heller's Blazing-star	1994-08-10	A	3-Medium	Threatened	Threatened	G2Q	S2
Vascular Plant	10343	Liatris helleri	Heller's Blazing-star	2001-09-08	C	3-Medium	Threatened	Threatened	G2Q	S2
Vascular Plant	19047	Liatris helleri	Heller's Blazing-star	1991-08-27	A	3-Medium	Threatened	Threatened	G2Q	S2
Vascular Plant	7021	Liatris helleri	Heller's Blazing-star	1991-08-16	D	3-Medium	Threatened	Threatened	G2Q	S2
Vascular Plant	23176	Liatris helleri	Heller's Blazing-star	2009-09-07	AC	2-High	Threatened	Threatened	G2Q	S2
Vascular Plant	3096	Liatris helleri	Heller's Blazing-star	1981-08-04	F	2-High	Threatened	Threatened	G2Q	S2
Vascular Plant	8870	Liatris helleri	Heller's Blazing-star	2017-07-12	A	1-Very High	Threatened	Threatened	G2Q	S2
Vascular Plant	4964	Liatris helleri	Heller's Blazing-star	1994-07-20	D	2-High	Threatened	Threatened	G2Q	S2

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Vascular Plant	25908	Liatris helleri	Heller's Blazing-star	2001-09-05	Er?	2-High	Threatened	Threatened	G2Q	S2
Vascular Plant	8920	Lilium canadense ssp. editorum	Red Canada Lily	1958-07-24	H	3-Medium	---	Endangered	G5T4	S1
Vascular Plant	2219	Lilium grayi	Gray's Lily	2002-06-15	AC	4-Low	---	Threatened	G3	S1S2
Vascular Plant	24382	Lilium grayi	Gray's Lily	2008-06-06	C?	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	27073	Lilium grayi	Gray's Lily	2007	B	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	20542	Lilium grayi	Gray's Lily	2005-07-17	B	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	19219	Lilium grayi	Gray's Lily	2013-06-22	B	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	17394	Lilium grayi	Gray's Lily	2005-07-17	B	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	20464	Lilium grayi	Gray's Lily	2004-08-11	B	2-High	---	Threatened	G3	S1S2
Vascular Plant	810	Lilium grayi	Gray's Lily	2013-07-08	A	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	20533	Lilium grayi	Gray's Lily	2005-07-17	C	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	19428	Lilium grayi	Gray's Lily	2005-06-06	D?	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	35144	Lilium grayi	Gray's Lily	2013-06-25	E	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	10508	Lilium grayi	Gray's Lily	2013-07-01	D	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	15737	Lilium grayi	Gray's Lily	2013-06-22	A	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	20507	Lilium grayi	Gray's Lily	2007-06-25	A	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	25963	Lilium grayi	Gray's Lily	2001-06-25	BC	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	13235	Lilium grayi	Gray's Lily	2003-07-12	A	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	33905	Lilium grayi	Gray's Lily	2007-06-27	E	2-High	---	Threatened	G3	S1S2
Vascular Plant	14936	Lilium grayi	Gray's Lily	1978-06-18	H?	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	15513	Lilium grayi	Gray's Lily	1989-06	CD	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	17415	Lilium grayi	Gray's Lily	2012-06-09	A	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	14804	Lilium grayi	Gray's Lily	1985-05-18	C	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	15445	Lilium grayi	Gray's Lily	1995-06-13	C	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	11076	Lilium grayi	Gray's Lily	1987-05-27	B	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	4961	Lilium grayi	Gray's Lily	1984-07-03	B?	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	25958	Lilium grayi	Gray's Lily	2001-06-25	C	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	24144	Lilium grayi	Gray's Lily	2005-07-26	E	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	574	Lilium grayi	Gray's Lily	2008-06-18	A	2-High	---	Threatened	G3	S1S2
Vascular Plant	20512	Lilium grayi	Gray's Lily	2008-06-26	C	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	26058	Lilium grayi	Gray's Lily	2008-05-19	B	2-High	---	Threatened	G3	S1S2
Vascular Plant	24164	Lilium grayi	Gray's Lily	2012-05-23	A?	2-High	---	Threatened	G3	S1S2
Vascular Plant	11334	Lilium grayi	Gray's Lily	1997-06-28	D	2-High	---	Threatened	G3	S1S2
Vascular Plant	23507	Lilium grayi	Gray's Lily	1994	D	2-High	---	Threatened	G3	S1S2
Vascular Plant	26054	Lilium grayi	Gray's Lily	2007-08-04	D	2-High	---	Threatened	G3	S1S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

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Vascular Plant	20503	Lilium grayi	Gray's Lily	2008-06-26	D?	2-High	---	Threatened	G3	S1S2
Vascular Plant	27070	Lilium grayi	Gray's Lily	2007-06-04	D	2-High	---	Threatened	G3	S1S2
Vascular Plant	20501	Lilium grayi	Gray's Lily	2003-07-03	C	2-High	---	Threatened	G3	S1S2
Vascular Plant	20504	Lilium grayi	Gray's Lily	1993	F	1-Very High	---	Threatened	G3	S1S2
Vascular Plant	20511	Lilium grayi	Gray's Lily	2008-06-23	D	1-Very High	---	Threatened	G3	S1S2
Vascular Plant	20506	Lilium grayi	Gray's Lily	2003-07-06	D	1-Very High	---	Threatened	G3	S1S2
Vascular Plant	20508	Lilium grayi	Gray's Lily	2015-06-13	B	1-Very High	---	Threatened	G3	S1S2
Vascular Plant	20510	Lilium grayi	Gray's Lily	1994-07-01	F	1-Very High	---	Threatened	G3	S1S2
Vascular Plant	20509	Lilium grayi	Gray's Lily	2008-06-26	B	1-Very High	---	Threatened	G3	S1S2
Vascular Plant	20505	Lilium grayi	Gray's Lily	2003-07-08	D	1-Very High	---	Threatened	G3	S1S2
Vascular Plant	10504	Lilium philadelphicum var. philadelphicum	Wood Lily	1992	E	4-Low	---	Endangered	G5T4T5	S2
Vascular Plant	20571	Lilium philadelphicum var. philadelphicum	Wood Lily	2017-07	A?	2-High	---	Endangered	G5T4T5	S2
Vascular Plant	18353	Liparis loeselii	Fen Orchid	1934-05	H	3-Medium	---	Endangered	G5	S1
Vascular Plant	5579	Lycopodiella inundata	Bog Clubmoss	2002-12-12	A	3-Medium	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	9908	Lycopodiella inundata	Bog Clubmoss	2006-07-27	F	2-High	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	16379	Meehania cordata	Meehania	1958-06	H	4-Low	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	18980	Micranthes caroliniana	Carolina Saxifrage	1994-07-19	C	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	15131	Micranthes caroliniana	Carolina Saxifrage	1994-07-20	B	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	23394	Monarda media	Purple Bee-balm	2007	C	3-Medium	---	Significantly Rare Peripheral	G4?	S1?

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Vascular Plant	34206	Monarda media	Purple Bee-balm	2014-07-17	C	2-High	---	Significantly Rare Peripheral	G4?	S1?
Vascular Plant	4007	Mononeuria groenlandica	Greenland Sandwort	2004-06-29	A	2-High	---	Threatened	G5	S2
Vascular Plant	4175	Mononeuria groenlandica	Greenland Sandwort	1998-06-26	F	3-Medium	---	Threatened	G5	S2
Vascular Plant	12032	Mononeuria groenlandica	Greenland Sandwort	2010-09-22	C?	3-Medium	---	Threatened	G5	S2
Vascular Plant	35171	Monotropsis odorata	Sweet Pinesap	2013-Fall	E	2-High	---	Special Concern Vulnerable	G3	S3
Vascular Plant	20573	Muhlenbergia glomerata	Spiked Muhly	2004-10-21	D	3-Medium	---	Special Concern Vulnerable	G5	S1
Vascular Plant	34748	Muhlenbergia sobolifera	Rock Muhly	2013-06-05	E	2-High	---	Special Concern Vulnerable	G5	S2
Vascular Plant	21310	Nabalus albus	Northern Rattlesnake-root	2014-09-24	A?	4-Low	---	Threatened	G5	S2?
Vascular Plant	7782	Packera paupercula var. paupercula	Balsam Ragwort	1963-08	H	5-Very Low	---	Significantly Rare Peripheral	G5	S1?
Vascular Plant	11942	Packera schweinitziana	Schweinitz's Ragwort	2013-07-08	A	3-Medium	---	Threatened	G5?	S2
Vascular Plant	4794	Packera schweinitziana	Schweinitz's Ragwort	2004	A	3-Medium	---	Threatened	G5?	S2
Vascular Plant	18015	Packera schweinitziana	Schweinitz's Ragwort	2015-06-13	A	3-Medium	---	Threatened	G5?	S2
Vascular Plant	35678	Packera schweinitziana	Schweinitz's Ragwort	2013-10-08	A	2-High	---	Threatened	G5?	S2
Vascular Plant	5152	Platanthera grandiflora	Large Purple-fringed Orchid	2007-06-24	E	4-Low	---	Threatened	G5	S2
Vascular Plant	35148	Platanthera grandiflora	Large Purple-fringed Orchid	2013-06-25	E	3-Medium	---	Threatened	G5	S2
Vascular Plant	8360	Platanthera grandiflora	Large Purple-fringed Orchid	1958-06-17	H	3-Medium	---	Threatened	G5	S2
Vascular Plant	3233	Platanthera grandiflora	Large Purple-fringed Orchid	2007-06-22	A	2-High	---	Threatened	G5	S2
Vascular Plant	29365	Poa paludigena	Bog Bluegrass	2008-06-06	E	3-Medium	---	Significantly Rare Throughout	G3	S1
Vascular Plant	4225	Poa paludigena	Bog Bluegrass	2005-06-06	E	3-Medium	---	Significantly Rare Throughout	G3	S1

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Vascular Plant	19970	Poa palustris	Swamp Bluegrass	1992	E	3-Medium	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	35439	Poa palustris	Swamp Bluegrass	2015-05-19	B	2-High	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	539	Rhodiola rosea	Roseroot	1932-Pre	H	5-Very Low	---	Endangered	G5	SH
Vascular Plant	907	Rhododendron vaseyi	Pink-shell Azalea	1976-Pre	H	5-Very Low	---	Significantly Rare Limited	G3	S3
Vascular Plant	3160	Rhododendron vaseyi	Pink-shell Azalea	1990-09-18	BC	3-Medium	---	Significantly Rare Limited	G3	S3
Vascular Plant	2752	Rhododendron vaseyi	Pink-shell Azalea	1995-07-15	A	3-Medium	---	Significantly Rare Limited	G3	S3
Vascular Plant	10674	Rhododendron vaseyi	Pink-shell Azalea	1991-09-04	C?	3-Medium	---	Significantly Rare Limited	G3	S3
Vascular Plant	11171	Rhododendron vaseyi	Pink-shell Azalea	1994-07-20	A	3-Medium	---	Significantly Rare Limited	G3	S3
Vascular Plant	24214	Sceptridium multifidum	Leathery Grape-fern	2006-Pre	E	3-Medium	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	3513	Sceptridium oneidense	Blunt-lobed Grape-fern	1970-08	H	3-Medium	---	Significantly Rare Peripheral	G4	S2
Vascular Plant	21479	Solidago rigida var. rigida	Prairie Bold Goldenrod	2012-06-07	E	2-High	---	Threatened	G5T5	S1
Vascular Plant	11227	Solidago spithamaea	Blue Ridge Goldenrod	1991-07-26	B	3-Medium	Threatened	Threatened	G2	S2
Vascular Plant	7010	Solidago spithamaea	Blue Ridge Goldenrod	1989-06-29	B	3-Medium	Threatened	Threatened	G2	S2
Vascular Plant	14410	Solidago spithamaea	Blue Ridge Goldenrod	1994-08-12	B	3-Medium	Threatened	Threatened	G2	S2
Vascular Plant	10659	Solidago spithamaea	Blue Ridge Goldenrod	1991-08-21	C	3-Medium	Threatened	Threatened	G2	S2
Vascular Plant	12374	Solidago spithamaea	Blue Ridge Goldenrod	2017-07-12	A	2-High	Threatened	Threatened	G2	S2
Vascular Plant	3827	Solidago spithamaea	Blue Ridge Goldenrod	1991-08-06	C	2-High	Threatened	Threatened	G2	S2
Vascular Plant	1396	Solidago spithamaea	Blue Ridge Goldenrod	1986-08-27	E	2-High	Threatened	Threatened	G2	S2
Vascular Plant	4651	Solidago spithamaea	Blue Ridge Goldenrod	1991-08-01	BD	2-High	Threatened	Threatened	G2	S2
Vascular Plant	25894	Solidago spithamaea	Blue Ridge Goldenrod	2001-08-30	BCr	2-High	Threatened	Threatened	G2	S2
Vascular Plant	11238	Solidago spithamaea	Blue Ridge Goldenrod	1991-08-27	A	2-High	Threatened	Threatened	G2	S2
Vascular Plant	3024	Solidago spithamaea	Blue Ridge Goldenrod	1994-07-20	A	2-High	Threatened	Threatened	G2	S2
Vascular Plant	25895	Solidago spithamaea	Blue Ridge Goldenrod	1991-07-18	CD	2-High	Threatened	Threatened	G2	S2
Vascular Plant	10660	Solidago spithamaea	Blue Ridge Goldenrod	1991-07-24	B	2-High	Threatened	Threatened	G2	S2
Vascular Plant	18215	Sparganium emersum	Greenfruit Bur-reed	1938-09	F	4-Low	---	Threatened	G5	S1
Vascular Plant	10210	Spiranthes ochroleuca	Yellow Ladies'-tresses	1958-09-24	H	3-Medium	---	Threatened	G4	S1

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	20563	Spiranthes ochroleuca	Yellow Ladies'-tresses	2004-09-30	C	2-High	---	Threatened	G4	S1
Vascular Plant	24134	Stenanthium gramineum var. robustum	Bog Featherbells	2003	E	3-Medium	---	Threatened	G4G5T3T5	S1
Vascular Plant	24131	Stenanthium gramineum var. robustum	Bog Featherbells	2006-08-28	B?	3-Medium	---	Threatened	G4G5T3T5	S1
Vascular Plant	18038	Stenanthium leimanthoides	Pinebarren Death-camas	2013-06-17	C	3-Medium	---	Threatened	G4Q	S1
Vascular Plant	20060	Stenanthium leimanthoides	Pinebarren Death-camas	1991-08-17	AB	3-Medium	---	Threatened	G4Q	S1
Vascular Plant	16769	Stenanthium leimanthoides	Pinebarren Death-camas	1994-07-19	A	3-Medium	---	Threatened	G4Q	S1
Vascular Plant	19621	Stenanthium leimanthoides	Pinebarren Death-camas	1991-08-17	A	3-Medium	---	Threatened	G4Q	S1
Vascular Plant	18268	Stenanthium leimanthoides	Pinebarren Death-camas	1994-08-12	E	3-Medium	---	Threatened	G4Q	S1
Vascular Plant	32183	Stenanthium leimanthoides	Pinebarren Death-camas	2013-06-17	CD	2-High	---	Threatened	G4Q	S1
Vascular Plant	33941	Thaspium pinnatifidum	Mountain Thaspium	2014-09-24	B?	2-High	---	Threatened	G2G3	S1
Vascular Plant	33574	Thaspium pinnatifidum	Mountain Thaspium	1995-07-10	E	2-High	---	Threatened	G2G3	S1
Vascular Plant	10126	Thelypteris simulata	Bog Fern	2010-08	A	3-Medium	---	Endangered	G4G5	S1
Vascular Plant	15786	Trichophorum cespitosum	Deerhair Bulrush	2017-07-12	A	2-High	---	Significantly Rare Disjunct	G5	S2S3
Vascular Plant	575	Trichophorum cespitosum	Deerhair Bulrush	1991-08-21	F	3-Medium	---	Significantly Rare Disjunct	G5	S2S3
Vascular Plant	7480	Trichophorum cespitosum	Deerhair Bulrush	1987-05-16	E	3-Medium	---	Significantly Rare Disjunct	G5	S2S3
Vascular Plant	13156	Trichophorum cespitosum	Deerhair Bulrush	2004-06-29	D	3-Medium	---	Significantly Rare Disjunct	G5	S2S3
Vascular Plant	17648	Trichophorum cespitosum	Deerhair Bulrush	1991-08-27	A	3-Medium	---	Significantly Rare Disjunct	G5	S2S3
Vascular Plant	15093	Trichophorum cespitosum	Deerhair Bulrush	1994-07-20	D	3-Medium	---	Significantly Rare Disjunct	G5	S2S3
Vascular Plant	4809	Trichophorum cespitosum	Deerhair Bulrush	1991-07-25	A	3-Medium	---	Significantly Rare Disjunct	G5	S2S3
Vascular Plant	18750	Trichophorum cespitosum	Deerhair Bulrush	1994-07-20	A	3-Medium	---	Significantly Rare Disjunct	G5	S2S3

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	7254	Trichophorum cespitosum	Deerhair Bulrush	1991-07-02	D?	3-Medium	---	Significantly Rare Disjunct	G5	S2S3
Vascular Plant	17184	Trichophorum cespitosum	Deerhair Bulrush	1991-09-17	B	3-Medium	---	Significantly Rare Disjunct	G5	S2S3
Vascular Plant	14393	Trichophorum cespitosum	Deerhair Bulrush	1991-08-01	B	3-Medium	---	Significantly Rare Disjunct	G5	S2S3
Vascular Plant	14536	Trisetum spicatum	Soft Trisetum	1889	H	5-Very Low	---	Special Concern Historical	G5	SH
Vascular Plant	20035	Turritis glabra	Tower Mustard	1958-07	H	3-Medium	---	Endangered	G5	S1
Vascular Plant	4410	Turritis glabra	Tower Mustard	1997-06-28	C	3-Medium	---	Endangered	G5	S1
Vascular Plant	4508	Vaccinium macrocarpon	Cranberry	1987-05-22	A?	3-Medium	---	Threatened	G5	S2
Vascular Plant	10897	Vaccinium macrocarpon	Cranberry	2006	A	3-Medium	---	Threatened	G5	S2
Vascular Plant	10322	Vaccinium macrocarpon	Cranberry	1991-06-07	X?	3-Medium	---	Threatened	G5	S2
Vascular Plant	10624	Vaccinium macrocarpon	Cranberry	1989-06-01	E	3-Medium	---	Threatened	G5	S2
Vascular Plant	2609	Vaccinium macrocarpon	Cranberry	1990-06-09	D	3-Medium	---	Threatened	G5	S2
Vascular Plant	10027	Vaccinium macrocarpon	Cranberry	1990-06-09	B?	3-Medium	---	Threatened	G5	S2
Vascular Plant	1488	Vaccinium macrocarpon	Cranberry	2007-06-22	B?	2-High	---	Threatened	G5	S2
Vascular Plant	25880	Vaccinium macrocarpon	Cranberry	2007-Summer	Ei	2-High	---	Threatened	G5	S2
Vascular Plant	4361	Veronica americana	American Speedwell	1958-06	H	3-Medium	---	Threatened	G5	S2
Vascular Plant	15164	Veronica americana	American Speedwell	2011-09-26	C?	3-Medium	---	Threatened	G5	S2
Vascular Plant	12845	Veronica americana	American Speedwell	1987-07-25	E	3-Medium	---	Threatened	G5	S2
Vascular Plant	710	Veronica americana	American Speedwell	1988-07-10	B?	3-Medium	---	Threatened	G5	S2
Vascular Plant	3721	Veronica americana	American Speedwell	1986-06-18	B	3-Medium	---	Threatened	G5	S2
Vascular Plant	18382	Veronica americana	American Speedwell	1989-08-01	B?	3-Medium	---	Threatened	G5	S2
Vascular Plant	15165	Veronica americana	American Speedwell	1985-08-30	E	2-High	---	Threatened	G5	S2

Natural Areas Documented Within a One-mile Radius of the Project Area

Site Name	Representational Rating	Collective Rating
Cranberry Knob Wetlands	R3 (High)	C4 (Moderate)
Squirrel Creek Meadow	R5 (General)	C5 (General)
Anthony Creek Wetlands	R5 (General)	C5 (General)
Cranberry Iron Mine Bat Habitat	R2 (Very High)	C4 (Moderate)
Stone Mountain (Locust Gap)	R2 (Very High)	C4 (Moderate)
Upper Creek Falls Forest	R5 (General)	C5 (General)
Duggers Creek Forests	R5 (General)	C5 (General)

Natural Areas Documented Within a One-mile Radius of the Project Area

Site Name	Representational Rating	Collective Rating
Belview Mountain Slopes	R5 (General)	C5 (General)
Hemlock Hill	R3 (High)	C4 (Moderate)
WAT/Watauga River Aquatic Habitat	R3 (High)	C4 (Moderate)
Linville Falls	R1 (Exceptional)	C3 (High)
Linville Gap Bog	R2 (Very High)	C3 (High)
High Haven Natural Area	R4 (Moderate)	C4 (Moderate)
Beech Creek Natural Area	R1 (Exceptional)	C1 (Exceptional)
Flat Rock Mountain	R2 (Very High)	C4 (Moderate)
Linville River Wetlands	R4 (Moderate)	C5 (General)
Lost Cove Cliffs	R2 (Very High)	C3 (High)
Sugar Mountain Natural Area	R1 (Exceptional)	C2 (Very High)
Pineola South Natural Area	R2 (Very High)	C3 (High)
Hughes Marsh	R5 (General)	C4 (Moderate)
North Toe River Bluff	R3 (High)	C4 (Moderate)
Brier Knob	R5 (General)	C5 (General)
Little Buck Hill Forests and Seep	R2 (Very High)	C4 (Moderate)
Sassafras Creek Forests	R3 (High)	C4 (Moderate)
Pyatte Wetland	R3 (High)	C4 (Moderate)
Pineola Natural Area	R2 (Very High)	C3 (High)
Linville Caverns	R1 (Exceptional)	C1 (Exceptional)
Wilson Creek Gorge	R2 (Very High)	C3 (High)
Grandfather Mountain	R1 (Exceptional)	C1 (Exceptional)
Roan Mountain Massif	R1 (Exceptional)	C1 (Exceptional)
Yellow Mountain/Raven Cliffs	R1 (Exceptional)	C1 (Exceptional)
Racket Creek Slopes	R4 (Moderate)	C5 (General)
Wilson Creek Slopes/Lost Cove Creek/Thorps Creek	R2 (Very High)	C4 (Moderate)
Walker Hollow Ridge	R4 (Moderate)	C4 (Moderate)
Hanging Rock Mountain	R1 (Exceptional)	C2 (Very High)
Cane Creek Mountain Connector	R5 (General)	C5 (General)
White Rock	R5 (General)	C5 (General)
Gragg Forests	R5 (General)	C5 (General)
Little Tablerock Mountain	R5 (General)	C4 (Moderate)
West Fork Forest	R3 (High)	C4 (Moderate)
Lutherock Natural Area	R2 (Very High)	C2 (Very High)
Harper Creek/Yellow Buck Mountain	R5 (General)	C4 (Moderate)
Big Yellow Mountain	R1 (Exceptional)	C1 (Exceptional)
Linville Mountain Dolomite Areas	R1 (Exceptional)	C2 (Very High)
Dun Vegan Mountain	R3 (High)	C3 (High)

Natural Areas Documented Within a One-mile Radius of the Project Area

Site Name	Representational Rating	Collective Rating
Little Yellow Mountain and Hawk Mountain	R1 (Exceptional)	C1 (Exceptional)
CTB/Wilson Creek Aquatic Habitat	R1 (Exceptional)	C3 (High)
FRB/North Toe River/Nolichucky River Aquatic Habitat	R2 (Very High)	C2 (Very High)

Managed Areas Documented Within a One-mile Radius of the Project Area

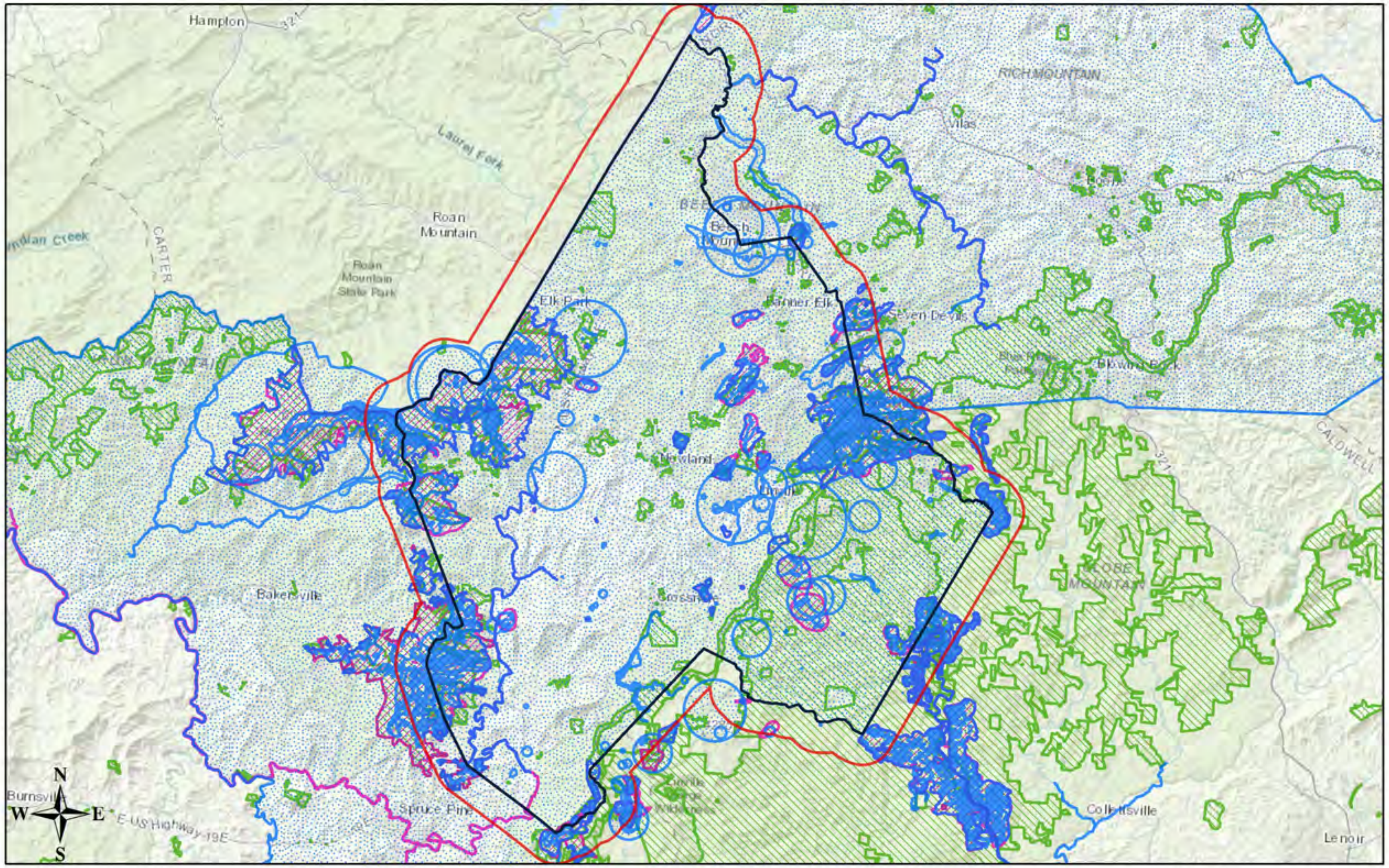
Managed Area Name	Owner	Owner Type
Pisgah National Forest - Grandfather Ranger District	US Forest Service	Federal
Pisgah National Forest - Appalachian Ranger District	US Forest Service	Federal
NC Clean Water Management Trust Fund Easement	NC DNCR, Clean Water Management Trust Fund	State
NC Department of Transportation Mitigation Site	NC Department of Transportation	State
Blue Ridge Parkway	US National Park Service	Federal
NC Division of Mitigation Services Easement	NC DEQ, Division of Mitigation Services	State
Southern Appalachian Highlands Conservancy Easement	Southern Appalachian Highlands Conservancy	Private
Nature Conservancy Easement	The Nature Conservancy	Private
North American Land Trust Easement	North American Land Trust	Private
Blue Ridge Conservancy Easement	Blue Ridge Conservancy	Private
Roan Mountain Massif (USFS) Registered Heritage Area	US Forest Service	Federal
Yellow Mountain/Raven Cliffs Registered Heritage Area	130 of Chatham, LLC	Private
Southern Appalachian Highlands Conservancy Preserve	Southern Appalachian Highlands Conservancy	Private
Foothills Conservancy of North Carolina Preserve	Foothills Conservancy of North Carolina	Private
Pisgah Game Land	NC Wildlife Resources Commission	State
Pisgah Game Land Dedicated Nature Preserve	NC Wildlife Resources Commission	State
Yellow Mountain State Natural Area	NC DNCR, Division of Parks and Recreation	State
Foothills Conservancy of North Carolina Easement	Foothills Conservancy of North Carolina	Private
Grandfather Mountain State Park	NC DNCR, Division of Parks and Recreation	State
Grandfather Mountain State Park Dedicated Nature Preserve	NC DNCR, Division of Parks and Recreation	State
Blue Ridge Conservancy Preserve	Blue Ridge Conservancy	Private
Conservation Trust for North Carolina Preserve	Conservation Trust for North Carolina	Private
Blue Ridge Parkway Easement	US National Park Service	Federal
Watauga County Open Space	Watauga County: multiple local government	Local Government
Grandfather Mountain Preserve	The Nature Conservancy	Private
Grandfather Mountain Preserve Dedicated Nature Preserve	The Nature Conservancy	Private
Grandfather Mountain Corridor Registered Heritage Area	US National Park Service	Federal
NC Division of Parks and Recreation Easement	NC DNCR, Division of Parks and Recreation	State
Avery County Open Space	Avery County: multiple local government	Local Government

Managed Areas Documented Within a One-mile Radius of the Project Area

Managed Area Name	Owner	Owner Type
Gill State Forest	NC Department of Agriculture, Forest Service	State
North Toe River Bluff Registered Heritage Area	130 of Chatham, LLC	Private
Big Yellow Mountain Preserve Dedicated Nature Preserve	The Nature Conservancy	Private
Big Yellow Mountain Preserve	The Nature Conservancy	Private
Bear Paw State Natural Area	NC DNCR, Division of Parks and Recreation	State
Bear Paw State Natural Area Dedicated Nature Preserve	NC DNCR, Division of Parks and Recreation	State
Cranberry Iron Mine	NC Wildlife Resources Commission	State
Beech Creek Bog State Natural Area	NC DNCR, Division of Parks and Recreation	State
Linville Falls Registered Heritage Area	US National Park Service	Federal
NC Division of Parks and Recreation Conservation Land	NC DNCR, Division of Parks and Recreation	State
Roan Mountain Massif (SAHC) Registered Heritage Area	Southern Appalachian Highlands Conservancy	Private
Cane Creek Mountain Connector Registered Heritage Area	130 of Chatham, LLC	Private
Linville River State Natural and Scenic River	NC DNCR, Division of Parks and Recreation	State
Wilson Creek National Wild and Scenic River	US Forest Service	Federal
Flat Rock Mountain Registered Heritage Area	US National Park Service	Federal
Beech Creek Bog State Natural Area Dedicated Nature Preserve	NC DNCR, Division of Parks and Recreation	State
High Haven Registered Heritage Area	Private Individual	Private
Linville Caverns Registered Heritage Area	Private Individual	Private
Sugar Mountain Bog State Natural Area	NC DNCR, Division of Parks and Recreation	State
Pineola Bog State Natural Area	NC DNCR, Division of Parks and Recreation	State
Mountain Bog State Natural Area Dedicated Nature Preserve	NC DNCR, Division of Parks and Recreation	State
North American Land Trust Preserve	North American Land Trust	Private
Beech Creek Bog Unique Wetland	NC DNCR, Division of Parks and Recreation	State
Hawk Mountain Preserve	The Nature Conservancy	Private

Definitions and an explanation of status designations and codes can be found at https://ncnhde.natureserve.org/content/help. Data query generated on September 17, 2018; source: NCNHP, Q3 July 2018. Please resubmit your information request if more than one year elapses before project initiation as new information is continually added to the NCNHP database.

NCNHDE-6949: 19-0040 - Avery County



September 17, 2018

- Project Boundary
- Buffered Project Boundary
- Natural Heritage Element Occurrence (NHEO)
- NHP Natural Area (NHNA)
- Managed Area (MAREA)

1:281,727

0 2.25 4.5 9 mi

0 3.75 7.5 15 km

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

North Carolina Department of Natural and Cultural Resources
Natural Heritage Program

Governor Roy Cooper | Secretary Susi H. Hamilton

NCNHDE-6950

September 17, 2018

Attn: Crystal Best
North Carolina Clearinghouse

RE: Clearinghouse 19-0040 - Burke County

Dear North Carolina Clearinghouse:

The North Carolina Natural Heritage Program (NCNHP) appreciates the opportunity to provide information about natural heritage resources for the project referenced above.

A query of the NCNHP database indicates that there are records for rare species, important natural communities, natural areas, and/or conservation/managed areas within the proposed project boundary. These results are presented in the attached 'Documented Occurrences' tables and map.

The attached 'Potential Occurrences' table summarizes rare species and natural communities that have been documented within a one-mile radius of the property boundary. The proximity of these records suggests that these natural heritage elements may potentially be present in the project area if suitable habitat exists. Tables of natural areas and conservation/managed areas within a one-mile radius of the project area, if any, are also included in this report.

If a Federally-listed species is documented within the project area or indicated within a one-mile radius of the project area, the NCNHP recommends contacting the US Fish and Wildlife Service (USFWS) for guidance. Contact information for USFWS offices in North Carolina is found here: https://www.fws.gov/offices/Directory/ListOffices.cfm?statecode=37.

Please note that natural heritage element data are maintained for the purposes of conservation planning, project review, and scientific research, and are not intended for use as the primary criteria for regulatory decisions. Information provided by the NCNHP database may not be published without prior written notification to the NCNHP, and the NCNHP must be credited as an information source in these publications. Maps of NCNHP data may not be redistributed without permission.

Also please note that the NC Natural Heritage Program may follow this letter with additional correspondence if a Dedicated Nature Preserve, Registered Heritage Area, Clean Water Management Trust Fund easement, or an occurrence of a Federally-listed species is documented near the project area.

If you have questions regarding the information provided in this letter or need additional assistance, please contact Rodney A. Butler at rodney.butler@ncdcr.gov or 919-707-8603.

Sincerely,
NC Natural Heritage Program

Natural Heritage Element Occurrences, Natural Areas, and Managed Areas Intersecting the Project Area
Clearinghouse 19-0040 - Burke County
September 17, 2018
NCNHDE-6950

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Amphibian	34817	Plethodon meridianus	South Mountain Gray-cheeked Salamander	2001-03-11	E	2-High	---	Significantly Rare	G2	S2
Amphibian	25203	Plethodon meridianus	South Mountain Gray-cheeked Salamander	2007-06-08	E	3-Medium	---	Significantly Rare	G2	S2
Bird	28283	Certhia americana	Brown Creeper	2009-05	E	3-Medium	---	Special Concern	G5	S3B,S5N
Bird	16036	Coccyzus erythropthalmus	Black-billed Cuckoo	1994-06-28	E	3-Medium	---	Significantly Rare	G5	S2B
Bird	5170	Falco peregrinus anatum	American Peregrine Falcon	2015-05	E	3-Medium	---	Endangered	G4T4	S1B,S2N
Bird	29400	Falco peregrinus anatum	American Peregrine Falcon	2013-05	E	3-Medium	---	Endangered	G4T4	S1B,S2N
Bird	36393	Haliaeetus leucocephalus	Bald Eagle	2017-02-14	E	2-High	Bald/Golden Eagle Protection Act	Threatened	G5	S3B,S3N
Bird	17034	Haliaeetus leucocephalus	Bald Eagle	2017-02-14	E	2-High	Bald/Golden Eagle Protection Act	Threatened	G5	S3B,S3N
Butterfly	34818	Pontia protodice	Checkered White	2000-07-10	E	1-Very High	---	Significantly Rare	G5	S1S2
Butterfly	34808	Pontia protodice	Checkered White	2014-08-20	E	2-High	---	Significantly Rare	G5	S1S2
Caddisfly	19061	Ceraclea slossonae	a caddisfly	1989-03-28	H?	3-Medium	---	Significantly Rare	G4	S2
Crustacean	33733	Cambarus eeseeohensis	Grandfather Mountain Crayfish	2016-08-22	E	3-Medium	---	Significantly Rare	G1	S2S3
Crustacean	33732	Cambarus eeseeohensis	Grandfather Mountain Crayfish	2011-04-29	E	3-Medium	---	Significantly Rare	G1	S2S3
Crustacean	37385	Cambarus eeseeohensis	Grandfather Mountain Crayfish	2014-10-06	E	3-Medium	---	Significantly Rare	G1	S2S3

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Crustacean	31039	Cambarus johni	Carolina Foothills Crayfish	2011-09-12	E	3-Medium	---	Significantly Rare	G3	S3
Crustacean	32635	Cambarus johni	Carolina Foothills Crayfish	2002-05-01	E	3-Medium	---	Significantly Rare	G3	S3
Crustacean	31038	Cambarus johni	Carolina Foothills Crayfish	2007-07-09	E	3-Medium	---	Significantly Rare	G3	S3
Crustacean	33273	Cambarus johni	Carolina Foothills Crayfish	2002-09-11	E	3-Medium	---	Significantly Rare	G3	S3
Crustacean	37362	Cambarus johni	Carolina Foothills Crayfish	2014-10-16	E	3-Medium	---	Significantly Rare	G3	S3
Crustacean	32634	Cambarus johni	Carolina Foothills Crayfish	1997-05-06	E	3-Medium	---	Significantly Rare	G3	S3
Crustacean	34836	Cambarus johni	Carolina Foothills Crayfish	2002-05-03	E	3-Medium	---	Significantly Rare	G3	S3
Crustacean	34835	Cambarus johni	Carolina Foothills Crayfish	2002-05-01	E	3-Medium	---	Significantly Rare	G3	S3
Crustacean	34831	Cambarus johni	Carolina Foothills Crayfish	2002-05-02	E	3-Medium	---	Significantly Rare	G3	S3
Crustacean	33279	Cambarus johni	Carolina Foothills Crayfish	2004-10-06	E	3-Medium	---	Significantly Rare	G3	S3
Crustacean	33248	Cambarus johni	Carolina Foothills Crayfish	2014-02-26	E	3-Medium	---	Significantly Rare	G3	S3
Crustacean	33278	Cambarus johni	Carolina Foothills Crayfish	1977-10-05	H?	3-Medium	---	Significantly Rare	G3	S3
Dragonfly or Damselfly	32074	Aeshna tuberculifera	Black-tipped Darner	2016-09-27	E	3-Medium	---	Significantly Rare	G5	S1
Dragonfly or Damselfly	32075	Aeshna verticalis	Green-striped Darner	1990-09-11	E	3-Medium	---	Significantly Rare	G5	S1
Dragonfly or Damselfly	33151	Cordulia shurtleffii	American Emerald	1993-07-06	E	3-Medium	---	Significantly Rare	G5	S1
Dragonfly or Damselfly	12052	Ophiogomphus edmundo	Edmund's Snaketail	2016-05-10	B	3-Medium	---	Significantly Rare	G2	S1
Dragonfly or Damselfly	4518	Ophiogomphus edmundo	Edmund's Snaketail	1994-06-08	E	3-Medium	---	Significantly Rare	G2	S1
Dragonfly or Damselfly	18101	Ophiogomphus howei	Pygmy Snaketail	1994	E	1-Very High	---	Significantly Rare	G3	S1

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Dragonfly or Damselfly	33322	Somatochlora elongata	Ski-tipped Emerald	1995-08-28	E	2-High	---	Significantly Rare	G5	S2S3
Freshwater Bivalve	21762	Alasmidonta varicosa	Brook Floater	2017-10-05	A	3-Medium	---	Endangered	G3	S3
Freshwater Bivalve	21727	Alasmidonta varicosa	Brook Floater	2016-09-07	B	3-Medium	---	Endangered	G3	S3
Freshwater Bivalve	21761	Alasmidonta varicosa	Brook Floater	2017-07-21	AB	3-Medium	---	Endangered	G3	S3
Freshwater Bivalve	8699	Alasmidonta varicosa	Brook Floater	1919	H	3-Medium	---	Endangered	G3	S3
Freshwater Bivalve	37337	Lampsilis splendida	Rayed Pink Fatmucket	2016-06-21	E	3-Medium	---	Significantly Rare	G3	S1
Freshwater Bivalve	37343	Strophitus undulatus	Creeper	2016-06-21	E	3-Medium	---	Threatened	G5	S3
Freshwater Bivalve	24823	Strophitus undulatus	Creeper	2003-10-02	E	3-Medium	---	Threatened	G5	S3
Freshwater Bivalve	29442	Villosa constricta	Notched Rainbow	2015-06-23	E	3-Medium	---	Threatened	G3	S3
Freshwater Bivalve	7188	Villosa constricta	Notched Rainbow	2011-09-12	E	3-Medium	---	Threatened	G3	S3
Freshwater Bivalve	29441	Villosa constricta	Notched Rainbow	2015-06-25	E	3-Medium	---	Threatened	G3	S3
Freshwater Bivalve	31202	Villosa delumbis	Eastern Creekshell	2011-03-19	E	3-Medium	---	Significantly Rare	G4	S4
Freshwater Bivalve	25380	Villosa delumbis	Eastern Creekshell	2017-10-17	E	3-Medium	---	Significantly Rare	G4	S4
Freshwater Bivalve	1461	Villosa delumbis	Eastern Creekshell	2016-08-23	E	3-Medium	---	Significantly Rare	G4	S4
Freshwater Bivalve	29542	Villosa delumbis	Eastern Creekshell	2005-03-09	E	3-Medium	---	Significantly Rare	G4	S4
Freshwater Bivalve	674	Villosa delumbis	Eastern Creekshell	2016-06-29	E	3-Medium	---	Significantly Rare	G4	S4
Freshwater Bivalve	29540	Villosa delumbis	Eastern Creekshell	2015-06-25	E	3-Medium	---	Significantly Rare	G4	S4
Freshwater Bivalve	36760	Villosa delumbis	Eastern Creekshell	2015-06-23	E	3-Medium	---	Significantly Rare	G4	S4

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Freshwater Fish	32440	Carpiodes sp. cf. cyprinus	Carolina Quillback	2007-03-30	E	3-Medium	---	Significantly Rare	GNR	S2
Freshwater Fish	32460	Etheostoma thalassinum	Seagreen Darter	2014-07-24	E	3-Medium	---	Significantly Rare	G4	S3
Freshwater Fish	32480	Etheostoma thalassinum	Seagreen Darter	2014-06-17	E	3-Medium	---	Significantly Rare	G4	S3
Freshwater Fish	32455	Etheostoma thalassinum	Seagreen Darter	2012-05-24	E	3-Medium	---	Significantly Rare	G4	S3
Freshwater Fish	32461	Etheostoma thalassinum	Seagreen Darter	2017-10-18	E	3-Medium	---	Significantly Rare	G4	S3
Freshwater Fish	32499	Etheostoma thalassinum	Seagreen Darter	2007-07-09	E	3-Medium	---	Significantly Rare	G4	S3
Freshwater Fish	32457	Etheostoma thalassinum	Seagreen Darter	1963-06-24	H	3-Medium	---	Significantly Rare	G4	S3
Freshwater Fish	13600	Micropterus coosae	Redeye Bass	1962-08	H	3-Medium	---	Significantly Rare	G5	S1
Freshwater Fish	18605	Moxostoma robustum	Robust Redhorse	1869	X	3-Medium	---	Endangered	G1	S1
Freshwater or Terrestrial Gastropod	37687	Paravitrea multidentata	Dentate Supercoil	2003-08-30	E	3-Medium	---	Significantly Rare	G5	S2S3
Lichen	25985	Gymnoderma lineare	Rock Gnome Lichen	2008	E	2-High	Endangered	Endangered	G3	S3
Liverwort	9313	Chiloscyphus appalachianus	A Liverwort	1992-04-18	E	3-Medium	---	Special Concern Vulnerable	G1G2Q	S1
Liverwort	22029	Chiloscyphus muricatus	A Liverwort	1994-06-13	E	3-Medium	---	Special Concern Vulnerable	G5	S1
Liverwort	22028	Chiloscyphus muricatus	A Liverwort	1994-06-04	E	3-Medium	---	Special Concern Vulnerable	G5	S1
Liverwort	17861	Chiloscyphus muricatus	A Liverwort	1992-04-18	A	3-Medium	---	Special Concern Vulnerable	G5	S1
Liverwort	22142	Diplophyllum obtusatum	A Liverwort	1961-Pre	H	3-Medium	---	Significantly Rare Disjunct	G2?	S1

Element Occurrences Documented Within Project Area

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Liverwort	22008	Drepanolejeunea appalachiana	A Liverwort	1988-05-31	E	3-Medium	---	Special Concern Vulnerable	G2?	S1
Liverwort	22773	Frullania appalachiana	A Liverwort	2005?	E	3-Medium	---	Significantly Rare Limited	G1?	S1?
Liverwort	21904	Lejeunea blomquistii	A Liverwort	1994-06-13	E	3-Medium	---	Special Concern Vulnerable	G1G2	S1
Liverwort	22775	Plagiochila ludoviciana	A Liverwort	2005?	E	3-Medium	---	Significantly Rare Peripheral	G5	S1
Liverwort	4145	Plagiochila sullivantii var. spinigera	A Liverwort	1953-07-28	H	3-Medium	---	Significantly Rare Limited	G2T1	S1
Liverwort	22030	Plagiochila sullivantii var. sullivantii	A Liverwort	1994-06-13	E	3-Medium	---	Significantly Rare Throughout	G2T2	S2
Liverwort	22779	Porella wataugensis	A Liverwort	2005?	E	3-Medium	---	Significantly Rare Limited	G1G2Q	S1
Liverwort	21926	Porella wataugensis	A Liverwort	1993	E	2-High	---	Significantly Rare Limited	G1G2Q	S1
Mammal	11750	Corynorhinus rafinesquii rafinesquii	Rafinesque's Big-eared Bat	2001-08-10	E	3-Medium	---	Threatened	G3G4T3	S2
Mammal	11749	Corynorhinus rafinesquii rafinesquii	Rafinesque's Big-eared Bat	2000-08-09	E	3-Medium	---	Threatened	G3G4T3	S2
Mammal	37308	Myotis leibii	Eastern Small-footed Bat	2016-08-01	E	2-High	---	Special Concern	G4	S2
Mammal	32146	Myotis septentrionalis	Northern Long-eared Bat	2001-07-11	A?	1-Very High	T-4(d)	Threatened	G1G2	S2
Mammal	32147	Myotis septentrionalis	Northern Long-eared Bat	2000-08-10	B?	3-Medium	T-4(d)	Threatened	G1G2	S2
Mammal	34296	Myotis septentrionalis	Northern Long-eared Bat	2011-08-03	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	14665	Neotoma magister	Allegheny Woodrat	2000	E	3-Medium	---	Special Concern	G3G4	S2S3
Mammal	19383	Neotoma magister	Allegheny Woodrat	2000-06-28	E	3-Medium	---	Special Concern	G3G4	S2S3
Mammal	8312	Neotoma magister	Allegheny Woodrat	2000	E	3-Medium	---	Special Concern	G3G4	S2S3

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Mammal	36136	Perimyotis subflavus	Tricolored Bat	2011-08-03	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	32945	Spilogale putorius	Eastern Spotted Skunk	1997-04-20	D?	3-Medium	---	Game Animal	G4	S2
Mammal	38359	Spilogale putorius	Eastern Spotted Skunk	2016-03-17	E	2-High	---	Game Animal	G4	S2
Mayfly	19450	Barbaetis benfieldi	Benfield's Bearded Small Minnow Mayfly	1990-05-18	H?	3-Medium	---	Significantly Rare	G2G4	S1
Mayfly	38248	Epeorus punctatus	a flatheaded mayfly	2017-07-12	E	2-High	---	Significantly Rare	G2G3	S1
Mayfly	35298	Ephemerella floripara	a mayfly	1990-01-22	H?	3-Medium	---	Significantly Rare	G3Q	S2
Mayfly	35229	Maccaffertium wudigeum	Wilson Creek "Stenonema"	2002	E	2-High	---	Significantly Rare	G1	S1
Mayfly	3849	Tsalia berneri	a mayfly	1991-01-08	H?	3-Medium	---	Significantly Rare	G4	S3
Mayfly	13586	Tsalia berneri	a mayfly	1990-05-17	H?	3-Medium	---	Significantly Rare	G4	S3
Mayfly	8224	Tsalia berneri	a mayfly	1989-03-28	H?	3-Medium	---	Significantly Rare	G4	S3
Moss	27688	Oxyrrhynchium pringlei	Pringle's Water Feather Moss	2009-Pre	E	3-Medium	---	Significantly Rare Disjunct	G2G3	S1
Moss	23665	Racomitrium aciculare	Dark Mountain Fringe Moss	1994-06-04	E	3-Medium	---	Significantly Rare Peripheral	G5	S1?
Moss	27691	Sphagnum capillifolium	Northern Peatmoss	2009-Pre	E	3-Medium	---	Significantly Rare Peripheral	G5	S1
Moss	27692	Sphagnum contortum	Contorted Peatmoss	2009-Pre	E	3-Medium	---	Threatened	G5	S1
Moss	4164	Sphagnum fallax	Pretty Peatmoss	2002-08-01	E	3-Medium	---	Significantly Rare Peripheral	G5	S2
Moss	5155	Sphagnum pylaesii	Simple Peatmoss	2002-03-08	E	3-Medium	---	Significantly Rare Disjunct	G4	S1
Moss	28685	Sphagnum squarrosum	Squarrose Peatmoss	2006	E	3-Medium	---	Significantly Rare Peripheral	G5	S1
Moss	27693	Sphagnum warnstorfii	Fen Peatmoss	2009-Pre	E	3-Medium	---	Significantly Rare Disjunct	G5	S1
Natural Community	25261	Acidic Cove Forest (Typic Subtype)	---	2010	C	2-High	---	---	G5	S4

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	28425	Acidic Cove Forest (Typic Subtype)	---	2010	B	3-Medium	---	---	G5	S4
Natural Community	14591	Acidic Cove Forest (Typic Subtype)	---	2010	C	3-Medium	---	---	G5	S4
Natural Community	38294	Acidic Cove Forest (Typic Subtype)	---	2018-05-16	B?	2-High	---	---	G5	S4
Natural Community	24733	Acidic Cove Forest (Typic Subtype)	---	2010	B	2-High	---	---	G5	S4
Natural Community	6821	Carolina Hemlock Forest (Typic Subtype)	---	1993	B?	3-Medium	---	---	G2	S2
Natural Community	24734	Carolina Hemlock Forest (Typic Subtype)	---	2006-06-29	B	2-High	---	---	G2	S2
Natural Community	596	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	A	3-Medium	---	---	G5	S5
Natural Community	3419	Chestnut Oak Forest (Dry Heath Subtype)	---	2009-05	C	3-Medium	---	---	G5	S5
Natural Community	25260	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	A	2-High	---	---	G5	S5
Natural Community	1041	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	BC	3-Medium	---	---	G5	S5
Natural Community	13344	Chestnut Oak Forest (Dry Heath Subtype)	---	2017-09-05	C	3-Medium	---	---	G5	S5
Natural Community	17752	Chestnut Oak Forest (Dry Heath Subtype)	---	2000-09-07	C	2-High	---	---	G5	S5
Natural Community	8926	Chestnut Oak Forest (Dry Heath Subtype)	---	2000-09-28	C	3-Medium	---	---	G5	S5
Natural Community	13738	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	C	3-Medium	---	---	G5	S5
Natural Community	15972	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	C	3-Medium	---	---	G5	S5
Natural Community	36616	Chestnut Oak Forest (Dry Heath Subtype)	---	2016-06-09	C	2-High	---	---	G5	S5
Natural Community	5459	Chestnut Oak Forest (Herb Subtype)	---	2010	AB	3-Medium	---	---	G4G5	S4
Natural Community	24736	Chestnut Oak Forest (Herb Subtype)	---	2010	BC	1-Very High	---	---	G4G5	S4

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Natural Community	28439	Chestnut Oak Forest (White Pine Subtype)	---	2010	B	2-High	---	---	G3	S3
Natural Community	8927	Chestnut Oak Forest (White Pine Subtype)	---	2010	C?	3-Medium	---	---	G3	S3
Natural Community	5384	Dry-Mesic Oak--Hickory Forest (Piedmont Subtype)	---	2010	C	3-Medium	---	---	G4G5	S4
Natural Community	30168	Heath Bald (Carolina Rhododendron Subtype)	---	2010	B	3-Medium	---	---	G2	S1
Natural Community	16439	Heath Bald (Carolina Rhododendron Subtype)	---	2010	A?	2-High	---	---	G2	S1
Natural Community	38295	High Elevation Red Oak Forest (Heath Subtype)	---	2018-05-16	C	2-High	---	---	G4	S3
Natural Community	9188	Low Elevation Basic Glade (Montane Subtype)	---	2010	A	3-Medium	---	---	G2	S2
Natural Community	7397	Low Elevation Basic Glade (Montane Subtype)	---	1993-10-26	A	3-Medium	---	---	G2	S2
Natural Community	17824	Low Elevation Rocky Summit (Acidic Subtype)	---	1992-04-19	B	3-Medium	---	---	G3?	S2
Natural Community	2490	Low Elevation Rocky Summit (Acidic Subtype)	---	1992	A	3-Medium	---	---	G3?	S2
Natural Community	25257	Low Elevation Rocky Summit (Basic Subtype)	---	2007-10-01	B	2-High	---	---	G1	S1
Natural Community	13708	Low Elevation Rocky Summit (Basic Subtype)	---	1992	A	3-Medium	---	---	G1	S1
Natural Community	10372	Low Elevation Rocky Summit (Basic Subtype)	---	2000-09-14	C	3-Medium	---	---	G1	S1
Natural Community	24735	Low Elevation Rocky Summit (Basic Subtype)	---	2006-06-29	B	1-Very High	---	---	G1	S1
Natural Community	14764	Low Elevation Rocky Summit (Quartzite Ledge Subtype)	---	2010	B?	2-High	---	---	G1	S1
Natural Community	944	Low Elevation Rocky Summit (Quartzite Ledge Subtype)	---	2010	B	2-High	---	---	G1	S1

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Natural Community	355	Low Elevation Rocky Summit (Quartzite Ledge Subtype)	---	2010	B	2-High	---	---	G1	S1
Natural Community	36614	Low Mountain Pine Forest (Montane Pine Subtype)	---	2016-06-09	BC	2-High	---	---	G3G4	S2?
Natural Community	11539	Mesic Mixed Hardwood Forest (Piedmont Subtype)	---	2016	C	2-High	---	---	G3G4	S4
Natural Community	18866	Montane Alluvial Forest (Small River Subtype)	---	2000-09-29	D	3-Medium	---	---	G3	S1
Natural Community	35112	Montane Cliff (Acidic Herb Subtype)	---	2015-04-28	B	2-High	---	---	G3G4	S3
Natural Community	13401	Montane Cliff (Acidic Herb Subtype)	---	1986-08-24	B	2-High	---	---	G3G4	S3
Natural Community	11093	Montane Oak--Hickory Forest (Acidic Subtype)	---	2017-03-31	BC	3-Medium	---	---	G4G5	S4S5
Natural Community	5972	Montane Oak--Hickory Forest (Acidic Subtype)	---	2010	AB	3-Medium	---	---	G4G5	S4S5
Natural Community	36615	Montane Oak--Hickory Forest (Acidic Subtype)	---	2016-06-09	B	2-High	---	---	G4G5	S4S5
Natural Community	14976	Montane Oak--Hickory Forest (Basic Subtype)	---	2017-09-05	C	2-High	---	---	G3	S3
Natural Community	34071	Montane Oak--Hickory Forest (Low Dry Subtype)	---	2010	C?	2-High	---	---	G2G3	S2
Natural Community	7054	Piedmont Cliff (Basic Subtype)	---	2010	CD	2-High	---	---	G2?	S1
Natural Community	6881	Piedmont/Coastal Plain Heath Bluff	---		NR	2-High	---	---	G3	S3
Natural Community	38296	Pine--Oak/Heath (High Elevation Subtype)	---	2018-05-16	C	2-High	---	---	G2	S2
Natural Community	25258	Pine--Oak/Heath (Typic Subtype)	---	2010	B	2-High	---	---	G3	S3
Natural Community	6480	Pine--Oak/Heath (Typic Subtype)	---	2010	B	3-Medium	---	---	G3	S3

Element Occurrences Documented Within Project Area

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Natural Community	1330	Pine--Oak/Heath (Typic Subtype)	---	2010	BC	3-Medium	---	---	G3	S3
Natural Community	12986	Pine--Oak/Heath (Typic Subtype)	---	2010	B?	3-Medium	---	---	G3	S3
Natural Community	13851	Pine--Oak/Heath (Typic Subtype)	---	2010	CD	3-Medium	---	---	G3	S3
Natural Community	14816	Pine--Oak/Heath (Typic Subtype)	---	2010	C	3-Medium	---	---	G3	S3
Natural Community	6776	Pine--Oak/Heath (Typic Subtype)	---	2010	B	3-Medium	---	---	G3	S3
Natural Community	4348	Pine--Oak/Heath (Typic Subtype)	---	2010	CD	3-Medium	---	---	G3	S3
Natural Community	3819	Rich Cove Forest (Foothills Intermediate Subtype)	---	2010	C	3-Medium	---	---	G4?	S3
Natural Community	12170	Rich Cove Forest (Foothills Intermediate Subtype)	---	2015-04-14	BC	3-Medium	---	---	G4?	S3
Natural Community	3381	Rich Cove Forest (Foothills Intermediate Subtype)	---	2010	B	3-Medium	---	---	G4?	S3
Natural Community	12369	Rich Cove Forest (Foothills Rich Subtype)	---	2010	A	3-Medium	---	---	G2G3	S2
Natural Community	12169	Rich Cove Forest (Foothills Rich Subtype)	---	2010	C	3-Medium	---	---	G2G3	S2
Natural Community	35115	Rocky Bar and Shore (Mountain Bedrock Scour Subtype)	---	2015-04-28	C	2-High	---	---	G3	S2
Natural Community	20021	Southern Appalachian Bog (Typic Subtype)	---	2006-07-26	AB	2-High	---	---	G1G2	S1S2
Natural Community	6694	Southern Appalachian Bog (Typic Subtype)	---	2012	CD	2-High	---	---	G1G2	S1S2
Natural Community	4351	Spray Cliff	---	2009-05	C	2-High	---	---	G2	S2
Natural Community	13535	Spray Cliff	---	2017-09-05	C	2-High	---	---	G2	S2

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Natural Community	3805	Swamp Forest--Bog Complex (Typic Subtype)	---	2000-08-15	C?	3-Medium	---	---	G2	S2
Natural Community	11597	Upland Pool (Mountain Subtype)	---	1992-09-26	B?	2-High	---	---	G1	S1
Natural Community	14960	Upland Pool (Mountain Subtype)	---	1988-07-25	A?	2-High	---	---	G1	S1
Reptile	34815	Crotalus horridus	Timber Rattlesnake	2014-06-26	E	3-Medium	---	Special Concern	G4	S3
Reptile	7709	Crotalus horridus	Timber Rattlesnake	2000-08-04	E	3-Medium	---	Special Concern	G4	S3
Reptile	10324	Crotalus horridus	Timber Rattlesnake	2000-09-28	E	3-Medium	---	Special Concern	G4	S3
Reptile	18502	Glyptemys muhlenbergii	Bog Turtle	2005-06-01	B	3-Medium	Threatened Similar Appearance	Threatened	G3	S2
Stonefly	38270	Nemocapnia carolina	Southern Snowfly	2017-03-23	E	2-High	---	Significantly Rare	G5	S1
Vascular Plant	34813	Asclepias purpurascens	Purple Milkweed	1983-08-04	E	3-Medium	---	Significantly Rare Throughout	G5?	S1?
Vascular Plant	9063	Asplenium bradleyi	Bradley's Spleenwort	1994-Pre	E	3-Medium	---	Significantly Rare Peripheral	G4	S2
Vascular Plant	6382	Asplenium bradleyi	Bradley's Spleenwort	1994-Pre	CD	3-Medium	---	Significantly Rare Peripheral	G4	S2
Vascular Plant	13031	Asplenium ruta-muraria var. cryptolepis	American Wall-rue	1997-06-13	C	3-Medium	---	Special Concern Vulnerable	G5T5	S1
Vascular Plant	7871	Botrychium lanceolatum var. angustisegmentum	Lance-leaf Moonwort	1987-06	B	3-Medium	---	Significantly Rare Peripheral	G5T4	S1
Vascular Plant	13237	Botrychium lanceolatum var. angustisegmentum	Lance-leaf Moonwort	1987	E	3-Medium	---	Significantly Rare Peripheral	G5T4	S1
Vascular Plant	21163	Botrychium lanceolatum var. angustisegmentum	Lance-leaf Moonwort	1996-07-24	C	3-Medium	---	Significantly Rare Peripheral	G5T4	S1
Vascular Plant	7184	Botrychium lanceolatum var. angustisegmentum	Lance-leaf Moonwort	1987-06	U	3-Medium	---	Significantly Rare Peripheral	G5T4	S1

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Vascular Plant	17103	Botrychium lanceolatum var. angustisegmentum	Lance-leaf Moonwort	1987-06	NR	3-Medium	---	Significantly Rare Peripheral	G5T4	S1
Vascular Plant	10066	Botrychium matricariifolium	Daisy-leaf Moonwort	1993-06	B?	3-Medium	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	4866	Campanula aparinoides var. aparinoides	Marsh Bellflower	1988-07-16	D	3-Medium	---	Significantly Rare Peripheral	G5TNR	S2
Vascular Plant	8204	Campanula aparinoides var. aparinoides	Marsh Bellflower	1972-08	H	3-Medium	---	Significantly Rare Peripheral	G5TNR	S2
Vascular Plant	34814	Cardamine clematitis	Mountain Bittercress	2014-04-20	E	2-High	---	Significantly Rare Throughout	G3	S2S3
Vascular Plant	22812	Celastrus scandens	American Bittersweet	2005?	E	3-Medium	---	Endangered	G5	S2?
Vascular Plant	22815	Celastrus scandens	American Bittersweet	2005?	E	3-Medium	---	Endangered	G5	S2?
Vascular Plant	22814	Celastrus scandens	American Bittersweet	2005?	E	3-Medium	---	Endangered	G5	S2?
Vascular Plant	22817	Chelone cuthbertii	Cuthbert's Turtlehead	2005?	E	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	10620	Chelone cuthbertii	Cuthbert's Turtlehead	1992-05	C	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	612	Cirsium carolinianum	Carolina Thistle	1993-10-27	D	3-Medium	---	Endangered	G5	S2
Vascular Plant	24428	Cirsium carolinianum	Carolina Thistle	2006-06-28	C	2-High	---	Endangered	G5	S2
Vascular Plant	31764	Collinsonia verticillata	Whorled Horsebalm	2001-07-14	E	2-High	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	26342	Corallorhiza wisteriana	Spring Coral-root	1979-Post	F	3-Medium	---	Significantly Rare Other	G5	S1
Vascular Plant	23828	Danthonia epilis	Bog Oatgrass	1996	E	2-High	---	Significantly Rare Throughout	G3G4	S3
Vascular Plant	33874	Dendrolycopodium dendroideum	Prickly Ground-pine	1992-01-01	E	2-High	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	28936	Dendrolycopodium hickeyi	Pennsylvania Ground-pine	1923-08-16	H	3-Medium	---	Significantly Rare Peripheral	G5	S2?
Vascular Plant	9712	Dicentra eximia	Bleeding Heart	1969-05-01	H	3-Medium	---	Significantly Rare Peripheral	G4	S3

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	21169	Dicentra eximia	Bleeding Heart	2007	CD	3-Medium	---	Significantly Rare Peripheral	G4	S3
Vascular Plant	17182	Dicentra eximia	Bleeding Heart	2006-06-28	D	2-High	---	Significantly Rare Peripheral	G4	S3
Vascular Plant	10938	Echinacea purpurea	Purple Coneflower	1996	X?	2-High	---	Special Concern Vulnerable	G4	S1
Vascular Plant	15206	Fothergilla major	Large Witch-alder	2000-06-07	B?	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	15751	Fothergilla major	Large Witch-alder	1965-05-02	H	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	23236	Fothergilla major	Large Witch-alder	2006-04-15	E	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	17523	Fothergilla major	Large Witch-alder	2006-09-21	A	2-High	---	Significantly Rare Throughout	G3	S3
Vascular Plant	463	Fothergilla major	Large Witch-alder	1992-09-05	E	2-High	---	Significantly Rare Throughout	G3	S3
Vascular Plant	20081	Fothergilla major	Large Witch-alder	2006-10-05	C	1-Very High	---	Significantly Rare Throughout	G3	S3
Vascular Plant	8062	Fothergilla major	Large Witch-alder	2000-06-07	B	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	16535	Fothergilla major	Large Witch-alder	2000-05-01	B	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	28525	Fothergilla major	Large Witch-alder	2009-10-19	A	3-Medium	---	Significantly Rare Throughout	G3	S3

Element Occurrences Documented Within Project Area

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Vascular Plant	26630	Fothergilla major	Large Witch-alder	1992-06-16	E	2-High	---	Significantly Rare Throughout	G3	S3
Vascular Plant	26629	Fothergilla major	Large Witch-alder	1992-09-08	E	2-High	---	Significantly Rare Throughout	G3	S3
Vascular Plant	26628	Fothergilla major	Large Witch-alder	1992-08-28	E	2-High	---	Significantly Rare Throughout	G3	S3
Vascular Plant	35114	Fothergilla major	Large Witch-alder	2015-04-28	C?	2-High	---	Significantly Rare Throughout	G3	S3
Vascular Plant	5552	Helianthus laevigatus	Smooth Sunflower	1993-10-27	E	3-Medium	---	Special Concern Vulnerable	G4	S3
Vascular Plant	25271	Helianthus laevigatus	Smooth Sunflower	2008-06-23	CD	2-High	---	Special Concern Vulnerable	G4	S3
Vascular Plant	26338	Helianthus laevigatus	Smooth Sunflower	2006-09-07	B	2-High	---	Special Concern Vulnerable	G4	S3
Vascular Plant	17280	Helianthus laevigatus	Smooth Sunflower	2008-10-20	AB	2-High	---	Special Concern Vulnerable	G4	S3
Vascular Plant	14504	Hexastylis naniflora	Dwarf-flowered Heartleaf	2016-05-24	A	2-High	Threatened	Threatened	G3	S3
Vascular Plant	28351	Hexastylis naniflora	Dwarf-flowered Heartleaf	2009-04-07	E	3-Medium	Threatened	Threatened	G3	S3
Vascular Plant	38033	Hexastylis naniflora	Dwarf-flowered Heartleaf	2017-03-28	BC	2-High	Threatened	Threatened	G3	S3
Vascular Plant	36661	Hexastylis naniflora	Dwarf-flowered Heartleaf	2016-04-05	A	1-Very High	Threatened	Threatened	G3	S3
Vascular Plant	22281	Hexastylis naniflora	Dwarf-flowered Heartleaf	2017-03-28	CD	2-High	Threatened	Threatened	G3	S3
Vascular Plant	22233	Hexastylis naniflora	Dwarf-flowered Heartleaf	2001-10	E	3-Medium	Threatened	Threatened	G3	S3
Vascular Plant	22283	Hexastylis naniflora	Dwarf-flowered Heartleaf	2017-03-28	BC	1-Very High	Threatened	Threatened	G3	S3
Vascular Plant	28352	Hexastylis naniflora	Dwarf-flowered Heartleaf	2009-04-07	E	3-Medium	Threatened	Threatened	G3	S3
Vascular Plant	20247	Hexastylis naniflora	Dwarf-flowered Heartleaf	2003-03-21	U	3-Medium	Threatened	Threatened	G3	S3
Vascular Plant	18888	Hexastylis naniflora	Dwarf-flowered Heartleaf	1996-05-03	CD	3-Medium	Threatened	Threatened	G3	S3

Element Occurrences Documented Within Project Area

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Vascular Plant	35113	Hexastylis naniflora	Dwarf-flowered Heartleaf	2015-04-28	AB	2-High	Threatened	Threatened	G3	S3
Vascular Plant	19217	Hexastylis naniflora	Dwarf-flowered Heartleaf	1991-Spring	U	3-Medium	Threatened	Threatened	G3	S3
Vascular Plant	626	Hexastylis naniflora	Dwarf-flowered Heartleaf	1985-03	U	3-Medium	Threatened	Threatened	G3	S3
Vascular Plant	21389	Hexastylis naniflora	Dwarf-flowered Heartleaf	2009-04-07	A	3-Medium	Threatened	Threatened	G3	S3
Vascular Plant	28350	Hexastylis naniflora	Dwarf-flowered Heartleaf	2009-04-07	E	3-Medium	Threatened	Threatened	G3	S3
Vascular Plant	35185	Hexastylis naniflora	Dwarf-flowered Heartleaf	2015-05-05	B?	2-High	Threatened	Threatened	G3	S3
Vascular Plant	22282	Hexastylis naniflora	Dwarf-flowered Heartleaf	2006-10-25	X	2-High	Threatened	Threatened	G3	S3
Vascular Plant	22284	Hexastylis naniflora	Dwarf-flowered Heartleaf	2017-03-28	A	2-High	Threatened	Threatened	G3	S3
Vascular Plant	21680	Hexastylis naniflora	Dwarf-flowered Heartleaf	1995	D	3-Medium	Threatened	Threatened	G3	S3
Vascular Plant	21388	Hexastylis naniflora	Dwarf-flowered Heartleaf	2013-05-14	A	3-Medium	Threatened	Threatened	G3	S3
Vascular Plant	28353	Hexastylis naniflora	Dwarf-flowered Heartleaf	2009-04-07	E	3-Medium	Threatened	Threatened	G3	S3
Vascular Plant	3600	Hexastylis naniflora	Dwarf-flowered Heartleaf	1981-05	X	2-High	Threatened	Threatened	G3	S3
Vascular Plant	21387	Hexastylis naniflora	Dwarf-flowered Heartleaf	2013	A	2-High	Threatened	Threatened	G3	S3
Vascular Plant	16347	Hexastylis naniflora	Dwarf-flowered Heartleaf	2002-04-18	D	2-High	Threatened	Threatened	G3	S3
Vascular Plant	30019	Hexastylis naniflora	Dwarf-flowered Heartleaf	2016-03-20	Ci	2-High	Threatened	Threatened	G3	S3
Vascular Plant	22493	Hexastylis naniflora	Dwarf-flowered Heartleaf	2010-05-26	C?r	2-High	Threatened	Threatened	G3	S3
Vascular Plant	37217	Hexastylis naniflora	Dwarf-flowered Heartleaf	2017-04	C	2-High	Threatened	Threatened	G3	S3
Vascular Plant	6117	Hexastylis naniflora	Dwarf-flowered Heartleaf	1981-05	X	2-High	Threatened	Threatened	G3	S3
Vascular Plant	8307	Hexastylis naniflora	Dwarf-flowered Heartleaf	2005-05-11	A	2-High	Threatened	Threatened	G3	S3
Vascular Plant	22491	Hexastylis naniflora	Dwarf-flowered Heartleaf	2010-05-26	D?r	2-High	Threatened	Threatened	G3	S3
Vascular Plant	22492	Hexastylis naniflora	Dwarf-flowered Heartleaf	2006-06	D	2-High	Threatened	Threatened	G3	S3
Vascular Plant	28343	Hexastylis naniflora	Dwarf-flowered Heartleaf	2009-04-07	C	2-High	Threatened	Threatened	G3	S3
Vascular Plant	36589	Hexastylis naniflora	Dwarf-flowered Heartleaf	2016-05-06	D?	2-High	Threatened	Threatened	G3	S3
Vascular Plant	22266	Hexastylis naniflora	Dwarf-flowered Heartleaf	2005-05-06	D	2-High	Threatened	Threatened	G3	S3
Vascular Plant	6412	Hexastylis naniflora	Dwarf-flowered Heartleaf	2005-05	D	2-High	Threatened	Threatened	G3	S3
Vascular Plant	20254	Hexastylis naniflora	Dwarf-flowered Heartleaf	2003-03-21	U	2-High	Threatened	Threatened	G3	S3
Vascular Plant	33396	Hexastylis rhombiformis	French Broad Heartleaf	1992-06-14	E	2-High	---	Significantly Rare Limited	G3	S3
Vascular Plant	33394	Hexastylis rhombiformis	French Broad Heartleaf	1992	E	2-High	---	Significantly Rare Limited	G3	S3
Vascular Plant	24466	Hudsonia montana	Mountain Golden-heather	2007-10-15	B	2-High	Threatened	Threatened	G1	S1
Vascular Plant	18140	Hudsonia montana	Mountain Golden-heather	2005-10-05	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24459	Hudsonia montana	Mountain Golden-heather	2007-10-02	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	16324	Hudsonia montana	Mountain Golden-heather	2009	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	19729	Hudsonia montana	Mountain Golden-heather	2004-Spring	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24474	Hudsonia montana	Mountain Golden-heather	2007-10-29	C	2-High	Threatened	Threatened	G1	S1

Element Occurrences Documented Within Project Area

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Vascular Plant	24468	Hudsonia montana	Mountain Golden-heather	2007-10-16	C	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24458	Hudsonia montana	Mountain Golden-heather	2004-Spring	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24475	Hudsonia montana	Mountain Golden-heather	2007-10-29	BC	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24447	Hudsonia montana	Mountain Golden-heather	2003-08	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24452	Hudsonia montana	Mountain Golden-heather	2004-Spring	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24476	Hudsonia montana	Mountain Golden-heather	2007-08-22	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24463	Hudsonia montana	Mountain Golden-heather	2007-10-02	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24442	Hudsonia montana	Mountain Golden-heather	2004-Spring	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24456	Hudsonia montana	Mountain Golden-heather	2006-10-05	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24465	Hudsonia montana	Mountain Golden-heather	2007-10-09	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24469	Hudsonia montana	Mountain Golden-heather	2007-08-22	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24450	Hudsonia montana	Mountain Golden-heather	1982	F	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24443	Hudsonia montana	Mountain Golden-heather	2004-Spring	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24467	Hudsonia montana	Mountain Golden-heather	2007-08-22	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24448	Hudsonia montana	Mountain Golden-heather	2004-Spring	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24444	Hudsonia montana	Mountain Golden-heather	2003-08	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24449	Hudsonia montana	Mountain Golden-heather	1982	F	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24457	Hudsonia montana	Mountain Golden-heather	2004-Spring	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24451	Hudsonia montana	Mountain Golden-heather	2003-08	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24464	Hudsonia montana	Mountain Golden-heather	2007-10-09	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	5348	Hudsonia montana	Mountain Golden-heather	2003-08	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24462	Hudsonia montana	Mountain Golden-heather	2004-Spring	F	2-High	Threatened	Threatened	G1	S1
Vascular Plant	1141	Isotria medeoloides	Small Whorled Pogonia	2013-05-14	C	3-Medium	Threatened	Threatened	G2?	S1
Vascular Plant	11855	Liatris aspera	Rough Blazing-star	1891-07	H	3-Medium	---	Threatened	G4G5	S1
Vascular Plant	7097	Liatris aspera	Rough Blazing-star	1992-08	D	3-Medium	---	Threatened	G4G5	S1
Vascular Plant	10986	Liatris helleri	Heller's Blazing-star	2005-10-05	B	3-Medium	Threatened	Threatened	G2Q	S2
Vascular Plant	25984	Liatris helleri	Heller's Blazing-star	2001-08-27	A	2-High	Threatened	Threatened	G2Q	S2
Vascular Plant	13412	Liatris helleri	Heller's Blazing-star	2001-08-22	B	3-Medium	Threatened	Threatened	G2Q	S2
Vascular Plant	358	Liatris helleri	Heller's Blazing-star	2005-10-05	Br	3-Medium	Threatened	Threatened	G2Q	S2
Vascular Plant	25940	Liatris helleri	Heller's Blazing-star	2006-10-05	CD	1-Very High	Threatened	Threatened	G2Q	S2
Vascular Plant	9739	Liatris turgida	Shale-barren Blazing-star	2007-09-06	E	3-Medium	---	Significantly Rare Throughout	G3	S1S2

Element Occurrences Documented Within Project Area

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Vascular Plant	16385	Liatris turgida	Shale-barren Blazing-star	2006-09-07	B	2-High	---	Significantly Rare Throughout	G3	S1S2
Vascular Plant	3380	Liatris turgida	Shale-barren Blazing-star	1993-10	C	3-Medium	---	Significantly Rare Throughout	G3	S1S2
Vascular Plant	4927	Liatris turgida	Shale-barren Blazing-star	1992-07	D	3-Medium	---	Significantly Rare Throughout	G3	S1S2
Vascular Plant	2186	Liatris turgida	Shale-barren Blazing-star	1994-Pre	E	3-Medium	---	Significantly Rare Throughout	G3	S1S2
Vascular Plant	5104	Liatris turgida	Shale-barren Blazing-star	1994-Pre	E	3-Medium	---	Significantly Rare Throughout	G3	S1S2
Vascular Plant	10859	Liatris turgida	Shale-barren Blazing-star	1992-08	D	3-Medium	---	Significantly Rare Throughout	G3	S1S2
Vascular Plant	10577	Liatris turgida	Shale-barren Blazing-star	1993-09	C	3-Medium	---	Significantly Rare Throughout	G3	S1S2
Vascular Plant	26431	Liatris turgida	Shale-barren Blazing-star	2007-09-06	B	3-Medium	---	Significantly Rare Throughout	G3	S1S2
Vascular Plant	2285	Matelea decipiens	Glade Milkvine	1994-Pre	D	3-Medium	---	Significantly Rare Peripheral	G5	S3
Vascular Plant	8381	Mononeuria groenlandica	Greenland Sandwort	2003?	E	3-Medium	---	Threatened	G5	S2
Vascular Plant	11303	Mononeuria groenlandica	Greenland Sandwort	2012-11-17	E	3-Medium	---	Threatened	G5	S2
Vascular Plant	6926	Mononeuria groenlandica	Greenland Sandwort	1993-10-26	D	3-Medium	---	Threatened	G5	S2
Vascular Plant	27708	Monotropsis odorata	Sweet Pinesap	2009-Pre	E	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	1632	Monotropsis odorata	Sweet Pinesap	1970-04-12	H	3-Medium	---	Special Concern Vulnerable	G3	S3

Element Occurrences Documented Within Project Area

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Vascular Plant	22978	Monotropsis odorata	Sweet Pinesap	2006-03-16	E	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	22976	Monotropsis odorata	Sweet Pinesap	2006-03-16	E	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	12387	Monotropsis odorata	Sweet Pinesap	2017-03-19	F	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	17478	Monotropsis odorata	Sweet Pinesap	2001-07-16	E	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	8236	Monotropsis odorata	Sweet Pinesap	1988?	D	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	6158	Monotropsis odorata	Sweet Pinesap	1993-05	D	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	7919	Monotropsis odorata	Sweet Pinesap	1997-06-13	C	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	2024	Monotropsis odorata	Sweet Pinesap	1993-04	D	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	8235	Monotropsis odorata	Sweet Pinesap	1988?	H	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	22977	Monotropsis odorata	Sweet Pinesap	2006-03-16	E	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	12234	Monotropsis odorata	Sweet Pinesap	1993-04	D	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	6264	Monotropsis odorata	Sweet Pinesap	1994-Pre	E	3-Medium	---	Special Concern Vulnerable	G3	S3

Element Occurrences Documented Within Project Area

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Vascular Plant	9100	Monotropsis odorata	Sweet Pinesap	1986-Spring	D	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	2307	Monotropsis odorata	Sweet Pinesap	1993-10	A	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	11109	Monotropsis odorata	Sweet Pinesap	1977-06	H	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	35171	Monotropsis odorata	Sweet Pinesap	2013-Fall	E	2-High	---	Special Concern Vulnerable	G3	S3
Vascular Plant	26652	Monotropsis odorata	Sweet Pinesap	1992-06-08	E	2-High	---	Special Concern Vulnerable	G3	S3
Vascular Plant	22979	Monotropsis odorata	Sweet Pinesap	2006-03-16	C	2-High	---	Special Concern Vulnerable	G3	S3
Vascular Plant	22980	Monotropsis odorata	Sweet Pinesap	2006-03-24	B	2-High	---	Special Concern Vulnerable	G3	S3
Vascular Plant	9071	Oenothera perennis	Perennial Sundrops	1991-06-15	F	3-Medium	---	Special Concern Vulnerable	G5	S2
Vascular Plant	22877	Packera paupercula var. paupercula	Balsam Ragwort	2005?	E	3-Medium	---	Significantly Rare Peripheral	G5	S1?
Vascular Plant	22872	Packera paupercula var. paupercula	Balsam Ragwort	2005?	E	3-Medium	---	Significantly Rare Peripheral	G5	S1?
Vascular Plant	10213	Parthenium auriculatum	Glade Wild Quinine	1993-10-27	D	3-Medium	---	Significantly Rare Throughout	G3G4	S3
Vascular Plant	26387	Parthenium auriculatum	Glade Wild Quinine	2008-08-21	B	2-High	---	Significantly Rare Throughout	G3G4	S3

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Vascular Plant	24445	Parthenium auriculatum	Glade Wild Quinine	2006-06-28	C	2-High	---	Significantly Rare Throughout	G3G4	S3
Vascular Plant	23547	Platanthera herbiola	Northern Rein Orchid	2005-05-30	AB	2-High	---	Significantly Rare Peripheral	G4?T4Q	S1S2
Vascular Plant	6414	Quercus ilicifolia	Bear Oak	2013-02-18	B	3-Medium	---	Endangered	G5	S2
Vascular Plant	4415	Robinia hispida var. fertilis	Fruitful Locust	1922-06	H	3-Medium	---	Significantly Rare Other	G4T1Q	S1
Vascular Plant	22795	Sceptridium jenmanii	Alabama Grape-fern	2005?	E	3-Medium	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	12894	Sceptridium jenmanii	Alabama Grape-fern	1993-10-27	B	3-Medium	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	16509	Sceptridium jenmanii	Alabama Grape-fern	1987-09	D	3-Medium	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	19576	Sceptridium jenmanii	Alabama Grape-fern	1994-Pre	D	3-Medium	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	22782	Sceptridium jenmanii	Alabama Grape-fern	2005?	E	2-High	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	13173	Sceptridium oneidense	Blunt-lobed Grape-fern	1987-07	BC	3-Medium	---	Significantly Rare Peripheral	G4	S2
Vascular Plant	24660	Sisyrinchium dichotomum	White Irisette	2007-06-08	D	2-High	Endangered	Endangered	G2	S2
Vascular Plant	25272	Sisyrinchium dichotomum	White Irisette	2007-06-08	D?	2-High	Endangered	Endangered	G2	S2
Vascular Plant	31922	Solidago ulmifolia	Elm-leaf Goldenrod	2001-07-15	E	2-High	---	Significantly Rare Disjunct	G5	S1?
Vascular Plant	34816	Stachys tenuifolia	Smooth Hedge-nettle	2006-06-30	E	2-High	---	Significantly Rare Disjunct	G5	S1
Vascular Plant	14837	Stenanthium leimanthoides	Pinebarren Death-camas	1990-07-01	D	3-Medium	---	Threatened	G4Q	S1
Vascular Plant	21090	Stenanthium leimanthoides	Pinebarren Death-camas	2002-08-03	D	3-Medium	---	Threatened	G4Q	S1

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Vascular Plant	33632	Stenanthium leimanthoides	Pinebarren Death-camas	1992-09-05	E	2-High	---	Threatened	G4Q	S1
Vascular Plant	33630	Stenanthium leimanthoides	Pinebarren Death-camas	1992-07-22	E	2-High	---	Threatened	G4Q	S1
Vascular Plant	6100	Thermopsis fraxinifolia	Ash-leaved Golden-banner	1993-06	F	3-Medium	---	Special Concern Vulnerable	G3?	S2?
Vascular Plant	5555	Thermopsis fraxinifolia	Ash-leaved Golden-banner	2001-06-21	B?	3-Medium	---	Special Concern Vulnerable	G3?	S2?
Vascular Plant	16374	Thermopsis fraxinifolia	Ash-leaved Golden-banner	1987	C	3-Medium	---	Special Concern Vulnerable	G3?	S2?
Vascular Plant	33575	Thermopsis fraxinifolia	Ash-leaved Golden-banner	1992-08-24	E	2-High	---	Special Concern Vulnerable	G3?	S2?
Vascular Plant	4636	Thermopsis mollis	Appalachian Golden-banner	1973-05-13	H	3-Medium	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	21336	Thermopsis mollis	Appalachian Golden-banner	2002-03-08	C	3-Medium	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	21338	Thermopsis mollis	Appalachian Golden-banner	2002-07-28	B	3-Medium	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	21335	Thermopsis mollis	Appalachian Golden-banner	2002-06-21	D	3-Medium	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	10788	Thermopsis mollis	Appalachian Golden-banner	2001-06-21	CD	3-Medium	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	25289	Thermopsis mollis	Appalachian Golden-banner	2007-06-08	B?	2-High	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	11481	Trichophorum cespitosum	Deerhair Bulrush	1986-05-27	A	3-Medium	---	Significantly Rare Disjunct	G5	S2S3

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	34422	Trichophorum cespitosum	Deerhair Bulrush	1990-09-19	E	3-Medium	---	Significantly Rare Disjunct	G5	S2S3
Vascular Plant	26620	Trichophorum cespitosum	Deerhair Bulrush	1992-09-05	E	2-High	---	Significantly Rare Disjunct	G5	S2S3
Vascular Plant	15582	Trillium simile	Sweet White Trillium	1994-Pre	E	3-Medium	---	Threatened	G3	S2
Vascular Plant	503	Trillium simile	Sweet White Trillium	1993-10	C?	3-Medium	---	Threatened	G3	S2
Vascular Plant	15399	Trillium simile	Sweet White Trillium	1994-03	D	3-Medium	---	Threatened	G3	S2
Vascular Plant	11823	Trillium simile	Sweet White Trillium	1980-Post	H	3-Medium	---	Threatened	G3	S2
Vascular Plant	5798	Trillium simile	Sweet White Trillium	1988-Spring	C	3-Medium	---	Threatened	G3	S2
Vascular Plant	3496	Trillium simile	Sweet White Trillium	1991-Spring	C	3-Medium	---	Threatened	G3	S2
Vascular Plant	19997	Trillium simile	Sweet White Trillium	1994-Pre	E	3-Medium	---	Threatened	G3	S2
Vascular Plant	17704	Trillium simile	Sweet White Trillium	1992-06	D	3-Medium	---	Threatened	G3	S2
Vascular Plant	9013	Trillium simile	Sweet White Trillium	1993	CD	3-Medium	---	Threatened	G3	S2
Vascular Plant	3607	Trillium simile	Sweet White Trillium	1993-Spring	X?	3-Medium	---	Threatened	G3	S2
Vascular Plant	25067	Trillium simile	Sweet White Trillium	2017-03-31	B?	2-High	---	Threatened	G3	S2
Vascular Plant	25066	Trillium simile	Sweet White Trillium	2007-04-03	BC	2-High	---	Threatened	G3	S2
Vascular Plant	10624	Vaccinium macrocarpon	Cranberry	1989-06-01	E	3-Medium	---	Threatened	G5	S2
Vascular Plant	2229	Vaccinium macrocarpon	Cranberry	2006-07-26	BC	2-High	---	Threatened	G5	S2
Vascular Plant	4643	Woodsia appalachiana	Appalachian Cliff Fern	1994-Pre	E	3-Medium	---	Significantly Rare Peripheral	G4	S2

Natural Areas Documented Within Project Area

Site Name	Representational Rating	Collective Rating
Camp Creek Bluff	R5 (General)	C5 (General)
Jonas Ridge Wetland	R2 (Very High)	C4 (Moderate)
Cranberry Knob Wetlands	R3 (High)	C4 (Moderate)
Simms Hill/Little River Uplands	R3 (High)	C4 (Moderate)
Brown Mountain Greenstone Forests	R5 (General)	C5 (General)
Upper Creek Falls Forest	R5 (General)	C5 (General)
Duggers Creek Forests	R5 (General)	C5 (General)
Island Creek Heath Bluff	R2 (Very High)	C5 (General)
Linville Falls	R1 (Exceptional)	C3 (High)
South Mountains Henry Fork Watershed	R1 (Exceptional)	C1 (Exceptional)
Linville Gorge	R1 (Exceptional)	C1 (Exceptional)
South Mountains Jacob Fork Watershed	R1 (Exceptional)	C1 (Exceptional)
Brindletown Forests	R3 (High)	C4 (Moderate)

Natural Areas Documented Within Project Area

Site Name	Representational Rating	Collective Rating
Wilson Creek Gorge	R2 (Very High)	C3 (High)
Rollins/South Mountains Natural Area	R1 (Exceptional)	C1 (Exceptional)
Smith Mountain/Hildebran Mountain	R5 (General)	C5 (General)
Hall Knob	R2 (Very High)	C3 (High)
Bristol Creek Wetlands	R3 (High)	C5 (General)
South Mountains North Slope	R2 (Very High)	C2 (Very High)
South Mountains Pleasant Grove Uplands	R4 (Moderate)	C4 (Moderate)
CTB/Linville River Aquatic Habitat	R1 (Exceptional)	C3 (High)
Broughton Hospital/Keller Knob	R5 (General)	C5 (General)
Vulcan/Rhodhiss Slopes	R5? (General?)	C5 (General)
Yellow Mountain/Ironmonger Mountain	R2 (Very High)	C4 (Moderate)
Smith Cliff/Henry Fork River	R1 (Exceptional)	C1 (Exceptional)
CTB/Johns River/Mulberry Creek Aquatic Habitat	R1 (Exceptional)	C4 (Moderate)
CTB/Upper Creek/Warrior Fork Aquatic Habitat	R2 (Very High)	C3 (High)
Hildebran/Henry River Slopes	R5 (General)	C4 (Moderate)

Managed Areas Documented Within Project Area*

Managed Area Name	Owner	Owner Type
Pisgah National Forest - Grandfather Ranger District	US Forest Service	Federal
NC Clean Water Management Trust Fund Easement	NC DNCR, Clean Water Management Trust Fund	State
NC Department of Transportation Mitigation Site	NC Department of Transportation	State
Blue Ridge Parkway	US National Park Service	Federal
NC Division of Mitigation Services Easement	NC DEQ, Division of Mitigation Services	State
NC Division of Mitigation Services Easement	NC DEQ, Division of Mitigation Services	State
South Mountains Game Land	NC Wildlife Resources Commission	State
South Mountains State Park	NC DNCR, Division of Parks and Recreation	State
South Mountains Game Land Dedicated Nature Preserve	NC Wildlife Resources Commission	State
South Mountains State Park Dedicated Nature Preserve	NC DNCR, Division of Parks and Recreation	State
Pisgah National Forest - Linville Gorge Wilderness	US Forest Service	Federal
Linville Gorge Registered Heritage Area	US Forest Service	Federal
Foothills Conservancy of North Carolina Preserve	Foothills Conservancy of North Carolina	Private
Pisgah Game Land	NC Wildlife Resources Commission	State
Lake James State Park	NC DNCR, Division of Parks and Recreation	State
Johns River Game Land	NC Wildlife Resources Commission	State
Pisgah Game Land Dedicated Nature Preserve	NC Wildlife Resources Commission	State
Foothills Conservancy of North Carolina Easement	Foothills Conservancy of North Carolina	Private
Blue Ridge Conservancy Preserve	Blue Ridge Conservancy	Private

Managed Areas Documented Within Project Area*

Managed Area Name	Owner	Owner Type
Blue Ridge Parkway Easement	US National Park Service	Federal
Catawba County Open Space	Catawba County	Local Government
Johns River Game Land Dedicated Nature Preserve	NC Wildlife Resources Commission	State
South Mountains Henry Fork and North Slope Registered Heritage Area	130 of Chatham, LLC	Private
North Carolina Agricultural Foundation Preserve	North American Agricultural Foundation	Private
Lake James State Park Dedicated Nature Preserve	NC DNCR, Division of Parks and Recreation	State
Linville Falls Registered Heritage Area	US National Park Service	Federal
Historic Preservation Foundation of North Carolina Easement	Historic Preservation Foundation of North Carolina	Private
Table Rock Fish Hatchery	NC Wildlife Resources Commission	State
Burke County Open Space	Burke County	Local Government
Linville River State Natural and Scenic River	NC DNCR, Division of Parks and Recreation	State
Smith Cliff/Henry Fork River Registered Heritage Area	Foothills Conservancy of North Carolina	Private
Smith Cliff/Henry Fork River Registered Heritage Area	130 of Chatham, LLC	Private
Town of Valdese Parkland	Town of Valdese	Local Government

*NOTE: If the proposed project intersects with a conservation/managed area, please contact the landowner directly for additional information. If the project intersects with a Dedicated Nature Preserve (DNP), Registered Natural Heritage Area (RHA), or Federally-listed species, NCNHP staff may provide additional correspondence regarding the project.

Definitions and an explanation of status designations and codes can be found at https://ncnhde.natureserve.org/content/help. Data query generated on September 17, 2018; source: NCNHP, Q3 July 2018. Please resubmit your information request if more than one year elapses before project initiation as new information is continually added to the NCNHP database.

Natural Heritage Element Occurrences, Natural Areas, and Managed Areas Within a One-mile Radius of the Project Area
Clearinghouse 19-0040 - Burke County
September 17, 2018
NCNHDE-6950

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Amphibian	34817	Plethodon meridianus	South Mountain Gray-cheeked Salamander	2001-03-11	E	2-High	---	Significantly Rare	G2	S2
Amphibian	25203	Plethodon meridianus	South Mountain Gray-cheeked Salamander	2007-06-08	E	3-Medium	---	Significantly Rare	G2	S2
Animal Assemblage	38202	Waterbird Colony	---	2017-02-14	E	2-High	---	---	GNR	S3
Arachnid	12292	Nesticus carolinensis	Linville Caverns Spider	2011-2012-winter	E	3-Medium	---	Significantly Rare	G1?	S1
Bird	28283	Certhia americana	Brown Creeper	2009-05	E	3-Medium	---	Special Concern	G5	S3B,S5N
Bird	16036	Coccyzus erythropthalmus	Black-billed Cuckoo	1994-06-28	E	3-Medium	---	Significantly Rare	G5	S2B
Bird	5170	Falco peregrinus anatum	American Peregrine Falcon	2015-05	E	3-Medium	---	Endangered	G4T4	S1B,S2N
Bird	29400	Falco peregrinus anatum	American Peregrine Falcon	2013-05	E	3-Medium	---	Endangered	G4T4	S1B,S2N
Bird	36393	Haliaeetus leucocephalus	Bald Eagle	2017-02-14	E	2-High	Bald/Golden Eagle Protection Act	Threatened	G5	S3B,S3N
Bird	17034	Haliaeetus leucocephalus	Bald Eagle	2017-02-14	E	2-High	Bald/Golden Eagle Protection Act	Threatened	G5	S3B,S3N
Bird	36497	Vermivora cyanoptera	Blue-winged Warbler	2002-05-22	E	2-High	---	Significantly Rare	G5	S2B
Butterfly	13119	Autochton cellus	Golden Banded-Skipper	2011-05-01	E	5-Very Low	---	Significantly Rare	G4	S2
Butterfly	29496	Erora laeta	Early Hairstreak	2011-04-30	D?	4-Low	---	Significantly Rare	GU	S2S3
Butterfly	34818	Pontia protodice	Checkered White	2000-07-10	E	1-Very High	---	Significantly Rare	G5	S1S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Butterfly	34808	Pontia protodice	Checkered White	2014-08-20	E	2-High	---	Significantly Rare	G5	S1S2
Caddisfly	19061	Ceraclea slossonae	a caddisfly	1989-03-28	H?	3-Medium	---	Significantly Rare	G4	S2
Crustacean	33733	Cambarus eeseeohensis	Grandfather Mountain Crayfish	2016-08-22	E	3-Medium	---	Significantly Rare	G1	S2S3
Crustacean	33732	Cambarus eeseeohensis	Grandfather Mountain Crayfish	2011-04-29	E	3-Medium	---	Significantly Rare	G1	S2S3
Crustacean	37385	Cambarus eeseeohensis	Grandfather Mountain Crayfish	2014-10-06	E	3-Medium	---	Significantly Rare	G1	S2S3
Crustacean	31039	Cambarus johni	Carolina Foothills Crayfish	2011-09-12	E	3-Medium	---	Significantly Rare	G3	S3
Crustacean	32635	Cambarus johni	Carolina Foothills Crayfish	2002-05-01	E	3-Medium	---	Significantly Rare	G3	S3
Crustacean	33334	Cambarus johni	Carolina Foothills Crayfish	2004-04-22	E	3-Medium	---	Significantly Rare	G3	S3
Crustacean	31038	Cambarus johni	Carolina Foothills Crayfish	2007-07-09	E	3-Medium	---	Significantly Rare	G3	S3
Crustacean	33273	Cambarus johni	Carolina Foothills Crayfish	2002-09-11	E	3-Medium	---	Significantly Rare	G3	S3
Crustacean	37362	Cambarus johni	Carolina Foothills Crayfish	2014-10-16	E	3-Medium	---	Significantly Rare	G3	S3
Crustacean	32634	Cambarus johni	Carolina Foothills Crayfish	1997-05-06	E	3-Medium	---	Significantly Rare	G3	S3
Crustacean	34836	Cambarus johni	Carolina Foothills Crayfish	2002-05-03	E	3-Medium	---	Significantly Rare	G3	S3
Crustacean	34835	Cambarus johni	Carolina Foothills Crayfish	2002-05-01	E	3-Medium	---	Significantly Rare	G3	S3
Crustacean	34831	Cambarus johni	Carolina Foothills Crayfish	2002-05-02	E	3-Medium	---	Significantly Rare	G3	S3
Crustacean	33279	Cambarus johni	Carolina Foothills Crayfish	2004-10-06	E	3-Medium	---	Significantly Rare	G3	S3
Crustacean	33248	Cambarus johni	Carolina Foothills Crayfish	2014-02-26	E	3-Medium	---	Significantly Rare	G3	S3
Crustacean	33278	Cambarus johni	Carolina Foothills Crayfish	1977-10-05	H?	3-Medium	---	Significantly Rare	G3	S3

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Crustacean	33271	Cambarus johni	Carolina Foothills Crayfish	1977-11-23	H?	3-Medium	---	Significantly Rare	G3	S3
Crustacean	8336	Cambarus lenati	Broad River Stream Crayfish	2017-04-20	E	3-Medium	---	Significantly Rare	G2	S2
Dragonfly or Damselfly	32074	Aeshna tuberculifera	Black-tipped Darner	2016-09-27	E	3-Medium	---	Significantly Rare	G5	S1
Dragonfly or Damselfly	32075	Aeshna verticalis	Green-striped Darner	1990-09-11	E	3-Medium	---	Significantly Rare	G5	S1
Dragonfly or Damselfly	35163	Boyeria grafiana	Ocellated Darner	2014-05-13	E	4-Low	---	Significantly Rare	G5	S2?
Dragonfly or Damselfly	33151	Cordulia shurtleffii	American Emerald	1993-07-06	E	3-Medium	---	Significantly Rare	G5	S1
Dragonfly or Damselfly	6276	Macromia margarita	Mountain River Cruiser	1994-06-04	E	4-Low	---	Significantly Rare	G3	S2?
Dragonfly or Damselfly	12052	Ophiogomphus edmundo	Edmund's Snaketail	2016-05-10	B	3-Medium	---	Significantly Rare	G2	S1
Dragonfly or Damselfly	4518	Ophiogomphus edmundo	Edmund's Snaketail	1994-06-08	E	3-Medium	---	Significantly Rare	G2	S1
Dragonfly or Damselfly	18101	Ophiogomphus howei	Pygmy Snaketail	1994	E	1-Very High	---	Significantly Rare	G3	S1
Dragonfly or Damselfly	33322	Somatochlora elongata	Ski-tipped Emerald	1995-08-28	E	2-High	---	Significantly Rare	G5	S2S3
Dragonfly or Damselfly	33783	Stylurus scudderi	Zebra Clubtail	2004-Pre	H?	5-Very Low	---	Significantly Rare	G4G5	S2?
Freshwater Bivalve	21762	Alasmidonta varicosa	Brook Floater	2017-10-05	A	3-Medium	---	Endangered	G3	S3
Freshwater Bivalve	21727	Alasmidonta varicosa	Brook Floater	2016-09-07	B	3-Medium	---	Endangered	G3	S3
Freshwater Bivalve	21761	Alasmidonta varicosa	Brook Floater	2017-07-21	AB	3-Medium	---	Endangered	G3	S3
Freshwater Bivalve	8699	Alasmidonta varicosa	Brook Floater	1919	H	3-Medium	---	Endangered	G3	S3
Freshwater Bivalve	37337	Lampsilis splendida	Rayed Pink Fatmucket	2016-06-21	E	3-Medium	---	Significantly Rare	G3	S1
Freshwater Bivalve	37343	Strophitus undulatus	Creeper	2016-06-21	E	3-Medium	---	Threatened	G5	S3

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Freshwater Bivalve	24823	Strophitus undulatus	Creeper	2003-10-02	E	3-Medium	---	Threatened	G5	S3
Freshwater Bivalve	29442	Villosa constricta	Notched Rainbow	2015-06-23	E	3-Medium	---	Threatened	G3	S3
Freshwater Bivalve	7188	Villosa constricta	Notched Rainbow	2011-09-12	E	3-Medium	---	Threatened	G3	S3
Freshwater Bivalve	29441	Villosa constricta	Notched Rainbow	2015-06-25	E	3-Medium	---	Threatened	G3	S3
Freshwater Bivalve	31202	Villosa delumbis	Eastern Creekshell	2011-03-19	E	3-Medium	---	Significantly Rare	G4	S4
Freshwater Bivalve	25380	Villosa delumbis	Eastern Creekshell	2017-10-17	E	3-Medium	---	Significantly Rare	G4	S4
Freshwater Bivalve	1461	Villosa delumbis	Eastern Creekshell	2016-08-23	E	3-Medium	---	Significantly Rare	G4	S4
Freshwater Bivalve	29542	Villosa delumbis	Eastern Creekshell	2005-03-09	E	3-Medium	---	Significantly Rare	G4	S4
Freshwater Bivalve	674	Villosa delumbis	Eastern Creekshell	2016-06-29	E	3-Medium	---	Significantly Rare	G4	S4
Freshwater Bivalve	29540	Villosa delumbis	Eastern Creekshell	2015-06-25	E	3-Medium	---	Significantly Rare	G4	S4
Freshwater Bivalve	36760	Villosa delumbis	Eastern Creekshell	2015-06-23	E	3-Medium	---	Significantly Rare	G4	S4
Freshwater Fish	32440	Carpiodes sp. cf. cyprinus	Carolina Quillback	2007-03-30	E	3-Medium	---	Significantly Rare	GNR	S2
Freshwater Fish	32460	Etheostoma thalassinum	Seagreen Darter	2014-07-24	E	3-Medium	---	Significantly Rare	G4	S3
Freshwater Fish	32480	Etheostoma thalassinum	Seagreen Darter	2014-06-17	E	3-Medium	---	Significantly Rare	G4	S3
Freshwater Fish	32455	Etheostoma thalassinum	Seagreen Darter	2012-05-24	E	3-Medium	---	Significantly Rare	G4	S3
Freshwater Fish	32461	Etheostoma thalassinum	Seagreen Darter	2017-10-18	E	3-Medium	---	Significantly Rare	G4	S3
Freshwater Fish	32500	Etheostoma thalassinum	Seagreen Darter	2017-06-06	E	3-Medium	---	Significantly Rare	G4	S3
Freshwater Fish	32499	Etheostoma thalassinum	Seagreen Darter	2007-07-09	E	3-Medium	---	Significantly Rare	G4	S3

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Freshwater Fish	32462	Etheostoma thalassinum	Seagreen Darter	1963-07-16	H	3-Medium	---	Significantly Rare	G4	S3
Freshwater Fish	32457	Etheostoma thalassinum	Seagreen Darter	1963-06-24	H	3-Medium	---	Significantly Rare	G4	S3
Freshwater Fish	13600	Micropterus coosae	Redeye Bass	1962-08	H	3-Medium	---	Significantly Rare	G5	S1
Freshwater Fish	18605	Moxostoma robustum	Robust Redhorse	1869	X	3-Medium	---	Endangered	G1	S1
Freshwater or Terrestrial Gastropod	37687	Paravitrea multidentata	Dentate Supercoil	2003-08-30	E	3-Medium	---	Significantly Rare	G5	S2S3
Freshwater or Terrestrial Gastropod	37694	Triodopsis fulciden	Dwarf Threetooth	2006-03-10	E	2-High	---	Special Concern	G1G2	S2S3
Lichen	25985	Gymnoderma lineare	Rock Gnome Lichen	2008	E	2-High	Endangered	Endangered	G3	S3
Liverwort	9313	Chiloscyphus appalachianus	A Liverwort	1992-04-18	E	3-Medium	---	Special Concern Vulnerable	G1G2Q	S1
Liverwort	22029	Chiloscyphus muricatus	A Liverwort	1994-06-13	E	3-Medium	---	Special Concern Vulnerable	G5	S1
Liverwort	22028	Chiloscyphus muricatus	A Liverwort	1994-06-04	E	3-Medium	---	Special Concern Vulnerable	G5	S1
Liverwort	17861	Chiloscyphus muricatus	A Liverwort	1992-04-18	A	3-Medium	---	Special Concern Vulnerable	G5	S1
Liverwort	22142	Diplophyllum obtusatum	A Liverwort	1961-Pre	H	3-Medium	---	Significantly Rare Disjunct	G2?	S1
Liverwort	13463	Drepanolejeunea appalachiana	A Liverwort	1956-07-28	H	4-Low	---	Special Concern Vulnerable	G2?	S1
Liverwort	22008	Drepanolejeunea appalachiana	A Liverwort	1988-05-31	E	3-Medium	---	Special Concern Vulnerable	G2?	S1
Liverwort	22773	Frullania appalachiana	A Liverwort	2005?	E	3-Medium	---	Significantly Rare Limited	G1?	S1?

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Liverwort	21905	Lejeunea blomquistii	A Liverwort	1994-06-13	E	3-Medium	---	Special Concern Vulnerable	G1G2	S1
Liverwort	21904	Lejeunea blomquistii	A Liverwort	1994-06-13	E	3-Medium	---	Special Concern Vulnerable	G1G2	S1
Liverwort	22064	Mannia californica	A Liverwort	1990-Pre	U	3-Medium	---	Significantly Rare Throughout	G3?	S1
Liverwort	23466	Nardia scalaris ssp. botryoidea	A Liverwort	2005-05-25	E	4-Low	---	Significantly Rare Other	G5T1	S1
Liverwort	22176	Plagiochasma wrightii	A Liverwort	2006-04-18	E	3-Medium	---	Significantly Rare Disjunct	G3?	S1
Liverwort	22009	Plagiochila austinii	A Liverwort	1988-05-31	E	4-Low	---	Significantly Rare Throughout	G3	S1S2
Liverwort	22775	Plagiochila ludoviciana	A Liverwort	2005?	E	3-Medium	---	Significantly Rare Peripheral	G5	S1
Liverwort	4145	Plagiochila sullivantii var. spinigera	A Liverwort	1953-07-28	H	3-Medium	---	Significantly Rare Limited	G2T1	S1
Liverwort	15672	Plagiochila sullivantii var. sullivantii	A Liverwort	1953-07-28	H	4-Low	---	Significantly Rare Throughout	G2T2	S2
Liverwort	22023	Plagiochila sullivantii var. sullivantii	A Liverwort	1994-06-12	E	2-High	---	Significantly Rare Throughout	G2T2	S2
Liverwort	22030	Plagiochila sullivantii var. sullivantii	A Liverwort	1994-06-13	E	3-Medium	---	Significantly Rare Throughout	G2T2	S2
Liverwort	15085	Plagiochila virginica var. virginica	A Liverwort	2012-06-07	E	2-High	---	Significantly Rare Limited	G3T3	S1
Liverwort	22779	Porella wataugensis	A Liverwort	2005?	E	3-Medium	---	Significantly Rare Limited	G1G2Q	S1
Liverwort	21874	Porella wataugensis	A Liverwort	1994-06-12	E	3-Medium	---	Significantly Rare Limited	G1G2Q	S1

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Liverwort	21926	Porella wataugensis	A Liverwort	1993	E	2-High	---	Significantly Rare Limited	G1G2Q	S1
Mammal	11750	Corynorhinus rafinesquii rafinesquii	Rafinesque's Big-eared Bat	2001-08-10	E	3-Medium	---	Threatened	G3G4T3	S2
Mammal	11749	Corynorhinus rafinesquii rafinesquii	Rafinesque's Big-eared Bat	2000-08-09	E	3-Medium	---	Threatened	G3G4T3	S2
Mammal	37308	Myotis leibii	Eastern Small-footed Bat	2016-08-01	E	2-High	---	Special Concern	G4	S2
Mammal	36004	Myotis lucifugus	Little Brown Bat	2001-05-17	E	5-Very Low	---	Significantly Rare	G3	S2
Mammal	36116	Myotis lucifugus	Little Brown Bat	2012-02-09	D	2-High	---	Significantly Rare	G3	S2
Mammal	36115	Myotis lucifugus	Little Brown Bat	2009-02-10	E	2-High	---	Significantly Rare	G3	S2
Mammal	36117	Myotis lucifugus	Little Brown Bat	2011-03-15	H?	1-Very High	---	Significantly Rare	G3	S2
Mammal	34363	Myotis septentrionalis	Northern Long-eared Bat	2001	E	4-Low	T-4(d)	Threatened	G1G2	S2
Mammal	32146	Myotis septentrionalis	Northern Long-eared Bat	2001-07-11	A?	1-Very High	T-4(d)	Threatened	G1G2	S2
Mammal	32147	Myotis septentrionalis	Northern Long-eared Bat	2000-08-10	B?	3-Medium	T-4(d)	Threatened	G1G2	S2
Mammal	34299	Myotis septentrionalis	Northern Long-eared Bat	2009-02-20	D	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34296	Myotis septentrionalis	Northern Long-eared Bat	2011-08-03	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	16631	Neotoma magister	Allegheny Woodrat	2000-06-29	E	4-Low	---	Special Concern	G3G4	S2S3
Mammal	14665	Neotoma magister	Allegheny Woodrat	2000	E	3-Medium	---	Special Concern	G3G4	S2S3
Mammal	19383	Neotoma magister	Allegheny Woodrat	2000-06-28	E	3-Medium	---	Special Concern	G3G4	S2S3
Mammal	8312	Neotoma magister	Allegheny Woodrat	2000	E	3-Medium	---	Special Concern	G3G4	S2S3
Mammal	36135	Perimyotis subflavus	Tricolored Bat	2001-07-11	B?	4-Low	---	Significantly Rare	G2G3	S3
Mammal	36199	Perimyotis subflavus	Tricolored Bat	2015-02-27	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	36200	Perimyotis subflavus	Tricolored Bat	2015-02-27	E	2-High	---	Significantly Rare	G2G3	S3

Element Occurrences Documented Within a One-mile Radius of the Project Area

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Mammal	36136	Perimyotis subflavus	Tricolored Bat	2011-08-03	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	36198	Perimyotis subflavus	Tricolored Bat	2016-02-25	E	1-Very High	---	Significantly Rare	G2G3	S3
Mammal	32945	Spilogale putorius	Eastern Spotted Skunk	1997-04-20	D?	3-Medium	---	Game Animal	G4	S2
Mammal	38359	Spilogale putorius	Eastern Spotted Skunk	2016-03-17	E	2-High	---	Game Animal	G4	S2
Mayfly	19450	Barbaetis benfieldi	Benfield's Bearded Small Minnow Mayfly	1990-05-18	H?	3-Medium	---	Significantly Rare	G2G4	S1
Mayfly	38248	Epeorus punctatus	a flatheaded mayfly	2017-07-12	E	2-High	---	Significantly Rare	G2G3	S1
Mayfly	35298	Ephemerella floripara	a mayfly	1990-01-22	H?	3-Medium	---	Significantly Rare	G3Q	S2
Mayfly	35229	Maccaffertium wudigeum	Wilson Creek "Stenonema"	2002	E	2-High	---	Significantly Rare	G1	S1
Mayfly	3849	Tsalia berneri	a mayfly	1991-01-08	H?	3-Medium	---	Significantly Rare	G4	S3
Mayfly	13586	Tsalia berneri	a mayfly	1990-05-17	H?	3-Medium	---	Significantly Rare	G4	S3
Mayfly	8224	Tsalia berneri	a mayfly	1989-03-28	H?	3-Medium	---	Significantly Rare	G4	S3
Moss	24877	Coscinodon cribrosus	Copper Grimmia	2007-04-Pre	E	4-Low	---	Significantly Rare Throughout	G3G4	S1
Moss	24878	Dicranella rufescens	Red Fork Moss	2007-04-Pre	E	4-Low	---	Significantly Rare Other	G5?	S1?
Moss	23638	Didymodon fallax	Fallacious Screw Moss	1951-04-27	H	3-Medium	---	Significantly Rare Other	G5	SH
Moss	23639	Didymodon tophaceus	Three-ranked Didymodon	1951-04-27	H	3-Medium	---	Significantly Rare Other	G5	S1?
Moss	2421	Encalypta procera	Extinguisher Moss	2012-06-07	E	3-Medium	---	Significantly Rare Disjunct	G5	S1
Moss	8884	Entodon concinnus	Lime Entodon	1951-04-27	H	3-Medium	---	Significantly Rare Peripheral	G4G5	S1
Moss	24879	Entodon sullivantii	Sullivant's Entodon	2007-04-Pre	E	4-Low	---	Significantly Rare Other	G3G4	S2

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Moss	13410	Entodon sullivantii	Sullivant's Entodon	2012-06-07	E	2-High	---	Significantly Rare Other	G3G4	S2
Moss	5809	Eucladium verticillatum	Lime-seep Eucladium	2012-06-07	E	3-Medium	---	Significantly Rare Other	G4	S1
Moss	27687	Herzogiella turfacea	Flat Stump Moss	2009-Pre	E	4-Low	---	Significantly Rare Peripheral	G5	S1?
Moss	2784	Hygrohypnum closteri	Closter's Brook-hypnum	1950-08-26	H	3-Medium	---	Significantly Rare Throughout	G3	S1
Moss	24880	Macrocoma sullivantii	Sullivant's Maned-moss	2007-04-Pre	E	4-Low	---	Significantly Rare Disjunct	G3G5	S2
Moss	23557	Orthotrichum strangulatum	Drummond Moss	1951-04-27	H	3-Medium	---	Significantly Rare Peripheral	G4	SH
Moss	27688	Oxyrrhynchium pringlei	Pringle's Water Feather Moss	2009-Pre	E	3-Medium	---	Significantly Rare Disjunct	G2G3	S1
Moss	10229	Platydictya confervoides	Alga-like Matted-moss	1950-08-26	H	4-Low	---	Significantly Rare Peripheral	G4G5	S1
Moss	27689	Pohlia lescuriana	Spherical Bulb Nodding Moss	2009-Pre	E	4-Low	---	Significantly Rare Throughout	G4?	S1?
Moss	23665	Racomitrium aciculare	Dark Mountain Fringe Moss	1994-06-04	E	3-Medium	---	Significantly Rare Peripheral	G5	S1?
Moss	24881	Scopelophila cataractae	Agoyan Cataract Moss	2007-04-Pre	E	4-Low	---	Significantly Rare Disjunct	G3	S1
Moss	27690	Scopelophila ligulata	Copper Moss	2009-Pre	E	4-Low	---	Significantly Rare Other	G5?	S1
Moss	19398	Scopelophila ligulata	Copper Moss	1951-04-27	H	3-Medium	---	Significantly Rare Other	G5?	S1
Moss	27691	Sphagnum capillifolium	Northern Peatmoss	2009-Pre	E	3-Medium	---	Significantly Rare Peripheral	G5	S1
Moss	27692	Sphagnum contortum	Contorted Peatmoss	2009-Pre	E	3-Medium	---	Threatened	G5	S1
Moss	4164	Sphagnum fallax	Pretty Peatmoss	2002-08-01	E	3-Medium	---	Significantly Rare Peripheral	G5	S2
Moss	5155	Sphagnum pylaesii	Simple Peatmoss	2002-03-08	E	3-Medium	---	Significantly Rare Disjunct	G4	S1

Element Occurrences Documented Within a One-mile Radius of the Project Area

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Moss	24884	Sphagnum squarrosum	Squarrose Peatmoss	2007-04-Pre	E	4-Low	---	Significantly Rare Peripheral	G5	S1
Moss	28685	Sphagnum squarrosum	Squarrose Peatmoss	2006	E	3-Medium	---	Significantly Rare Peripheral	G5	S1
Moss	27693	Sphagnum warnstorfii	Fen Peatmoss	2009-Pre	E	3-Medium	---	Significantly Rare Disjunct	G5	S1
Moth	38094	Lytrosis permagnaria	A Geometrid Moth	2017-05-16	E	2-High	---	Significantly Rare	G3G4	S2S3
Natural Community	9335	Acidic Cove Forest (Typic Subtype)	---	2018-05-23	B	4-Low	---	---	G5	S4
Natural Community	2410	Acidic Cove Forest (Typic Subtype)	---	2010	B	4-Low	---	---	G5	S4
Natural Community	25261	Acidic Cove Forest (Typic Subtype)	---	2010	C	2-High	---	---	G5	S4
Natural Community	28425	Acidic Cove Forest (Typic Subtype)	---	2010	B	3-Medium	---	---	G5	S4
Natural Community	14591	Acidic Cove Forest (Typic Subtype)	---	2010	C	3-Medium	---	---	G5	S4
Natural Community	38294	Acidic Cove Forest (Typic Subtype)	---	2018-05-16	B?	2-High	---	---	G5	S4
Natural Community	24733	Acidic Cove Forest (Typic Subtype)	---	2010	B	2-High	---	---	G5	S4
Natural Community	24505	Acidic Cove Forest (Typic Subtype)	---	2010	B	2-High	---	---	G5	S4
Natural Community	12140	Calcareous Oak-Walnut Forest	---	2004-08-25	B	2-High	---	---	G1Q	S1
Natural Community	4433	Calcareous Oak-Walnut Forest	---	2004-08-18	B?	3-Medium	---	---	G1Q	S1
Natural Community	18113	Canada Hemlock Forest (Typic Subtype)	---	2010	A	5-Very Low	---	---	G3G4	S1S2
Natural Community	9002	Canada Hemlock Forest (Typic Subtype)	---	2010	A?	4-Low	---	---	G3G4	S1S2
Natural Community	30629	Carolina Hemlock Forest (Mesic Subtype)	---	1992-04-19	A	4-Low	---	---	G1G2	S1
Natural Community	30627	Carolina Hemlock Forest (Mesic Subtype)	---	1980	A	4-Low	---	---	G1G2	S1

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	5813	Carolina Hemlock Forest (Pine Subtype)	---	1992-04-19	A	4-Low	---	---	G2	S1S2
Natural Community	284	Carolina Hemlock Forest (Typic Subtype)	---	1980	NR	4-Low	---	---	G2	S2
Natural Community	6821	Carolina Hemlock Forest (Typic Subtype)	---	1993	B?	3-Medium	---	---	G2	S2
Natural Community	24734	Carolina Hemlock Forest (Typic Subtype)	---	2006-06-29	B	2-High	---	---	G2	S2
Natural Community	596	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	A	3-Medium	---	---	G5	S5
Natural Community	3419	Chestnut Oak Forest (Dry Heath Subtype)	---	2009-05	C	3-Medium	---	---	G5	S5
Natural Community	25260	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	A	2-High	---	---	G5	S5
Natural Community	1041	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	BC	3-Medium	---	---	G5	S5
Natural Community	6991	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	B	4-Low	---	---	G5	S5
Natural Community	13344	Chestnut Oak Forest (Dry Heath Subtype)	---	2017-09-05	C	3-Medium	---	---	G5	S5
Natural Community	11457	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	BC	4-Low	---	---	G5	S5
Natural Community	17752	Chestnut Oak Forest (Dry Heath Subtype)	---	2000-09-07	C	2-High	---	---	G5	S5
Natural Community	8926	Chestnut Oak Forest (Dry Heath Subtype)	---	2000-09-28	C	3-Medium	---	---	G5	S5
Natural Community	13738	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	C	3-Medium	---	---	G5	S5
Natural Community	15972	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	C	3-Medium	---	---	G5	S5
Natural Community	14839	Chestnut Oak Forest (Dry Heath Subtype)	---	2012	B	2-High	---	---	G5	S5
Natural Community	36616	Chestnut Oak Forest (Dry Heath Subtype)	---	2016-06-09	C	2-High	---	---	G5	S5
Natural Community	30280	Chestnut Oak Forest (Herb Subtype)	---	2010	A	5-Very Low	---	---	G4G5	S4

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Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	19967	Chestnut Oak Forest (Herb Subtype)	---	2010	B	4-Low	---	---	G4G5	S4
Natural Community	5459	Chestnut Oak Forest (Herb Subtype)	---	2010	AB	3-Medium	---	---	G4G5	S4
Natural Community	24736	Chestnut Oak Forest (Herb Subtype)	---	2010	BC	1-Very High	---	---	G4G5	S4
Natural Community	30279	Chestnut Oak Forest (Mesic Subtype)	---	2010	A	5-Very Low	---	---	G4	S3S4
Natural Community	30278	Chestnut Oak Forest (White Pine Subtype)	---	2010	A	5-Very Low	---	---	G3	S3
Natural Community	30291	Chestnut Oak Forest (White Pine Subtype)	---	2009-05	C	4-Low	---	---	G3	S3
Natural Community	12168	Chestnut Oak Forest (White Pine Subtype)	---	2010	A	4-Low	---	---	G3	S3
Natural Community	28439	Chestnut Oak Forest (White Pine Subtype)	---	2010	B	2-High	---	---	G3	S3
Natural Community	8927	Chestnut Oak Forest (White Pine Subtype)	---	2010	C?	3-Medium	---	---	G3	S3
Natural Community	496	Dry-Mesic Basic Oak--Hickory Forest (Piedmont Subtype)	---	2004-08-25	C	4-Low	---	---	G3G4	S3
Natural Community	15498	Dry-Mesic Oak--Hickory Forest (Piedmont Subtype)	---	2010	B	4-Low	---	---	G4G5	S4
Natural Community	5384	Dry-Mesic Oak--Hickory Forest (Piedmont Subtype)	---	2010	C	3-Medium	---	---	G4G5	S4
Natural Community	30168	Heath Bald (Carolina Rhododendron Subtype)	---	2010	B	3-Medium	---	---	G2	S1
Natural Community	16439	Heath Bald (Carolina Rhododendron Subtype)	---	2010	A?	2-High	---	---	G2	S1
Natural Community	38295	High Elevation Red Oak Forest (Heath Subtype)	---	2018-05-16	C	2-High	---	---	G4	S3
Natural Community	9188	Low Elevation Basic Glade (Montane Subtype)	---	2010	A	3-Medium	---	---	G2	S2

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Natural Community	7397	Low Elevation Basic Glade (Montane Subtype)	---	1993-10-26	A	3-Medium	---	---	G2	S2
Natural Community	17824	Low Elevation Rocky Summit (Acidic Subtype)	---	1992-04-19	B	3-Medium	---	---	G3?	S2
Natural Community	2490	Low Elevation Rocky Summit (Acidic Subtype)	---	1992	A	3-Medium	---	---	G3?	S2
Natural Community	17255	Low Elevation Rocky Summit (Acidic Subtype)	---	1992-10	A?	2-High	---	---	G3?	S2
Natural Community	25257	Low Elevation Rocky Summit (Basic Subtype)	---	2007-10-01	B	2-High	---	---	G1	S1
Natural Community	13708	Low Elevation Rocky Summit (Basic Subtype)	---	1992	A	3-Medium	---	---	G1	S1
Natural Community	10372	Low Elevation Rocky Summit (Basic Subtype)	---	2000-09-14	C	3-Medium	---	---	G1	S1
Natural Community	24735	Low Elevation Rocky Summit (Basic Subtype)	---	2006-06-29	B	1-Very High	---	---	G1	S1
Natural Community	354	Low Elevation Rocky Summit (Quartzite Ledge Subtype)	---	2010	B	4-Low	---	---	G1	S1
Natural Community	14764	Low Elevation Rocky Summit (Quartzite Ledge Subtype)	---	2010	B?	2-High	---	---	G1	S1
Natural Community	944	Low Elevation Rocky Summit (Quartzite Ledge Subtype)	---	2010	B	2-High	---	---	G1	S1
Natural Community	355	Low Elevation Rocky Summit (Quartzite Ledge Subtype)	---	2010	B	2-High	---	---	G1	S1
Natural Community	36614	Low Mountain Pine Forest (Montane Pine Subtype)	---	2016-06-09	BC	2-High	---	---	G3G4	S2?
Natural Community	28431	Mesic Mixed Hardwood Forest (Piedmont Subtype)	---	2001-08-03	C	2-High	---	---	G3G4	S4

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Natural Community	11539	Mesic Mixed Hardwood Forest (Piedmont Subtype)	---	2016	C	2-High	---	---	G3G4	S4
Natural Community	18866	Montane Alluvial Forest (Small River Subtype)	---	2000-09-29	D	3-Medium	---	---	G3	S1
Natural Community	14823	Montane Cliff (Acidic Herb Subtype)	---	1988-06-18	A?	4-Low	---	---	G3G4	S3
Natural Community	3156	Montane Cliff (Acidic Herb Subtype)	---	1990	NR	4-Low	---	---	G3G4	S3
Natural Community	7460	Montane Cliff (Acidic Herb Subtype)	---	1992-04-19	A	4-Low	---	---	G3G4	S3
Natural Community	15226	Montane Cliff (Acidic Herb Subtype)	---	2012	A	3-Medium	---	---	G3G4	S3
Natural Community	35112	Montane Cliff (Acidic Herb Subtype)	---	2015-04-28	B	2-High	---	---	G3G4	S3
Natural Community	22675	Montane Cliff (Acidic Herb Subtype)	---	2004-08-25	C?	2-High	---	---	G3G4	S3
Natural Community	13401	Montane Cliff (Acidic Herb Subtype)	---	1986-08-24	B	2-High	---	---	G3G4	S3
Natural Community	1073	Montane Cliff (Calcareous Subtype)	---	2004-08-25	A	4-Low	---	---	G3G4	S1
Natural Community	11093	Montane Oak--Hickory Forest (Acidic Subtype)	---	2017-03-31	BC	3-Medium	---	---	G4G5	S4S5
Natural Community	7005	Montane Oak--Hickory Forest (Acidic Subtype)	---	2010	B	4-Low	---	---	G4G5	S4S5
Natural Community	3784	Montane Oak--Hickory Forest (Acidic Subtype)	---	2010	B	4-Low	---	---	G4G5	S4S5
Natural Community	5972	Montane Oak--Hickory Forest (Acidic Subtype)	---	2010	AB	3-Medium	---	---	G4G5	S4S5
Natural Community	22674	Montane Oak--Hickory Forest (Acidic Subtype)	---	2010	C?	2-High	---	---	G4G5	S4S5
Natural Community	24507	Montane Oak--Hickory Forest (Acidic Subtype)	---	2010	C	2-High	---	---	G4G5	S4S5
Natural Community	36615	Montane Oak--Hickory Forest (Acidic Subtype)	---	2016-06-09	B	2-High	---	---	G4G5	S4S5

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Natural Community	14976	Montane Oak--Hickory Forest (Basic Subtype)	---	2017-09-05	C	2-High	---	---	G3	S3
Natural Community	34071	Montane Oak--Hickory Forest (Low Dry Subtype)	---	2010	C?	2-High	---	---	G2G3	S2
Natural Community	5341	Montane Oak--Hickory Forest (White Pine Subtype)	---	2010	BC	4-Low	---	---	G2G3	S2
Natural Community	18838	Montane Oak--Hickory Forest (White Pine Subtype)	---	2010	C	3-Medium	---	---	G2G3	S2
Natural Community	7054	Piedmont Cliff (Basic Subtype)	---	2010	CD	2-High	---	---	G2?	S1
Natural Community	6881	Piedmont/Coastal Plain Heath Bluff	---		NR	2-High	---	---	G3	S3
Natural Community	38296	Pine--Oak/Heath (High Elevation Subtype)	---	2018-05-16	C	2-High	---	---	G2	S2
Natural Community	4882	Pine--Oak/Heath (Typic Subtype)	---	2010	C?	4-Low	---	---	G3	S3
Natural Community	25258	Pine--Oak/Heath (Typic Subtype)	---	2010	B	2-High	---	---	G3	S3
Natural Community	14052	Pine--Oak/Heath (Typic Subtype)	---	2010	B	4-Low	---	---	G3	S3
Natural Community	5376	Pine--Oak/Heath (Typic Subtype)	---	2010	NR	4-Low	---	---	G3	S3
Natural Community	6480	Pine--Oak/Heath (Typic Subtype)	---	2010	B	3-Medium	---	---	G3	S3
Natural Community	1330	Pine--Oak/Heath (Typic Subtype)	---	2010	BC	3-Medium	---	---	G3	S3
Natural Community	12986	Pine--Oak/Heath (Typic Subtype)	---	2010	B?	3-Medium	---	---	G3	S3
Natural Community	13851	Pine--Oak/Heath (Typic Subtype)	---	2010	CD	3-Medium	---	---	G3	S3
Natural Community	14816	Pine--Oak/Heath (Typic Subtype)	---	2010	C	3-Medium	---	---	G3	S3
Natural Community	6776	Pine--Oak/Heath (Typic Subtype)	---	2010	B	3-Medium	---	---	G3	S3

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Natural Community	4348	Pine--Oak/Heath (Typic Subtype)	---	2010	CD	3-Medium	---	---	G3	S3
Natural Community	30226	Rich Cove Forest (Boulderfield Subtype)	---	2010	A	3-Medium	---	---	G3	S2
Natural Community	15419	Rich Cove Forest (Foothills Intermediate Subtype)	---	2010	C?	4-Low	---	---	G4?	S3
Natural Community	13587	Rich Cove Forest (Foothills Intermediate Subtype)	---	2010	C	4-Low	---	---	G4?	S3
Natural Community	3819	Rich Cove Forest (Foothills Intermediate Subtype)	---	2010	C	3-Medium	---	---	G4?	S3
Natural Community	12170	Rich Cove Forest (Foothills Intermediate Subtype)	---	2015-04-14	BC	3-Medium	---	---	G4?	S3
Natural Community	3381	Rich Cove Forest (Foothills Intermediate Subtype)	---	2010	B	3-Medium	---	---	G4?	S3
Natural Community	7441	Rich Cove Forest (Foothills Intermediate Subtype)	---	2010	C?	3-Medium	---	---	G4?	S3
Natural Community	12369	Rich Cove Forest (Foothills Rich Subtype)	---	2010	A	3-Medium	---	---	G2G3	S2
Natural Community	12169	Rich Cove Forest (Foothills Rich Subtype)	---	2010	C	3-Medium	---	---	G2G3	S2
Natural Community	1217	Rich Cove Forest (Foothills Rich Subtype)	---	2010	A	3-Medium	---	---	G2G3	S2
Natural Community	22673	Rich Cove Forest (Montane Intermediate Subtype)	---	2010	C	2-High	---	---	G4	S4
Natural Community	14352	Rocky Bar and Shore (Alder-Yellowroot Subtype)	---	1992-04-19	A	4-Low	---	---	G3G4	S3
Natural Community	25256	Rocky Bar and Shore (Mixed Bar Subtype)	---	2007-10-09	C	2-High	---	---	G4	S3

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Natural Community	35115	Rocky Bar and Shore (Mountain Bedrock Scour Subtype)	---	2015-04-28	C	2-High	---	---	G3	S2
Natural Community	30644	Rocky Bar and Shore (Twisted Sedge Subtype)	---	1992-04-19	A	4-Low	---	---	G3G4	S3
Natural Community	20021	Southern Appalachian Bog (Typic Subtype)	---	2006-07-26	AB	2-High	---	---	G1G2	S1S2
Natural Community	6694	Southern Appalachian Bog (Typic Subtype)	---	2012	CD	2-High	---	---	G1G2	S1S2
Natural Community	4351	Spray Cliff	---	2009-05	C	2-High	---	---	G2	S2
Natural Community	13535	Spray Cliff	---	2017-09-05	C	2-High	---	---	G2	S2
Natural Community	1232	Spray Cliff	---	1992	NR	2-High	---	---	G2	S2
Natural Community	3805	Swamp Forest--Bog Complex (Typic Subtype)	---	2000-08-15	C?	3-Medium	---	---	G2	S2
Natural Community	11597	Upland Pool (Mountain Subtype)	---	1992-09-26	B?	2-High	---	---	G1	S1
Natural Community	14960	Upland Pool (Mountain Subtype)	---	1988-07-25	A?	2-High	---	---	G1	S1
Natural Community	656	White Pine Forest	---	1992-04-19	A?	4-Low	---	---	G2G3	S2
Reptile	1285	Crotalus horridus	Timber Rattlesnake	1974-07-07	E	4-Low	---	Special Concern	G4	S3
Reptile	19692	Crotalus horridus	Timber Rattlesnake	1974-08	H?	4-Low	---	Special Concern	G4	S3
Reptile	34815	Crotalus horridus	Timber Rattlesnake	2014-06-26	E	3-Medium	---	Special Concern	G4	S3
Reptile	7709	Crotalus horridus	Timber Rattlesnake	2000-08-04	E	3-Medium	---	Special Concern	G4	S3
Reptile	10324	Crotalus horridus	Timber Rattlesnake	2000-09-28	E	3-Medium	---	Special Concern	G4	S3
Reptile	18502	Glyptemys muhlenbergii	Bog Turtle	2005-06-01	B	3-Medium	Threatened Similar Appearance	Threatened	G3	S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Stonefly	38270	Nemocapnia carolina	Southern Snowfly	2017-03-23	E	2-High	---	Significantly Rare	G5	S1
Vascular Plant	22801	Anemone berlandieri	Southern Anemone	2005?	E	3-Medium	---	Endangered	G4?	S2
Vascular Plant	31084	Anemone caroliniana	Prairie Anemone	2001-07-14	E	2-High	---	Endangered	G5	S1
Vascular Plant	2924	Anticlea glauca	White Camas	2012-06-07	C	3-Medium	---	Significantly Rare Peripheral	G5T4T5	S1
Vascular Plant	34813	Asclepias purpurascens	Purple Milkweed	1983-08-04	E	3-Medium	---	Significantly Rare Throughout	G5?	S1?
Vascular Plant	1088	Asplenium bradleyi	Bradley's Spleenwort	1935-08	H	4-Low	---	Significantly Rare Peripheral	G4	S2
Vascular Plant	9063	Asplenium bradleyi	Bradley's Spleenwort	1994-Pre	E	3-Medium	---	Significantly Rare Peripheral	G4	S2
Vascular Plant	17313	Asplenium bradleyi	Bradley's Spleenwort	1988-07-24	CD	3-Medium	---	Significantly Rare Peripheral	G4	S2
Vascular Plant	6382	Asplenium bradleyi	Bradley's Spleenwort	1994-Pre	CD	3-Medium	---	Significantly Rare Peripheral	G4	S2
Vascular Plant	24882	Asplenium ruta-muraria var. cryptolepis	American Wall-rue	2007-04-Pre	E	4-Low	---	Special Concern Vulnerable	G5T5	S1
Vascular Plant	18316	Asplenium ruta-muraria var. cryptolepis	American Wall-rue	2012-06-07	A	3-Medium	---	Special Concern Vulnerable	G5T5	S1
Vascular Plant	11575	Asplenium ruta-muraria var. cryptolepis	American Wall-rue	2004-08-18	E	3-Medium	---	Special Concern Vulnerable	G5T5	S1
Vascular Plant	13031	Asplenium ruta-muraria var. cryptolepis	American Wall-rue	1997-06-13	C	3-Medium	---	Special Concern Vulnerable	G5T5	S1
Vascular Plant	27704	Berberis canadensis	American Barberry	2009-Pre	E	4-Low	---	Special Concern Vulnerable	G3	S2
Vascular Plant	22810	Berberis canadensis	American Barberry	2005?	E	3-Medium	---	Special Concern Vulnerable	G3	S2

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Vascular Plant	22352	Berberis canadensis	American Barberry	2005-06-14	D	2-High	---	Special Concern Vulnerable	G3	S2
Vascular Plant	7871	Botrychium lanceolatum var. angustisegmentum	Lance-leaf Moonwort	1987-06	B	3-Medium	---	Significantly Rare Peripheral	G5T4	S1
Vascular Plant	13237	Botrychium lanceolatum var. angustisegmentum	Lance-leaf Moonwort	1987	E	3-Medium	---	Significantly Rare Peripheral	G5T4	S1
Vascular Plant	21163	Botrychium lanceolatum var. angustisegmentum	Lance-leaf Moonwort	1996-07-24	C	3-Medium	---	Significantly Rare Peripheral	G5T4	S1
Vascular Plant	7184	Botrychium lanceolatum var. angustisegmentum	Lance-leaf Moonwort	1987-06	U	3-Medium	---	Significantly Rare Peripheral	G5T4	S1
Vascular Plant	17103	Botrychium lanceolatum var. angustisegmentum	Lance-leaf Moonwort	1987-06	NR	3-Medium	---	Significantly Rare Peripheral	G5T4	S1
Vascular Plant	10066	Botrychium matricariifolium	Daisy-leaf Moonwort	1993-06	B?	3-Medium	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	4866	Campanula aparinoides var. aparinoides	Marsh Bellflower	1988-07-16	D	3-Medium	---	Significantly Rare Peripheral	G5TNR	S2
Vascular Plant	8204	Campanula aparinoides var. aparinoides	Marsh Bellflower	1972-08	H	3-Medium	---	Significantly Rare Peripheral	G5TNR	S2
Vascular Plant	34814	Cardamine clematitis	Mountain Bittercress	2014-04-20	E	2-High	---	Significantly Rare Throughout	G3	S2S3
Vascular Plant	35906	Carex hitchcockiana	Hitchcock's Sedge	1995-07-11	E	2-High	---	Special Concern Vulnerable	G5	S1
Vascular Plant	22816	Celastrus scandens	American Bittersweet	2005?	E	4-Low	---	Endangered	G5	S2?
Vascular Plant	22812	Celastrus scandens	American Bittersweet	2005?	E	3-Medium	---	Endangered	G5	S2?
Vascular Plant	21236	Celastrus scandens	American Bittersweet	2012-06-07	D	2-High	---	Endangered	G5	S2?
Vascular Plant	22815	Celastrus scandens	American Bittersweet	2005?	E	3-Medium	---	Endangered	G5	S2?
Vascular Plant	22814	Celastrus scandens	American Bittersweet	2005?	E	3-Medium	---	Endangered	G5	S2?
Vascular Plant	22817	Chelone cuthbertii	Cuthbert's Turtlehead	2005?	E	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	10620	Chelone cuthbertii	Cuthbert's Turtlehead	1992-05	C	3-Medium	---	Special Concern Vulnerable	G3	S3

Element Occurrences Documented Within a One-mile Radius of the Project Area

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Vascular Plant	23596	Chelone obliqua	Red Turtlehead	2005-Pre	E	4-Low	---	Significantly Rare Throughout	G4	S2
Vascular Plant	612	Cirsium carolinianum	Carolina Thistle	1993-10-27	D	3-Medium	---	Endangered	G5	S2
Vascular Plant	24428	Cirsium carolinianum	Carolina Thistle	2006-06-28	C	2-High	---	Endangered	G5	S2
Vascular Plant	26309	Clematis catesbyana	Coastal Virgin's-bower	2012-06-07	E	2-High	---	Significantly Rare Peripheral	G4G5	S2
Vascular Plant	26310	Clematis catesbyana	Coastal Virgin's-bower	1995-07-11	E	2-High	---	Significantly Rare Peripheral	G4G5	S2
Vascular Plant	22820	Collinsonia tuberosa	Piedmont Horsebalm	1996-09-13	E	3-Medium	---	Special Concern Vulnerable	G3G4	S1
Vascular Plant	31764	Collinsonia verticillata	Whorled Horsebalm	2001-07-14	E	2-High	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	26342	Corallorhiza wisteriana	Spring Coral-root	1979-Post	F	3-Medium	---	Significantly Rare Other	G5	S1
Vascular Plant	23649	Cuscuta coryli	Hazel Dodder	2005-Pre	E	4-Low	---	Significantly Rare Throughout	G5?	S1?
Vascular Plant	23828	Danthonia epilis	Bog Oatgrass	1996	E	2-High	---	Significantly Rare Throughout	G3G4	S3
Vascular Plant	21051	Delphinium exaltatum	Tall Larkspur	2012-06-07	B?	2-High	---	Endangered	G3	S2
Vascular Plant	33874	Dendrolycopodium dendroideum	Prickly Ground-pine	1992-01-01	E	2-High	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	28936	Dendrolycopodium hickeyi	Pennsylvania Ground-pine	1923-08-16	H	3-Medium	---	Significantly Rare Peripheral	G5	S2?
Vascular Plant	9712	Dicentra eximia	Bleeding Heart	1969-05-01	H	3-Medium	---	Significantly Rare Peripheral	G4	S3
Vascular Plant	21169	Dicentra eximia	Bleeding Heart	2007	CD	3-Medium	---	Significantly Rare Peripheral	G4	S3
Vascular Plant	17182	Dicentra eximia	Bleeding Heart	2006-06-28	D	2-High	---	Significantly Rare Peripheral	G4	S3

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Vascular Plant	10938	Echinacea purpurea	Purple Coneflower	1996	X?	2-High	---	Special Concern Vulnerable	G4	S1
Vascular Plant	23619	Eupatorium saltuense	Tall Boneset	2005-Pre	E	5-Very Low	---	Significantly Rare Limited	G4	S1?
Vascular Plant	15206	Fothergilla major	Large Witch-alder	2000-06-07	B?	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	15751	Fothergilla major	Large Witch-alder	1965-05-02	H	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	23236	Fothergilla major	Large Witch-alder	2006-04-15	E	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	17523	Fothergilla major	Large Witch-alder	2006-09-21	A	2-High	---	Significantly Rare Throughout	G3	S3
Vascular Plant	463	Fothergilla major	Large Witch-alder	1992-09-05	E	2-High	---	Significantly Rare Throughout	G3	S3
Vascular Plant	20081	Fothergilla major	Large Witch-alder	2006-10-05	C	1-Very High	---	Significantly Rare Throughout	G3	S3
Vascular Plant	8062	Fothergilla major	Large Witch-alder	2000-06-07	B	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	16535	Fothergilla major	Large Witch-alder	2000-05-01	B	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	28525	Fothergilla major	Large Witch-alder	2009-10-19	A	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	26630	Fothergilla major	Large Witch-alder	1992-06-16	E	2-High	---	Significantly Rare Throughout	G3	S3

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Vascular Plant	26629	Fothergilla major	Large Witch-alder	1992-09-08	E	2-High	---	Significantly Rare Throughout	G3	S3
Vascular Plant	26628	Fothergilla major	Large Witch-alder	1992-08-28	E	2-High	---	Significantly Rare Throughout	G3	S3
Vascular Plant	35114	Fothergilla major	Large Witch-alder	2015-04-28	C?	2-High	---	Significantly Rare Throughout	G3	S3
Vascular Plant	23924	Hackelia virginiana	Virginia Stickseed	2005-Pre	E	5-Very Low	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	24120	Hackelia virginiana	Virginia Stickseed	1952-08	H	4-Low	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	23930	Hackelia virginiana	Virginia Stickseed	1952-08-08	H	4-Low	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	27604	Helianthus laevigatus	Smooth Sunflower	2009-Pre	E	4-Low	---	Special Concern Vulnerable	G4	S3
Vascular Plant	5552	Helianthus laevigatus	Smooth Sunflower	1993-10-27	E	3-Medium	---	Special Concern Vulnerable	G4	S3
Vascular Plant	25271	Helianthus laevigatus	Smooth Sunflower	2008-06-23	CD	2-High	---	Special Concern Vulnerable	G4	S3
Vascular Plant	26338	Helianthus laevigatus	Smooth Sunflower	2006-09-07	B	2-High	---	Special Concern Vulnerable	G4	S3
Vascular Plant	17280	Helianthus laevigatus	Smooth Sunflower	2008-10-20	AB	2-High	---	Special Concern Vulnerable	G4	S3
Vascular Plant	6731	Hexalectris spicata	Crested Coralroot	1958-09-09	X	4-Low	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	24981	Hexastylis contracta	Mountain Heartleaf	2007-05-24	CD	2-High	---	Endangered	G3	S1
Vascular Plant	14504	Hexastylis naniflora	Dwarf-flowered Heartleaf	2016-05-24	A	2-High	Threatened	Threatened	G3	S3
Vascular Plant	28351	Hexastylis naniflora	Dwarf-flowered Heartleaf	2009-04-07	E	3-Medium	Threatened	Threatened	G3	S3
Vascular Plant	38033	Hexastylis naniflora	Dwarf-flowered Heartleaf	2017-03-28	BC	2-High	Threatened	Threatened	G3	S3

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Vascular Plant	36661	Hexastylis naniflora	Dwarf-flowered Heartleaf	2016-04-05	A	1-Very High	Threatened	Threatened	G3	S3
Vascular Plant	22281	Hexastylis naniflora	Dwarf-flowered Heartleaf	2017-03-28	CD	2-High	Threatened	Threatened	G3	S3
Vascular Plant	22233	Hexastylis naniflora	Dwarf-flowered Heartleaf	2001-10	E	3-Medium	Threatened	Threatened	G3	S3
Vascular Plant	22283	Hexastylis naniflora	Dwarf-flowered Heartleaf	2017-03-28	BC	1-Very High	Threatened	Threatened	G3	S3
Vascular Plant	28352	Hexastylis naniflora	Dwarf-flowered Heartleaf	2009-04-07	E	3-Medium	Threatened	Threatened	G3	S3
Vascular Plant	20247	Hexastylis naniflora	Dwarf-flowered Heartleaf	2003-03-21	U	3-Medium	Threatened	Threatened	G3	S3
Vascular Plant	18888	Hexastylis naniflora	Dwarf-flowered Heartleaf	1996-05-03	CD	3-Medium	Threatened	Threatened	G3	S3
Vascular Plant	35113	Hexastylis naniflora	Dwarf-flowered Heartleaf	2015-04-28	AB	2-High	Threatened	Threatened	G3	S3
Vascular Plant	19217	Hexastylis naniflora	Dwarf-flowered Heartleaf	1991-Spring	U	3-Medium	Threatened	Threatened	G3	S3
Vascular Plant	626	Hexastylis naniflora	Dwarf-flowered Heartleaf	1985-03	U	3-Medium	Threatened	Threatened	G3	S3
Vascular Plant	21389	Hexastylis naniflora	Dwarf-flowered Heartleaf	2009-04-07	A	3-Medium	Threatened	Threatened	G3	S3
Vascular Plant	28350	Hexastylis naniflora	Dwarf-flowered Heartleaf	2009-04-07	E	3-Medium	Threatened	Threatened	G3	S3
Vascular Plant	35185	Hexastylis naniflora	Dwarf-flowered Heartleaf	2015-05-05	B?	2-High	Threatened	Threatened	G3	S3
Vascular Plant	22282	Hexastylis naniflora	Dwarf-flowered Heartleaf	2006-10-25	X	2-High	Threatened	Threatened	G3	S3
Vascular Plant	5089	Hexastylis naniflora	Dwarf-flowered Heartleaf	2002	D	3-Medium	Threatened	Threatened	G3	S3
Vascular Plant	22284	Hexastylis naniflora	Dwarf-flowered Heartleaf	2017-03-28	A	2-High	Threatened	Threatened	G3	S3
Vascular Plant	21680	Hexastylis naniflora	Dwarf-flowered Heartleaf	1995	D	3-Medium	Threatened	Threatened	G3	S3
Vascular Plant	21388	Hexastylis naniflora	Dwarf-flowered Heartleaf	2013-05-14	A	3-Medium	Threatened	Threatened	G3	S3
Vascular Plant	28353	Hexastylis naniflora	Dwarf-flowered Heartleaf	2009-04-07	E	3-Medium	Threatened	Threatened	G3	S3
Vascular Plant	3600	Hexastylis naniflora	Dwarf-flowered Heartleaf	1981-05	X	2-High	Threatened	Threatened	G3	S3
Vascular Plant	36701	Hexastylis naniflora	Dwarf-flowered Heartleaf	2012-03-21	B?	2-High	Threatened	Threatened	G3	S3
Vascular Plant	21387	Hexastylis naniflora	Dwarf-flowered Heartleaf	2013	A	2-High	Threatened	Threatened	G3	S3
Vascular Plant	16347	Hexastylis naniflora	Dwarf-flowered Heartleaf	2002-04-18	D	2-High	Threatened	Threatened	G3	S3
Vascular Plant	30019	Hexastylis naniflora	Dwarf-flowered Heartleaf	2016-03-20	Ci	2-High	Threatened	Threatened	G3	S3
Vascular Plant	22493	Hexastylis naniflora	Dwarf-flowered Heartleaf	2010-05-26	C?r	2-High	Threatened	Threatened	G3	S3
Vascular Plant	37217	Hexastylis naniflora	Dwarf-flowered Heartleaf	2017-04	C	2-High	Threatened	Threatened	G3	S3
Vascular Plant	6117	Hexastylis naniflora	Dwarf-flowered Heartleaf	1981-05	X	2-High	Threatened	Threatened	G3	S3
Vascular Plant	8307	Hexastylis naniflora	Dwarf-flowered Heartleaf	2005-05-11	A	2-High	Threatened	Threatened	G3	S3
Vascular Plant	22491	Hexastylis naniflora	Dwarf-flowered Heartleaf	2010-05-26	D?r	2-High	Threatened	Threatened	G3	S3
Vascular Plant	22492	Hexastylis naniflora	Dwarf-flowered Heartleaf	2006-06	D	2-High	Threatened	Threatened	G3	S3
Vascular Plant	28343	Hexastylis naniflora	Dwarf-flowered Heartleaf	2009-04-07	C	2-High	Threatened	Threatened	G3	S3
Vascular Plant	36589	Hexastylis naniflora	Dwarf-flowered Heartleaf	2016-05-06	D?	2-High	Threatened	Threatened	G3	S3
Vascular Plant	36703	Hexastylis naniflora	Dwarf-flowered Heartleaf	2012-03-20	C	2-High	Threatened	Threatened	G3	S3
Vascular Plant	20246	Hexastylis naniflora	Dwarf-flowered Heartleaf	2003-03-21	U	2-High	Threatened	Threatened	G3	S3

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Vascular Plant	22266	Hexastylis naniflora	Dwarf-flowered Heartleaf	2005-05-06	D	2-High	Threatened	Threatened	G3	S3
Vascular Plant	21386	Hexastylis naniflora	Dwarf-flowered Heartleaf	2016-05-24	D	2-High	Threatened	Threatened	G3	S3
Vascular Plant	6412	Hexastylis naniflora	Dwarf-flowered Heartleaf	2005-05	D	2-High	Threatened	Threatened	G3	S3
Vascular Plant	20254	Hexastylis naniflora	Dwarf-flowered Heartleaf	2003-03-21	U	2-High	Threatened	Threatened	G3	S3
Vascular Plant	33396	Hexastylis rhombiformis	French Broad Heartleaf	1992-06-14	E	2-High	---	Significantly Rare Limited	G3	S3
Vascular Plant	33394	Hexastylis rhombiformis	French Broad Heartleaf	1992	E	2-High	---	Significantly Rare Limited	G3	S3
Vascular Plant	24466	Hudsonia montana	Mountain Golden-heather	2007-10-15	B	2-High	Threatened	Threatened	G1	S1
Vascular Plant	18140	Hudsonia montana	Mountain Golden-heather	2005-10-05	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24459	Hudsonia montana	Mountain Golden-heather	2007-10-02	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	16324	Hudsonia montana	Mountain Golden-heather	2009	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	19729	Hudsonia montana	Mountain Golden-heather	2004-Spring	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24474	Hudsonia montana	Mountain Golden-heather	2007-10-29	C	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24468	Hudsonia montana	Mountain Golden-heather	2007-10-16	C	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24458	Hudsonia montana	Mountain Golden-heather	2004-Spring	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24475	Hudsonia montana	Mountain Golden-heather	2007-10-29	BC	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24447	Hudsonia montana	Mountain Golden-heather	2003-08	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24452	Hudsonia montana	Mountain Golden-heather	2004-Spring	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24476	Hudsonia montana	Mountain Golden-heather	2007-08-22	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24463	Hudsonia montana	Mountain Golden-heather	2007-10-02	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24442	Hudsonia montana	Mountain Golden-heather	2004-Spring	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24456	Hudsonia montana	Mountain Golden-heather	2006-10-05	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24465	Hudsonia montana	Mountain Golden-heather	2007-10-09	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24469	Hudsonia montana	Mountain Golden-heather	2007-08-22	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24450	Hudsonia montana	Mountain Golden-heather	1982	F	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24443	Hudsonia montana	Mountain Golden-heather	2004-Spring	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24467	Hudsonia montana	Mountain Golden-heather	2007-08-22	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24448	Hudsonia montana	Mountain Golden-heather	2004-Spring	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24444	Hudsonia montana	Mountain Golden-heather	2003-08	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24449	Hudsonia montana	Mountain Golden-heather	1982	F	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24457	Hudsonia montana	Mountain Golden-heather	2004-Spring	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24451	Hudsonia montana	Mountain Golden-heather	2003-08	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24464	Hudsonia montana	Mountain Golden-heather	2007-10-09	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	5348	Hudsonia montana	Mountain Golden-heather	2003-08	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24462	Hudsonia montana	Mountain Golden-heather	2004-Spring	F	2-High	Threatened	Threatened	G1	S1

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	23378	Ilex longipes	Georgia Holly	2003	E	4-Low	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	1141	Isotria medeoloides	Small Whorled Pogonia	2013-05-14	C	3-Medium	Threatened	Threatened	G2?	S1
Vascular Plant	22858	Liatris aspera	Rough Blazing-star	2005?	E	3-Medium	---	Threatened	G4G5	S1
Vascular Plant	11855	Liatris aspera	Rough Blazing-star	1891-07	H	3-Medium	---	Threatened	G4G5	S1
Vascular Plant	22860	Liatris aspera	Rough Blazing-star	2005?	E	3-Medium	---	Threatened	G4G5	S1
Vascular Plant	14821	Liatris aspera	Rough Blazing-star	1969-09	F	3-Medium	---	Threatened	G4G5	S1
Vascular Plant	7097	Liatris aspera	Rough Blazing-star	1992-08	D	3-Medium	---	Threatened	G4G5	S1
Vascular Plant	10986	Liatris helleri	Heller's Blazing-star	2005-10-05	B	3-Medium	Threatened	Threatened	G2Q	S2
Vascular Plant	25984	Liatris helleri	Heller's Blazing-star	2001-08-27	A	2-High	Threatened	Threatened	G2Q	S2
Vascular Plant	13412	Liatris helleri	Heller's Blazing-star	2001-08-22	B	3-Medium	Threatened	Threatened	G2Q	S2
Vascular Plant	358	Liatris helleri	Heller's Blazing-star	2005-10-05	Br	3-Medium	Threatened	Threatened	G2Q	S2
Vascular Plant	25940	Liatris helleri	Heller's Blazing-star	2006-10-05	CD	1-Very High	Threatened	Threatened	G2Q	S2
Vascular Plant	9856	Liatris microcephala	Small-head Blazing-star	1992	E	3-Medium	---	Special Concern Vulnerable	G3G4	S1
Vascular Plant	10575	Liatris turgida	Shale-barren Blazing-star	2001-07-15	D	4-Low	---	Significantly Rare Throughout	G3	S1S2
Vascular Plant	22863	Liatris turgida	Shale-barren Blazing-star	2005?	E	3-Medium	---	Significantly Rare Throughout	G3	S1S2
Vascular Plant	9739	Liatris turgida	Shale-barren Blazing-star	2007-09-06	E	3-Medium	---	Significantly Rare Throughout	G3	S1S2
Vascular Plant	16385	Liatris turgida	Shale-barren Blazing-star	2006-09-07	B	2-High	---	Significantly Rare Throughout	G3	S1S2
Vascular Plant	3380	Liatris turgida	Shale-barren Blazing-star	1993-10	C	3-Medium	---	Significantly Rare Throughout	G3	S1S2
Vascular Plant	14830	Liatris turgida	Shale-barren Blazing-star	1992-08	D	3-Medium	---	Significantly Rare Throughout	G3	S1S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	4927	Liatris turgida	Shale-barren Blazing-star	1992-07	D	3-Medium	---	Significantly Rare Throughout	G3	S1S2
Vascular Plant	2186	Liatris turgida	Shale-barren Blazing-star	1994-Pre	E	3-Medium	---	Significantly Rare Throughout	G3	S1S2
Vascular Plant	5104	Liatris turgida	Shale-barren Blazing-star	1994-Pre	E	3-Medium	---	Significantly Rare Throughout	G3	S1S2
Vascular Plant	10859	Liatris turgida	Shale-barren Blazing-star	1992-08	D	3-Medium	---	Significantly Rare Throughout	G3	S1S2
Vascular Plant	10577	Liatris turgida	Shale-barren Blazing-star	1993-09	C	3-Medium	---	Significantly Rare Throughout	G3	S1S2
Vascular Plant	26431	Liatris turgida	Shale-barren Blazing-star	2007-09-06	B	3-Medium	---	Significantly Rare Throughout	G3	S1S2
Vascular Plant	23806	Lysimachia tonsa	Southern Loosestrife	2005	E	5-Very Low	---	Significantly Rare Peripheral	G4	S2
Vascular Plant	2285	Matelea decipiens	Glade Milkvine	1994-Pre	D	3-Medium	---	Significantly Rare Peripheral	G5	S3
Vascular Plant	8381	Mononeuria groenlandica	Greenland Sandwort	2003?	E	3-Medium	---	Threatened	G5	S2
Vascular Plant	11303	Mononeuria groenlandica	Greenland Sandwort	2012-11-17	E	3-Medium	---	Threatened	G5	S2
Vascular Plant	6926	Mononeuria groenlandica	Greenland Sandwort	1993-10-26	D	3-Medium	---	Threatened	G5	S2
Vascular Plant	27708	Monotropsis odorata	Sweet Pinesap	2009-Pre	E	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	1632	Monotropsis odorata	Sweet Pinesap	1970-04-12	H	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	22978	Monotropsis odorata	Sweet Pinesap	2006-03-16	E	3-Medium	---	Special Concern Vulnerable	G3	S3

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	22976	Monotropsis odorata	Sweet Pinesap	2006-03-16	E	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	12387	Monotropsis odorata	Sweet Pinesap	2017-03-19	F	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	17478	Monotropsis odorata	Sweet Pinesap	2001-07-16	E	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	14371	Monotropsis odorata	Sweet Pinesap	1990-03	C	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	8236	Monotropsis odorata	Sweet Pinesap	1988?	D	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	6158	Monotropsis odorata	Sweet Pinesap	1993-05	D	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	14633	Monotropsis odorata	Sweet Pinesap	1991-04	D	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	7919	Monotropsis odorata	Sweet Pinesap	1997-06-13	C	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	2024	Monotropsis odorata	Sweet Pinesap	1993-04	D	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	8235	Monotropsis odorata	Sweet Pinesap	1988?	H	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	22977	Monotropsis odorata	Sweet Pinesap	2006-03-16	E	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	12234	Monotropsis odorata	Sweet Pinesap	1993-04	D	3-Medium	---	Special Concern Vulnerable	G3	S3

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	6264	Monotropsis odorata	Sweet Pinesap	1994-Pre	E	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	9100	Monotropsis odorata	Sweet Pinesap	1986-Spring	D	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	2307	Monotropsis odorata	Sweet Pinesap	1993-10	A	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	11109	Monotropsis odorata	Sweet Pinesap	1977-06	H	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	35171	Monotropsis odorata	Sweet Pinesap	2013-Fall	E	2-High	---	Special Concern Vulnerable	G3	S3
Vascular Plant	26652	Monotropsis odorata	Sweet Pinesap	1992-06-08	E	2-High	---	Special Concern Vulnerable	G3	S3
Vascular Plant	25013	Monotropsis odorata	Sweet Pinesap	2010-03-25	B	2-High	---	Special Concern Vulnerable	G3	S3
Vascular Plant	22979	Monotropsis odorata	Sweet Pinesap	2006-03-16	C	2-High	---	Special Concern Vulnerable	G3	S3
Vascular Plant	22980	Monotropsis odorata	Sweet Pinesap	2006-03-24	B	2-High	---	Special Concern Vulnerable	G3	S3
Vascular Plant	21310	Nabalus albus	Northern Rattlesnake-root	2014-09-24	A?	4-Low	---	Threatened	G5	S2?
Vascular Plant	9071	Oenothera perennis	Perennial Sundrops	1991-06-15	F	3-Medium	---	Special Concern Vulnerable	G5	S2
Vascular Plant	22877	Packera paupercula var. paupercula	Balsam Ragwort	2005?	E	3-Medium	---	Significantly Rare Peripheral	G5	S1?
Vascular Plant	22874	Packera paupercula var. paupercula	Balsam Ragwort	2005?	E	3-Medium	---	Significantly Rare Peripheral	G5	S1?

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	22872	Packera paupercula var. paupercula	Balsam Ragwort	2005?	E	3-Medium	---	Significantly Rare Peripheral	G5	S1?
Vascular Plant	10213	Parthenium auriculatum	Glade Wild Quinine	1993-10-27	D	3-Medium	---	Significantly Rare Throughout	G3G4	S3
Vascular Plant	26387	Parthenium auriculatum	Glade Wild Quinine	2008-08-21	B	2-High	---	Significantly Rare Throughout	G3G4	S3
Vascular Plant	24445	Parthenium auriculatum	Glade Wild Quinine	2006-06-28	C	2-High	---	Significantly Rare Throughout	G3G4	S3
Vascular Plant	23547	Platanthera herbiola	Northern Rein Orchid	2005-05-30	AB	2-High	---	Significantly Rare Peripheral	G4?T4Q	S1S2
Vascular Plant	6414	Quercus ilicifolia	Bear Oak	2013-02-18	B	3-Medium	---	Endangered	G5	S2
Vascular Plant	22883	Quercus prinoides	Dwarf Chinquapin Oak	2005?	E	4-Low	---	Endangered	G5	S1
Vascular Plant	12037	Rhus michauxii	Michaux's Sumac	1917-Pre	H	5-Very Low	Endangered	Endangered	G2G3	S2
Vascular Plant	4415	Robinia hispida var. fertilis	Fruitful Locust	1922-06	H	3-Medium	---	Significantly Rare Other	G4T1Q	S1
Vascular Plant	31434	Robinia viscosa	Clammy Locust	2009-Pre	X	4-Low	---	Significantly Rare Throughout	G3	S1
Vascular Plant	22798	Sceptridium jenmanii	Alabama Grape-fern	2005?	E	4-Low	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	22795	Sceptridium jenmanii	Alabama Grape-fern	2005?	E	3-Medium	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	12894	Sceptridium jenmanii	Alabama Grape-fern	1993-10-27	B	3-Medium	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	16509	Sceptridium jenmanii	Alabama Grape-fern	1987-09	D	3-Medium	---	Special Concern Vulnerable	G3G4	S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	19576	Sceptridium jenmanii	Alabama Grape-fern	1994-Pre	D	3-Medium	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	22782	Sceptridium jenmanii	Alabama Grape-fern	2005?	E	2-High	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	13173	Sceptridium oneidense	Blunt-lobed Grape-fern	1987-07	BC	3-Medium	---	Significantly Rare Peripheral	G4	S2
Vascular Plant	8704	Sisyrinchium dichotomum	White Irisette	2008-05-30	A	3-Medium	Endangered	Endangered	G2	S2
Vascular Plant	24660	Sisyrinchium dichotomum	White Irisette	2007-06-08	D	2-High	Endangered	Endangered	G2	S2
Vascular Plant	25272	Sisyrinchium dichotomum	White Irisette	2007-06-08	D?	2-High	Endangered	Endangered	G2	S2
Vascular Plant	21479	Solidago rigida var. rigida	Prairie Bold Goldenrod	2012-06-07	E	2-High	---	Threatened	G5T5	S1
Vascular Plant	23906	Solidago ulmifolia	Elm-leaf Goldenrod	2005-Pre	E	4-Low	---	Significantly Rare Disjunct	G5	S1?
Vascular Plant	31922	Solidago ulmifolia	Elm-leaf Goldenrod	2001-07-15	E	2-High	---	Significantly Rare Disjunct	G5	S1?
Vascular Plant	34816	Stachys tenuifolia	Smooth Hedge-nettle	2006-06-30	E	2-High	---	Significantly Rare Disjunct	G5	S1
Vascular Plant	14837	Stenanthium leimanthoides	Pinebarren Death-camas	1990-07-01	D	3-Medium	---	Threatened	G4Q	S1
Vascular Plant	21090	Stenanthium leimanthoides	Pinebarren Death-camas	2002-08-03	D	3-Medium	---	Threatened	G4Q	S1
Vascular Plant	33632	Stenanthium leimanthoides	Pinebarren Death-camas	1992-09-05	E	2-High	---	Threatened	G4Q	S1
Vascular Plant	33630	Stenanthium leimanthoides	Pinebarren Death-camas	1992-07-22	E	2-High	---	Threatened	G4Q	S1
Vascular Plant	23734	Stewartia ovata	Mountain Camellia	2006-Pre	E	3-Medium	---	Significantly Rare Peripheral	G4	S3
Vascular Plant	33941	Thaspium pinnatifidum	Mountain Thaspium	2014-09-24	B?	2-High	---	Threatened	G2G3	S1
Vascular Plant	879	Thermopsis fraxinifolia	Ash-leaved Golden-banner	1892-06-15	H	4-Low	---	Special Concern Vulnerable	G3?	S2?
Vascular Plant	34940	Thermopsis fraxinifolia	Ash-leaved Golden-banner	1932-1892	H	4-Low	---	Special Concern Vulnerable	G3?	S2?

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	6100	Thermopsis fraxinifolia	Ash-leaved Golden-banner	1993-06	F	3-Medium	---	Special Concern Vulnerable	G3?	S2?
Vascular Plant	5555	Thermopsis fraxinifolia	Ash-leaved Golden-banner	2001-06-21	B?	3-Medium	---	Special Concern Vulnerable	G3?	S2?
Vascular Plant	16374	Thermopsis fraxinifolia	Ash-leaved Golden-banner	1987	C	3-Medium	---	Special Concern Vulnerable	G3?	S2?
Vascular Plant	33575	Thermopsis fraxinifolia	Ash-leaved Golden-banner	1992-08-24	E	2-High	---	Special Concern Vulnerable	G3?	S2?
Vascular Plant	4636	Thermopsis mollis	Appalachian Golden-banner	1973-05-13	H	3-Medium	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	21336	Thermopsis mollis	Appalachian Golden-banner	2002-03-08	C	3-Medium	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	21338	Thermopsis mollis	Appalachian Golden-banner	2002-07-28	B	3-Medium	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	21335	Thermopsis mollis	Appalachian Golden-banner	2002-06-21	D	3-Medium	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	14102	Thermopsis mollis	Appalachian Golden-banner	1990-04	D	3-Medium	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	10788	Thermopsis mollis	Appalachian Golden-banner	2001-06-21	CD	3-Medium	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	20155	Thermopsis mollis	Appalachian Golden-banner	2007-05	C	1-Very High	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	25289	Thermopsis mollis	Appalachian Golden-banner	2007-06-08	B?	2-High	---	Special Concern Vulnerable	G3G4	S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	25290	Thermopsis mollis	Appalachian Golden-banner	2007-07-16	C	2-High	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	24885	Tradescantia virginiana	Virginia Spiderwort	2007-04-Pre	E	4-Low	---	Threatened	G5	S2
Vascular Plant	11481	Trichophorum cespitosum	Deerhair Bulrush	1986-05-27	A	3-Medium	---	Significantly Rare Disjunct	G5	S2S3
Vascular Plant	34422	Trichophorum cespitosum	Deerhair Bulrush	1990-09-19	E	3-Medium	---	Significantly Rare Disjunct	G5	S2S3
Vascular Plant	26620	Trichophorum cespitosum	Deerhair Bulrush	1992-09-05	E	2-High	---	Significantly Rare Disjunct	G5	S2S3
Vascular Plant	23938	Trichostema setaceum	Narrowleaf Bluecurls	2005-Pre	E	5-Very Low	---	Significantly Rare Throughout	G5	S2
Vascular Plant	14184	Trillium simile	Sweet White Trillium	1938-04-15	H	4-Low	---	Threatened	G3	S2
Vascular Plant	15582	Trillium simile	Sweet White Trillium	1994-Pre	E	3-Medium	---	Threatened	G3	S2
Vascular Plant	503	Trillium simile	Sweet White Trillium	1993-10	C?	3-Medium	---	Threatened	G3	S2
Vascular Plant	15399	Trillium simile	Sweet White Trillium	1994-03	D	3-Medium	---	Threatened	G3	S2
Vascular Plant	11823	Trillium simile	Sweet White Trillium	1980-Post	H	3-Medium	---	Threatened	G3	S2
Vascular Plant	5798	Trillium simile	Sweet White Trillium	1988-Spring	C	3-Medium	---	Threatened	G3	S2
Vascular Plant	3496	Trillium simile	Sweet White Trillium	1991-Spring	C	3-Medium	---	Threatened	G3	S2
Vascular Plant	19997	Trillium simile	Sweet White Trillium	1994-Pre	E	3-Medium	---	Threatened	G3	S2
Vascular Plant	17704	Trillium simile	Sweet White Trillium	1992-06	D	3-Medium	---	Threatened	G3	S2
Vascular Plant	9013	Trillium simile	Sweet White Trillium	1993	CD	3-Medium	---	Threatened	G3	S2
Vascular Plant	3607	Trillium simile	Sweet White Trillium	1993-Spring	X?	3-Medium	---	Threatened	G3	S2
Vascular Plant	25067	Trillium simile	Sweet White Trillium	2017-03-31	B?	2-High	---	Threatened	G3	S2
Vascular Plant	25066	Trillium simile	Sweet White Trillium	2007-04-03	BC	2-High	---	Threatened	G3	S2
Vascular Plant	10624	Vaccinium macrocarpon	Cranberry	1989-06-01	E	3-Medium	---	Threatened	G5	S2
Vascular Plant	2229	Vaccinium macrocarpon	Cranberry	2006-07-26	BC	2-High	---	Threatened	G5	S2
Vascular Plant	4643	Woodsia appalachiana	Appalachian Cliff Fern	1994-Pre	E	3-Medium	---	Significantly Rare Peripheral	G4	S2

Natural Areas Documented Within a One-mile Radius of the Project Area

Site Name	Representational Rating	Collective Rating
Camp Creek Bluff	R5 (General)	C5 (General)
Jonas Ridge Wetland	R2 (Very High)	C4 (Moderate)
Cranberry Knob Wetlands	R3 (High)	C4 (Moderate)

Natural Areas Documented Within a One-mile Radius of the Project Area

Site Name	Representational Rating	Collective Rating
Simms Hill/Little River Uplands	R3 (High)	C4 (Moderate)
Brown Mountain Greenstone Forests	R5 (General)	C5 (General)
Upper Creek Falls Forest	R5 (General)	C5 (General)
Duggers Creek Forests	R5 (General)	C5 (General)
Island Creek Heath Bluff	R2 (Very High)	C5 (General)
Henry Fork River Slopes	R5? (General?)	C5 (General)
Linville Falls	R1 (Exceptional)	C3 (High)
South Mountains Henry Fork Watershed	R1 (Exceptional)	C1 (Exceptional)
Linville Gorge	R1 (Exceptional)	C1 (Exceptional)
South Mountains Jacob Fork Watershed	R1 (Exceptional)	C1 (Exceptional)
Linville Caverns	R1 (Exceptional)	C1 (Exceptional)
Brindletown Forests	R3 (High)	C4 (Moderate)
Jacob Fork West Corridor	R3 (High)	C4 (Moderate)
Wilson Creek Gorge	R2 (Very High)	C3 (High)
Rollins/South Mountains Natural Area	R1 (Exceptional)	C1 (Exceptional)
Smith Mountain/Hildebran Mountain	R5 (General)	C5 (General)
Hall Knob	R2 (Very High)	C3 (High)
BRD/First Broad River Headwaters Aquatic Habitat	R1 (Exceptional)	C4 (Moderate)
Bristol Creek Wetlands	R3 (High)	C5 (General)
Playmore Beach Rare Plant Site	R4 (Moderate)	C5 (General)
South Mountains North Slope	R2 (Very High)	C2 (Very High)
South Mountains Pleasant Grove Uplands	R4 (Moderate)	C4 (Moderate)
CTB/Linville River Aquatic Habitat	R1 (Exceptional)	C3 (High)
Broughton Hospital/Keller Knob	R5 (General)	C5 (General)
Vulcan/Rhodhiss Slopes	R5? (General?)	C5 (General)
Linville Mountain Dolomite Areas	R1 (Exceptional)	C2 (Very High)
Yellow Mountain/Ironmonger Mountain	R2 (Very High)	C4 (Moderate)
Smith Cliff/Henry Fork River	R1 (Exceptional)	C1 (Exceptional)
CTB/Wilson Creek Aquatic Habitat	R1 (Exceptional)	C3 (High)
CTB/Johns River/Mulberry Creek Aquatic Habitat	R1 (Exceptional)	C4 (Moderate)
CTB/Upper Creek/Warrior Fork Aquatic Habitat	R2 (Very High)	C3 (High)
Hildebran/Henry River Slopes	R5 (General)	C4 (Moderate)

Managed Areas Documented Within a One-mile Radius of the Project Area

Managed Area Name	Owner	Owner Type
Pisgah National Forest - Grandfather Ranger District	US Forest Service	Federal
NC Clean Water Management Trust Fund Easement	NC DNCR, Clean Water Management Trust Fund	State

Managed Areas Documented Within a One-mile Radius of the Project Area

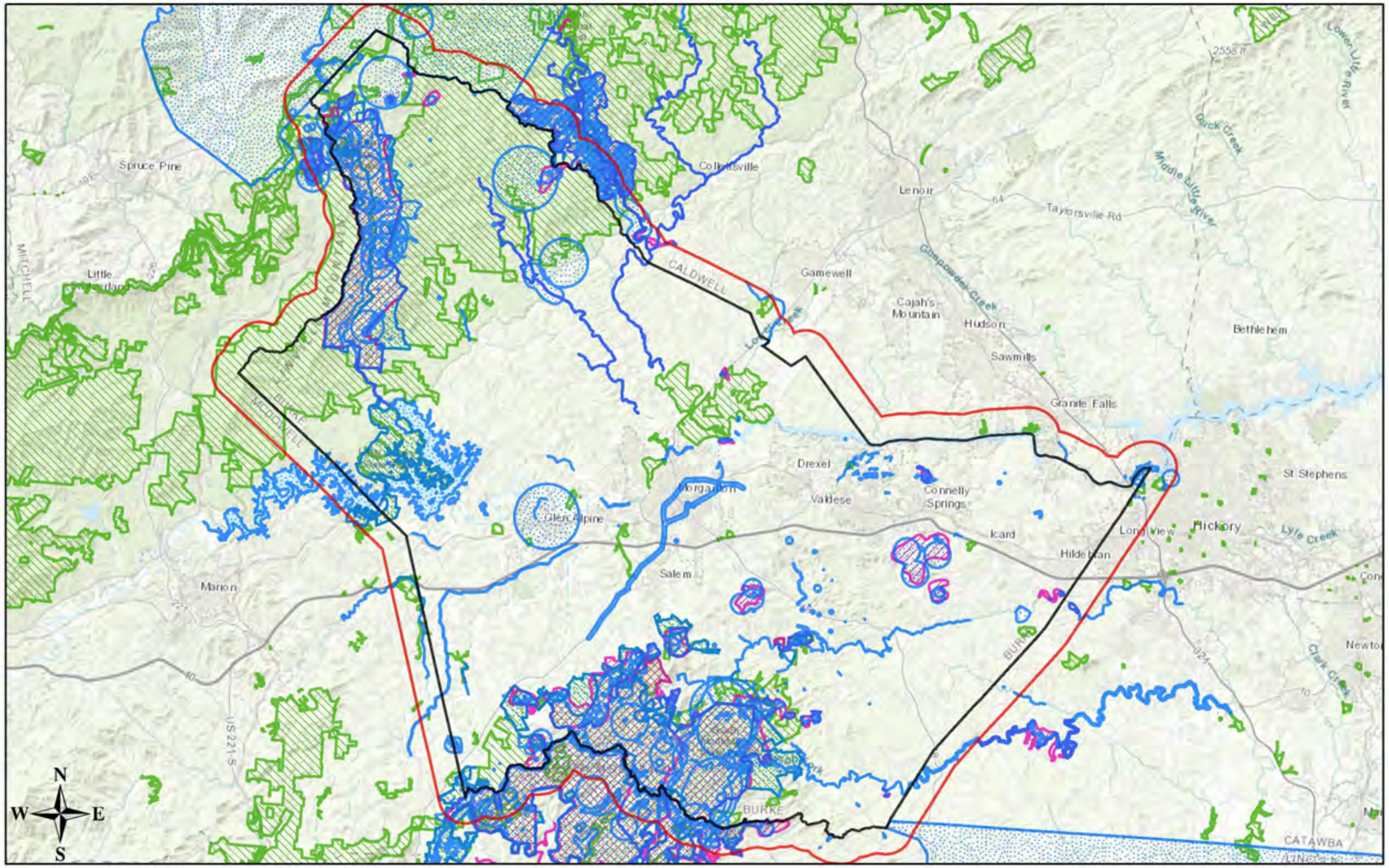
Managed Area Name	Owner	Owner Type
NC Department of Transportation Mitigation Site	NC Department of Transportation	State
Blue Ridge Parkway	US National Park Service	Federal
NC Division of Mitigation Services Easement	NC DEQ, Division of Mitigation Services	State
NC Division of Mitigation Services Easement	NC DEQ, Division of Mitigation Services	State
Conservation Trust for North Carolina Easement	Conservation Trust for North Carolina	Private
South Mountains Game Land	NC Wildlife Resources Commission	State
South Mountains State Park	NC DNCR, Division of Parks and Recreation	State
South Mountains Game Land Dedicated Nature Preserve	NC Wildlife Resources Commission	State
South Mountains State Park Dedicated Nature Preserve	NC DNCR, Division of Parks and Recreation	State
Box Creek Wilderness and Camel Knob Registered Heritage Area	130 of Chatham, LLC	Private
NC Wildlife Resources Commission Easement	NC Wildlife Resources Commission	State
Pisgah National Forest - Linville Gorge Wilderness	US Forest Service	Federal
Linville Gorge Registered Heritage Area	US Forest Service	Federal
Foothills Conservancy of North Carolina Preserve	Foothills Conservancy of North Carolina	Private
Pisgah Game Land	NC Wildlife Resources Commission	State
Lake James State Park	NC DNCR, Division of Parks and Recreation	State
Johns River Game Land	NC Wildlife Resources Commission	State
Pisgah Game Land Dedicated Nature Preserve	NC Wildlife Resources Commission	State
Foothills Conservancy of North Carolina Easement	Foothills Conservancy of North Carolina	Private
Blue Ridge Conservancy Preserve	Blue Ridge Conservancy	Private
Blue Ridge Parkway Easement	US National Park Service	Federal
Catawba County Open Space	Catawba County	Local Government
Johns River Game Land Dedicated Nature Preserve	NC Wildlife Resources Commission	State
South Mountains Henry Fork and North Slope Registered Heritage Area	130 of Chatham, LLC	Private
North Carolina Agricultural Foundation Preserve	North American Agricultural Foundation	Private
Gill State Forest	NC Department of Agriculture, Forest Service	State
Lake James State Park Dedicated Nature Preserve	NC DNCR, Division of Parks and Recreation	State
Linville Falls Registered Heritage Area	US National Park Service	Federal
Historic Preservation Foundation of North Carolina Easement	Historic Preservation Foundation of North Carolina	Private
Table Rock Fish Hatchery	NC Wildlife Resources Commission	State
Burke County Open Space	Burke County	Local Government
Linville River State Natural and Scenic River	NC DNCR, Division of Parks and Recreation	State
Wilson Creek National Wild and Scenic River	US Forest Service	Federal
Tuttle State Forest	NC Department of Agriculture, Forest Service	State
Linville Caverns Registered Heritage Area	Private Individual	Private

Managed Areas Documented Within a One-mile Radius of the Project Area

Managed Area Name	Owner	Owner Type
Smith Cliff/Henry Fork River Registered Heritage Area	Foothills Conservancy of North Carolina	Private
Pineola Bog State Natural Area	NC DNCR, Division of Parks and Recreation	State
Smith Cliff/Henry Fork River Registered Heritage Area	130 of Chatham, LLC	Private
Town of Valdese Parkland	Town of Valdese	Local Government
Muddy Creek Watershed Restoration Site	NC Wildlife Resources Commission	State

Definitions and an explanation of status designations and codes can be found at https://ncnhde.natureserve.org/content/help. Data query generated on September 17, 2018; source: NCNHP, Q3 July 2018. Please resubmit your information request if more than one year elapses before project initiation as new information is continually added to the NCNHP database.

NCNHDE-6950: Clearinghouse 19-0040 - Burke County



September 17, 2018

- Project Boundary
- Buffered Project Boundary
- Natural Heritage Element Occurrence (NHEO)
- NHP Natural Area (NHNA)
- Managed Area (MAREA)

1:334,074

0 2.75 5.5 11 mi

0 4.5 9 18 km

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

North Carolina Department of Natural and Cultural Resources
Natural Heritage Program

Governor Roy Cooper | Secretary Susi H. Hamilton

NCNHDE-6951

September 17, 2018

Attn: Crystal Best
North Carolina Clearinghouse

RE: Clearinghouse 19-0040 - Cherokee County

Dear North Carolina Clearinghouse:

The North Carolina Natural Heritage Program (NCNHP) appreciates the opportunity to provide information about natural heritage resources for the project referenced above.

A query of the NCNHP database indicates that there are records for rare species, important natural communities, natural areas, and/or conservation/managed areas within the proposed project boundary. These results are presented in the attached 'Documented Occurrences' tables and map.

The attached 'Potential Occurrences' table summarizes rare species and natural communities that have been documented within a one-mile radius of the property boundary. The proximity of these records suggests that these natural heritage elements may potentially be present in the project area if suitable habitat exists. Tables of natural areas and conservation/managed areas within a one-mile radius of the project area, if any, are also included in this report.

If a Federally-listed species is documented within the project area or indicated within a one-mile radius of the project area, the NCNHP recommends contacting the US Fish and Wildlife Service (USFWS) for guidance. Contact information for USFWS offices in North Carolina is found here: https://www.fws.gov/offices/Directory/ListOffices.cfm?statecode=37.

Please note that natural heritage element data are maintained for the purposes of conservation planning, project review, and scientific research, and are not intended for use as the primary criteria for regulatory decisions. Information provided by the NCNHP database may not be published without prior written notification to the NCNHP, and the NCNHP must be credited as an information source in these publications. Maps of NCNHP data may not be redistributed without permission.

Also please note that the NC Natural Heritage Program may follow this letter with additional correspondence if a Dedicated Nature Preserve, Registered Heritage Area, Clean Water Management Trust Fund easement, or an occurrence of a Federally-listed species is documented near the project area.

If you have questions regarding the information provided in this letter or need additional assistance, please contact Rodney A. Butler at rodney.butler@ncdcr.gov or 919-707-8603.

Sincerely,
NC Natural Heritage Program

MAILING ADDRESS:
1651 Mail Service Center
Raleigh, NC 27699-1651

Telephone: (919) 707-8107
www.ncnhp.org

LOCATION:
121 West Jones Street
Raleigh, NC 27603

Natural Heritage Element Occurrences, Natural Areas, and Managed Areas Intersecting the Project Area
Clearinghouse 19-0040 - Cherokee County
September 17, 2018
NCNHDE-6951

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Amphibian	8305	Ambystoma talpoideum	Mole Salamander	2012-03-29	B	3-Medium	---	Special Concern	G5	S2S3
Amphibian	3136	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	2017-06-12	B	3-Medium	---	Special Concern	G3G4T2	S3
Amphibian	1254	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	2011-07-13	BC	3-Medium	---	Special Concern	G3G4T2	S3
Amphibian	1670	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	2011-07-13	BC	3-Medium	---	Special Concern	G3G4T2	S3
Amphibian	29357	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	2017-04-02	E	3-Medium	---	Special Concern	G3G4T2	S3
Amphibian	33016	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	2016-07-05	BC	3-Medium	---	Special Concern	G3G4T2	S3
Amphibian	27821	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	2011-07-14	B	3-Medium	---	Special Concern	G3G4T2	S3
Amphibian	7889	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	1998-08-26	E	3-Medium	---	Special Concern	G3G4T2	S3
Amphibian	27563	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	2014-09-16	E	3-Medium	---	Special Concern	G3G4T2	S3
Amphibian	1833	Eurycea junaluska	Junaluska Salamander	2000	E	3-Medium	---	Threatened	G3	S1S2
Amphibian	10672	Hemidactylium scutatum	Four-toed Salamander	2012-03-29	B?	3-Medium	---	Special Concern	G5	S3
Amphibian	32122	Hemidactylium scutatum	Four-toed Salamander	2012-04-02	E	3-Medium	---	Special Concern	G5	S3
Amphibian	35483	Plethodon aureolus	Tellico Salamander	1983-06	H?	3-Medium	---	Significantly Rare	G2G3	S2?

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Amphibian	35438	Plethodon aureolus	Tellico Salamander	2008-06-02	E	3-Medium	---	Significantly Rare	G2G3	S2?
Amphibian	35482	Plethodon aureolus	Tellico Salamander	1983-06	H?	3-Medium	---	Significantly Rare	G2G3	S2?
Amphibian	32120	Plethodon chattahoochee	Chattahoochee Slimy Salamander	2012-05-10	E	2-High	---	Significantly Rare	G3	S1
Amphibian	37777	Plethodon chattahoochee	Chattahoochee Slimy Salamander	2014-04-04	E	2-High	---	Significantly Rare	G3	S1
Amphibian	37778	Plethodon chattahoochee	Chattahoochee Slimy Salamander	2015-05-31	E	2-High	---	Significantly Rare	G3	S1
Amphibian	37775	Plethodon chattahoochee	Chattahoochee Slimy Salamander	2014-04-04	E	2-High	---	Significantly Rare	G3	S1
Amphibian	37774	Plethodon chattahoochee	Chattahoochee Slimy Salamander	2014-04-04	E	2-High	---	Significantly Rare	G3	S1
Amphibian	37773	Plethodon chattahoochee	Chattahoochee Slimy Salamander	2014-04-04	E	2-High	---	Significantly Rare	G3	S1
Amphibian	35068	Pseudacris brachyphona	Mountain Chorus Frog	2013-03-18	A	1-Very High	---	Special Concern	G5	S2
Amphibian	35089	Pseudacris brachyphona	Mountain Chorus Frog	2017-03-28	A	2-High	---	Special Concern	G5	S2
Amphibian	15370	Pseudacris brachyphona	Mountain Chorus Frog	2008-03-19	AB	3-Medium	---	Special Concern	G5	S2
Amphibian	24841	Pseudacris brachyphona	Mountain Chorus Frog	2001	E	2-High	---	Special Concern	G5	S2
Amphibian	27458	Pseudacris brachyphona	Mountain Chorus Frog	2010-03-11	A	2-High	---	Special Concern	G5	S2
Amphibian	25905	Pseudacris brachyphona	Mountain Chorus Frog	2009-03-26	A?	1-Very High	---	Special Concern	G5	S2
Amphibian	27461	Pseudacris brachyphona	Mountain Chorus Frog	2012-03-09	AB	1-Very High	---	Special Concern	G5	S2
Amphibian	27462	Pseudacris brachyphona	Mountain Chorus Frog	2009-03-26	AB	1-Very High	---	Special Concern	G5	S2
Amphibian	27466	Pseudacris brachyphona	Mountain Chorus Frog	2009-03-26	AB	1-Very High	---	Special Concern	G5	S2
Amphibian	35085	Pseudacris brachyphona	Mountain Chorus Frog	2011-03-19	AB	1-Very High	---	Special Concern	G5	S2

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Amphibian	35080	Pseudacris brachyphona	Mountain Chorus Frog	2017-03-28	AB	2-High	---	Special Concern	G5	S2
Amphibian	1304	Pseudacris brachyphona	Mountain Chorus Frog	1954-02-20	H	3-Medium	---	Special Concern	G5	S2
Amphibian	15281	Pseudacris brachyphona	Mountain Chorus Frog	1949-03-10	H	3-Medium	---	Special Concern	G5	S2
Amphibian	29971	Pseudacris brachyphona	Mountain Chorus Frog	2011-04-20	B?	2-High	---	Special Concern	G5	S2
Amphibian	35079	Pseudacris brachyphona	Mountain Chorus Frog	2010-03-11	B?	1-Very High	---	Special Concern	G5	S2
Amphibian	27464	Pseudacris brachyphona	Mountain Chorus Frog	2009-03-26	C?	1-Very High	---	Special Concern	G5	S2
Amphibian	27460	Pseudacris brachyphona	Mountain Chorus Frog	2009-03-26	C?	1-Very High	---	Special Concern	G5	S2
Amphibian	4579	Pseudacris brachyphona	Mountain Chorus Frog	2008-03-19	BC	2-High	---	Special Concern	G5	S2
Amphibian	25904	Pseudacris brachyphona	Mountain Chorus Frog	2009-03-26	C?	3-Medium	---	Special Concern	G5	S2
Amphibian	38190	Pseudacris brachyphona	Mountain Chorus Frog	2017-02-24	E	2-High	---	Special Concern	G5	S2
Amphibian	25921	Pseudacris brachyphona	Mountain Chorus Frog	2012-03-13	BC	3-Medium	---	Special Concern	G5	S2
Amphibian	35077	Pseudacris brachyphona	Mountain Chorus Frog	2010-03-11	C?	1-Very High	---	Special Concern	G5	S2
Amphibian	35069	Pseudacris brachyphona	Mountain Chorus Frog	2013-03-18	BC	1-Very High	---	Special Concern	G5	S2
Amphibian	35070	Pseudacris brachyphona	Mountain Chorus Frog	2013-03-18	BC	1-Very High	---	Special Concern	G5	S2
Amphibian	35090	Pseudacris brachyphona	Mountain Chorus Frog	2012-03-13	C	1-Very High	---	Special Concern	G5	S2
Amphibian	29973	Pseudacris brachyphona	Mountain Chorus Frog	2011-03-25	B?	3-Medium	---	Special Concern	G5	S2
Amphibian	35087	Pseudacris brachyphona	Mountain Chorus Frog	2011-03-25	BC	1-Very High	---	Special Concern	G5	S2
Amphibian	27463	Pseudacris brachyphona	Mountain Chorus Frog	2009-03-26	CD	3-Medium	---	Special Concern	G5	S2

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Amphibian	25919	Pseudacris brachyphona	Mountain Chorus Frog	2008-03-19	C	3-Medium	---	Special Concern	G5	S2
Amphibian	25920	Pseudacris brachyphona	Mountain Chorus Frog	2008-03-19	C	3-Medium	---	Special Concern	G5	S2
Amphibian	27459	Pseudacris brachyphona	Mountain Chorus Frog	2009-03-26	C?	3-Medium	---	Special Concern	G5	S2
Amphibian	34994	Pseudacris brachyphona	Mountain Chorus Frog	2011-03-14	B?	1-Very High	---	Special Concern	G5	S2
Amphibian	35064	Pseudacris brachyphona	Mountain Chorus Frog	2011-03-30	AB	1-Very High	---	Special Concern	G5	S2
Amphibian	35088	Pseudacris brachyphona	Mountain Chorus Frog	2013-03-17	BC	2-High	---	Special Concern	G5	S2
Amphibian	35067	Pseudacris brachyphona	Mountain Chorus Frog	2013-03-18	BC	2-High	---	Special Concern	G5	S2
Amphibian	35066	Pseudacris brachyphona	Mountain Chorus Frog	2013-03-18	C	2-High	---	Special Concern	G5	S2
Amphibian	35065	Pseudacris brachyphona	Mountain Chorus Frog	2013-03-18	C	2-High	---	Special Concern	G5	S2
Amphibian	35074	Pseudacris brachyphona	Mountain Chorus Frog	2013-03-18	BC	2-High	---	Special Concern	G5	S2
Amphibian	35082	Pseudacris brachyphona	Mountain Chorus Frog	2010-03-10	BC	2-High	---	Special Concern	G5	S2
Amphibian	38192	Pseudacris brachyphona	Mountain Chorus Frog	2017-03-28	E	2-High	---	Special Concern	G5	S2
Amphibian	35083	Pseudacris brachyphona	Mountain Chorus Frog	2011-04-01	E	1-Very High	---	Special Concern	G5	S2
Amphibian	35075	Pseudacris brachyphona	Mountain Chorus Frog	2013-03-18	C?	2-High	---	Special Concern	G5	S2
Amphibian	35092	Pseudacris brachyphona	Mountain Chorus Frog	2013-03-17	C?	2-High	---	Special Concern	G5	S2
Amphibian	35091	Pseudacris brachyphona	Mountain Chorus Frog	2012-03-13	BC	2-High	---	Special Concern	G5	S2
Amphibian	35078	Pseudacris brachyphona	Mountain Chorus Frog	2010-03-11	C?	2-High	---	Special Concern	G5	S2
Amphibian	35073	Pseudacris brachyphona	Mountain Chorus Frog	2013-03-17	BC	2-High	---	Special Concern	G5	S2

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Amphibian	35076	Pseudacris brachyphona	Mountain Chorus Frog	2013-03-18	C?	2-High	---	Special Concern	G5	S2
Amphibian	35084	Pseudacris brachyphona	Mountain Chorus Frog	2011-03-18	E	1-Very High	---	Special Concern	G5	S2
Amphibian	34995	Pseudacris brachyphona	Mountain Chorus Frog	2011-03-14	C?	2-High	---	Special Concern	G5	S2
Amphibian	34998	Pseudacris brachyphona	Mountain Chorus Frog	2011-03-14	E	2-High	---	Special Concern	G5	S2
Amphibian	35063	Pseudacris brachyphona	Mountain Chorus Frog	2011-03-15	BC	2-High	---	Special Concern	G5	S2
Amphibian	38191	Pseudacris brachyphona	Mountain Chorus Frog	2017-03-07	E	2-High	---	Special Concern	G5	S2
Bird	24771	Haliaeetus leucocephalus	Bald Eagle	2010	E	2-High	Bald/Golden Eagle Protection Act	Threatened	G5	S3B,S3N
Bird	14715	Vermivora cyanoptera	Blue-winged Warbler	2013-05-30	E	3-Medium	---	Significantly Rare	G5	S2B
Bird	15757	Vermivora cyanoptera	Blue-winged Warbler	1976-05-31	H	3-Medium	---	Significantly Rare	G5	S2B
Bird	3824	Vermivora cyanoptera	Blue-winged Warbler	2012-06-04	E	3-Medium	---	Significantly Rare	G5	S2B
Caddisfly	35329	Brachycentrus etowahensis	a caddisfly	1985-08	H?	3-Medium	---	Significantly Rare	G3	SH
Caddisfly	35310	Rhyacophila appalachia	a rhyacophilan caddisfly	2006-03-21	E	3-Medium	---	Significantly Rare	G3	S2
Crustacean	33834	Cambarus acanthura	Thornytail Crayfish	2004-05-21	E	3-Medium	---	Significantly Rare	G4G5	S1
Crustacean	33835	Cambarus acanthura	Thornytail Crayfish	2005-07-15	E	3-Medium	---	Significantly Rare	G4G5	S1
Crustacean	33833	Cambarus acanthura	Thornytail Crayfish	2004-05-20	E	3-Medium	---	Significantly Rare	G4G5	S1
Crustacean	33800	Cambarus brimleyorum	Valley River Crayfish	2014-09-23	E	3-Medium	---	Significantly Rare	G3G4	S2
Crustacean	33837	Cambarus nodosus	Knotty Burrowing Crayfish	1984-07-21	H?	3-Medium	---	Significantly Rare	G4	S1

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Crustacean	33839	Cambarus nodosus	Knotty Burrowing Crayfish	2005-07-14	E	3-Medium	---	Significantly Rare	G4	S1
Freshwater Bivalve	15209	Elliptio dilatata	Spike	2014-09-23	E	3-Medium	---	Special Concern	G5	S2
Freshwater Bivalve	15730	Elliptio dilatata	Spike	1993-07-14	E	3-Medium	---	Special Concern	G5	S2
Freshwater Bivalve	29669	Fusconaia subrotunda	Longsolid	2014-09-24	E	3-Medium	---	Endangered	G3	S1
Freshwater Bivalve	23497	Lampsilis fasciola	Wavyrayed Lampmussel	2014-09-24	E	3-Medium	---	Special Concern	G5	S2
Freshwater Bivalve	157	Lampsilis fasciola	Wavyrayed Lampmussel	1993	E	3-Medium	---	Special Concern	G5	S2
Freshwater Bivalve	16620	Pleurobema oviforme	Tennessee Clubshell	2014-09-24	E	3-Medium	---	Endangered	G2G3	S1
Freshwater Bivalve	29664	Pleuronaia barnesiana	Tennessee Pigtoe	2010-07-21	E	3-Medium	---	Endangered	G2G3	S1
Freshwater Bivalve	5796	Villosa iris	Rainbow	2017-11-02	E	3-Medium	---	Threatened	G5Q	S2
Freshwater Bivalve	11052	Villosa iris	Rainbow	1993-07-14	E	3-Medium	---	Threatened	G5Q	S2
Freshwater Bivalve	11479	Villosa trabalis	Cumberland Bean	2003-02-21	F	3-Medium	Endangered	Significantly Rare	G1	SH
Freshwater Bivalve	19568	Villosa vanuxemensis	Mountain Creekshell	2006-08-02	E	3-Medium	---	Threatened	G4	S1?
Freshwater Fish	27450	Clinostomus sp. 1	Smoky Dace	2014-07-10	E	3-Medium	---	Special Concern	G5T3Q	S2
Freshwater Fish	27444	Clinostomus sp. 1	Smoky Dace	2009-07-29	E	3-Medium	---	Special Concern	G5T3Q	S2
Freshwater Fish	27445	Clinostomus sp. 1	Smoky Dace	1967-06-15	H	3-Medium	---	Special Concern	G5T3Q	S2
Freshwater Fish	31054	Clinostomus sp. 1	Smoky Dace	2009-07-29	E	3-Medium	---	Special Concern	G5T3Q	S2
Freshwater Fish	35719	Cottus carolinae	Banded Sculpin	2002-07-24	E	3-Medium	---	Special Concern	G5	S1
Freshwater Fish	14939	Erimystax insignis	Blotched Chub	2009-07-29	E	3-Medium	---	Significantly Rare	G4	S2

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Freshwater Fish	14940	Erimystax insignis	Blotched Chub	2001-10-15	E	3-Medium	---	Significantly Rare	G4	S2
Freshwater Fish	29681	Luxilus chrysocephalus	Striped Shiner	2010-07-21	E	3-Medium	---	Special Concern	G5	S1
Freshwater Fish	26447	Luxilus chrysocephalus	Striped Shiner	2006-06-01	E	3-Medium	---	Special Concern	G5	S1
Freshwater Fish	35602	Moxostoma breviceps	Smallmouth Redhorse	2009-06-11	E	3-Medium	---	Significantly Rare	G5	S2
Freshwater Fish	37298	Moxostoma breviceps	Smallmouth Redhorse	2016-07-05	E	3-Medium	---	Significantly Rare	G5	S2
Freshwater Fish	18954	Moxostoma sp. 2	Sicklefin Redhorse	2014-09-23	E	3-Medium	---	Threatened	G1G2	S2
Freshwater Fish	31171	Notropis micropteryx	Highland Shiner	2014-07-09	E	3-Medium	---	Significantly Rare	G5	S2
Freshwater Fish	32527	Notropis micropteryx	Highland Shiner	2007-03-21	E	3-Medium	---	Significantly Rare	G5	S2
Freshwater Fish	32562	Notropis micropteryx	Highland Shiner	2001-10-16	E	3-Medium	---	Significantly Rare	G5	S2
Freshwater Fish	14279	Percina squamata	Olive Darter	1991-Pre	H?	3-Medium	---	Special Concern	G3	S2
Freshwater Fish	14229	Percina squamata	Olive Darter	1994-05-23	E	3-Medium	---	Special Concern	G3	S2
Freshwater Fish	19029	Sander canadensis	Sauger	1987-Pre	H?	2-High	---	Significantly Rare	G5	S1
Freshwater or Terrestrial Gastropod	28450	Elimia christyi	Christy's Elimia	2014-09-23	E	3-Medium	---	Endangered	G2	S1
Freshwater or Terrestrial Gastropod	35979	Elimia christyi	Christy's Elimia	2000-03-09	E	3-Medium	---	Endangered	G2	S1
Freshwater or Terrestrial Gastropod	28451	Elimia christyi	Christy's Elimia	2004-Pre	E	3-Medium	---	Endangered	G2	S1
Liverwort	32706	Chiloscyphus appalachianus	A Liverwort	2011-03-10	E	2-High	---	Special Concern Vulnerable	G1G2Q	S1

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Liverwort	16218	Plagiochila ludoviciana	A Liverwort	1948-08-13	H	3-Medium	---	Significantly Rare Peripheral	G5	S1
Liverwort	22192	Plagiochila sullivantii var. sullivantii	A Liverwort	1980	H	3-Medium	---	Significantly Rare Throughout	G2T2	S2
Mammal	21795	Myotis leibii	Eastern Small-footed Bat	2016-02-09	E	2-High	---	Special Concern	G4	S2
Mammal	37000	Myotis leibii	Eastern Small-footed Bat	2010-07-04	E	2-High	---	Special Concern	G4	S2
Mammal	36009	Myotis lucifugus	Little Brown Bat	2009-07-27	E	2-High	---	Significantly Rare	G3	S2
Mammal	36010	Myotis lucifugus	Little Brown Bat	2016-02-09	E	1-Very High	---	Significantly Rare	G3	S2
Mammal	36011	Myotis lucifugus	Little Brown Bat	2013-08-13	E	3-Medium	---	Significantly Rare	G3	S2
Mammal	36008	Myotis lucifugus	Little Brown Bat	2008-08-01	E	1-Very High	---	Significantly Rare	G3	S2
Mammal	32773	Myotis septentrionalis	Northern Long-eared Bat	2012-05-28	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	32774	Myotis septentrionalis	Northern Long-eared Bat	2007-07-16	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	32780	Myotis septentrionalis	Northern Long-eared Bat	2016-06-28	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	32776	Myotis septentrionalis	Northern Long-eared Bat	2009-07-27	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	32770	Myotis septentrionalis	Northern Long-eared Bat	2009-07-01	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34127	Myotis septentrionalis	Northern Long-eared Bat	2014-02-01	C	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	32781	Myotis septentrionalis	Northern Long-eared Bat	2009-06-03	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	32769	Myotis septentrionalis	Northern Long-eared Bat	2009-06-03	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34128	Myotis septentrionalis	Northern Long-eared Bat	2003-07-29	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34126	Myotis septentrionalis	Northern Long-eared Bat	2008-07-09	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	32775	Myotis septentrionalis	Northern Long-eared Bat	2010-05-26	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34125	Myotis septentrionalis	Northern Long-eared Bat	2002-08-06	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	32778	Myotis septentrionalis	Northern Long-eared Bat	2009-06-03	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34124	Myotis septentrionalis	Northern Long-eared Bat	2008-07-16	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	32783	Myotis septentrionalis	Northern Long-eared Bat	2011-06-30	BC	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34123	Myotis septentrionalis	Northern Long-eared Bat	2000-07-10	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	37004	Myotis septentrionalis	Northern Long-eared Bat	2010-07-16	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	35099	Myotis septentrionalis	Northern Long-eared Bat	2008-08-12	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	37013	Myotis septentrionalis	Northern Long-eared Bat	2010-07-12	E	2-High	T-4(d)	Threatened	G1G2	S2

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Mammal	37003	Myotis septentrionalis	Northern Long-eared Bat	2009-06-11	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	35238	Myotis septentrionalis	Northern Long-eared Bat	2000	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	27985	Myotis sodalis	Indiana Bat	2015-07-17	E	2-High	Endangered	Endangered	G2	S1S2
Mammal	32450	Myotis sodalis	Indiana Bat	2007-07-18	E	2-High	Endangered	Endangered	G2	S1S2
Mammal	37037	Myotis sodalis	Indiana Bat	2010-07-04	E	2-High	Endangered	Endangered	G2	S1S2
Mammal	35111	Myotis sodalis	Indiana Bat	2008-08-12	E	2-High	Endangered	Endangered	G2	S1S2
Mammal	36138	Perimyotis subflavus	Tricolored Bat	2008-07-17	E	3-Medium	---	Significantly Rare	G2G3	S3
Mammal	36140	Perimyotis subflavus	Tricolored Bat	2015-06-09	E	3-Medium	---	Significantly Rare	G2G3	S3
Mammal	36038	Perimyotis subflavus	Tricolored Bat	2016-02-09	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	36139	Perimyotis subflavus	Tricolored Bat	2014-07-07	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	36142	Perimyotis subflavus	Tricolored Bat	2011-07-10	E	3-Medium	---	Significantly Rare	G2G3	S3
Mammal	35118	Perimyotis subflavus	Tricolored Bat	2008-08-06	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	35119	Perimyotis subflavus	Tricolored Bat	2008-08-13	BC	2-High	---	Significantly Rare	G2G3	S3
Mammal	36262	Sylvilagus obscurus	Appalachian Cottontail	1990-06	E	3-Medium	---	Game Animal	G4	S3
Mammal	36259	Sylvilagus obscurus	Appalachian Cottontail	1991-03-06	E	3-Medium	---	Game Animal	G4	S3
Mayfly	35291	Cercobrachys etowah	a caenid mayfly	2002-06-27	E	3-Medium	---	Significantly Rare	G4	S2
Moth	38092	Idia majoralis	Greater Idia Moth	2015-08-12	E	2-High	---	Significantly Rare	GNR	S1S3
Natural Community	26838	Acidic Cove Forest (Typic Subtype)	---	2013-05-30	A	3-Medium	---	---	G5	S4
Natural Community	30884	Acidic Cove Forest (Typic Subtype)	---	2012-04-11	BC	3-Medium	---	---	G5	S4
Natural Community	30979	Acidic Cove Forest (Typic Subtype)	---	2011-05-26	C	3-Medium	---	---	G5	S4
Natural Community	35842	Acidic Cove Forest (Typic Subtype)	---	2015-08-05	BC	2-High	---	---	G5	S4
Natural Community	32047	Acidic Cove Forest (Typic Subtype)	---	2012-05-10	C	3-Medium	---	---	G5	S4

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	30883	Acidic Cove Forest (Typic Subtype)	---	2011-03-16	C	2-High	---	---	G5	S4
Natural Community	30886	Acidic Cove Forest (Typic Subtype)	---	2011-06-10	C	3-Medium	---	---	G5	S4
Natural Community	31741	Acidic Cove Forest (Typic Subtype)	---	2012-08-05	C	2-High	---	---	G5	S4
Natural Community	31740	Acidic Cove Forest (Typic Subtype)	---	2012-09-26	CD	3-Medium	---	---	G5	S4
Natural Community	31436	Acidic Cove Forest (Typic Subtype)	---	2011-03-10	BC	3-Medium	---	---	G5	S4
Natural Community	31739	Acidic Cove Forest (Typic Subtype)	---	2012-04-03	C	3-Medium	---	---	G5	S4
Natural Community	31870	Canada Hemlock Forest (Typic Subtype)	---	2013-04-09	C	3-Medium	---	---	G3G4	S1S2
Natural Community	26841	Chestnut Oak Forest (Dry Heath Subtype)	---	2013-05-30	B	3-Medium	---	---	G5	S5
Natural Community	32086	Chestnut Oak Forest (Dry Heath Subtype)	---	2012-08-15	B	3-Medium	---	---	G5	S5
Natural Community	30894	Chestnut Oak Forest (Dry Heath Subtype)	---	2012-08-08	B	3-Medium	---	---	G5	S5
Natural Community	30980	Chestnut Oak Forest (Dry Heath Subtype)	---	2012-08-28	BC	3-Medium	---	---	G5	S5
Natural Community	31745	Chestnut Oak Forest (Dry Heath Subtype)	---	2012-09-26	C	3-Medium	---	---	G5	S5
Natural Community	30895	Chestnut Oak Forest (Dry Heath Subtype)	---	2011-06-10	C	3-Medium	---	---	G5	S5
Natural Community	31872	Chestnut Oak Forest (Herb Subtype)	---	2012-07-17	B	3-Medium	---	---	G4G5	S4
Natural Community	31437	Chestnut Oak Forest (Herb Subtype)	---	2011-10-25	BC	3-Medium	---	---	G4G5	S4
Natural Community	30898	Chestnut Oak Forest (Mesic Subtype)	---	2013-05-02	A	3-Medium	---	---	G4	S3S4
Natural Community	31876	Floodplain Pool	---	2012-04-02	B	2-High	---	---	G3	S2
Natural Community	5033	Floodplain Pool	---	2012-03-29	A	2-High	---	---	G3	S2

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	30887	High Elevation Birch Boulderfield Forest	---	2010-09-14	BC	3-Medium	---	---	G3	S2
Natural Community	30903	High Elevation Granitic Dome	---	2010-05-06	B	3-Medium	---	---	G2G3	S3
Natural Community	30904	High Elevation Red Oak Forest (Orchard Forest Subtype)	---	2010-05-13	A	2-High	---	---	G2	S2
Natural Community	26842	High Elevation Red Oak Forest (Typic Herb Subtype)	---	2012	A	3-Medium	---	---	G4	S3
Natural Community	31661	High Elevation Red Oak Forest (Typic Herb Subtype)	---	2012-07-05	B	2-High	---	---	G4	S3
Natural Community	28963	High Elevation Red Oak Forest (Typic Herb Subtype)	---	2010	B	2-High	---	---	G4	S3
Natural Community	30907	High Elevation Red Oak Forest (Typic Herb Subtype)	---	2010-09-14	B	3-Medium	---	---	G4	S3
Natural Community	30908	High Elevation Red Oak Forest (Typic Herb Subtype)	---	2011-06-10	BC	3-Medium	---	---	G4	S3
Natural Community	30909	High Elevation Rocky Summit (Typic Subtype)	---	2010-05-06	B	3-Medium	---	---	G2	S2
Natural Community	31902	High Elevation Rocky Summit (Typic Subtype)	---	2012-08-08	C	2-High	---	---	G2	S2
Natural Community	30911	Low Elevation Basic Glade (Montane Subtype)	---	2011-03-28	B	2-High	---	---	G2	S2
Natural Community	30914	Low Elevation Basic Glade (Montane Subtype)	---	2011-09-23	B	3-Medium	---	---	G2	S2
Natural Community	31459	Low Elevation Basic Glade (Montane Subtype)	---	2011-06-09	BC	3-Medium	---	---	G2	S2
Natural Community	31898	Low Elevation Basic Glade (Montane Subtype)	---	2011-10-14	BC	3-Medium	---	---	G2	S2
Natural Community	30912	Low Elevation Basic Glade (Montane Subtype)	---	2011-04-18	B	3-Medium	---	---	G2	S2

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	30913	Low Elevation Basic Glade (Montane Subtype)	---	2011-09-07	B	2-High	---	---	G2	S2
Natural Community	30917	Low Elevation Seep (Floodplain Subtype)	---	2011-03-16	B	2-High	---	---	G4	S2
Natural Community	31909	Low Elevation Seep (Floodplain Subtype)	---	2012-07-03	B	2-High	---	---	G4	S2
Natural Community	30916	Low Elevation Seep (Montane Subtype)	---	2011-09-07	BC	2-High	---	---	G2G3	S2S3
Natural Community	30915	Low Elevation Seep (Montane Subtype)	---	2011-09-23	BC	2-High	---	---	G2G3	S2S3
Natural Community	31911	Low Elevation Seep (Montane Subtype)	---	2012-04-11	BC	2-High	---	---	G2G3	S2S3
Natural Community	31912	Low Elevation Seep (Montane Subtype)	---	2012-07-18	C	2-High	---	---	G2G3	S2S3
Natural Community	31913	Low Elevation Seep (Montane Subtype)	---	2011-10-14	BC	2-High	---	---	G2G3	S2S3
Natural Community	31910	Low Elevation Seep (Piedmont/Mountain Springhead Subtype)	---	2012-06-04	C	2-High	---	---	G2	S1
Natural Community	35839	Low Elevation Seep (Typic Subtype)	---	2015-08-05	B?	3-Medium	---	---	G3?	S3
Natural Community	31438	Low Elevation Seep (Typic Subtype)	---	2011-02-11	B	2-High	---	---	G3?	S3
Natural Community	35838	Low Elevation Seep (Typic Subtype)	---	2015-08-13	C	2-High	---	---	G3?	S3
Natural Community	35840	Low Elevation Seep (Typic Subtype)	---	2015-08-13	C	2-High	---	---	G3?	S3
Natural Community	30918	Low Mountain Pine Forest (Montane Pine Subtype)	---	2012-08-08	B	2-High	---	---	G3G4	S2?
Natural Community	30987	Low Mountain Pine Forest (Montane Pine Subtype)	---	2012-07-16	AB	2-High	---	---	G3G4	S2?
Natural Community	30988	Low Mountain Pine Forest (Montane Pine Subtype)	---	2012-08-28	C	2-High	---	---	G3G4	S2?

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	31919	Low Mountain Pine Forest (Montane Pine Subtype)	---	2011-07-08	C	2-High	---	---	G3G4	S2?
Natural Community	31918	Low Mountain Pine Forest (Montane Pine Subtype)	---	2012-08-05	BC	2-High	---	---	G3G4	S2?
Natural Community	31920	Low Mountain Pine Forest (Montane Pine Subtype)	---	2012-09-25	B	2-High	---	---	G3G4	S2?
Natural Community	35843	Low Mountain Pine Forest (Shortleaf Pine Subtype)	---	2015-08-05	BC	2-High	---	---	G2G3	S2
Natural Community	30920	Low Mountain Pine Forest (Shortleaf Pine Subtype)	---	2011-09-07	C	3-Medium	---	---	G2G3	S2
Natural Community	30919	Low Mountain Pine Forest (Shortleaf Pine Subtype)	---	2012-04-11	B	2-High	---	---	G2G3	S2
Natural Community	30921	Low Mountain Pine Forest (Shortleaf Pine Subtype)	---	2011-09-07	B	2-High	---	---	G2G3	S2
Natural Community	31916	Low Mountain Pine Forest (Shortleaf Pine Subtype)	---	2012-07-03	C	2-High	---	---	G2G3	S2
Natural Community	16861	Montane Alluvial Forest (Large River Subtype)	---	2012-03-29	B	2-High	---	---	G2?	S1
Natural Community	31066	Montane Alluvial Forest (Small River Subtype)	---	2010-05-11	BC	3-Medium	---	---	G3	S1
Natural Community	30925	Montane Alluvial Forest (Small River Subtype)	---	2011-03-16	B	2-High	---	---	G3	S1
Natural Community	31925	Montane Alluvial Forest (Small River Subtype)	---	2013-04-09	C	3-Medium	---	---	G3	S1
Natural Community	31929	Montane Cliff (Acidic Herb Subtype)	---	2012-04-11	B	3-Medium	---	---	G3G4	S3
Natural Community	8454	Montane Cliff (Acidic Herb Subtype)	---	1994-05-04	A	3-Medium	---	---	G3G4	S3

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	30977	Montane Cliff (Acidic Herb Subtype)	---	2012-03-29	B	3-Medium	---	---	G3G4	S3
Natural Community	30982	Montane Cliff (Acidic Herb Subtype)	---	2010-05-26	C	3-Medium	---	---	G3G4	S3
Natural Community	31933	Montane Cliff (Acidic Herb Subtype)	---	2012-04-03	BC	2-High	---	---	G3G4	S3
Natural Community	34064	Montane Cliff (Acidic Herb Subtype)	---	2012-05-24	B	2-High	---	---	G3G4	S3
Natural Community	31928	Montane Cliff (Acidic Herb Subtype)	---	2011-07-11	BC	2-High	---	---	G3G4	S3
Natural Community	31938	Montane Floodplain Slough Forest	---	2013-04-09	D	3-Medium	---	---	G1	S1
Natural Community	26840	Montane Oak--Hickory Forest (Acidic Subtype)	---	2013-05-30	B	3-Medium	---	---	G4G5	S4S5
Natural Community	32089	Montane Oak--Hickory Forest (Acidic Subtype)	---		B	2-High	---	---	G4G5	S4S5
Natural Community	29022	Montane Oak--Hickory Forest (Acidic Subtype)	---	2010	AB	3-Medium	---	---	G4G5	S4S5
Natural Community	30931	Montane Oak--Hickory Forest (Acidic Subtype)	---	2010-05-06	BC	3-Medium	---	---	G4G5	S4S5
Natural Community	30933	Montane Oak--Hickory Forest (Acidic Subtype)	---	2012-07-16	B	3-Medium	---	---	G4G5	S4S5
Natural Community	30934	Montane Oak--Hickory Forest (Acidic Subtype)	---	2012-08-08	C	3-Medium	---	---	G4G5	S4S5
Natural Community	30947	Montane Oak--Hickory Forest (Acidic Subtype)	---	2012-04-11	B	3-Medium	---	---	G4G5	S4S5
Natural Community	12190	Montane Oak--Hickory Forest (Acidic Subtype)	---	2010	C	3-Medium	---	---	G4G5	S4S5
Natural Community	31940	Montane Oak--Hickory Forest (Acidic Subtype)	---	2011-10-14	C	3-Medium	---	---	G4G5	S4S5
Natural Community	35844	Montane Oak--Hickory Forest (Acidic Subtype)	---	2015-08-05	BC	2-High	---	---	G4G5	S4S5
Natural Community	31939	Montane Oak--Hickory Forest (Acidic Subtype)	---	2012-04-03	CD	3-Medium	---	---	G4G5	S4S5
Natural Community	30141	Montane Oak--Hickory Forest (Basic Subtype)	---	2010	AB	3-Medium	---	---	G3	S3

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	30940	Montane Oak--Hickory Forest (Basic Subtype)	---	2011-09-23	BC	3-Medium	---	---	G3	S3
Natural Community	30939	Montane Oak--Hickory Forest (Basic Subtype)	---	2011-07-06	C	3-Medium	---	---	G3	S3
Natural Community	32014	Montane Oak--Hickory Forest (Basic Subtype)	---	2012-05-30	B	3-Medium	---	---	G3	S3
Natural Community	1998	Montane Oak--Hickory Forest (Basic Subtype)	---	2010	C	3-Medium	---	---	G3	S3
Natural Community	30944	Montane Oak--Hickory Forest (Low Dry Subtype)	---	2011-03-28	B	3-Medium	---	---	G2G3	S2
Natural Community	3782	Montane Oak--Hickory Forest (Low Dry Subtype)	---	2010	BC	3-Medium	---	---	G2G3	S2
Natural Community	30943	Montane Oak--Hickory Forest (Low Dry Subtype)	---	2011-09-07	C	3-Medium	---	---	G2G3	S2
Natural Community	31067	Montane Oak--Hickory Forest (Low Dry Subtype)	---	2011-09-07	B	3-Medium	---	---	G2G3	S2
Natural Community	31663	Northern Hardwood Forest (Typic Subtype)	---	2012-06-14	B	2-High	---	---	G3G4	S3
Natural Community	29047	Northern Hardwood Forest (Typic Subtype)	---	2010	AB	2-High	---	---	G3G4	S3
Natural Community	30986	Northern Hardwood Forest (Typic Subtype)	---	2011-08-11	B	3-Medium	---	---	G3G4	S3
Natural Community	31962	Northern Hardwood Forest (Typic Subtype)	---	2012-08-05	AB	3-Medium	---	---	G3G4	S3
Natural Community	32016	Northern Hardwood Forest (Typic Subtype)	---	2012-05-30	BC	3-Medium	---	---	G3G4	S3
Natural Community	31964	Piedmont/Mountain Semipermanent Impoundment (Montane Marsh Subtype)	---	2013-04-09	B	3-Medium	---	---	G3	S3S4
Natural Community	31966	Piedmont/Mountain Semipermanent Impoundment (Montane Marsh Subtype)	---	2012-03-09	BC	3-Medium	---	---	G3	S3S4
Natural Community	6753	Pine--Oak/Heath (Typic Subtype)	---	2012	C	3-Medium	---	---	G3	S3

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	30989	Pine--Oak/Heath (Typic Subtype)	---	2011-06-28	C	2-High	---	---	G3	S3
Natural Community	31009	Rich Cove Forest (Boulderfield Subtype)	---	2010-09-14	B	2-High	---	---	G3	S2
Natural Community	31967	Rich Cove Forest (Boulderfield Subtype)	---	2012-08-08	B	2-High	---	---	G3	S2
Natural Community	34102	Rich Cove Forest (Foothills Intermediate Subtype)	---	2011-09-07	C	2-High	---	---	G4?	S3
Natural Community	35845	Rich Cove Forest (Foothills Intermediate Subtype)	---	2015-08-05	BC	2-High	---	---	G4?	S3
Natural Community	34098	Rich Cove Forest (Foothills Intermediate Subtype)	---	2012-07-03	C	2-High	---	---	G4?	S3
Natural Community	26839	Rich Cove Forest (Montane Intermediate Subtype)	---	2013-05-30	A	3-Medium	---	---	G4	S4
Natural Community	30995	Rich Cove Forest (Montane Intermediate Subtype)	---	2011-03-28	B	3-Medium	---	---	G4	S4
Natural Community	30996	Rich Cove Forest (Montane Intermediate Subtype)	---	2012-04-11	B	3-Medium	---	---	G4	S4
Natural Community	31986	Rich Cove Forest (Montane Intermediate Subtype)	---	2012-08-05	C	2-High	---	---	G4	S4
Natural Community	31977	Rich Cove Forest (Montane Intermediate Subtype)	---	2012-05-10	C	3-Medium	---	---	G4	S4
Natural Community	31991	Rich Cove Forest (Montane Intermediate Subtype)	---	2012-09-26	C	3-Medium	---	---	G4	S4
Natural Community	12913	Rich Cove Forest (Montane Intermediate Subtype)	---	2010	C	3-Medium	---	---	G4	S4

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	31987	Rich Cove Forest (Montane Intermediate Subtype)	---	2011-07-08	C	2-High	---	---	G4	S4
Natural Community	31001	Rich Cove Forest (Montane Rich Subtype)	---	2011-06-28	B	2-High	---	---	G3G4	S3
Natural Community	30998	Rich Cove Forest (Montane Rich Subtype)	---	2010-09-14	B	3-Medium	---	---	G3G4	S3
Natural Community	30999	Rich Cove Forest (Montane Rich Subtype)	---	2012-07-16	B	3-Medium	---	---	G3G4	S3
Natural Community	32028	Rich Cove Forest (Montane Rich Subtype)	---	2012-07-18	B	3-Medium	---	---	G3G4	S3
Natural Community	30997	Rich Cove Forest (Montane Rich Subtype)	---	2011-06-10	B	3-Medium	---	---	G3G4	S3
Natural Community	31003	Rich Cove Forest (Montane Rich Subtype)	---	2011-07-06	BC	3-Medium	---	---	G3G4	S3
Natural Community	31005	Rich Cove Forest (Montane Rich Subtype)	---	2011-09-23	BC	3-Medium	---	---	G3G4	S3
Natural Community	31451	Rich Montane Seep	---	2010-06-03	B	2-High	---	---	G3	S3
Natural Community	31006	Rich Montane Seep	---	2011-05-26	BC	2-High	---	---	G3	S3
Natural Community	31996	Southern Appalachian Bog (Low Elevation Subtype)	---	2013-04-09	C	2-High	---	---	G1G2	S1S2
Natural Community	31995	Southern Mountain Pine--Oak Forest	---	2012-07-03	B	3-Medium	---	---	G3G4	S1S2
Natural Community	32033	Southern Mountain Pine--Oak Forest	---	2011-10-04	BC	3-Medium	---	---	G3G4	S1S2
Natural Community	35846	Southern Mountain Pine--Oak Forest	---	2015-08-05	BC	2-High	---	---	G3G4	S1S2
Natural Community	954	Southern Mountain Pine--Oak Forest	---	2010	BC	3-Medium	---	---	G3G4	S1S2
Natural Community	31439	Spray Cliff	---	2011-03-10	BC	2-High	---	---	G2	S2
Natural Community	31008	White Pine Forest	---	2011-03-16	BC	2-High	---	---	G2G3	S2

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Reptile	5556	Glyptemys muhlenbergii	Bog Turtle	1988-05-15	H	3-Medium	Threatened Similar Appearance	Threatened	G3	S2
Reptile	28388	Graptemys geographica	Common Map Turtle	2008-08-05	E	3-Medium	---	Significantly Rare	G5	S1
Reptile	28387	Graptemys geographica	Common Map Turtle	2009-06-24	E	3-Medium	---	Significantly Rare	G5	S1
Reptile	35535	Ophisaurus attenuatus	Slender Glass Lizard	1972-09-10	H?	3-Medium	---	Significantly Rare	G5	S2
Reptile	28815	Pituophis melanoleucus melanoleucus	Northern Pinesnake	2009-05-20	D	2-High	---	Threatened	G4T4	S2
Reptile	10144	Sternotherus minor	Loggerhead Musk Turtle	2008-08	E	3-Medium	---	Special Concern	G5	S1
Stonefly	35265	Rasvena terna	Vermont Sallfly	2009-04-21	E	3-Medium	---	Significantly Rare	G4	S2
Vascular Plant	11824	Aconitum reclinatum	Trailing Wolfsbane	2010-05-26	BC	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	35814	Buchnera americana	American Bluehearts	2015-08-13	A?	2-High	---	Endangered	G5?	S1
Vascular Plant	31647	Calamagrostis porteri ssp. porteri	Porter's Reed Grass	2012-07-18	E	2-High	---	Significantly Rare Peripheral	G4T4	S2?
Vascular Plant	30151	Calamagrostis porteri ssp. porteri	Porter's Reed Grass	2011-08-11	AB	2-High	---	Significantly Rare Peripheral	G4T4	S2?
Vascular Plant	31648	Campanula aparinoides var. aparinoides	Marsh Bellflower	2013-04-09	B?	2-High	---	Significantly Rare Peripheral	G5TNR	S2
Vascular Plant	33674	Campanula aparinoides var. aparinoides	Marsh Bellflower	2010-06-17	E	2-High	---	Significantly Rare Peripheral	G5TNR	S2
Vascular Plant	8944	Carex cherokeensis	Cherokee Sedge	2012-04-11	AB	3-Medium	---	Endangered	G4G5	S1
Vascular Plant	31650	Carex cherokeensis	Cherokee Sedge	2012-04-12	B	2-High	---	Endangered	G4G5	S1
Vascular Plant	31649	Carex cherokeensis	Cherokee Sedge	2012-05-09	CD	2-High	---	Endangered	G4G5	S1
Vascular Plant	3594	Carex projecta	Necklace Sedge	1988-Pre	H	3-Medium	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	29184	Carex projecta	Necklace Sedge	2010-09-08	CD	2-High	---	Significantly Rare Peripheral	G5	S1

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	9441	Carex purpurifera	Purple Sedge	2005-05-23	A	3-Medium	---	Special Concern Vulnerable	G4?	S3
Vascular Plant	27901	Carex purpurifera	Purple Sedge	2008-08-18	D	2-High	---	Special Concern Vulnerable	G4?	S3
Vascular Plant	31672	Carex purpurifera	Purple Sedge	2012-07-18	B	2-High	---	Special Concern Vulnerable	G4?	S3
Vascular Plant	31675	Carex purpurifera	Purple Sedge	2012-07-17	AB	2-High	---	Special Concern Vulnerable	G4?	S3
Vascular Plant	29192	Carex purpurifera	Purple Sedge	2011-06-28	C	2-High	---	Special Concern Vulnerable	G4?	S3
Vascular Plant	30155	Carex purpurifera	Purple Sedge	2011-09-14	B	2-High	---	Special Concern Vulnerable	G4?	S3
Vascular Plant	30154	Carex purpurifera	Purple Sedge	2011-09-23	A	2-High	---	Special Concern Vulnerable	G4?	S3
Vascular Plant	30153	Carex purpurifera	Purple Sedge	2011-09-13	B	2-High	---	Special Concern Vulnerable	G4?	S3
Vascular Plant	30157	Celastrus scandens	American Bittersweet	2011-09-23	BC	2-High	---	Endangered	G5	S2?
Vascular Plant	30158	Celastrus scandens	American Bittersweet	2011-06-13	CD	2-High	---	Endangered	G5	S2?
Vascular Plant	33803	Celastrus scandens	American Bittersweet	2010-06-18	E	2-High	---	Endangered	G5	S2?
Vascular Plant	1856	Frasera caroliniensis	Columbo	2012-04-10	BC	2-High	---	Significantly Rare Peripheral	G5	S2S3
Vascular Plant	4231	Isotria medeoloides	Small Whorled Pogonia	2012-05-24	F	3-Medium	Threatened	Threatened	G2?	S1
Vascular Plant	30176	Liatris squarrulosa	Earle's Blazing-star	2011-10-04	C	3-Medium	---	Significantly Rare Peripheral	G4G5	S2
Vascular Plant	29255	Monotropsis odorata	Sweet Pinesap	2010-06-10	BC	2-High	---	Special Concern Vulnerable	G3	S3

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	33943	Monotropsis odorata	Sweet Pinesap	2010-06-18	E	2-High	---	Special Concern Vulnerable	G3	S3
Vascular Plant	36777	Orbexilum pedunculatum	Sampson's Snakeroot	2015-08-13	B?	1-Very High	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	31706	Platanthera herbiola	Northern Rein Orchid	2012-07-03	D	2-High	---	Significantly Rare Peripheral	G4?T4Q	S1S2
Vascular Plant	31707	Platanthera herbiola	Northern Rein Orchid	2012-06-04	AB	2-High	---	Significantly Rare Peripheral	G4?T4Q	S1S2
Vascular Plant	2093	Sceptridium jenmanii	Alabama Grape-fern	1979-10	H	3-Medium	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	35841	Sceptridium jenmanii	Alabama Grape-fern	2015-08-13	CD	2-High	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	31711	Scutellaria saxatilis	Rock Skullcap	2012-08-08	A	2-High	---	Significantly Rare Throughout	G3	S2
Vascular Plant	31712	Scutellaria saxatilis	Rock Skullcap	2012-08-15	AB	2-High	---	Significantly Rare Throughout	G3	S2
Vascular Plant	6177	Silene ovata	Mountain Catchfly	1994-09	D	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	30298	Silene ovata	Mountain Catchfly	2011-07-06	D	2-High	---	Special Concern Vulnerable	G3	S3
Vascular Plant	31714	Silene ovata	Mountain Catchfly	2012-05-30	AB	2-High	---	Special Concern Vulnerable	G3	S3
Vascular Plant	20603	Spigelia marilandica	Pink-root	1999-09-15	E	3-Medium	---	Threatened	G4	S1
Vascular Plant	20606	Spigelia marilandica	Pink-root	2010-06-18	E	2-High	---	Threatened	G4	S1
Vascular Plant	30328	Spigelia marilandica	Pink-root	2011-09-07	E	2-High	---	Threatened	G4	S1
Vascular Plant	20604	Spigelia marilandica	Pink-root	1999-09-15	E	2-High	---	Threatened	G4	S1
Vascular Plant	30334	Stewartia ovata	Mountain Camellia	2011-04-11	AB	2-High	---	Significantly Rare Peripheral	G4	S3

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	20611	Stewartia ovata	Mountain Camellia	1999-09-15	C	2-High	---	Significantly Rare Peripheral	G4	S3
Vascular Plant	29319	Stewartia ovata	Mountain Camellia	2010-09-07	B	2-High	---	Significantly Rare Peripheral	G4	S3
Vascular Plant	31729	Stewartia ovata	Mountain Camellia	2012-04-12	C	2-High	---	Significantly Rare Peripheral	G4	S3
Vascular Plant	29315	Stewartia ovata	Mountain Camellia	2010-05-03	CD	2-High	---	Significantly Rare Peripheral	G4	S3
Vascular Plant	30335	Stewartia ovata	Mountain Camellia	2011-03-28	C	2-High	---	Significantly Rare Peripheral	G4	S3
Vascular Plant	31730	Symphyotrichum shortii	Short's Aster	2012-07-17	AB	2-High	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	31731	Symphyotrichum shortii	Short's Aster	2012-07-18	AB	2-High	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	30341	Symphyotrichum shortii	Short's Aster	2011-09-13	B?	2-High	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	30343	Symphyotrichum shortii	Short's Aster	2011-06-14	BC	2-High	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	30342	Symphyotrichum shortii	Short's Aster	2011-09-14	C	2-High	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	30344	Symphyotrichum shortii	Short's Aster	2011-06-13	B	2-High	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	32301	Thalictrum macrostylum	Small-leaved Meadowrue	2013-04-09	BC	2-High	---	Significantly Rare Throughout	G3G4	S2
Vascular Plant	32302	Thalictrum macrostylum	Small-leaved Meadowrue	2013-04-09	CD	2-High	---	Significantly Rare Throughout	G3G4	S2
Vascular Plant	7429	Trientalis borealis	Starflower	1993-06-16	A	3-Medium	---	Endangered	G5	S1
Vascular Plant	29340	Trientalis borealis	Starflower	2010-05-06	C	2-High	---	Endangered	G5	S1
Vascular Plant	34423	Trillium flexipes	Bent White Trillium	2010-06-17	E	3-Medium	---	Special Concern Historical	G5	S1
Vascular Plant	15580	Trillium simile	Sweet White Trillium	2010-05-03	BC	3-Medium	---	Threatened	G3	S2

Natural Areas Documented Within Project Area

Site Name	Representational Rating	Collective Rating
Slate Creek Forests and Powerline	R2 (Very High)	C4 (Moderate)
Will Scott Mountain	R3 (High)	C4 (Moderate)
HIW/Hanging Dog Creek Aquatic Habitat	R3 (High)	C4 (Moderate)
HIW/Lower Hiwassee River Aquatic Habitat	R1 (Exceptional)	C3 (High)
Fires Creek Ridgeline	R2 (Very High)	C3 (High)
Western Valley River Mountains	R2 (Very High)	C2 (Very High)
Little Brasstown Creek Floodplain	R2 (Very High)	C4 (Moderate)
Shorty Top	R2 (Very High)	C4 (Moderate)
HIW/Upper Hiwassee River Aquatic Habitat	R1 (Exceptional)	C1 (Exceptional)
HIW/Valley River Aquatic Habitat	R1 (Exceptional)	C3 (High)
Farmer Top	R4 (Moderate)	C4 (Moderate)
Hamby Bend	R2 (Very High)	C3 (High)
Hanging Dog Mountain	R3 (High)	C4 (Moderate)
Appalachia Lake Old-Growth Site	R1 (Exceptional)	C4 (Moderate)
North Shoal Creek Falls	R3 (High)	C4 (Moderate)
Rocky Knob/Davis Creek Headwaters	R3 (High)	C3 (High)
Shuler Creek Wetland Complex	R2 (Very High)	C4 (Moderate)
Turner Top	R3 (High)	C4 (Moderate)
Hiwassee Church Bluffs	R3 (High)	C4 (Moderate)
Long Ridge/Unicoi Mountains	R2 (Very High)	C3 (High)
Rocky Ford Beaver Marsh	R4 (Moderate)	C5 (General)
Payne Mountain	R2 (Very High)	C4 (Moderate)
Peels High Top/Cantrell Top	R3 (High)	C4 (Moderate)
Old Billy Top	R4 (Moderate)	C4 (Moderate)
Moccasin Mountain	R1 (Exceptional)	C4 (Moderate)
John Green Bend	R3 (High)	C4 (Moderate)
Corundum #3/Snowbird Mountains	R3 (High)	C4 (Moderate)
Camp Creek Wetlands	R3 (High)	C3 (High)
Camp Creek Falls	R5 (General)	C5 (General)
Beavers Branch Wetland and Slopes	R3 (High)	C4 (Moderate)
Snowbird Creek/Hooper Bald	R1 (Exceptional)	C2 (Very High)
Die Bend/Crowder Bluff	R1 (Exceptional)	C3 (High)
Hiwassee Lake Rare Plant Site	R2 (Very High)	C3 (High)
Piercy Bald/London Bald	R4 (Moderate)	C3 (High)
Buck Knob	R3 (High)	C3 (High)
Pack Mountain	R2 (Very High)	C4 (Moderate)
Gipp Creek/Teyahalee Bald	R3 (High)	C3 (High)
Piercy Range/Kennedy Top	R2 (Very High)	C3 (High)

Managed Areas Documented Within Project Area*

Managed Area Name	Owner	Owner Type
Nantahala National Forest - Nantahala Ranger District	US Forest Service	Federal
Nantahala National Forest - Tusquitee Ranger District	US Forest Service	Federal
Nantahala National Forest - Cheoah Ranger District	US Forest Service	Federal
NC Clean Water Management Trust Fund Easement	NC DNCR, Clean Water Management Trust Fund	State
NC Department of Transportation Mitigation Site	NC Department of Transportation	State
NC Division of Mitigation Services Easement	NC DEQ, Division of Mitigation Services	State
Mainspring Conservation Trust Easement	Land Trust for the Little Tennessee	Private
NC Clean Water Management Trust Fund Easement	NC DNCR, Clean Water Management Trust Fund	State
Mainspring Conservation Trust Preserve	Land Trust for the Little Tennessee	Private

*NOTE: If the proposed project intersects with a conservation/managed area, please contact the landowner directly for additional information. If the project intersects with a Dedicated Nature Preserve (DNP), Registered Natural Heritage Area (RHA), or Federally-listed species, NCNHP staff may provide additional correspondence regarding the project.

Definitions and an explanation of status designations and codes can be found at https://ncnhde.natureserve.org/content/help. Data query generated on September 17, 2018; source: NCNHP, Q3 July 2018. Please resubmit your information request if more than one year elapses before project initiation as new information is continually added to the NCNHP database.

Natural Heritage Element Occurrences, Natural Areas, and Managed Areas Within a One-mile Radius of the Project Area
Clearinghouse 19-0040 - Cherokee County
September 17, 2018
NCNHDE-6951

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Amphibian	12577	Ambystoma talpoideum	Mole Salamander	1946-11-22	H	4-Low	---	Special Concern	G5	S2S3
Amphibian	8305	Ambystoma talpoideum	Mole Salamander	2012-03-29	B	3-Medium	---	Special Concern	G5	S2S3
Amphibian	13165	Ambystoma talpoideum	Mole Salamander	1954-01	H	4-Low	---	Special Concern	G5	S2S3
Amphibian	37393	Ambystoma talpoideum	Mole Salamander	No Date	H?	4-Low	---	Special Concern	G5	S2S3
Amphibian	3136	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	2017-06-12	B	3-Medium	---	Special Concern	G3G4T2	S3
Amphibian	14394	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	2017-08-24	B	3-Medium	---	Special Concern	G3G4T2	S3
Amphibian	1254	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	2011-07-13	BC	3-Medium	---	Special Concern	G3G4T2	S3
Amphibian	1670	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	2011-07-13	BC	3-Medium	---	Special Concern	G3G4T2	S3
Amphibian	29357	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	2017-04-02	E	3-Medium	---	Special Concern	G3G4T2	S3
Amphibian	33016	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	2016-07-05	BC	3-Medium	---	Special Concern	G3G4T2	S3
Amphibian	27821	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	2011-07-14	B	3-Medium	---	Special Concern	G3G4T2	S3
Amphibian	7889	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	1998-08-26	E	3-Medium	---	Special Concern	G3G4T2	S3

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Amphibian	27563	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	2014-09-16	E	3-Medium	---	Special Concern	G3G4T2	S3
Amphibian	34822	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	2011-07-14	E	2-High	---	Special Concern	G3G4T2	S3
Amphibian	15171	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	1936-08-13	H	4-Low	---	Special Concern	G3G4T2	S3
Amphibian	37745	Desmognathus wrighti	Southern Pygmy Salamander	1972-08-20	H	4-Low	---	Significantly Rare	G3	S2S3
Amphibian	37787	Desmognathus wrighti	Southern Pygmy Salamander	1969-08-11	H	3-Medium	---	Significantly Rare	G3	S2S3
Amphibian	1833	Eurycea junaluska	Junaluska Salamander	2000	E	3-Medium	---	Threatened	G3	S1S2
Amphibian	10672	Hemidactylium scutatum	Four-toed Salamander	2012-03-29	B?	3-Medium	---	Special Concern	G5	S3
Amphibian	27587	Hemidactylium scutatum	Four-toed Salamander	2007-03-31	E	3-Medium	---	Special Concern	G5	S3
Amphibian	11873	Hemidactylium scutatum	Four-toed Salamander	1949-04-24	H	4-Low	---	Special Concern	G5	S3
Amphibian	32122	Hemidactylium scutatum	Four-toed Salamander	2012-04-02	E	3-Medium	---	Special Concern	G5	S3
Amphibian	38139	Hemidactylium scutatum	Four-toed Salamander	1954-11-25	H	5-Very Low	---	Special Concern	G5	S3
Amphibian	35483	Plethodon aureolus	Tellico Salamander	1983-06	H?	3-Medium	---	Significantly Rare	G2G3	S2?
Amphibian	35438	Plethodon aureolus	Tellico Salamander	2008-06-02	E	3-Medium	---	Significantly Rare	G2G3	S2?
Amphibian	35482	Plethodon aureolus	Tellico Salamander	1983-06	H?	3-Medium	---	Significantly Rare	G2G3	S2?
Amphibian	32120	Plethodon chattahoochee	Chattahoochee Slimy Salamander	2012-05-10	E	2-High	---	Significantly Rare	G3	S1
Amphibian	37715	Plethodon chattahoochee	Chattahoochee Slimy Salamander	1961-07-18	H	4-Low	---	Significantly Rare	G3	S1
Amphibian	37777	Plethodon chattahoochee	Chattahoochee Slimy Salamander	2014-04-04	E	2-High	---	Significantly Rare	G3	S1

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Amphibian	37778	Plethodon chattahoochee	Chattahoochee Slimy Salamander	2015-05-31	E	2-High	---	Significantly Rare	G3	S1
Amphibian	37775	Plethodon chattahoochee	Chattahoochee Slimy Salamander	2014-04-04	E	2-High	---	Significantly Rare	G3	S1
Amphibian	37774	Plethodon chattahoochee	Chattahoochee Slimy Salamander	2014-04-04	E	2-High	---	Significantly Rare	G3	S1
Amphibian	37773	Plethodon chattahoochee	Chattahoochee Slimy Salamander	2014-04-04	E	2-High	---	Significantly Rare	G3	S1
Amphibian	35068	Pseudacris brachyphona	Mountain Chorus Frog	2013-03-18	A	1-Very High	---	Special Concern	G5	S2
Amphibian	35089	Pseudacris brachyphona	Mountain Chorus Frog	2017-03-28	A	2-High	---	Special Concern	G5	S2
Amphibian	15370	Pseudacris brachyphona	Mountain Chorus Frog	2008-03-19	AB	3-Medium	---	Special Concern	G5	S2
Amphibian	24841	Pseudacris brachyphona	Mountain Chorus Frog	2001	E	2-High	---	Special Concern	G5	S2
Amphibian	27458	Pseudacris brachyphona	Mountain Chorus Frog	2010-03-11	A	2-High	---	Special Concern	G5	S2
Amphibian	25905	Pseudacris brachyphona	Mountain Chorus Frog	2009-03-26	A?	1-Very High	---	Special Concern	G5	S2
Amphibian	27461	Pseudacris brachyphona	Mountain Chorus Frog	2012-03-09	AB	1-Very High	---	Special Concern	G5	S2
Amphibian	27462	Pseudacris brachyphona	Mountain Chorus Frog	2009-03-26	AB	1-Very High	---	Special Concern	G5	S2
Amphibian	27466	Pseudacris brachyphona	Mountain Chorus Frog	2009-03-26	AB	1-Very High	---	Special Concern	G5	S2
Amphibian	35085	Pseudacris brachyphona	Mountain Chorus Frog	2011-03-19	AB	1-Very High	---	Special Concern	G5	S2
Amphibian	35080	Pseudacris brachyphona	Mountain Chorus Frog	2017-03-28	AB	2-High	---	Special Concern	G5	S2
Amphibian	1304	Pseudacris brachyphona	Mountain Chorus Frog	1954-02-20	H	3-Medium	---	Special Concern	G5	S2
Amphibian	15281	Pseudacris brachyphona	Mountain Chorus Frog	1949-03-10	H	3-Medium	---	Special Concern	G5	S2
Amphibian	29971	Pseudacris brachyphona	Mountain Chorus Frog	2011-04-20	B?	2-High	---	Special Concern	G5	S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Amphibian	35079	Pseudacris brachyphona	Mountain Chorus Frog	2010-03-11	B?	1-Very High	---	Special Concern	G5	S2
Amphibian	27464	Pseudacris brachyphona	Mountain Chorus Frog	2009-03-26	C?	1-Very High	---	Special Concern	G5	S2
Amphibian	27460	Pseudacris brachyphona	Mountain Chorus Frog	2009-03-26	C?	1-Very High	---	Special Concern	G5	S2
Amphibian	4579	Pseudacris brachyphona	Mountain Chorus Frog	2008-03-19	BC	2-High	---	Special Concern	G5	S2
Amphibian	25904	Pseudacris brachyphona	Mountain Chorus Frog	2009-03-26	C?	3-Medium	---	Special Concern	G5	S2
Amphibian	38190	Pseudacris brachyphona	Mountain Chorus Frog	2017-02-24	E	2-High	---	Special Concern	G5	S2
Amphibian	25921	Pseudacris brachyphona	Mountain Chorus Frog	2012-03-13	BC	3-Medium	---	Special Concern	G5	S2
Amphibian	29498	Pseudacris brachyphona	Mountain Chorus Frog	2017-03-07	A?	2-High	---	Special Concern	G5	S2
Amphibian	35077	Pseudacris brachyphona	Mountain Chorus Frog	2010-03-11	C?	1-Very High	---	Special Concern	G5	S2
Amphibian	35069	Pseudacris brachyphona	Mountain Chorus Frog	2013-03-18	BC	1-Very High	---	Special Concern	G5	S2
Amphibian	35070	Pseudacris brachyphona	Mountain Chorus Frog	2013-03-18	BC	1-Very High	---	Special Concern	G5	S2
Amphibian	35090	Pseudacris brachyphona	Mountain Chorus Frog	2012-03-13	C	1-Very High	---	Special Concern	G5	S2
Amphibian	29973	Pseudacris brachyphona	Mountain Chorus Frog	2011-03-25	B?	3-Medium	---	Special Concern	G5	S2
Amphibian	35087	Pseudacris brachyphona	Mountain Chorus Frog	2011-03-25	BC	1-Very High	---	Special Concern	G5	S2
Amphibian	27463	Pseudacris brachyphona	Mountain Chorus Frog	2009-03-26	CD	3-Medium	---	Special Concern	G5	S2
Amphibian	25919	Pseudacris brachyphona	Mountain Chorus Frog	2008-03-19	C	3-Medium	---	Special Concern	G5	S2
Amphibian	25920	Pseudacris brachyphona	Mountain Chorus Frog	2008-03-19	C	3-Medium	---	Special Concern	G5	S2
Amphibian	27459	Pseudacris brachyphona	Mountain Chorus Frog	2009-03-26	C?	3-Medium	---	Special Concern	G5	S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Amphibian	34994	Pseudacris brachyphona	Mountain Chorus Frog	2011-03-14	B?	1-Very High	---	Special Concern	G5	S2
Amphibian	35064	Pseudacris brachyphona	Mountain Chorus Frog	2011-03-30	AB	1-Very High	---	Special Concern	G5	S2
Amphibian	35088	Pseudacris brachyphona	Mountain Chorus Frog	2013-03-17	BC	2-High	---	Special Concern	G5	S2
Amphibian	35067	Pseudacris brachyphona	Mountain Chorus Frog	2013-03-18	BC	2-High	---	Special Concern	G5	S2
Amphibian	35066	Pseudacris brachyphona	Mountain Chorus Frog	2013-03-18	C	2-High	---	Special Concern	G5	S2
Amphibian	35065	Pseudacris brachyphona	Mountain Chorus Frog	2013-03-18	C	2-High	---	Special Concern	G5	S2
Amphibian	35074	Pseudacris brachyphona	Mountain Chorus Frog	2013-03-18	BC	2-High	---	Special Concern	G5	S2
Amphibian	35082	Pseudacris brachyphona	Mountain Chorus Frog	2010-03-10	BC	2-High	---	Special Concern	G5	S2
Amphibian	38192	Pseudacris brachyphona	Mountain Chorus Frog	2017-03-28	E	2-High	---	Special Concern	G5	S2
Amphibian	35083	Pseudacris brachyphona	Mountain Chorus Frog	2011-04-01	E	1-Very High	---	Special Concern	G5	S2
Amphibian	35075	Pseudacris brachyphona	Mountain Chorus Frog	2013-03-18	C?	2-High	---	Special Concern	G5	S2
Amphibian	35092	Pseudacris brachyphona	Mountain Chorus Frog	2013-03-17	C?	2-High	---	Special Concern	G5	S2
Amphibian	35091	Pseudacris brachyphona	Mountain Chorus Frog	2012-03-13	BC	2-High	---	Special Concern	G5	S2
Amphibian	35078	Pseudacris brachyphona	Mountain Chorus Frog	2010-03-11	C?	2-High	---	Special Concern	G5	S2
Amphibian	35073	Pseudacris brachyphona	Mountain Chorus Frog	2013-03-17	BC	2-High	---	Special Concern	G5	S2
Amphibian	35076	Pseudacris brachyphona	Mountain Chorus Frog	2013-03-18	C?	2-High	---	Special Concern	G5	S2
Amphibian	35084	Pseudacris brachyphona	Mountain Chorus Frog	2011-03-18	E	1-Very High	---	Special Concern	G5	S2
Amphibian	34995	Pseudacris brachyphona	Mountain Chorus Frog	2011-03-14	C?	2-High	---	Special Concern	G5	S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Amphibian	34998	Pseudacris brachyphona	Mountain Chorus Frog	2011-03-14	E	2-High	---	Special Concern	G5	S2
Amphibian	29499	Pseudacris brachyphona	Mountain Chorus Frog	2011-03-15	BC	2-High	---	Special Concern	G5	S2
Amphibian	35063	Pseudacris brachyphona	Mountain Chorus Frog	2011-03-15	BC	2-High	---	Special Concern	G5	S2
Amphibian	38191	Pseudacris brachyphona	Mountain Chorus Frog	2017-03-07	E	2-High	---	Special Concern	G5	S2
Bird	24771	Haliaeetus leucocephalus	Bald Eagle	2010	E	2-High	Bald/Golden Eagle Protection Act	Threatened	G5	S3B,S3N
Bird	37806	Loxia curvirostra	Red Crossbill	2016-08-06	E	2-High	---	Special Concern	G5	S2
Bird	27453	Setophaga cerulea	Cerulean Warbler	2008-07-23	CD	3-Medium	---	Special Concern	G4	S2B
Bird	27446	Vermivora chrysoptera	Golden-winged Warbler	2016-05-11	E	3-Medium	---	Special Concern	G4	S2S3B
Bird	36401	Vermivora chrysoptera	Golden-winged Warbler	2015-05-11	E	2-High	---	Special Concern	G4	S2S3B
Bird	14715	Vermivora cyanoptera	Blue-winged Warbler	2013-05-30	E	3-Medium	---	Significantly Rare	G5	S2B
Bird	15757	Vermivora cyanoptera	Blue-winged Warbler	1976-05-31	H	3-Medium	---	Significantly Rare	G5	S2B
Bird	3824	Vermivora cyanoptera	Blue-winged Warbler	2012-06-04	E	3-Medium	---	Significantly Rare	G5	S2B
Bird	3822	Vermivora cyanoptera	Blue-winged Warbler	1974-06-20	H?	4-Low	---	Significantly Rare	G5	S2B
Butterfly	22132	Autochton cellus	Golden Banded-Skipper	2005-04-25	E	4-Low	---	Significantly Rare	G4	S2
Caddisfly	35329	Brachycentrus etowahensis	a caddisfly	1985-08	H?	3-Medium	---	Significantly Rare	G3	SH
Caddisfly	35310	Rhyacophila appalachia	a rhyacophilan caddisfly	2006-03-21	E	3-Medium	---	Significantly Rare	G3	S2
Crustacean	33834	Cambarus acanthura	Thornytail Crayfish	2004-05-21	E	3-Medium	---	Significantly Rare	G4G5	S1

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Crustacean	33835	Cambarus acanthura	Thornytail Crayfish	2005-07-15	E	3-Medium	---	Significantly Rare	G4G5	S1
Crustacean	33833	Cambarus acanthura	Thornytail Crayfish	2004-05-20	E	3-Medium	---	Significantly Rare	G4G5	S1
Crustacean	33800	Cambarus brimleyorum	Valley River Crayfish	2014-09-23	E	3-Medium	---	Significantly Rare	G3G4	S2
Crustacean	33801	Cambarus brimleyorum	Valley River Crayfish	2017-10-30	E	3-Medium	---	Significantly Rare	G3G4	S2
Crustacean	33837	Cambarus nodosus	Knotty Burrowing Crayfish	1984-07-21	H?	3-Medium	---	Significantly Rare	G4	S1
Crustacean	33839	Cambarus nodosus	Knotty Burrowing Crayfish	2005-07-14	E	3-Medium	---	Significantly Rare	G4	S1
Dragonfly or Damselfly	33445	Calopteryx amata	Superb Jewelwing	2004-Pre	H?	5-Very Low	---	Significantly Rare	G4	S1S2
Dragonfly or Damselfly	33719	Somatochlora elongata	Ski-tipped Emerald	2004-Pre	H?	5-Very Low	---	Significantly Rare	G5	S2S3
Freshwater Bivalve	15209	Elliptio dilatata	Spike	2014-09-23	E	3-Medium	---	Special Concern	G5	S2
Freshwater Bivalve	15730	Elliptio dilatata	Spike	1993-07-14	E	3-Medium	---	Special Concern	G5	S2
Freshwater Bivalve	29669	Fusconaia subrotunda	Longsolid	2014-09-24	E	3-Medium	---	Endangered	G3	S1
Freshwater Bivalve	3351	Fusconaia subrotunda	Longsolid	2010-07-19	E	3-Medium	---	Endangered	G3	S1
Freshwater Bivalve	23497	Lampsilis fasciola	Wavyrayed Lampmussel	2014-09-24	E	3-Medium	---	Special Concern	G5	S2
Freshwater Bivalve	157	Lampsilis fasciola	Wavyrayed Lampmussel	1993	E	3-Medium	---	Special Concern	G5	S2
Freshwater Bivalve	29675	Lampsilis fasciola	Wavyrayed Lampmussel	2014-09-24	E	3-Medium	---	Special Concern	G5	S2
Freshwater Bivalve	4532	Lasmigona holstonia	Tennessee Heelsplitter	1882-Pre	H	4-Low	---	Endangered	G3	SH
Freshwater Bivalve	8346	Pegias fabula	Littlewing Pearlymussel	1882-Pre	H	4-Low	Endangered	Endangered	G1	S1
Freshwater Bivalve	16620	Pleurobema oviforme	Tennessee Clubshell	2014-09-24	E	3-Medium	---	Endangered	G2G3	S1

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Freshwater Bivalve	29687	Pleurobema oviforme	Tennessee Clubshell	2010-07-19	E	3-Medium	---	Endangered	G2G3	S1
Freshwater Bivalve	29664	Pleuronaia barnesiana	Tennessee Pigtoe	2010-07-21	E	3-Medium	---	Endangered	G2G3	S1
Freshwater Bivalve	5796	Villosa iris	Rainbow	2017-11-02	E	3-Medium	---	Threatened	G5Q	S2
Freshwater Bivalve	26155	Villosa iris	Rainbow	2010-07-19	E	3-Medium	---	Threatened	G5Q	S2
Freshwater Bivalve	11052	Villosa iris	Rainbow	1993-07-14	E	3-Medium	---	Threatened	G5Q	S2
Freshwater Bivalve	11479	Villosa trabalis	Cumberland Bean	2003-02-21	F	3-Medium	Endangered	Significantly Rare	G1	SH
Freshwater Bivalve	19568	Villosa vanuxemensis	Mountain Creekshell	2006-08-02	E	3-Medium	---	Threatened	G4	S1?
Freshwater Fish	27450	Clinostomus sp. 1	Smoky Dace	2014-07-10	E	3-Medium	---	Special Concern	G5T3Q	S2
Freshwater Fish	27444	Clinostomus sp. 1	Smoky Dace	2009-07-29	E	3-Medium	---	Special Concern	G5T3Q	S2
Freshwater Fish	27445	Clinostomus sp. 1	Smoky Dace	1967-06-15	H	3-Medium	---	Special Concern	G5T3Q	S2
Freshwater Fish	31054	Clinostomus sp. 1	Smoky Dace	2009-07-29	E	3-Medium	---	Special Concern	G5T3Q	S2
Freshwater Fish	35719	Cottus carolinae	Banded Sculpin	2002-07-24	E	3-Medium	---	Special Concern	G5	S1
Freshwater Fish	14939	Erimystax insignis	Blotched Chub	2009-07-29	E	3-Medium	---	Significantly Rare	G4	S2
Freshwater Fish	14940	Erimystax insignis	Blotched Chub	2001-10-15	E	3-Medium	---	Significantly Rare	G4	S2
Freshwater Fish	29681	Luxilus chrysocephalus	Striped Shiner	2010-07-21	E	3-Medium	---	Special Concern	G5	S1
Freshwater Fish	26447	Luxilus chrysocephalus	Striped Shiner	2006-06-01	E	3-Medium	---	Special Concern	G5	S1
Freshwater Fish	35602	Moxostoma breviceps	Smallmouth Redhorse	2009-06-11	E	3-Medium	---	Significantly Rare	G5	S2
Freshwater Fish	37298	Moxostoma breviceps	Smallmouth Redhorse	2016-07-05	E	3-Medium	---	Significantly Rare	G5	S2

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Freshwater Fish	18954	Moxostoma sp. 2	Sicklefin Redhorse	2014-09-23	E	3-Medium	---	Threatened	G1G2	S2
Freshwater Fish	31171	Notropis micropteryx	Highland Shiner	2014-07-09	E	3-Medium	---	Significantly Rare	G5	S2
Freshwater Fish	32527	Notropis micropteryx	Highland Shiner	2007-03-21	E	3-Medium	---	Significantly Rare	G5	S2
Freshwater Fish	32562	Notropis micropteryx	Highland Shiner	2001-10-16	E	3-Medium	---	Significantly Rare	G5	S2
Freshwater Fish	14279	Percina squamata	Olive Darter	1991-Pre	H?	3-Medium	---	Special Concern	G3	S2
Freshwater Fish	14229	Percina squamata	Olive Darter	1994-05-23	E	3-Medium	---	Special Concern	G3	S2
Freshwater Fish	19029	Sander canadensis	Sauger	1987-Pre	H?	2-High	---	Significantly Rare	G5	S1
Freshwater or Terrestrial Gastropod	28450	Elimia christyi	Christy's Elimia	2014-09-23	E	3-Medium	---	Endangered	G2	S1
Freshwater or Terrestrial Gastropod	35979	Elimia christyi	Christy's Elimia	2000-03-09	E	3-Medium	---	Endangered	G2	S1
Freshwater or Terrestrial Gastropod	28451	Elimia christyi	Christy's Elimia	2004-Pre	E	3-Medium	---	Endangered	G2	S1
Freshwater or Terrestrial Gastropod	10947	Glyphyalinia junaluskana	Dark Glyph	1946-Pre	H?	4-Low	---	Special Concern	G2	S2
Liverwort	32706	Chiloscyphus appalachianus	A Liverwort	2011-03-10	E	2-High	---	Special Concern Vulnerable	G1G2Q	S1
Liverwort	16218	Plagiochila ludoviciana	A Liverwort	1948-08-13	H	3-Medium	---	Significantly Rare Peripheral	G5	S1
Liverwort	22192	Plagiochila sullivantii var. sullivantii	A Liverwort	1980	H	3-Medium	---	Significantly Rare Throughout	G2T2	S2
Mammal	7461	Corynorhinus rafinesquii rafinesquii	Rafinesque's Big-eared Bat	1959-Pre	H	4-Low	---	Threatened	G3G4T3	S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

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Mammal	9329	Glaucomys sabrinus coloratus	Carolina Northern Flying Squirrel	2009-03-21	E	2-High	Endangered	Endangered	G5T2	S2
Mammal	20088	Myotis austroriparius	Southeastern Bat	2001-08-10	E	2-High	---	Special Concern	G4	S2
Mammal	21795	Myotis leibii	Eastern Small-footed Bat	2016-02-09	E	2-High	---	Special Concern	G4	S2
Mammal	37000	Myotis leibii	Eastern Small-footed Bat	2010-07-04	E	2-High	---	Special Concern	G4	S2
Mammal	36009	Myotis lucifugus	Little Brown Bat	2009-07-27	E	2-High	---	Significantly Rare	G3	S2
Mammal	36019	Myotis lucifugus	Little Brown Bat	2008-08-02	E	2-High	---	Significantly Rare	G3	S2
Mammal	36012	Myotis lucifugus	Little Brown Bat	2001-08-10	E	2-High	---	Significantly Rare	G3	S2
Mammal	36010	Myotis lucifugus	Little Brown Bat	2016-02-09	E	1-Very High	---	Significantly Rare	G3	S2
Mammal	36011	Myotis lucifugus	Little Brown Bat	2013-08-13	E	3-Medium	---	Significantly Rare	G3	S2
Mammal	36008	Myotis lucifugus	Little Brown Bat	2008-08-01	E	1-Very High	---	Significantly Rare	G3	S2
Mammal	35177	Myotis lucifugus	Little Brown Bat	2000-07-26	E	2-High	---	Significantly Rare	G3	S2
Mammal	32142	Myotis septentrionalis	Northern Long-eared Bat	1956-01-21	H	4-Low	T-4(d)	Threatened	G1G2	S2
Mammal	32773	Myotis septentrionalis	Northern Long-eared Bat	2012-05-28	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	32774	Myotis septentrionalis	Northern Long-eared Bat	2007-07-16	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	32780	Myotis septentrionalis	Northern Long-eared Bat	2016-06-28	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	32776	Myotis septentrionalis	Northern Long-eared Bat	2009-07-27	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	32770	Myotis septentrionalis	Northern Long-eared Bat	2009-07-01	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34127	Myotis septentrionalis	Northern Long-eared Bat	2014-02-01	C	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	32781	Myotis septentrionalis	Northern Long-eared Bat	2009-06-03	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	32769	Myotis septentrionalis	Northern Long-eared Bat	2009-06-03	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34128	Myotis septentrionalis	Northern Long-eared Bat	2003-07-29	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34126	Myotis septentrionalis	Northern Long-eared Bat	2008-07-09	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	32775	Myotis septentrionalis	Northern Long-eared Bat	2010-05-26	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34129	Myotis septentrionalis	Northern Long-eared Bat	2001-08-13	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34125	Myotis septentrionalis	Northern Long-eared Bat	2002-08-06	E	2-High	T-4(d)	Threatened	G1G2	S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

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Mammal	32778	Myotis septentrionalis	Northern Long-eared Bat	2009-06-03	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	32784	Myotis septentrionalis	Northern Long-eared Bat	2009-06-03	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34124	Myotis septentrionalis	Northern Long-eared Bat	2008-07-16	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	32783	Myotis septentrionalis	Northern Long-eared Bat	2011-06-30	BC	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34123	Myotis septentrionalis	Northern Long-eared Bat	2000-07-10	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	37004	Myotis septentrionalis	Northern Long-eared Bat	2010-07-16	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	35099	Myotis septentrionalis	Northern Long-eared Bat	2008-08-12	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	35204	Myotis septentrionalis	Northern Long-eared Bat	2000-07-30	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	37013	Myotis septentrionalis	Northern Long-eared Bat	2010-07-12	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	37003	Myotis septentrionalis	Northern Long-eared Bat	2009-06-11	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	35238	Myotis septentrionalis	Northern Long-eared Bat	2000	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	27985	Myotis sodalis	Indiana Bat	2015-07-17	E	2-High	Endangered	Endangered	G2	S1S2
Mammal	32450	Myotis sodalis	Indiana Bat	2007-07-18	E	2-High	Endangered	Endangered	G2	S1S2
Mammal	37037	Myotis sodalis	Indiana Bat	2010-07-04	E	2-High	Endangered	Endangered	G2	S1S2
Mammal	35111	Myotis sodalis	Indiana Bat	2008-08-12	E	2-High	Endangered	Endangered	G2	S1S2
Mammal	36148	Perimyotis subflavus	Tricolored Bat	2008-08-02	E	3-Medium	---	Significantly Rare	G2G3	S3
Mammal	36138	Perimyotis subflavus	Tricolored Bat	2008-07-17	E	3-Medium	---	Significantly Rare	G2G3	S3
Mammal	36140	Perimyotis subflavus	Tricolored Bat	2015-06-09	E	3-Medium	---	Significantly Rare	G2G3	S3
Mammal	36038	Perimyotis subflavus	Tricolored Bat	2016-02-09	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	36146	Perimyotis subflavus	Tricolored Bat	2001-08-13	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	36139	Perimyotis subflavus	Tricolored Bat	2014-07-07	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	36142	Perimyotis subflavus	Tricolored Bat	2011-07-10	E	3-Medium	---	Significantly Rare	G2G3	S3
Mammal	35118	Perimyotis subflavus	Tricolored Bat	2008-08-06	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	35119	Perimyotis subflavus	Tricolored Bat	2008-08-13	BC	2-High	---	Significantly Rare	G2G3	S3
Mammal	37038	Perimyotis subflavus	Tricolored Bat	2010-07-04	E	6-Unknown	---	Significantly Rare	G2G3	S3

Element Occurrences Documented Within a One-mile Radius of the Project Area

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Mammal	32980	Spilogale putorius	Eastern Spotted Skunk	1982-Pre	H	5-Very Low	---	Game Animal	G4	S2
Mammal	36262	Sylvilagus obscurus	Appalachian Cottontail	1990-06	E	3-Medium	---	Game Animal	G4	S3
Mammal	36259	Sylvilagus obscurus	Appalachian Cottontail	1991-03-06	E	3-Medium	---	Game Animal	G4	S3
Mammal	36247	Sylvilagus obscurus	Appalachian Cottontail	1990-03-07	E	2-High	---	Game Animal	G4	S3
Mayfly	35291	Cercobrachys etowah	a caenid mayfly	2002-06-27	E	3-Medium	---	Significantly Rare	G4	S2
Moss	20042	Lindbergia brachyptera	Lindberg's Maple-moss	1948-08-14	H	4-Low	---	Significantly Rare Peripheral	G5	S1
Moth	38092	Idia majoralis	Greater Idia Moth	2015-08-12	E	2-High	---	Significantly Rare	GNR	S1S3
Natural Community	31658	Acidic Cove Forest (High Elevation Subtype)	---	2012-07-24	B	4-Low	---	---	G3G4Q	S2
Natural Community	26838	Acidic Cove Forest (Typic Subtype)	---	2013-05-30	A	3-Medium	---	---	G5	S4
Natural Community	30885	Acidic Cove Forest (Typic Subtype)	---	2011-09-17	C	4-Low	---	---	G5	S4
Natural Community	30884	Acidic Cove Forest (Typic Subtype)	---	2012-04-11	BC	3-Medium	---	---	G5	S4
Natural Community	30979	Acidic Cove Forest (Typic Subtype)	---	2011-05-26	C	3-Medium	---	---	G5	S4
Natural Community	35842	Acidic Cove Forest (Typic Subtype)	---	2015-08-05	BC	2-High	---	---	G5	S4
Natural Community	31653	Acidic Cove Forest (Typic Subtype)	---	2012-05-30	C	3-Medium	---	---	G5	S4
Natural Community	32047	Acidic Cove Forest (Typic Subtype)	---	2012-05-10	C	3-Medium	---	---	G5	S4
Natural Community	30883	Acidic Cove Forest (Typic Subtype)	---	2011-03-16	C	2-High	---	---	G5	S4
Natural Community	30886	Acidic Cove Forest (Typic Subtype)	---	2011-06-10	C	3-Medium	---	---	G5	S4
Natural Community	28901	Acidic Cove Forest (Typic Subtype)	---	2010	C?	2-High	---	---	G5	S4
Natural Community	31741	Acidic Cove Forest (Typic Subtype)	---	2012-08-05	C	2-High	---	---	G5	S4

Element Occurrences Documented Within a One-mile Radius of the Project Area

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Natural Community	31740	Acidic Cove Forest (Typic Subtype)	---	2012-09-26	CD	3-Medium	---	---	G5	S4
Natural Community	31436	Acidic Cove Forest (Typic Subtype)	---	2011-03-10	BC	3-Medium	---	---	G5	S4
Natural Community	31739	Acidic Cove Forest (Typic Subtype)	---	2012-04-03	C	3-Medium	---	---	G5	S4
Natural Community	31870	Canada Hemlock Forest (Typic Subtype)	---	2013-04-09	C	3-Medium	---	---	G3G4	S1S2
Natural Community	26841	Chestnut Oak Forest (Dry Heath Subtype)	---	2013-05-30	B	3-Medium	---	---	G5	S5
Natural Community	32086	Chestnut Oak Forest (Dry Heath Subtype)	---	2012-08-15	B	3-Medium	---	---	G5	S5
Natural Community	30894	Chestnut Oak Forest (Dry Heath Subtype)	---	2012-08-08	B	3-Medium	---	---	G5	S5
Natural Community	30980	Chestnut Oak Forest (Dry Heath Subtype)	---	2012-08-28	BC	3-Medium	---	---	G5	S5
Natural Community	31745	Chestnut Oak Forest (Dry Heath Subtype)	---	2012-09-26	C	3-Medium	---	---	G5	S5
Natural Community	28910	Chestnut Oak Forest (Dry Heath Subtype)	---	2008-11-07	C	3-Medium	---	---	G5	S5
Natural Community	30895	Chestnut Oak Forest (Dry Heath Subtype)	---	2011-06-10	C	3-Medium	---	---	G5	S5
Natural Community	31872	Chestnut Oak Forest (Herb Subtype)	---	2012-07-17	B	3-Medium	---	---	G4G5	S4
Natural Community	31437	Chestnut Oak Forest (Herb Subtype)	---	2011-10-25	BC	3-Medium	---	---	G4G5	S4
Natural Community	30898	Chestnut Oak Forest (Mesic Subtype)	---	2013-05-02	A	3-Medium	---	---	G4	S3S4
Natural Community	32090	Chestnut Oak Forest (White Pine Subtype)	---	2013-05-02	B	3-Medium	---	---	G3	S3
Natural Community	31876	Floodplain Pool	---	2012-04-02	B	2-High	---	---	G3	S2
Natural Community	5033	Floodplain Pool	---	2012-03-29	A	2-High	---	---	G3	S2
Natural Community	31662	Heath Bald (Southern Mixed Subtype)	---	2010-06-03	B	2-High	---	---	G1	S1

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	30887	High Elevation Birch Boulderfield Forest	---	2010-09-14	BC	3-Medium	---	---	G3	S2
Natural Community	30903	High Elevation Granitic Dome	---	2010-05-06	B	3-Medium	---	---	G2G3	S3
Natural Community	30904	High Elevation Red Oak Forest (Orchard Forest Subtype)	---	2010-05-13	A	2-High	---	---	G2	S2
Natural Community	26842	High Elevation Red Oak Forest (Typic Herb Subtype)	---	2012	A	3-Medium	---	---	G4	S3
Natural Community	31661	High Elevation Red Oak Forest (Typic Herb Subtype)	---	2012-07-05	B	2-High	---	---	G4	S3
Natural Community	28963	High Elevation Red Oak Forest (Typic Herb Subtype)	---	2010	B	2-High	---	---	G4	S3
Natural Community	30907	High Elevation Red Oak Forest (Typic Herb Subtype)	---	2010-09-14	B	3-Medium	---	---	G4	S3
Natural Community	30908	High Elevation Red Oak Forest (Typic Herb Subtype)	---	2011-06-10	BC	3-Medium	---	---	G4	S3
Natural Community	30909	High Elevation Rocky Summit (Typic Subtype)	---	2010-05-06	B	3-Medium	---	---	G2	S2
Natural Community	31902	High Elevation Rocky Summit (Typic Subtype)	---	2012-08-08	C	2-High	---	---	G2	S2
Natural Community	30911	Low Elevation Basic Glade (Montane Subtype)	---	2011-03-28	B	2-High	---	---	G2	S2
Natural Community	30914	Low Elevation Basic Glade (Montane Subtype)	---	2011-09-23	B	3-Medium	---	---	G2	S2
Natural Community	31459	Low Elevation Basic Glade (Montane Subtype)	---	2011-06-09	BC	3-Medium	---	---	G2	S2
Natural Community	31898	Low Elevation Basic Glade (Montane Subtype)	---	2011-10-14	BC	3-Medium	---	---	G2	S2
Natural Community	30912	Low Elevation Basic Glade (Montane Subtype)	---	2011-04-18	B	3-Medium	---	---	G2	S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	30913	Low Elevation Basic Glade (Montane Subtype)	---	2011-09-07	B	2-High	---	---	G2	S2
Natural Community	30917	Low Elevation Seep (Floodplain Subtype)	---	2011-03-16	B	2-High	---	---	G4	S2
Natural Community	31909	Low Elevation Seep (Floodplain Subtype)	---	2012-07-03	B	2-High	---	---	G4	S2
Natural Community	30916	Low Elevation Seep (Montane Subtype)	---	2011-09-07	BC	2-High	---	---	G2G3	S2S3
Natural Community	30915	Low Elevation Seep (Montane Subtype)	---	2011-09-23	BC	2-High	---	---	G2G3	S2S3
Natural Community	31911	Low Elevation Seep (Montane Subtype)	---	2012-04-11	BC	2-High	---	---	G2G3	S2S3
Natural Community	31912	Low Elevation Seep (Montane Subtype)	---	2012-07-18	C	2-High	---	---	G2G3	S2S3
Natural Community	31913	Low Elevation Seep (Montane Subtype)	---	2011-10-14	BC	2-High	---	---	G2G3	S2S3
Natural Community	31910	Low Elevation Seep (Piedmont/Mountain Springhead Subtype)	---	2012-06-04	C	2-High	---	---	G2	S1
Natural Community	35839	Low Elevation Seep (Typic Subtype)	---	2015-08-05	B?	3-Medium	---	---	G3?	S3
Natural Community	31438	Low Elevation Seep (Typic Subtype)	---	2011-02-11	B	2-High	---	---	G3?	S3
Natural Community	35838	Low Elevation Seep (Typic Subtype)	---	2015-08-13	C	2-High	---	---	G3?	S3
Natural Community	35840	Low Elevation Seep (Typic Subtype)	---	2015-08-13	C	2-High	---	---	G3?	S3
Natural Community	30918	Low Mountain Pine Forest (Montane Pine Subtype)	---	2012-08-08	B	2-High	---	---	G3G4	S2?
Natural Community	30987	Low Mountain Pine Forest (Montane Pine Subtype)	---	2012-07-16	AB	2-High	---	---	G3G4	S2?
Natural Community	30988	Low Mountain Pine Forest (Montane Pine Subtype)	---	2012-08-28	C	2-High	---	---	G3G4	S2?

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	31919	Low Mountain Pine Forest (Montane Pine Subtype)	---	2011-07-08	C	2-High	---	---	G3G4	S2?
Natural Community	31918	Low Mountain Pine Forest (Montane Pine Subtype)	---	2012-08-05	BC	2-High	---	---	G3G4	S2?
Natural Community	31920	Low Mountain Pine Forest (Montane Pine Subtype)	---	2012-09-25	B	2-High	---	---	G3G4	S2?
Natural Community	35843	Low Mountain Pine Forest (Shortleaf Pine Subtype)	---	2015-08-05	BC	2-High	---	---	G2G3	S2
Natural Community	30920	Low Mountain Pine Forest (Shortleaf Pine Subtype)	---	2011-09-07	C	3-Medium	---	---	G2G3	S2
Natural Community	30919	Low Mountain Pine Forest (Shortleaf Pine Subtype)	---	2012-04-11	B	2-High	---	---	G2G3	S2
Natural Community	30921	Low Mountain Pine Forest (Shortleaf Pine Subtype)	---	2011-09-07	B	2-High	---	---	G2G3	S2
Natural Community	31916	Low Mountain Pine Forest (Shortleaf Pine Subtype)	---	2012-07-03	C	2-High	---	---	G2G3	S2
Natural Community	16861	Montane Alluvial Forest (Large River Subtype)	---	2012-03-29	B	2-High	---	---	G2?	S1
Natural Community	31066	Montane Alluvial Forest (Small River Subtype)	---	2010-05-11	BC	3-Medium	---	---	G3	S1
Natural Community	30925	Montane Alluvial Forest (Small River Subtype)	---	2011-03-16	B	2-High	---	---	G3	S1
Natural Community	31925	Montane Alluvial Forest (Small River Subtype)	---	2013-04-09	C	3-Medium	---	---	G3	S1
Natural Community	31929	Montane Cliff (Acidic Herb Subtype)	---	2012-04-11	B	3-Medium	---	---	G3G4	S3
Natural Community	8454	Montane Cliff (Acidic Herb Subtype)	---	1994-05-04	A	3-Medium	---	---	G3G4	S3

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	30977	Montane Cliff (Acidic Herb Subtype)	---	2012-03-29	B	3-Medium	---	---	G3G4	S3
Natural Community	30982	Montane Cliff (Acidic Herb Subtype)	---	2010-05-26	C	3-Medium	---	---	G3G4	S3
Natural Community	31933	Montane Cliff (Acidic Herb Subtype)	---	2012-04-03	BC	2-High	---	---	G3G4	S3
Natural Community	34064	Montane Cliff (Acidic Herb Subtype)	---	2012-05-24	B	2-High	---	---	G3G4	S3
Natural Community	31928	Montane Cliff (Acidic Herb Subtype)	---	2011-07-11	BC	2-High	---	---	G3G4	S3
Natural Community	31938	Montane Floodplain Slough Forest	---	2013-04-09	D	3-Medium	---	---	G1	S1
Natural Community	26840	Montane Oak--Hickory Forest (Acidic Subtype)	---	2013-05-30	B	3-Medium	---	---	G4G5	S4S5
Natural Community	365	Montane Oak--Hickory Forest (Acidic Subtype)	---	1986	B?	4-Low	---	---	G4G5	S4S5
Natural Community	31068	Montane Oak--Hickory Forest (Acidic Subtype)	---	2012-09-14	B	4-Low	---	---	G4G5	S4S5
Natural Community	32089	Montane Oak--Hickory Forest (Acidic Subtype)	---		B	2-High	---	---	G4G5	S4S5
Natural Community	29022	Montane Oak--Hickory Forest (Acidic Subtype)	---	2010	AB	3-Medium	---	---	G4G5	S4S5
Natural Community	31942	Montane Oak--Hickory Forest (Acidic Subtype)	---	2012-05-10	BC	4-Low	---	---	G4G5	S4S5
Natural Community	31943	Montane Oak--Hickory Forest (Acidic Subtype)	---	2012-09-26	B	4-Low	---	---	G4G5	S4S5
Natural Community	29023	Montane Oak--Hickory Forest (Acidic Subtype)	---	2009-06-19	B	2-High	---	---	G4G5	S4S5
Natural Community	30931	Montane Oak--Hickory Forest (Acidic Subtype)	---	2010-05-06	BC	3-Medium	---	---	G4G5	S4S5
Natural Community	30933	Montane Oak--Hickory Forest (Acidic Subtype)	---	2012-07-16	B	3-Medium	---	---	G4G5	S4S5
Natural Community	30934	Montane Oak--Hickory Forest (Acidic Subtype)	---	2012-08-08	C	3-Medium	---	---	G4G5	S4S5
Natural Community	30947	Montane Oak--Hickory Forest (Acidic Subtype)	---	2012-04-11	B	3-Medium	---	---	G4G5	S4S5

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	12190	Montane Oak--Hickory Forest (Acidic Subtype)	---	2010	C	3-Medium	---	---	G4G5	S4S5
Natural Community	31940	Montane Oak--Hickory Forest (Acidic Subtype)	---	2011-10-14	C	3-Medium	---	---	G4G5	S4S5
Natural Community	35844	Montane Oak--Hickory Forest (Acidic Subtype)	---	2015-08-05	BC	2-High	---	---	G4G5	S4S5
Natural Community	31939	Montane Oak--Hickory Forest (Acidic Subtype)	---	2012-04-03	CD	3-Medium	---	---	G4G5	S4S5
Natural Community	30938	Montane Oak--Hickory Forest (Basic Subtype)	---	2012-09-14	B	4-Low	---	---	G3	S3
Natural Community	30141	Montane Oak--Hickory Forest (Basic Subtype)	---	2010	AB	3-Medium	---	---	G3	S3
Natural Community	30932	Montane Oak--Hickory Forest (Basic Subtype)	---	2011-08-11	B	4-Low	---	---	G3	S3
Natural Community	31959	Montane Oak--Hickory Forest (Basic Subtype)	---	2012-09-26	B	4-Low	---	---	G3	S3
Natural Community	30174	Montane Oak--Hickory Forest (Basic Subtype)	---	2011-07-08	A	4-Low	---	---	G3	S3
Natural Community	31948	Montane Oak--Hickory Forest (Basic Subtype)	---	2012-07-17	B	4-Low	---	---	G3	S3
Natural Community	31947	Montane Oak--Hickory Forest (Basic Subtype)	---	2012-07-18	B	4-Low	---	---	G3	S3
Natural Community	30940	Montane Oak--Hickory Forest (Basic Subtype)	---	2011-09-23	BC	3-Medium	---	---	G3	S3
Natural Community	30939	Montane Oak--Hickory Forest (Basic Subtype)	---	2011-07-06	C	3-Medium	---	---	G3	S3
Natural Community	32014	Montane Oak--Hickory Forest (Basic Subtype)	---	2012-05-30	B	3-Medium	---	---	G3	S3
Natural Community	1998	Montane Oak--Hickory Forest (Basic Subtype)	---	2010	C	3-Medium	---	---	G3	S3
Natural Community	30944	Montane Oak--Hickory Forest (Low Dry Subtype)	---	2011-03-28	B	3-Medium	---	---	G2G3	S2
Natural Community	3782	Montane Oak--Hickory Forest (Low Dry Subtype)	---	2010	BC	3-Medium	---	---	G2G3	S2
Natural Community	30943	Montane Oak--Hickory Forest (Low Dry Subtype)	---	2011-09-07	C	3-Medium	---	---	G2G3	S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	31067	Montane Oak--Hickory Forest (Low Dry Subtype)	---	2011-09-07	B	3-Medium	---	---	G2G3	S2
Natural Community	32091	Montane Oak--Hickory Forest (White Pine Subtype)	---	2013-05-02	B	3-Medium	---	---	G2G3	S2
Natural Community	31659	Northern Hardwood Forest (Beech Gap Subtype)	---	2012-07-24	B	2-High	---	---	G1	S1S2
Natural Community	34830	Northern Hardwood Forest (Beech Gap Subtype)	---	2010-07-08	C	3-Medium	---	---	G1	S1S2
Natural Community	31663	Northern Hardwood Forest (Typic Subtype)	---	2012-06-14	B	2-High	---	---	G3G4	S3
Natural Community	30983	Northern Hardwood Forest (Typic Subtype)	---	2012-07-16	A	4-Low	---	---	G3G4	S3
Natural Community	29047	Northern Hardwood Forest (Typic Subtype)	---	2010	AB	2-High	---	---	G3G4	S3
Natural Community	30986	Northern Hardwood Forest (Typic Subtype)	---	2011-08-11	B	3-Medium	---	---	G3G4	S3
Natural Community	31962	Northern Hardwood Forest (Typic Subtype)	---	2012-08-05	AB	3-Medium	---	---	G3G4	S3
Natural Community	32016	Northern Hardwood Forest (Typic Subtype)	---	2012-05-30	BC	3-Medium	---	---	G3G4	S3
Natural Community	32304	Piedmont/Mountain Semipermanent Impoundment (Montane Marsh Subtype)	---	2012-03-21	B	3-Medium	---	---	G3	S3S4
Natural Community	31964	Piedmont/Mountain Semipermanent Impoundment (Montane Marsh Subtype)	---	2013-04-09	B	3-Medium	---	---	G3	S3S4
Natural Community	31966	Piedmont/Mountain Semipermanent Impoundment (Montane Marsh Subtype)	---	2012-03-09	BC	3-Medium	---	---	G3	S3S4

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	30990	Pine--Oak/Heath (Typic Subtype)	---	2011-09-13	B	4-Low	---	---	G3	S3
Natural Community	6753	Pine--Oak/Heath (Typic Subtype)	---	2012	C	3-Medium	---	---	G3	S3
Natural Community	30989	Pine--Oak/Heath (Typic Subtype)	---	2011-06-28	C	2-High	---	---	G3	S3
Natural Community	31009	Rich Cove Forest (Boulderfield Subtype)	---	2010-09-14	B	2-High	---	---	G3	S2
Natural Community	31967	Rich Cove Forest (Boulderfield Subtype)	---	2012-08-08	B	2-High	---	---	G3	S2
Natural Community	34102	Rich Cove Forest (Foothills Intermediate Subtype)	---	2011-09-07	C	2-High	---	---	G4?	S3
Natural Community	35845	Rich Cove Forest (Foothills Intermediate Subtype)	---	2015-08-05	BC	2-High	---	---	G4?	S3
Natural Community	34098	Rich Cove Forest (Foothills Intermediate Subtype)	---	2012-07-03	C	2-High	---	---	G4?	S3
Natural Community	26839	Rich Cove Forest (Montane Intermediate Subtype)	---	2013-05-30	A	3-Medium	---	---	G4	S4
Natural Community	30994	Rich Cove Forest (Montane Intermediate Subtype)	---	2012-08-08	BC	4-Low	---	---	G4	S4
Natural Community	30995	Rich Cove Forest (Montane Intermediate Subtype)	---	2011-03-28	B	3-Medium	---	---	G4	S4
Natural Community	30996	Rich Cove Forest (Montane Intermediate Subtype)	---	2012-04-11	B	3-Medium	---	---	G4	S4
Natural Community	31986	Rich Cove Forest (Montane Intermediate Subtype)	---	2012-08-05	C	2-High	---	---	G4	S4

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Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	31977	Rich Cove Forest (Montane Intermediate Subtype)	---	2012-05-10	C	3-Medium	---	---	G4	S4
Natural Community	31991	Rich Cove Forest (Montane Intermediate Subtype)	---	2012-09-26	C	3-Medium	---	---	G4	S4
Natural Community	12913	Rich Cove Forest (Montane Intermediate Subtype)	---	2010	C	3-Medium	---	---	G4	S4
Natural Community	31987	Rich Cove Forest (Montane Intermediate Subtype)	---	2011-07-08	C	2-High	---	---	G4	S4
Natural Community	32027	Rich Cove Forest (Montane Rich Subtype)	---	2012-07-17	B?	4-Low	---	---	G3G4	S3
Natural Community	31002	Rich Cove Forest (Montane Rich Subtype)	---	2012-09-14	B	4-Low	---	---	G3G4	S3
Natural Community	31000	Rich Cove Forest (Montane Rich Subtype)	---	2011-04-28	B	4-Low	---	---	G3G4	S3
Natural Community	31001	Rich Cove Forest (Montane Rich Subtype)	---	2011-06-28	B	2-High	---	---	G3G4	S3
Natural Community	30998	Rich Cove Forest (Montane Rich Subtype)	---	2010-09-14	B	3-Medium	---	---	G3G4	S3
Natural Community	30999	Rich Cove Forest (Montane Rich Subtype)	---	2012-07-16	B	3-Medium	---	---	G3G4	S3
Natural Community	32028	Rich Cove Forest (Montane Rich Subtype)	---	2012-07-18	B	3-Medium	---	---	G3G4	S3
Natural Community	30997	Rich Cove Forest (Montane Rich Subtype)	---	2011-06-10	B	3-Medium	---	---	G3G4	S3
Natural Community	31003	Rich Cove Forest (Montane Rich Subtype)	---	2011-07-06	BC	3-Medium	---	---	G3G4	S3
Natural Community	31005	Rich Cove Forest (Montane Rich Subtype)	---	2011-09-23	BC	3-Medium	---	---	G3G4	S3
Natural Community	32010	Rich Montane Seep	---	2012-07-24	A	2-High	---	---	G3	S3
Natural Community	31451	Rich Montane Seep	---	2010-06-03	B	2-High	---	---	G3	S3

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	32013	Rich Montane Seep	---	2012-05-30	B	2-High	---	---	G3	S3
Natural Community	31006	Rich Montane Seep	---	2011-05-26	BC	2-High	---	---	G3	S3
Natural Community	32022	Rocky Bar and Shore (Twisted Sedge Subtype)	---	2011-08-05	A	2-High	---	---	G3G4	S3
Natural Community	31996	Southern Appalachian Bog (Low Elevation Subtype)	---	2013-04-09	C	2-High	---	---	G1G2	S1S2
Natural Community	31995	Southern Mountain Pine--Oak Forest	---	2012-07-03	B	3-Medium	---	---	G3G4	S1S2
Natural Community	32033	Southern Mountain Pine--Oak Forest	---	2011-10-04	BC	3-Medium	---	---	G3G4	S1S2
Natural Community	35846	Southern Mountain Pine--Oak Forest	---	2015-08-05	BC	2-High	---	---	G3G4	S1S2
Natural Community	954	Southern Mountain Pine--Oak Forest	---	2010	BC	3-Medium	---	---	G3G4	S1S2
Natural Community	31439	Spray Cliff	---	2011-03-10	BC	2-High	---	---	G2	S2
Natural Community	32306	Swamp Forest--Bog Complex (Typic Subtype)	---	2012-03-21	BC	3-Medium	---	---	G2	S2
Natural Community	31008	White Pine Forest	---	2011-03-16	BC	2-High	---	---	G2G3	S2
Reptile	11528	Glyptemys muhlenbergii	Bog Turtle	1996-06	D	3-Medium	Threatened Similar Appearance	Threatened	G3	S2
Reptile	5556	Glyptemys muhlenbergii	Bog Turtle	1988-05-15	H	3-Medium	Threatened Similar Appearance	Threatened	G3	S2
Reptile	28388	Graptemys geographica	Common Map Turtle	2008-08-05	E	3-Medium	---	Significantly Rare	G5	S1
Reptile	28387	Graptemys geographica	Common Map Turtle	2009-06-24	E	3-Medium	---	Significantly Rare	G5	S1
Reptile	35535	Ophisaurus attenuatus	Slender Glass Lizard	1972-09-10	H?	3-Medium	---	Significantly Rare	G5	S2

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Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Reptile	35527	Ophisaurus attenuatus	Slender Glass Lizard	1984-06-22	H?	4-Low	---	Significantly Rare	G5	S2
Reptile	37427	Ophisaurus mimicus	Mimic Glass Lizard	1936-06-07	H	4-Low	---	Special Concern	G3	S1
Reptile	13178	Pituophis melanoleucus melanoleucus	Northern Pinesnake	1936-06-07	H	4-Low	---	Threatened	G4T4	S2
Reptile	28815	Pituophis melanoleucus melanoleucus	Northern Pinesnake	2009-05-20	D	2-High	---	Threatened	G4T4	S2
Reptile	23774	Plestiodon anthracinus	Coal Skink	1974-08-17	H?	3-Medium	---	Significantly Rare	G5	S2S3
Reptile	10144	Sternotherus minor	Loggerhead Musk Turtle	2008-08	E	3-Medium	---	Special Concern	G5	S1
Stonefly	35265	Rasvena terna	Vermont Sallfly	2009-04-21	E	3-Medium	---	Significantly Rare	G4	S2
Vascular Plant	11824	Aconitum reclinatum	Trailing Wolfsbane	2010-05-26	BC	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	13228	Aconitum reclinatum	Trailing Wolfsbane	1992-07-01	C	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	32893	Brachyelytrum aristosum	Northern Shorthusk	2012-07-24	A	2-High	---	Significantly Rare Peripheral	G5	S3
Vascular Plant	30148	Brachyelytrum aristosum	Northern Shorthusk	2011-08-11	C	2-High	---	Significantly Rare Peripheral	G5	S3
Vascular Plant	35814	Buchnera americana	American Bluehearts	2015-08-13	A?	2-High	---	Endangered	G5?	S1
Vascular Plant	31647	Calamagrostis porteri ssp. porteri	Porter's Reed Grass	2012-07-18	E	2-High	---	Significantly Rare Peripheral	G4T4	S2?
Vascular Plant	30151	Calamagrostis porteri ssp. porteri	Porter's Reed Grass	2011-08-11	AB	2-High	---	Significantly Rare Peripheral	G4T4	S2?
Vascular Plant	31648	Campanula aparinoides var. aparinoides	Marsh Bellflower	2013-04-09	B?	2-High	---	Significantly Rare Peripheral	G5TNR	S2
Vascular Plant	33674	Campanula aparinoides var. aparinoides	Marsh Bellflower	2010-06-17	E	2-High	---	Significantly Rare Peripheral	G5TNR	S2
Vascular Plant	8944	Carex cherokeensis	Cherokee Sedge	2012-04-11	AB	3-Medium	---	Endangered	G4G5	S1
Vascular Plant	31650	Carex cherokeensis	Cherokee Sedge	2012-04-12	B	2-High	---	Endangered	G4G5	S1
Vascular Plant	31649	Carex cherokeensis	Cherokee Sedge	2012-05-09	CD	2-High	---	Endangered	G4G5	S1

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	3594	Carex projecta	Necklace Sedge	1988-Pre	H	3-Medium	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	29184	Carex projecta	Necklace Sedge	2010-09-08	CD	2-High	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	9441	Carex purpurifera	Purple Sedge	2005-05-23	A	3-Medium	---	Special Concern Vulnerable	G4?	S3
Vascular Plant	27901	Carex purpurifera	Purple Sedge	2008-08-18	D	2-High	---	Special Concern Vulnerable	G4?	S3
Vascular Plant	31672	Carex purpurifera	Purple Sedge	2012-07-18	B	2-High	---	Special Concern Vulnerable	G4?	S3
Vascular Plant	31675	Carex purpurifera	Purple Sedge	2012-07-17	AB	2-High	---	Special Concern Vulnerable	G4?	S3
Vascular Plant	29192	Carex purpurifera	Purple Sedge	2011-06-28	C	2-High	---	Special Concern Vulnerable	G4?	S3
Vascular Plant	30155	Carex purpurifera	Purple Sedge	2011-09-14	B	2-High	---	Special Concern Vulnerable	G4?	S3
Vascular Plant	30154	Carex purpurifera	Purple Sedge	2011-09-23	A	2-High	---	Special Concern Vulnerable	G4?	S3
Vascular Plant	30153	Carex purpurifera	Purple Sedge	2011-09-13	B	2-High	---	Special Concern Vulnerable	G4?	S3
Vascular Plant	30157	Celastrus scandens	American Bittersweet	2011-09-23	BC	2-High	---	Endangered	G5	S2?
Vascular Plant	30158	Celastrus scandens	American Bittersweet	2011-06-13	CD	2-High	---	Endangered	G5	S2?
Vascular Plant	33803	Celastrus scandens	American Bittersweet	2010-06-18	E	2-High	---	Endangered	G5	S2?
Vascular Plant	26321	Corallorhiza wisteriana	Spring Coral-root	1976-04	H	3-Medium	---	Significantly Rare Other	G5	S1
Vascular Plant	6769	Frasera caroliniensis	Columbo	1952-06-05	H	5-Very Low	---	Significantly Rare Peripheral	G5	S2S3

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	1856	Frasera caroliniensis	Columbo	2012-04-10	BC	2-High	---	Significantly Rare Peripheral	G5	S2S3
Vascular Plant	9551	Gentianopsis crinita	Fringed Gentian	1968-Pre	H	5-Very Low	---	Threatened	G5	S1
Vascular Plant	29222	Glyceria nubigena	Smoky Mountain Mannagrass	2010-07-07	A	2-High	---	Significantly Rare Limited	G2G3	S2
Vascular Plant	23934	Hackelia virginiana	Virginia Stickseed	1968-Pre	H	5-Very Low	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	23931	Hackelia virginiana	Virginia Stickseed	1968-Pre	H	5-Very Low	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	4231	Isotria medeoloides	Small Whorled Pogonia	2012-05-24	F	3-Medium	Threatened	Threatened	G2?	S1
Vascular Plant	30176	Liatris squarrulosa	Earle's Blazing-star	2011-10-04	C	3-Medium	---	Significantly Rare Peripheral	G4G5	S2
Vascular Plant	12544	Lilium canadense ssp. editorum	Red Canada Lily	1994-07	C	3-Medium	---	Endangered	G5T4	S1
Vascular Plant	29255	Monotropsis odorata	Sweet Pinesap	2010-06-10	BC	2-High	---	Special Concern Vulnerable	G3	S3
Vascular Plant	33943	Monotropsis odorata	Sweet Pinesap	2010-06-18	E	2-High	---	Special Concern Vulnerable	G3	S3
Vascular Plant	34842	Oenothera perennis	Perennial Sundrops	2013-06-12	A	3-Medium	---	Special Concern Vulnerable	G5	S2
Vascular Plant	17236	Oenothera perennis	Perennial Sundrops	2000-07	A?	3-Medium	---	Special Concern Vulnerable	G5	S2
Vascular Plant	36778	Orbexilum pedunculatum	Sampson's Snakeroot	1953-06-06	H	4-Low	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	36777	Orbexilum pedunculatum	Sampson's Snakeroot	2015-08-13	B?	1-Very High	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	31706	Platanthera herbiola	Northern Rein Orchid	2012-07-03	D	2-High	---	Significantly Rare Peripheral	G4?T4Q	S1S2
Vascular Plant	31707	Platanthera herbiola	Northern Rein Orchid	2012-06-04	AB	2-High	---	Significantly Rare Peripheral	G4?T4Q	S1S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	37078	Platanthera integrilabia	White Fringeless Orchid	1935-08-02	H	5-Very Low	Threatened	Special Concern Historical	G2G3	SH
Vascular Plant	2093	Sceptridium jenmanii	Alabama Grape-fern	1979-10	H	3-Medium	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	35841	Sceptridium jenmanii	Alabama Grape-fern	2015-08-13	CD	2-High	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	31711	Scutellaria saxatilis	Rock Skullcap	2012-08-08	A	2-High	---	Significantly Rare Throughout	G3	S2
Vascular Plant	31712	Scutellaria saxatilis	Rock Skullcap	2012-08-15	AB	2-High	---	Significantly Rare Throughout	G3	S2
Vascular Plant	6177	Silene ovata	Mountain Catchfly	1994-09	D	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	30298	Silene ovata	Mountain Catchfly	2011-07-06	D	2-High	---	Special Concern Vulnerable	G3	S3
Vascular Plant	31714	Silene ovata	Mountain Catchfly	2012-05-30	AB	2-High	---	Special Concern Vulnerable	G3	S3
Vascular Plant	20603	Spigelia marilandica	Pink-root	1999-09-15	E	3-Medium	---	Threatened	G4	S1
Vascular Plant	20606	Spigelia marilandica	Pink-root	2010-06-18	E	2-High	---	Threatened	G4	S1
Vascular Plant	30328	Spigelia marilandica	Pink-root	2011-09-07	E	2-High	---	Threatened	G4	S1
Vascular Plant	20604	Spigelia marilandica	Pink-root	1999-09-15	E	2-High	---	Threatened	G4	S1
Vascular Plant	30334	Stewartia ovata	Mountain Camellia	2011-04-11	AB	2-High	---	Significantly Rare Peripheral	G4	S3
Vascular Plant	20611	Stewartia ovata	Mountain Camellia	1999-09-15	C	2-High	---	Significantly Rare Peripheral	G4	S3
Vascular Plant	29319	Stewartia ovata	Mountain Camellia	2010-09-07	B	2-High	---	Significantly Rare Peripheral	G4	S3
Vascular Plant	31729	Stewartia ovata	Mountain Camellia	2012-04-12	C	2-High	---	Significantly Rare Peripheral	G4	S3

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	29315	Stewartia ovata	Mountain Camellia	2010-05-03	CD	2-High	---	Significantly Rare Peripheral	G4	S3
Vascular Plant	30335	Stewartia ovata	Mountain Camellia	2011-03-28	C	2-High	---	Significantly Rare Peripheral	G4	S3
Vascular Plant	31730	Symphyotrichum shortii	Short's Aster	2012-07-17	AB	2-High	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	31731	Symphyotrichum shortii	Short's Aster	2012-07-18	AB	2-High	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	30341	Symphyotrichum shortii	Short's Aster	2011-09-13	B?	2-High	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	30343	Symphyotrichum shortii	Short's Aster	2011-06-14	BC	2-High	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	30342	Symphyotrichum shortii	Short's Aster	2011-09-14	C	2-High	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	30344	Symphyotrichum shortii	Short's Aster	2011-06-13	B	2-High	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	32301	Thalictrum macrostylum	Small-leaved Meadowrue	2013-04-09	BC	2-High	---	Significantly Rare Throughout	G3G4	S2
Vascular Plant	32302	Thalictrum macrostylum	Small-leaved Meadowrue	2013-04-09	CD	2-High	---	Significantly Rare Throughout	G3G4	S2
Vascular Plant	7429	Trientalis borealis	Starflower	1993-06-16	A	3-Medium	---	Endangered	G5	S1
Vascular Plant	29340	Trientalis borealis	Starflower	2010-05-06	C	2-High	---	Endangered	G5	S1
Vascular Plant	34423	Trillium flexipes	Bent White Trillium	2010-06-17	E	3-Medium	---	Special Concern Historical	G5	S1
Vascular Plant	15580	Trillium simile	Sweet White Trillium	2010-05-03	BC	3-Medium	---	Threatened	G3	S2
Vascular Plant	27354	Viola appalachiensis	Appalachian Violet	2008-07-23	C	2-High	---	Special Concern Vulnerable	G4	S2

Natural Areas Documented Within a One-mile Radius of the Project Area

Site Name	Representational Rating	Collective Rating
Slate Creek Forests and Powerline	R2 (Very High)	C4 (Moderate)
Will Scott Mountain	R3 (High)	C4 (Moderate)

Natural Areas Documented Within a One-mile Radius of the Project Area

Site Name	Representational Rating	Collective Rating
HIW/Hanging Dog Creek Aquatic Habitat	R3 (High)	C4 (Moderate)
HIW/Lower Hiwassee River Aquatic Habitat	R1 (Exceptional)	C3 (High)
Fires Creek Ridgeline	R2 (Very High)	C3 (High)
Western Valley River Mountains	R2 (Very High)	C2 (Very High)
Little Brasstown Creek Floodplain	R2 (Very High)	C4 (Moderate)
Upper Nantahala Gorge	R1 (Exceptional)	C3 (High)
Shorty Top	R2 (Very High)	C4 (Moderate)
HIW/Fires Creek Aquatic Habitat	R1 (Exceptional)	C4 (Moderate)
HIW/Upper Hiwassee River Aquatic Habitat	R1 (Exceptional)	C1 (Exceptional)
HIW/Valley River Aquatic Habitat	R1 (Exceptional)	C3 (High)
Farmer Top	R4 (Moderate)	C4 (Moderate)
Hamby Bend	R2 (Very High)	C3 (High)
Hanging Dog Mountain	R3 (High)	C4 (Moderate)
Appalachia Lake Old-Growth Site	R1 (Exceptional)	C4 (Moderate)
North Shoal Creek Falls	R3 (High)	C4 (Moderate)
Rocky Knob/Davis Creek Headwaters	R3 (High)	C3 (High)
Shuler Creek Wetland Complex	R2 (Very High)	C4 (Moderate)
Turner Top	R3 (High)	C4 (Moderate)
Hiwassee Church Bluffs	R3 (High)	C4 (Moderate)
Long Ridge/Unicoi Mountains	R2 (Very High)	C3 (High)
Rocky Ford Beaver Marsh	R4 (Moderate)	C5 (General)
Payne Mountain	R2 (Very High)	C4 (Moderate)
Peels High Top/Cantrell Top	R3 (High)	C4 (Moderate)
Old Billy Top	R4 (Moderate)	C4 (Moderate)
Moccasin Mountain	R1 (Exceptional)	C4 (Moderate)
John Green Bend	R3 (High)	C4 (Moderate)
Corundum #3/Snowbird Mountains	R3 (High)	C4 (Moderate)
Camp Creek Wetlands	R3 (High)	C3 (High)
Camp Creek Falls	R5 (General)	C5 (General)
Beavers Branch Wetland and Slopes	R3 (High)	C4 (Moderate)
Snowbird Creek/Hooper Bald	R1 (Exceptional)	C2 (Very High)
Die Bend/Crowder Bluff	R1 (Exceptional)	C3 (High)
Hiwassee Lake Rare Plant Site	R2 (Very High)	C3 (High)
Piercy Bald/London Bald	R4 (Moderate)	C3 (High)
Buck Knob	R3 (High)	C3 (High)
Pack Mountain	R2 (Very High)	C4 (Moderate)
Tulula Wetlands	R3 (High)	C3 (High)
Santeetlah Bluffs/Stratton Meadows	R1 (Exceptional)	C1 (Exceptional)

Natural Areas Documented Within a One-mile Radius of the Project Area

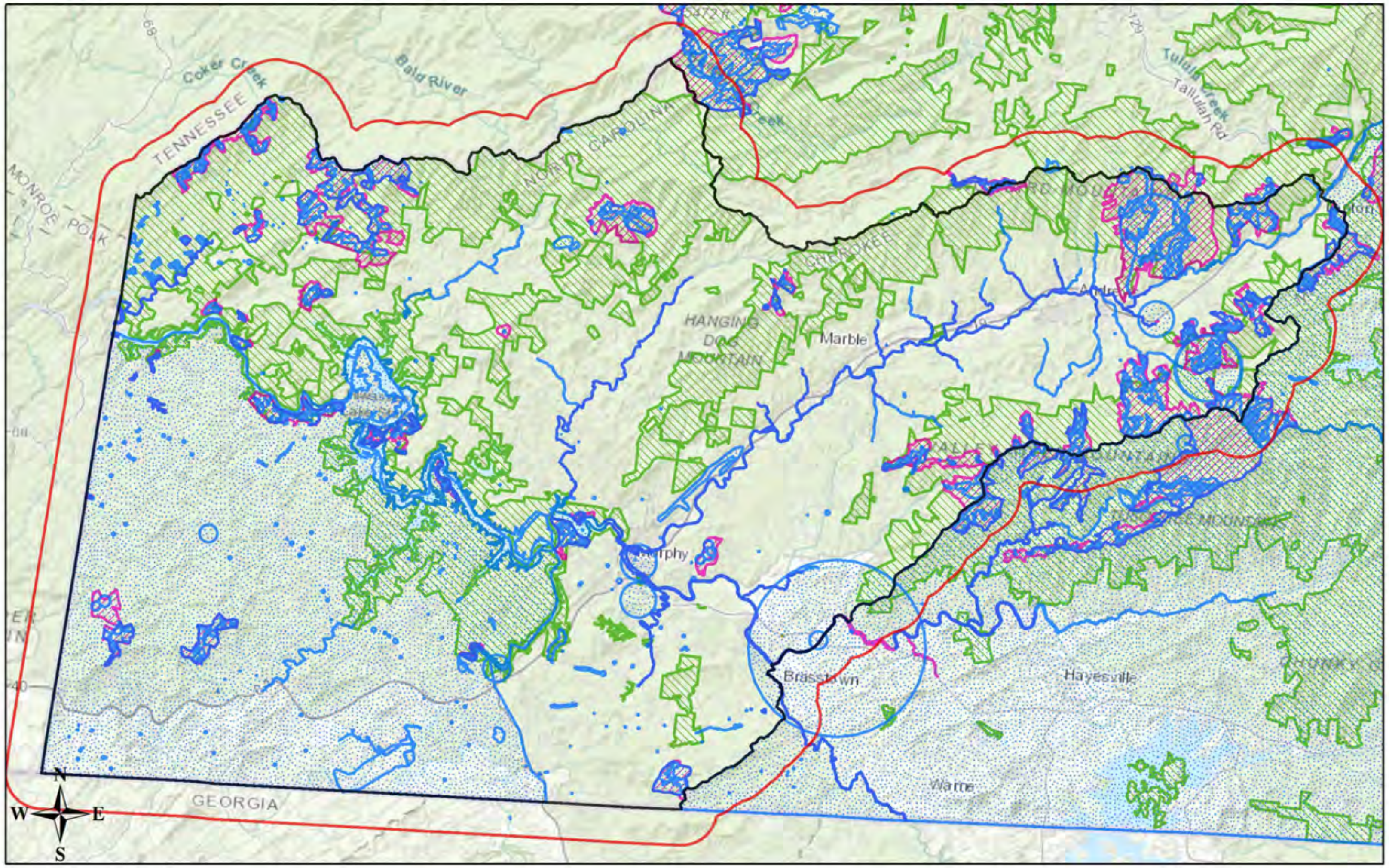
Site Name	Representational Rating	Collective Rating
Gipp Creek/Teyahalee Bald	R3 (High)	C3 (High)
Piercy Range/Kennedy Top	R2 (Very High)	C3 (High)

Managed Areas Documented Within a One-mile Radius of the Project Area

Managed Area Name	Owner	Owner Type
Nantahala National Forest - Nantahala Ranger District	US Forest Service	Federal
Nantahala National Forest - Tusquitee Ranger District	US Forest Service	Federal
Nantahala National Forest - Cheoah Ranger District	US Forest Service	Federal
NC Clean Water Management Trust Fund Easement	NC DNCR, Clean Water Management Trust Fund	State
NC Department of Transportation Mitigation Site	NC Department of Transportation	State
NC Division of Mitigation Services Easement	NC DEQ, Division of Mitigation Services	State
Mainspring Conservation Trust Easement	Land Trust for the Little Tennessee	Private
NC Clean Water Management Trust Fund Easement	NC DNCR, Clean Water Management Trust Fund	State
Mainspring Conservation Trust Preserve	Land Trust for the Little Tennessee	Private
Tulula Bog Conservation Site	NC Department of Transportation	State

Definitions and an explanation of status designations and codes can be found at https://ncnhde.natureserve.org/content/help. Data query generated on September 17, 2018; source: NCNHP, Q3 July 2018. Please resubmit your information request if more than one year elapses before project initiation as new information is continually added to the NCNHP database.

NCNHDE-6951: Clearinghouse 19-0040 - Cherokee County



September 17, 2018

- Project Boundary
- Buffered Project Boundary
- Natural Heritage Element Occurrence (NHEO)
- NHP Natural Area (NHNA)
- Managed Area (MAREA)

1:244,563

0 2 4 8 mi

0 3.25 6.5 13 km

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

North Carolina Department of Natural and Cultural Resources
Natural Heritage Program

Governor Roy Cooper | Secretary Susi H. Hamilton

NCNHDE-6952

September 17, 2018

Attn: Crystal Best
North Carolina Clearinghouse

RE: Clearinghouse 19-0040 - McDowell County

Dear North Carolina Clearinghouse:

The North Carolina Natural Heritage Program (NCNHP) appreciates the opportunity to provide information about natural heritage resources for the project referenced above.

A query of the NCNHP database indicates that there are records for rare species, important natural communities, natural areas, and/or conservation/managed areas within the proposed project boundary. These results are presented in the attached 'Documented Occurrences' tables and map.

The attached 'Potential Occurrences' table summarizes rare species and natural communities that have been documented within a one-mile radius of the property boundary. The proximity of these records suggests that these natural heritage elements may potentially be present in the project area if suitable habitat exists. Tables of natural areas and conservation/managed areas within a one-mile radius of the project area, if any, are also included in this report.

If a Federally-listed species is documented within the project area or indicated within a one-mile radius of the project area, the NCNHP recommends contacting the US Fish and Wildlife Service (USFWS) for guidance. Contact information for USFWS offices in North Carolina is found here: https://www.fws.gov/offices/Directory/ListOffices.cfm?statecode=37.

Please note that natural heritage element data are maintained for the purposes of conservation planning, project review, and scientific research, and are not intended for use as the primary criteria for regulatory decisions. Information provided by the NCNHP database may not be published without prior written notification to the NCNHP, and the NCNHP must be credited as an information source in these publications. Maps of NCNHP data may not be redistributed without permission.

Also please note that the NC Natural Heritage Program may follow this letter with additional correspondence if a Dedicated Nature Preserve, Registered Heritage Area, Clean Water Management Trust Fund easement, or an occurrence of a Federally-listed species is documented near the project area.

If you have questions regarding the information provided in this letter or need additional assistance, please contact Rodney A. Butler at rodney.butler@ncdcr.gov or 919-707-8603.

Sincerely,
NC Natural Heritage Program

Natural Heritage Element Occurrences, Natural Areas, and Managed Areas Intersecting the Project Area
Clearinghouse 19-0040 - McDowell County
September 17, 2018
NCNHDE-6952

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Amphibian	37219	Ambystoma talpoideum	Mole Salamander	2016-03-23	E	2-High	---	Special Concern	G5	S2S3
Amphibian	32755	Ambystoma talpoideum	Mole Salamander	2013-10-11	C	2-High	---	Special Concern	G5	S2S3
Amphibian	34437	Hemidactylium scutatum	Four-toed Salamander	2014-06-10	E	2-High	---	Special Concern	G5	S3
Amphibian	34438	Hemidactylium scutatum	Four-toed Salamander	2017-10-28	E	2-High	---	Special Concern	G5	S3
Amphibian	34435	Hemidactylium scutatum	Four-toed Salamander	2014-03-24	E	2-High	---	Special Concern	G5	S3
Amphibian	34439	Hemidactylium scutatum	Four-toed Salamander	2014-05-01	E	2-High	---	Special Concern	G5	S3
Amphibian	31640	Plethodon meridianus	South Mountain Gray-cheeked Salamander	2012-03-30	B?	2-High	---	Significantly Rare	G2	S2
Amphibian	22111	Plethodon yonahlossee pop. 1	Crevice Salamander	2005-08-26	E	3-Medium	---	Special Concern	G4T1T2Q	S2
Animal Assemblage	38185	Waterbird Colony	---	2017-02-14	E	2-High	---	---	GNR	S3
Arachnid	22075	Hypochilus coylei	a Lampshade Weaver	2005-08-26	AB	2-High	---	Significantly Rare	G3?	S3?
Arachnid	12227	Hypochilus sheari	a Lampshade Weaver	1987-09-01	AB	3-Medium	---	Significantly Rare	G2G3	S2S3
Arachnid	12292	Nesticus carolinensis	Linville Caverns Spider	2011-2012-winter	E	3-Medium	---	Significantly Rare	G1?	S1
Bird	3365	Catharus guttatus	Hermit Thrush	2015-05-23	A	3-Medium	---	Significantly Rare	G5	S2B,S5N
Bird	5043	Coccyzus erythropthalmus	Black-billed Cuckoo	1994-06-15	E	3-Medium	---	Significantly Rare	G5	S2B
Bird	37809	Loxia curvirostra	Red Crossbill	2010-05-01	E	2-High	---	Special Concern	G5	S2
Butterfly	6335	Satyrium caryaevorus	Hickory Hairstreak	1994-06-23	E	3-Medium	---	Significantly Rare	G4	S1

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Crustacean	16149	Caecidotea carolinensis	Bennett's Mill Cave Water Slater	1977-03-19	H?	2-High	---	Endangered	G2G3	SH
Crustacean	32643	Cambarus johni	Carolina Foothills Crayfish	2014-07-07	E	3-Medium	---	Significantly Rare	G3	S3
Crustacean	31036	Cambarus johni	Carolina Foothills Crayfish	2017-05-02	E	3-Medium	---	Significantly Rare	G3	S3
Crustacean	32635	Cambarus johni	Carolina Foothills Crayfish	2002-05-01	E	3-Medium	---	Significantly Rare	G3	S3
Crustacean	34622	Cambarus johni	Carolina Foothills Crayfish	2012-03-13	E	3-Medium	---	Significantly Rare	G3	S3
Crustacean	33291	Cambarus johni	Carolina Foothills Crayfish	2005-04-15	E	3-Medium	---	Significantly Rare	G3	S3
Crustacean	31037	Cambarus johni	Carolina Foothills Crayfish	2010-06-02	E	3-Medium	---	Significantly Rare	G3	S3
Crustacean	33280	Cambarus johni	Carolina Foothills Crayfish	1985-04-17	H?	3-Medium	---	Significantly Rare	G3	S3
Freshwater Bivalve	31016	Alasmidonta varicosa	Brook Floater	2017-07-31	E	3-Medium	---	Endangered	G3	S3
Freshwater Bivalve	35455	Villosa constricta	Notched Rainbow	2014-04-23	E	3-Medium	---	Threatened	G3	S3
Freshwater Fish	32440	Carpiodes sp. cf. cyprinus	Carolina Quillback	2007-03-30	E	3-Medium	---	Significantly Rare	GNR	S2
Freshwater Fish	27489	Carpiodes sp. cf. cyprinus	Carolina Quillback	2007-06-28	E	3-Medium	---	Significantly Rare	GNR	S2
Freshwater Fish	32502	Etheostoma thalassinum	Seagreen Darter	2014-06-12	E	3-Medium	---	Significantly Rare	G4	S3
Freshwater or Terrestrial Gastropod	37670	Mesomphix vulgatus	Common Button	2004-09-25	E	3-Medium	---	Significantly Rare	G4	S2?
Freshwater or Terrestrial Gastropod	37702	Ventridens coelaxis	Bidentate Dome	2005-09-03	E	3-Medium	---	Special Concern	G3	S3?
Lichen	5594	Melanelia stygia	Alpine Camouflage Lichen	1991	E	3-Medium	---	Significantly Rare Disjunct	G5	S1S2

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Liverwort	27609	Aneura sharpii	A Liverwort	2009-Pre	E	3-Medium	---	Significantly Rare Throughout	G1G2	S1
Liverwort	22747	Aneura sharpii	A Liverwort	2005?	E	3-Medium	---	Significantly Rare Throughout	G1G2	S1
Liverwort	28996	Cephaloziella spinicaulis	A Liverwort	2007-12	E	3-Medium	---	Significantly Rare Peripheral	G3G4	S1
Liverwort	22142	Diplophyllum obtusatum	A Liverwort	1961-Pre	H	3-Medium	---	Significantly Rare Disjunct	G2?	S1
Liverwort	21905	Lejeunea blomquistii	A Liverwort	1994-06-13	E	3-Medium	---	Special Concern Vulnerable	G1G2	S1
Liverwort	22064	Mannia californica	A Liverwort	1990-Pre	U	3-Medium	---	Significantly Rare Throughout	G3?	S1
Liverwort	22176	Plagiochasma wrightii	A Liverwort	2006-04-18	E	3-Medium	---	Significantly Rare Disjunct	G3?	S1
Liverwort	22775	Plagiochila ludoviciana	A Liverwort	2005?	E	3-Medium	---	Significantly Rare Peripheral	G5	S1
Liverwort	4145	Plagiochila sullivantii var. spinigera	A Liverwort	1953-07-28	H	3-Medium	---	Significantly Rare Limited	G2T1	S1
Liverwort	22023	Plagiochila sullivantii var. sullivantii	A Liverwort	1994-06-12	E	2-High	---	Significantly Rare Throughout	G2T2	S2
Liverwort	15085	Plagiochila virginica var. virginica	A Liverwort	2012-06-07	E	2-High	---	Significantly Rare Limited	G3T3	S1
Liverwort	27610	Plagiochila virginica var. virginica	A Liverwort	2009-Pre	E	3-Medium	---	Significantly Rare Limited	G3T3	S1
Liverwort	22779	Porella wataugensis	A Liverwort	2005?	E	3-Medium	---	Significantly Rare Limited	G1G2Q	S1
Liverwort	21874	Porella wataugensis	A Liverwort	1994-06-12	E	3-Medium	---	Significantly Rare Limited	G1G2Q	S1
Mammal	36072	Myotis lucifugus	Little Brown Bat	2011-08-01	E	2-High	---	Significantly Rare	G3	S2

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Mammal	36116	Myotis lucifugus	Little Brown Bat	2012-02-09	D	2-High	---	Significantly Rare	G3	S2
Mammal	36073	Myotis lucifugus	Little Brown Bat	2011-08-01	E	2-High	---	Significantly Rare	G3	S2
Mammal	36115	Myotis lucifugus	Little Brown Bat	2009-02-10	E	2-High	---	Significantly Rare	G3	S2
Mammal	36074	Myotis lucifugus	Little Brown Bat	2011-08-03	E	2-High	---	Significantly Rare	G3	S2
Mammal	36117	Myotis lucifugus	Little Brown Bat	2011-03-15	H?	1-Very High	---	Significantly Rare	G3	S2
Mammal	34299	Myotis septentrionalis	Northern Long-eared Bat	2009-02-20	D	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34301	Myotis septentrionalis	Northern Long-eared Bat	2011-08-01	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	32160	Myotis septentrionalis	Northern Long-eared Bat	2006-06-28	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34303	Myotis septentrionalis	Northern Long-eared Bat	2011-08-01	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34311	Myotis septentrionalis	Northern Long-eared Bat	2002-06-30	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	35350	Myotis septentrionalis	Northern Long-eared Bat	2013-06-12	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	35343	Myotis septentrionalis	Northern Long-eared Bat	2012-07-25	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	36195	Perimyotis subflavus	Tricolored Bat	2011-08-01	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	36199	Perimyotis subflavus	Tricolored Bat	2015-02-27	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	36194	Perimyotis subflavus	Tricolored Bat	2002-06-30	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	36197	Perimyotis subflavus	Tricolored Bat	2011-08-03	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	36196	Perimyotis subflavus	Tricolored Bat	2011-08-01	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	36200	Perimyotis subflavus	Tricolored Bat	2015-02-27	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	36198	Perimyotis subflavus	Tricolored Bat	2016-02-25	E	1-Very High	---	Significantly Rare	G2G3	S3
Mammal	33034	Spilogale putorius	Eastern Spotted Skunk	2014-04-04	E	2-High	---	Game Animal	G4	S2
Mayfly	16370	Tsalia berneri	a mayfly	1991-01-09	H?	3-Medium	---	Significantly Rare	G4	S3
Moss	5634	Bryoerythrophyllum inaequalifolium	A Foot Moss	1967-09-23	H	3-Medium	---	Significantly Rare Disjunct	G4?	S1

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Moss	8028	Bryoxiphium norvegicum	Sword Moss	1966-06-13	H	3-Medium	---	Significantly Rare Other	G5?	S1
Moss	15010	Cirriphyllum piliferum	Long Leaf Mustache Moss	1965-07-17	H	3-Medium	---	Significantly Rare Peripheral	G5	S1
Moss	29085	Cleistocarpidium palustre	Prairie Pleuridium	2007-03-31	E	3-Medium	---	Significantly Rare Disjunct	G5?	S1
Moss	27623	Dichelyma capillaceum	Hair Claw Moss	2009-Pre	E	3-Medium	---	Significantly Rare Peripheral	G5	S1?
Moss	2866	Dichodontium pellucidum	Transparent Fork Moss	1951-04-27	H	3-Medium	---	Significantly Rare Peripheral	G5	S2
Moss	23638	Didymodon fallax	Fallacious Screw Moss	1951-04-27	H	3-Medium	---	Significantly Rare Other	G5	SH
Moss	23639	Didymodon tophaceus	Three-ranked Didymodon	1951-04-27	H	3-Medium	---	Significantly Rare Other	G5	S1?
Moss	2421	Encalypta procera	Extinguisher Moss	2012-06-07	E	3-Medium	---	Significantly Rare Disjunct	G5	S1
Moss	8884	Entodon concinnus	Lime Entodon	1951-04-27	H	3-Medium	---	Significantly Rare Peripheral	G4G5	S1
Moss	1339	Entodon sullivantii	Sullivant's Entodon	1965-07-06	H	3-Medium	---	Significantly Rare Other	G3G4	S2
Moss	22735	Entodon sullivantii	Sullivant's Entodon	2005	E	3-Medium	---	Significantly Rare Other	G3G4	S2
Moss	13410	Entodon sullivantii	Sullivant's Entodon	2012-06-07	E	2-High	---	Significantly Rare Other	G3G4	S2
Moss	5809	Eucladium verticillatum	Lime-seep Eucladium	2012-06-07	E	3-Medium	---	Significantly Rare Other	G4	S1
Moss	12478	Homalia trichomanoides	Lime Homalia	1965-07-17	F	3-Medium	---	Significantly Rare Peripheral	G5	S1
Moss	2784	Hygrohypnum closteri	Closter's Brook-hypnum	1950-08-26	H	3-Medium	---	Significantly Rare Throughout	G3	S1
Moss	27648	Lindbergia brachyptera	Lindberg's Maple-moss	2009-Pre	E	3-Medium	---	Significantly Rare Peripheral	G5	S1
Moss	23556	Orthotrichum strangulatum	Drummond Moss	1935-06-23	H	3-Medium	---	Significantly Rare Peripheral	G4	SH

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Moss	23557	Orthotrichum strangulatum	Drummond Moss	1951-04-27	H	3-Medium	---	Significantly Rare Peripheral	G4	SH
Moss	27611	Oxyrrhynchium pringlei	Pringle's Water Feather Moss	2009-Pre	E	3-Medium	---	Significantly Rare Disjunct	G2G3	S1
Moss	23435	Plagiomnium rostratum	Long-beaked Thread Moss	1965-07-06	H	3-Medium	---	Significantly Rare Peripheral	G5	S1?
Moss	15617	Rhachithecium perpusillum	Budding Tortula	1949-09-06	H	3-Medium	---	Significantly Rare Disjunct	G4G5	S1S2
Moss	9880	Scopelophila cataractae	Agoyan Cataract Moss	2018-05-28	E	3-Medium	---	Significantly Rare Disjunct	G3	S1
Moss	19398	Scopelophila ligulata	Copper Moss	1951-04-27	H	3-Medium	---	Significantly Rare Other	G5?	S1
Moss	15695	Scopelophila ligulata	Copper Moss	2018-05-28	E	3-Medium	---	Significantly Rare Other	G5?	S1
Moss	27652	Sphagnum fallax	Pretty Peatmoss	2009-Pre	E	3-Medium	---	Significantly Rare Peripheral	G5	S2
Moss	27653	Sphagnum flexuosum	Flexuous Peatmoss	2009-Pre	E	3-Medium	---	Significantly Rare Peripheral	G5	S1
Moss	27654	Sphagnum subsecundum	Orange Peatmoss	2009-Pre	E	3-Medium	---	Significantly Rare Peripheral	G5	S1
Moss	27655	Sphagnum warnstorfii	Fen Peatmoss	2009-Pre	E	3-Medium	---	Significantly Rare Disjunct	G5	S1
Moth	38094	Lytrosis permagnaria	A Geometrid Moth	2017-05-16	E	2-High	---	Significantly Rare	G3G4	S2S3
Natural Community	22753	Acidic Cove Forest (Typic Subtype)	---	2017-09-05	AB	3-Medium	---	---	G5	S4
Natural Community	17436	Acidic Cove Forest (Typic Subtype)	---	2010	A	3-Medium	---	---	G5	S4
Natural Community	31486	Acidic Cove Forest (Typic Subtype)	---	2015-03-31	B	3-Medium	---	---	G5	S4
Natural Community	22707	Acidic Cove Forest (Typic Subtype)	---	2015-05-28	BC	2-High	---	---	G5	S4
Natural Community	8914	Acidic Cove Forest (Typic Subtype)	---	2014?	B	3-Medium	---	---	G5	S4
Natural Community	35398	Acidic Cove Forest (Typic Subtype)	---	2015-05-13	B	2-High	---	---	G5	S4

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	33605	Acidic Cove Forest (Typic Subtype)	---	2014-07-23	C	2-High	---	---	G5	S4
Natural Community	36034	Acidic Cove Forest (Typic Subtype)	---	2017-07-21	B	2-High	---	---	G5	S4
Natural Community	36223	Acidic Cove Forest (Typic Subtype)	---	2015-09-01	C	3-Medium	---	---	G5	S4
Natural Community	36632	Acidic Cove Forest (Typic Subtype)	---	2016-05-19	C	2-High	---	---	G5	S4
Natural Community	12140	Calcareous Oak-Walnut Forest	---	2004-08-25	B	2-High	---	---	G1Q	S1
Natural Community	4433	Calcareous Oak-Walnut Forest	---	2004-08-18	B?	3-Medium	---	---	G1Q	S1
Natural Community	36031	Canada Hemlock Forest (Typic Subtype)	---	2015-06-04	A	2-High	---	---	G3G4	S1S2
Natural Community	18573	Carolina Hemlock Forest (Pine Subtype)	---	1987	B	3-Medium	---	---	G2	S1S2
Natural Community	35402	Carolina Hemlock Forest (Pine Subtype)	---	2015-04-28	C	2-High	---	---	G2	S1S2
Natural Community	22744	Carolina Hemlock Forest (Typic Subtype)	---	2004-09-25	A	3-Medium	---	---	G2	S2
Natural Community	596	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	A	3-Medium	---	---	G5	S5
Natural Community	22756	Chestnut Oak Forest (Dry Heath Subtype)	---	2017-09-05	B	3-Medium	---	---	G5	S5
Natural Community	17173	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	A	3-Medium	---	---	G5	S5
Natural Community	22741	Chestnut Oak Forest (Dry Heath Subtype)	---	2012-07-16	B	3-Medium	---	---	G5	S5
Natural Community	22708	Chestnut Oak Forest (Dry Heath Subtype)	---	2016-06-09	B	2-High	---	---	G5	S5
Natural Community	35403	Chestnut Oak Forest (Dry Heath Subtype)	---	2015-05-13	AB	2-High	---	---	G5	S5
Natural Community	36215	Chestnut Oak Forest (Dry Heath Subtype)	---	2017-07-21	A	2-High	---	---	G5	S5
Natural Community	22780	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	BC	2-High	---	---	G5	S5

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	22661	Chestnut Oak Forest (Dry Heath Subtype)	---	2015-09-01	A	2-High	---	---	G5	S5
Natural Community	9026	Chestnut Oak Forest (Dry Heath Subtype)	---	2013	A	2-High	---	---	G5	S5
Natural Community	22654	Chestnut Oak Forest (Dry Heath Subtype)	---	2016-05-19	A	3-Medium	---	---	G5	S5
Natural Community	31484	Chestnut Oak Forest (Dry Heath Subtype)	---	2015-03-31	BC	3-Medium	---	---	G5	S5
Natural Community	12367	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	B	3-Medium	---	---	G5	S5
Natural Community	22679	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	BC	3-Medium	---	---	G5	S5
Natural Community	22702	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	B	2-High	---	---	G5	S5
Natural Community	14839	Chestnut Oak Forest (Dry Heath Subtype)	---	2012	B	2-High	---	---	G5	S5
Natural Community	27297	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	CD	2-High	---	---	G5	S5
Natural Community	35404	Chestnut Oak Forest (Herb Subtype)	---	2015-05-13	AB	2-High	---	---	G4G5	S4
Natural Community	20928	Chestnut Oak Forest (Herb Subtype)	---	2010	B	2-High	---	---	G4G5	S4
Natural Community	30306	Chestnut Oak Forest (Herb Subtype)	---	2010	C	3-Medium	---	---	G4G5	S4
Natural Community	37323	Chestnut Oak Forest (Herb Subtype)	---	2013	A	2-High	---	---	G4G5	S4
Natural Community	32403	Chestnut Oak Forest (Herb Subtype)	---	2013-07-19	B	2-High	---	---	G4G5	S4
Natural Community	34957	Chestnut Oak Forest (Herb Subtype)	---	2015-03-31	C	2-High	---	---	G4G5	S4
Natural Community	1690	Chestnut Oak Forest (Mesic Subtype)	---	2008-04-25	A	3-Medium	---	---	G4	S3S4
Natural Community	36996	Chestnut Oak Forest (Mesic Subtype)	---	2013	A	2-High	---	---	G4	S3S4
Natural Community	33969	Chestnut Oak Forest (Mesic Subtype)	---	2014-08-12	BC	2-High	---	---	G4	S3S4

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	29128	Chestnut Oak Forest (Mesic Subtype)	---	2010	B	2-High	---	---	G4	S3S4
Natural Community	36225	Chestnut Oak Forest (Mesic Subtype)	---	2015-09-01	B	3-Medium	---	---	G4	S3S4
Natural Community	22687	Dry-Mesic Oak--Hickory Forest (Piedmont Subtype)	---	2010	CD	2-High	---	---	G4G5	S4
Natural Community	33933	Heath Bald (Catawba Rhododendron Subtype)	---	2013-06-24	B	2-High	---	---	G2	S2
Natural Community	10738	High Elevation Red Oak Forest (Heath Subtype)	---	2010	B	3-Medium	---	---	G4	S3
Natural Community	33928	High Elevation Red Oak Forest (Heath Subtype)	---	2013-07-02	A	2-High	---	---	G4	S3
Natural Community	30052	High Elevation Red Oak Forest (Heath Subtype)	---	2010	A	3-Medium	---	---	G4	S3
Natural Community	33938	High Elevation Red Oak Forest (Orchard Forest Subtype)	---	2013-06-24	A	2-High	---	---	G2	S2
Natural Community	33932	High Elevation Red Oak Forest (Typic Herb Subtype)	---	2013-07-02	A	2-High	---	---	G4	S3
Natural Community	12909	High Elevation Red Oak Forest (Typic Herb Subtype)	---	2010	A	3-Medium	---	---	G4	S3
Natural Community	33968	High Elevation Red Oak Forest (Typic Herb Subtype)	---	2014-08-12	C	2-High	---	---	G4	S3
Natural Community	2341	High Elevation Rocky Summit (Typic Subtype)	---	1991	E	3-Medium	---	---	G2	S2
Natural Community	19953	High Elevation Rocky Summit (Typic Subtype)	---	1997-08-19	A	3-Medium	---	---	G2	S2
Natural Community	30085	Low Elevation Basic Glade (Montane Subtype)	---	2011	A	3-Medium	---	---	G2	S2
Natural Community	20926	Low Elevation Basic Glade (Montane Subtype)	---	2004-09-27	C	2-High	---	---	G2	S2

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	22745	Low Elevation Granitic Dome	---	2004-09-25	AB	3-Medium	---	---	G2	S2
Natural Community	22722	Low Elevation Granitic Dome	---	2014	C	2-High	---	---	G2	S2
Natural Community	28204	Low Elevation Rocky Summit (Acidic Subtype)	---	2013	B	2-High	---	---	G3?	S2
Natural Community	36635	Low Elevation Rocky Summit (Basic Subtype)	---	2016-05-10	B	2-High	---	---	G1	S1
Natural Community	32707	Low Elevation Seep (Floodplain Subtype)	---	2013-09-24	CD	3-Medium	---	---	G4	S2
Natural Community	31568	Low Elevation Seep (Montane Subtype)	---	2012-07-16	C	3-Medium	---	---	G2G3	S2S3
Natural Community	34367	Low Elevation Seep (Montane Subtype)	---	2014-05-13	C	2-High	---	---	G2G3	S2S3
Natural Community	17160	Low Elevation Seep (Piedmont/Mountain Springhead Subtype)	---	1993-10-26	B?	2-High	---	---	G2	S1
Natural Community	37324	Low Elevation Seep (Typic Subtype)	---	2013	B	2-High	---	---	G3?	S3
Natural Community	33602	Low Elevation Seep (Typic Subtype)	---	2014-07-23	CD	2-High	---	---	G3?	S3
Natural Community	36022	Low Mountain Pine Forest (Montane Pine Subtype)	---	2015-08-31	B	2-High	---	---	G3G4	S2?
Natural Community	36220	Low Mountain Pine Forest (Shortleaf Pine Subtype)	---	2015-09-04	C	2-High	---	---	G2G3	S2
Natural Community	32708	Montane Alluvial Forest (Large River Subtype)	---	2014-07-25	D	2-High	---	---	G2?	S1
Natural Community	31563	Montane Alluvial Forest (Small River Subtype)	---	2012-07-16	C	3-Medium	---	---	G3	S1
Natural Community	36028	Montane Alluvial Forest (Small River Subtype)	---	2015-06-04	C	2-High	---	---	G3	S1
Natural Community	14085	Montane Cliff (Acidic Herb Subtype)	---	1987	B	3-Medium	---	---	G3G4	S3

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	15226	Montane Cliff (Acidic Herb Subtype)	---	2012	A	3-Medium	---	---	G3G4	S3
Natural Community	22675	Montane Cliff (Acidic Herb Subtype)	---	2004-08-25	C?	2-High	---	---	G3G4	S3
Natural Community	34959	Montane Cliff (Acidic Herb Subtype)	---	2015-03-30	C	2-High	---	---	G3G4	S3
Natural Community	22755	Montane Oak--Hickory Forest (Acidic Subtype)	---	2017-09-05	AB	3-Medium	---	---	G4G5	S4S5
Natural Community	22743	Montane Oak--Hickory Forest (Acidic Subtype)	---	2012-07-16	B	3-Medium	---	---	G4G5	S4S5
Natural Community	11905	Montane Oak--Hickory Forest (Acidic Subtype)	---	2013	A	2-High	---	---	G4G5	S4S5
Natural Community	22703	Montane Oak--Hickory Forest (Acidic Subtype)	---	2016-06-08	B	2-High	---	---	G4G5	S4S5
Natural Community	32710	Montane Oak--Hickory Forest (Acidic Subtype)	---	2014-07-21	B	2-High	---	---	G4G5	S4S5
Natural Community	22662	Montane Oak--Hickory Forest (Acidic Subtype)	---	2015-09-04	A	2-High	---	---	G4G5	S4S5
Natural Community	20927	Montane Oak--Hickory Forest (Acidic Subtype)	---	2013-09-24	B	3-Medium	---	---	G4G5	S4S5
Natural Community	22632	Montane Oak--Hickory Forest (Acidic Subtype)	---	2016-05-19	BC	3-Medium	---	---	G4G5	S4S5
Natural Community	22681	Montane Oak--Hickory Forest (Acidic Subtype)	---	2010	C	2-High	---	---	G4G5	S4S5
Natural Community	36218	Montane Oak--Hickory Forest (Acidic Subtype)	---	2017-07-21	A	3-Medium	---	---	G4G5	S4S5
Natural Community	33603	Montane Oak--Hickory Forest (Acidic Subtype)	---	2014-07-23	B	3-Medium	---	---	G4G5	S4S5
Natural Community	22658	Montane Oak--Hickory Forest (Acidic Subtype)	---	2004-09-10	C	2-High	---	---	G4G5	S4S5
Natural Community	22686	Montane Oak--Hickory Forest (Acidic Subtype)	---	2010	A	2-High	---	---	G4G5	S4S5
Natural Community	34936	Montane Oak--Hickory Forest (Acidic Subtype)	---	2015-03-31	B	2-High	---	---	G4G5	S4S5
Natural Community	34345	Montane Oak--Hickory Forest (Acidic Subtype)	---	2014-07-25	B	2-High	---	---	G4G5	S4S5

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	22678	Montane Oak--Hickory Forest (Acidic Subtype)	---	2010	C?	3-Medium	---	---	G4G5	S4S5
Natural Community	25999	Montane Oak--Hickory Forest (Acidic Subtype)	---	2010	A?	3-Medium	---	---	G4G5	S4S5
Natural Community	22674	Montane Oak--Hickory Forest (Acidic Subtype)	---	2010	C?	2-High	---	---	G4G5	S4S5
Natural Community	36224	Montane Oak--Hickory Forest (Acidic Subtype)	---	2015-09-01	B	3-Medium	---	---	G4G5	S4S5
Natural Community	22685	Montane Oak--Hickory Forest (Acidic Subtype)	---	2010	C	3-Medium	---	---	G4G5	S4S5
Natural Community	35401	Montane Oak--Hickory Forest (Acidic Subtype)	---	2015-05-13	C	2-High	---	---	G4G5	S4S5
Natural Community	31562	Montane Oak--Hickory Forest (Basic Subtype)	---	2012-07-16	B	3-Medium	---	---	G3	S3
Natural Community	36217	Montane Oak--Hickory Forest (Basic Subtype)	---	2017-07-21	A	2-High	---	---	G3	S3
Natural Community	37006	Montane Oak--Hickory Forest (Basic Subtype)	---	2013	A	2-High	---	---	G3	S3
Natural Community	36688	Montane Oak--Hickory Forest (Basic Subtype)	---	2016-06-09	B	2-High	---	---	G3	S3
Natural Community	32402	Montane Oak--Hickory Forest (Basic Subtype)	---	2013-07-19	B	2-High	---	---	G3	S3
Natural Community	30125	Montane Oak--Hickory Forest (Basic Subtype)	---	2010	B?	2-High	---	---	G3	S3
Natural Community	31564	Montane Oak--Hickory Forest (Low Dry Subtype)	---	2013-07-18	AB	2-High	---	---	G2G3	S2
Natural Community	34365	Montane Oak--Hickory Forest (Low Dry Subtype)	---	2014-07-25	C	3-Medium	---	---	G2G3	S2
Natural Community	36017	Montane Oak--Hickory Forest (Low Dry Subtype)	---	2015-08-31	A	2-High	---	---	G2G3	S2
Natural Community	37322	Montane Oak--Hickory Forest (Low Dry Subtype)	---	2013	AB	2-High	---	---	G2G3	S2
Natural Community	32405	Montane Oak--Hickory Forest (Low Dry Subtype)	---	2013-09-24	C	2-High	---	---	G2G3	S2
Natural Community	36219	Montane Oak--Hickory Forest (Low Dry Subtype)	---	2015-09-04	C	2-High	---	---	G2G3	S2

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	33939	Northern Hardwood Forest (Beech Gap Subtype)	---	2013-06-24	BC	2-High	---	---	G1	S1S2
Natural Community	8025	Northern Hardwood Forest (Typic Subtype)	---	2013-07-03	A	2-High	---	---	G3G4	S3
Natural Community	31565	Piedmont Headwater Stream Forest (Typic Subtype)	---	2012-07-16	C	3-Medium	---	---	G3G4	S3S4
Natural Community	6145	Pine--Oak/Heath (High Elevation Subtype)	---	2010	B?	3-Medium	---	---	G2	S2
Natural Community	37304	Pine--Oak/Heath (Typic Subtype)	---	2013	B	2-High	---	---	G3	S3
Natural Community	12901	Pine--Oak/Heath (Typic Subtype)	---	2010	A	3-Medium	---	---	G3	S3
Natural Community	35400	Pine--Oak/Heath (Typic Subtype)	---	2015-05-13	BC	2-High	---	---	G3	S3
Natural Community	36222	Pine--Oak/Heath (Typic Subtype)	---	2015-09-01	C	3-Medium	---	---	G3	S3
Natural Community	34912	Pine--Oak/Heath (Typic Subtype)	---	2015-03-30	B	2-High	---	---	G3	S3
Natural Community	22754	Pine--Oak/Heath (Typic Subtype)	---	2017-09-05	B	2-High	---	---	G3	S3
Natural Community	2393	Pine--Oak/Heath (Typic Subtype)	---	2010	B?	3-Medium	---	---	G3	S3
Natural Community	22710	Pine--Oak/Heath (Typic Subtype)	---	2010	C	2-High	---	---	G3	S3
Natural Community	22682	Pine--Oak/Heath (Typic Subtype)	---	2010	BC	2-High	---	---	G3	S3
Natural Community	35374	Pine--Oak/Heath (Typic Subtype)	---	2015-05-20	C?	2-High	---	---	G3	S3
Natural Community	22659	Pine--Oak/Heath (Typic Subtype)	---	2010	BC	2-High	---	---	G3	S3
Natural Community	22656	Pine--Oak/Heath (Typic Subtype)	---	2010	C	2-High	---	---	G3	S3
Natural Community	33604	Pine--Oak/Heath (Typic Subtype)	---	2014-07-23	C	2-High	---	---	G3	S3

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	30226	Rich Cove Forest (Boulderfield Subtype)	---	2010	A	3-Medium	---	---	G3	S2
Natural Community	22683	Rich Cove Forest (Foothills Intermediate Subtype)	---	2010	CD	3-Medium	---	---	G4?	S3
Natural Community	22680	Rich Cove Forest (Foothills Intermediate Subtype)	---	2010	CD	2-High	---	---	G4?	S3
Natural Community	37757	Rich Cove Forest (Foothills Intermediate Subtype)	---	2017-07-21	C	2-High	---	---	G4?	S3
Natural Community	1217	Rich Cove Forest (Foothills Rich Subtype)	---	2010	A	3-Medium	---	---	G2G3	S2
Natural Community	22752	Rich Cove Forest (Montane Intermediate Subtype)	---	2010	AB	3-Medium	---	---	G4	S4
Natural Community	18869	Rich Cove Forest (Montane Intermediate Subtype)	---	2017-03-24	B?	3-Medium	---	---	G4	S4
Natural Community	22706	Rich Cove Forest (Montane Intermediate Subtype)	---	2012-09-07	C	2-High	---	---	G4	S4
Natural Community	30216	Rich Cove Forest (Montane Intermediate Subtype)	---	2010	B	3-Medium	---	---	G4	S4
Natural Community	22631	Rich Cove Forest (Montane Intermediate Subtype)	---	2014-08-12	C	2-High	---	---	G4	S4
Natural Community	35399	Rich Cove Forest (Montane Intermediate Subtype)	---	2015-05-13	B	2-High	---	---	G4	S4
Natural Community	31487	Rich Cove Forest (Montane Intermediate Subtype)	---	2015-03-31	BC	3-Medium	---	---	G4	S4

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	22684	Rich Cove Forest (Montane Intermediate Subtype)	---	2010	C	3-Medium	---	---	G4	S4
Natural Community	22677	Rich Cove Forest (Montane Intermediate Subtype)	---	2010	BC	3-Medium	---	---	G4	S4
Natural Community	22673	Rich Cove Forest (Montane Intermediate Subtype)	---	2010	C	2-High	---	---	G4	S4
Natural Community	22705	Rich Cove Forest (Montane Rich Subtype)	---	2010	B	3-Medium	---	---	G3G4	S3
Natural Community	17139	Rich Montane Seep	---	1991	E	3-Medium	---	---	G3	S3
Natural Community	33967	Rich Montane Seep	---	2014-08-12	A	2-High	---	---	G3	S3
Natural Community	30086	Southern Mountain Pine--Oak Forest	---	2012-07-20	BC	2-High	---	---	G3G4	S1S2
Natural Community	32404	Southern Mountain Pine--Oak Forest	---	2014-07-21	C	2-High	---	---	G3G4	S1S2
Natural Community	36020	Southern Mountain Pine--Oak Forest	---	2015-08-31	A	2-High	---	---	G3G4	S1S2
Natural Community	34366	Southern Mountain Pine--Oak Forest	---	2014-07-25	CD	2-High	---	---	G3G4	S1S2
Natural Community	36633	Spray Cliff	---	2016-05-19	C	2-High	---	---	G2	S2
Natural Community	13861	Swamp Forest--Bog Complex (Typic Subtype)	---	2005-10-21	C?	3-Medium	---	---	G2	S2
Natural Community	14563	Swamp Forest--Bog Complex (Typic Subtype)	---	1993-10-26	D	2-High	---	---	G2	S2
Reptile	10478	Crotalus horridus	Timber Rattlesnake	1997-09-19	E	3-Medium	---	Special Concern	G4	S3
Reptile	11650	Crotalus horridus	Timber Rattlesnake	2015-05-28	E	3-Medium	---	Special Concern	G4	S3
Reptile	6500	Glyptemys muhlenbergii	Bog Turtle	1995-09-17	CD	3-Medium	Threatened Similar Appearance	Threatened	G3	S2

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Reptile	18992	Glyptemys muhlenbergii	Bog Turtle	2014	CD	3-Medium	Threatened Similar Appearance	Threatened	G3	S2
Stonefly	17137	Bolotoperla rossi	Smoky Willowfly	1992-02-10	E	3-Medium	---	Significantly Rare	G4	S3
Vascular Plant	2924	Anticlea glauca	White Camas	2012-06-07	C	3-Medium	---	Significantly Rare Peripheral	G5T4T5	S1
Vascular Plant	14213	Arisaema stewardsonii	Bog Jack-in-the-pulpit	1994-05	AB	3-Medium	---	Significantly Rare Peripheral	G5T4T5	S2
Vascular Plant	17313	Asplenium bradleyi	Bradley's Spleenwort	1988-07-24	CD	3-Medium	---	Significantly Rare Peripheral	G4	S2
Vascular Plant	33889	Asplenium ruta-muraria var. cryptolepis	American Wall-rue	1936-06-14	H	3-Medium	---	Special Concern Vulnerable	G5T5	S1
Vascular Plant	18316	Asplenium ruta-muraria var. cryptolepis	American Wall-rue	2012-06-07	A	3-Medium	---	Special Concern Vulnerable	G5T5	S1
Vascular Plant	11575	Asplenium ruta-muraria var. cryptolepis	American Wall-rue	2004-08-18	E	3-Medium	---	Special Concern Vulnerable	G5T5	S1
Vascular Plant	11383	Baptisia bracteata	Creamy Wild Indigo	1956-09-01	H	3-Medium	---	Special Concern Historical	G4G5T4?	SH
Vascular Plant	13810	Berberis canadensis	American Barberry	1995-10	C	3-Medium	---	Special Concern Vulnerable	G3	S2
Vascular Plant	31572	Berberis canadensis	American Barberry	2012	C?	2-High	---	Special Concern Vulnerable	G3	S2
Vascular Plant	22352	Berberis canadensis	American Barberry	2005-06-14	D	2-High	---	Special Concern Vulnerable	G3	S2
Vascular Plant	31697	Botrychium lanceolatum var. angustisegmentum	Lance-leaf Moonwort	2012-04-10	B	2-High	---	Significantly Rare Peripheral	G5T4	S1

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	35906	Carex hitchcockiana	Hitchcock's Sedge	1995-07-11	E	2-High	---	Special Concern Vulnerable	G5	S1
Vascular Plant	20529	Carex roanensis	Roan Sedge	2003-06-19	E	3-Medium	---	Significantly Rare Throughout	G2G3	S2
Vascular Plant	4812	Carex roanensis	Roan Sedge	1986-06-25	B	2-High	---	Significantly Rare Throughout	G2G3	S2
Vascular Plant	21236	Celastrus scandens	American Bittersweet	2012-06-07	D	2-High	---	Endangered	G5	S2?
Vascular Plant	1843	Chelone cuthbertii	Cuthbert's Turtlehead	1993-10	C	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	26309	Clematis catesbyana	Coastal Virgin's-bower	2012-06-07	E	2-High	---	Significantly Rare Peripheral	G4G5	S2
Vascular Plant	26310	Clematis catesbyana	Coastal Virgin's-bower	1995-07-11	E	2-High	---	Significantly Rare Peripheral	G4G5	S2
Vascular Plant	3437	Collinsonia tuberosa	Piedmont Horsebalm	2005-10-21	A	2-High	---	Special Concern Vulnerable	G3G4	S1
Vascular Plant	34607	Collinsonia tuberosa	Piedmont Horsebalm	2014-09-10	A	1-Very High	---	Special Concern Vulnerable	G3G4	S1
Vascular Plant	34608	Collinsonia tuberosa	Piedmont Horsebalm	2013-11-12	CD	1-Very High	---	Special Concern Vulnerable	G3G4	S1
Vascular Plant	31694	Collinsonia tuberosa	Piedmont Horsebalm	2012	BC	2-High	---	Special Concern Vulnerable	G3G4	S1
Vascular Plant	26336	Corallorhiza wisteriana	Spring Coral-root	1995-04	F	2-High	---	Significantly Rare Other	G5	S1
Vascular Plant	21051	Delphinium exaltatum	Tall Larkspur	2012-06-07	B?	2-High	---	Endangered	G3	S2
Vascular Plant	22605	Dicentra eximia	Bleeding Heart	2004-06-26	CD	2-High	---	Significantly Rare Peripheral	G4	S3
Vascular Plant	28124	Echinacea pallida	Pale Coneflower	1956-09-01	H	3-Medium	---	Significantly Rare Disjunct	G4	S1

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	25583	Echinacea purpurea	Purple Coneflower	2006-06-28	E	2-High	---	Special Concern Vulnerable	G4	S1
Vascular Plant	6498	Echinacea purpurea	Purple Coneflower	1949-08	H	3-Medium	---	Special Concern Vulnerable	G4	S1
Vascular Plant	35397	Echinacea purpurea	Purple Coneflower	2015-04-28	C?	2-High	---	Special Concern Vulnerable	G4	S1
Vascular Plant	34609	Eupatorium saltuense	Tall Boneset	2012	D	2-High	---	Significantly Rare Limited	G4	S1?
Vascular Plant	23236	Fothergilla major	Large Witch-alder	2006-04-15	E	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	34611	Fothergilla major	Large Witch-alder	2014-06-26	D	1-Very High	---	Significantly Rare Throughout	G3	S3
Vascular Plant	36036	Fothergilla major	Large Witch-alder	2015-09-01	D	2-High	---	Significantly Rare Throughout	G3	S3
Vascular Plant	27660	Gillenia stipulata	Indian Physic	2009-Pre	E	3-Medium	---	Threatened	G5	S2
Vascular Plant	13621	Helianthus laevigatus	Smooth Sunflower	1992-08	C	3-Medium	---	Special Concern Vulnerable	G4	S3
Vascular Plant	34765	Helianthus laevigatus	Smooth Sunflower	2009	E	3-Medium	---	Special Concern Vulnerable	G4	S3
Vascular Plant	8289	Hudsonia montana	Mountain Golden-heather	2011-10-05	C	2-High	Threatened	Threatened	G1	S1
Vascular Plant	8946	Hudsonia montana	Mountain Golden-heather	2011-10-05	B	2-High	Threatened	Threatened	G1	S1
Vascular Plant	33405	Hydrastis canadensis	Goldenseal	2001-07-18	E	2-High	---	Significantly Rare Other	G3G4	S3
Vascular Plant	23234	Hymenocallis occidentalis var. occidentalis	Hillside Spider-lily	1949-08-17	H	3-Medium	---	Special Concern Historical	G4?TNR	SH
Vascular Plant	9862	Isotria medeoloides	Small Whorled Pogonia	2005-09-10	D	3-Medium	Threatened	Threatened	G2?	S1
Vascular Plant	22858	Liatris aspera	Rough Blazing-star	2005?	E	3-Medium	---	Threatened	G4G5	S1

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	22859	Liatris aspera	Rough Blazing-star	2006-09-17	E	3-Medium	---	Threatened	G4G5	S1
Vascular Plant	14821	Liatris aspera	Rough Blazing-star	1969-09	F	3-Medium	---	Threatened	G4G5	S1
Vascular Plant	31669	Liatris squarrulosa	Earle's Blazing-star	2012	C	2-High	---	Significantly Rare Peripheral	G4G5	S2
Vascular Plant	8490	Lilium grayi	Gray's Lily	1991	C	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	14255	Lilium grayi	Gray's Lily	1988-06-20	B	2-High	---	Threatened	G3	S1S2
Vascular Plant	10335	Malaxis bayardii	Appalachian Adder's-mouth	1995	C	3-Medium	---	Significantly Rare Throughout	G1G2	S1
Vascular Plant	31692	Matelea decipiens	Glade Milkvine	2013	C	1-Very High	---	Significantly Rare Peripheral	G5	S3
Vascular Plant	22603	Mononeuria groenlandica	Greenland Sandwort	2004-09-14	D	2-High	---	Threatened	G5	S2
Vascular Plant	22602	Mononeuria groenlandica	Greenland Sandwort	2004-09-10	B	2-High	---	Threatened	G5	S2
Vascular Plant	5491	Monotropsis odorata	Sweet Pinesap	1993-04	B	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	12659	Monotropsis odorata	Sweet Pinesap	1994-04	D	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	3525	Monotropsis odorata	Sweet Pinesap	1995-04	C	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	27668	Monotropsis odorata	Sweet Pinesap	2009-Pre	E	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	22610	Monotropsis odorata	Sweet Pinesap	2004-05-13	CD	2-High	---	Special Concern Vulnerable	G3	S3
Vascular Plant	2972	Muhlenbergia sobolifera	Rock Muhly	1956-09-01	H	3-Medium	---	Special Concern Vulnerable	G5	S2
Vascular Plant	15533	Oenothera perennis	Perennial Sundrops	1994-06	F	3-Medium	---	Special Concern Vulnerable	G5	S2
Vascular Plant	17463	Packera millefolium	Divided-leaf Ragwort	2004-09-14	D	3-Medium	---	Threatened	G3	S2
Vascular Plant	22870	Packera millefolium	Divided-leaf Ragwort	2012	B	2-High	---	Threatened	G3	S2

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	22873	Packera paupercula var. paupercula	Balsam Ragwort	2005?	E	3-Medium	---	Significantly Rare Peripheral	G5	S1?
Vascular Plant	15682	Parnassia grandifolia	Large-leaved Grass-of-parnassus	2001-08	B	3-Medium	---	Threatened	G3	S2
Vascular Plant	12467	Parnassia grandifolia	Large-leaved Grass-of-parnassus	2005-10-21	B	1-Very High	---	Threatened	G3	S2
Vascular Plant	7167	Parnassia grandifolia	Large-leaved Grass-of-parnassus	1993-10	CD	2-High	---	Threatened	G3	S2
Vascular Plant	31676	Polygala senega	Seneca Snakeroot	2013	A	2-High	---	Significantly Rare Disjunct	G4G5	S2
Vascular Plant	31450	Prunus alleghaniensis var. alleghaniensis	Allegheny Plum	2007-07-12	B	2-High	---	Significantly Rare Throughout	G4T4	S1
Vascular Plant	31699	Prunus alleghaniensis var. alleghaniensis	Allegheny Plum	2012-05-01	AB	2-High	---	Significantly Rare Throughout	G4T4	S1
Vascular Plant	15340	Robinia hispida var. kelseyi	Kelsey's Locust	1977-05-03	H	3-Medium	---	Significantly Rare Other	G4T1	S1
Vascular Plant	2133	Sceptridium jenmanii	Alabama Grape-fern	1995-10	D	3-Medium	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	22795	Sceptridium jenmanii	Alabama Grape-fern	2005?	E	3-Medium	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	27717	Sceptridium jenmanii	Alabama Grape-fern	2009-Pre	X?	3-Medium	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	6128	Sceptridium jenmanii	Alabama Grape-fern	1992-04	D	3-Medium	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	27718	Sceptridium jenmanii	Alabama Grape-fern	2009-Pre	E	2-High	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	10340	Sceptridium oneidense	Blunt-lobed Grape-fern	1993-09	D	3-Medium	---	Significantly Rare Peripheral	G4	S2

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	2300	Shortia galacifolia var. brevistyla	Northern Oconee Bells	1986-05-16	D	3-Medium	---	Endangered	G3T2	S2
Vascular Plant	7650	Shortia galacifolia var. brevistyla	Northern Oconee Bells	2011	C?	3-Medium	---	Endangered	G3T2	S2
Vascular Plant	8775	Shortia galacifolia var. brevistyla	Northern Oconee Bells	2011	A	3-Medium	---	Endangered	G3T2	S2
Vascular Plant	5426	Shortia galacifolia var. brevistyla	Northern Oconee Bells	2018-03-18	A	2-High	---	Endangered	G3T2	S2
Vascular Plant	10339	Shortia galacifolia var. brevistyla	Northern Oconee Bells	2013-07	BC	3-Medium	---	Endangered	G3T2	S2
Vascular Plant	12961	Shortia galacifolia var. brevistyla	Northern Oconee Bells	2013-07	BC	2-High	---	Endangered	G3T2	S2
Vascular Plant	6867	Shortia galacifolia var. brevistyla	Northern Oconee Bells	2013-07	A	1-Very High	---	Endangered	G3T2	S2
Vascular Plant	19665	Shortia galacifolia var. brevistyla	Northern Oconee Bells	2013-07-17	BC	2-High	---	Endangered	G3T2	S2
Vascular Plant	24236	Shortia galacifolia var. brevistyla	Northern Oconee Bells	2013-07	C	2-High	---	Endangered	G3T2	S2
Vascular Plant	24235	Shortia galacifolia var. brevistyla	Northern Oconee Bells	2013-07	BC	2-High	---	Endangered	G3T2	S2
Vascular Plant	36308	Sisyrinchium dichotomum	White Irisette	2017-06-30	C	2-High	Endangered	Endangered	G2	S2
Vascular Plant	31724	Smilax lasioneura	Blue Ridge Carrion-flower	2012-05-01	B	2-High	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	31720	Smilax lasioneura	Blue Ridge Carrion-flower	2012	B	2-High	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	21479	Solidago rigida var. rigida	Prairie Bold Goldenrod	2012-06-07	E	2-High	---	Threatened	G5T5	S1
Vascular Plant	27612	Solidago ulmifolia	Elm-leaf Goldenrod	2009-Pre	E	3-Medium	---	Significantly Rare Disjunct	G5	S1?
Vascular Plant	35209	Solidago ulmifolia	Elm-leaf Goldenrod	2014-09-02	A	1-Very High	---	Significantly Rare Disjunct	G5	S1?
Vascular Plant	23577	Thalictrum macrostylum	Small-leaved Meadowrue	2006-06-28	B	2-High	---	Significantly Rare Throughout	G3G4	S2
Vascular Plant	31755	Thalictrum macrostylum	Small-leaved Meadowrue	2012	D	2-High	---	Significantly Rare Throughout	G3G4	S2

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	33941	Thaspium pinnatifidum	Mountain Thaspium	2014-09-24	B?	2-High	---	Threatened	G2G3	S1
Vascular Plant	33574	Thaspium pinnatifidum	Mountain Thaspium	1995-07-10	E	2-High	---	Threatened	G2G3	S1
Vascular Plant	10257	Thermopsis fraxinifolia	Ash-leaved Golden-banner	2000-08-05	A	3-Medium	---	Special Concern Vulnerable	G3?	S2?
Vascular Plant	31673	Thermopsis fraxinifolia	Ash-leaved Golden-banner	2012-04-10	BC	2-High	---	Special Concern Vulnerable	G3?	S2?
Vascular Plant	11116	Thermopsis mollis	Appalachian Golden-banner	2001-06-22	B	3-Medium	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	10839	Thermopsis mollis	Appalachian Golden-banner	2001-08	B	3-Medium	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	20969	Thermopsis mollis	Appalachian Golden-banner	2012	A	2-High	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	13276	Thermopsis mollis	Appalachian Golden-banner	1993-10	C	3-Medium	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	22611	Thermopsis mollis	Appalachian Golden-banner	2003-09-17	F?	2-High	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	36571	Tradescantia virginiana	Virginia Spiderwort	2016-05-10	B?	2-High	---	Threatened	G5	S2
Vascular Plant	31674	Tradescantia virginiana	Virginia Spiderwort	2012-06-05	AB	2-High	---	Threatened	G5	S2
Vascular Plant	8611	Trillium simile	Sweet White Trillium	1995-04	D	3-Medium	---	Threatened	G3	S2
Vascular Plant	19768	Trillium simile	Sweet White Trillium	1994-Pre	E	3-Medium	---	Threatened	G3	S2

Natural Areas Documented Within Project Area

Site Name	Representational Rating	Collective Rating
Beartree Ridge	R3 (High)	C4 (Moderate)
Newberry Creek Gorge	R3 (High)	C4 (Moderate)
Brackettown Valley Meadow	R3 (High)	C4 (Moderate)
Pinnacle Mountain/Mill Creek	R2 (Very High)	C2 (Very High)
Christmount Natural Area	R5 (General)	C5 (General)
Mackey Mountain	R2 (Very High)	C5 (General)

Natural Areas Documented Within Project Area

Site Name	Representational Rating	Collective Rating
Linville Falls	R1 (Exceptional)	C3 (High)
North Fork Watershed	R1 (Exceptional)	C1 (Exceptional)
Johns Creek Natural Area	R2 (Very High)	C5 (General)
Montreat Watershed	R3 (High)	C3 (High)
Rockhouse Creek Forests	R2 (Very High)	C3 (High)
Laurel Ridges	R2 (Very High)	C4 (Moderate)
Bear Creek Natural Area	R2 (Very High)	C5 (General)
Hickorynut Mountain	R1 (Exceptional)	C2 (Very High)
Catawba Headwaters/Fortune Field	R3 (High)	C4 (Moderate)
Morgan Mountain -- Ledbetter Mountain	R2 (Very High)	C3 (High)
Jones Mountain/French Mountain	R5 (General)	C5 (General)
The Loop/Gillespie Gap	R5 (General)	C4 (Moderate)
Upper Pepper Creek Natural Area	R5 (General)	C5 (General)
Honeycutt Cove Natural Area	R5 (General)	C5 (General)
Bald Mountain Natural Areas	R1 (Exceptional)	C5 (General)
Woods Mountain/Singecat Ridge	R1 (Exceptional)	C4 (Moderate)
Brackettown Seep	R2 (Very High)	C4 (Moderate)
Wildacres Escarpment Slopes	R4 (Moderate)	C4 (Moderate)
Bob's Creek Pocket Wilderness	R2 (Very High)	C1 (Exceptional)
Montford Cove/Chestnut Mountain	R5 (General)	C5 (General)
Mike Mountain--Pinnacle Mountain	R2 (Very High)	C1 (Exceptional)
Edmondson Mountain	R2 (Very High)	C4 (Moderate)
Sunnyvale Slopes	R5 (General)	C5 (General)
Linville Gorge	R1 (Exceptional)	C1 (Exceptional)
Linville Caverns	R1 (Exceptional)	C1 (Exceptional)
Muddy Creek Bog and Slopes	R1 (Exceptional)	C3 (High)
Toms Creek Natural Area	R1 (Exceptional)	C5 (General)
Rollins/South Mountains Natural Area	R1 (Exceptional)	C1 (Exceptional)
Lone Mountain Natural Area	R2 (Very High)	C2 (Very High)
Black Mountain Overlook Natural Area	R3 (High)	C5 (General)
Cross Mountain	R4 (Moderate)	C5 (General)
Little Tablerock Mountain	R5 (General)	C4 (Moderate)
Linville Mountain Dolomite Areas	R1 (Exceptional)	C2 (Very High)
Box Creek Wilderness Natural Area	R1 (Exceptional)	C1 (Exceptional)
Camel Knob	R4 (Moderate)	C4 (Moderate)

Managed Areas Documented Within Project Area*

Managed Area Name	Owner	Owner Type
Pisgah National Forest - Grandfather Ranger District	US Forest Service	Federal
Pisgah National Forest - Appalachian Ranger District	US Forest Service	Federal
NC Clean Water Management Trust Fund Easement	NC DNCR, Clean Water Management Trust Fund	State
NC Department of Transportation Mitigation Site	NC Department of Transportation	State
Blue Ridge Parkway	US National Park Service	Federal
NC Division of Mitigation Services Easement	NC DEQ, Division of Mitigation Services	State
NC Division of Mitigation Services Easement	NC DEQ, Division of Mitigation Services	State
Southern Appalachian Highlands Conservancy Easement	Southern Appalachian Highlands Conservancy	Private
Conservation Trust for North Carolina Easement	Conservation Trust for North Carolina	Private
South Mountains Game Land	NC Wildlife Resources Commission	State
South Mountains Game Land Dedicated Nature Preserve	NC Wildlife Resources Commission	State
Box Creek Wilderness and Camel Knob Registered Heritage Area	130 of Chatham, LLC	Private
NC Wildlife Resources Commission Easement	NC Wildlife Resources Commission	State
Pisgah National Forest - Linville Gorge Wilderness	US Forest Service	Federal
Linville Gorge Registered Heritage Area	US Forest Service	Federal
Foothills Conservancy of North Carolina Preserve	Foothills Conservancy of North Carolina	Private
Pisgah Game Land	NC Wildlife Resources Commission	State
Lake James State Park	NC DNCR, Division of Parks and Recreation	State
Pisgah Game Land Dedicated Nature Preserve	NC Wildlife Resources Commission	State
Foothills Conservancy of North Carolina Easement	Foothills Conservancy of North Carolina	Private
Montreat Watershed (Mountain Retreat) Registered Heritage Area	Mountain Retreat	Private
Conservation Trust for North Carolina Preserve	Conservation Trust for North Carolina	Private
Blue Ridge Parkway Easement	US National Park Service	Federal
Morgan Mountain--Ledbetter Mountain Registered Heritage Area	130 of Chatham, LLC	Private
North Fork Watershed (BRP/NPS) Registered Heritage Area	US National Park Service	Federal
Mike Mountain--Pinnacle Mountain Registered Heritage Area	130 of Chatham, LLC	Private
Armstrong Fish Hatchery	NC Wildlife Resources Commission	State
Linville Falls Registered Heritage Area	US National Park Service	Federal
Laurel Ridges Registered Heritage Area	US National Park Service	Federal
Montreat Watershed (Montreat Cottagers) Registered Heritage Area	Montreat Cottagers	Private
Edmondson Mountain Registered Heritage Area	130 of Chatham LLC	Private

Managed Areas Documented Within Project Area*

Managed Area Name	Owner	Owner Type
Sunnyvale Slopes Registered Heritage Area	130 of Chatham, LLC	Private
Linville Caverns Registered Heritage Area	Private Individual	Private
Caraway Plant Conservation Preserve Dedicated Nature Preserve	North Carolina Department of Agriculture, Plant Conservation Program	
Marion Fish Hatchery	NC Wildlife Resources Commission	State
Johns Creek Natural Area Registered Heritage Area	US Forest Service	Federal
Muddy Creek Watershed Restoration Site	NC Wildlife Resources Commission	State

*NOTE: If the proposed project intersects with a conservation/managed area, please contact the landowner directly for additional information. If the project intersects with a Dedicated Nature Preserve (DNP), Registered Natural Heritage Area (RHA), or Federally-listed species, NCNHP staff may provide additional correspondence regarding the project.

Definitions and an explanation of status designations and codes can be found at https://ncnhde.natureserve.org/content/help. Data query generated on September 17, 2018; source: NCNHP, Q3 July 2018. Please resubmit your information request if more than one year elapses before project initiation as new information is continually added to the NCNHP database.

Natural Heritage Element Occurrences, Natural Areas, and Managed Areas Within a One-mile Radius of the Project Area
Clearinghouse 19-0040 - McDowell County
September 17, 2018
NCNHDE-6952

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Amphibian	37219	Ambystoma talpoideum	Mole Salamander	2016-03-23	E	2-High	---	Special Concern	G5	S2S3
Amphibian	32755	Ambystoma talpoideum	Mole Salamander	2013-10-11	C	2-High	---	Special Concern	G5	S2S3
Amphibian	7156	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	2017-10-04	C	3-Medium	---	Special Concern	G3G4T2	S3
Amphibian	20343	Desmognathus organi	Northern Pygmy Salamander	1966-07-13	H	4-Low	---	Significantly Rare	G3	S2S3
Amphibian	28069	Desmognathus organi	Northern Pygmy Salamander	2015-06-30	A?	3-Medium	---	Significantly Rare	G3	S2S3
Amphibian	37472	Desmognathus organi	Northern Pygmy Salamander	1946-05-01	H	5-Very Low	---	Significantly Rare	G3	S2S3
Amphibian	37444	Desmognathus organi	Northern Pygmy Salamander	1967-06-10	H	3-Medium	---	Significantly Rare	G3	S2S3
Amphibian	34437	Hemidactylium scutatum	Four-toed Salamander	2014-06-10	E	2-High	---	Special Concern	G5	S3
Amphibian	34438	Hemidactylium scutatum	Four-toed Salamander	2017-10-28	E	2-High	---	Special Concern	G5	S3
Amphibian	34435	Hemidactylium scutatum	Four-toed Salamander	2014-03-24	E	2-High	---	Special Concern	G5	S3
Amphibian	34439	Hemidactylium scutatum	Four-toed Salamander	2014-05-01	E	2-High	---	Special Concern	G5	S3
Amphibian	31640	Plethodon meridianus	South Mountain Gray-cheeked Salamander	2012-03-30	B?	2-High	---	Significantly Rare	G2	S2
Amphibian	22111	Plethodon yonahlossee pop. 1	Crevice Salamander	2005-08-26	E	3-Medium	---	Special Concern	G4T1T2Q	S2
Animal Assemblage	38185	Waterbird Colony	---	2017-02-14	E	2-High	---	---	GNR	S3
Arachnid	17620	Hypochilus coylei	a Lampshade Weaver	1988-10-09	B?	4-Low	---	Significantly Rare	G3?	S3?

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Arachnid	22075	Hypochilus coylei	a Lampshade Weaver	2005-08-26	AB	2-High	---	Significantly Rare	G3?	S3?
Arachnid	8164	Hypochilus sheari	a Lampshade Weaver	1988-09-24	AB	4-Low	---	Significantly Rare	G2G3	S2S3
Arachnid	4235	Hypochilus sheari	a Lampshade Weaver	1988-09-24	AB	4-Low	---	Significantly Rare	G2G3	S2S3
Arachnid	11101	Hypochilus sheari	a Lampshade Weaver	1988-09-24	A	4-Low	---	Significantly Rare	G2G3	S2S3
Arachnid	12227	Hypochilus sheari	a Lampshade Weaver	1987-09-01	AB	3-Medium	---	Significantly Rare	G2G3	S2S3
Arachnid	12292	Nesticus carolinensis	Linville Caverns Spider	2011-2012-winter	E	3-Medium	---	Significantly Rare	G1?	S1
Beetle	13601	Nicrophorus americanus	American Burying Beetle	1958-Pre	H	5-Very Low	Endangered	Significantly Rare	G2G3	SH
Bird	10583	Aegolius acadicus	Northern Saw-whet Owl	1989-Pre	E	4-Low	---	Threatened	G5	S2B,S2N
Bird	3365	Catharus guttatus	Hermit Thrush	2015-05-23	A	3-Medium	---	Significantly Rare	G5	S2B,S5N
Bird	9917	Certhia americana	Brown Creeper	2007-06-14	B	4-Low	---	Special Concern	G5	S3B,S5N
Bird	5043	Coccyzus erythropthalmus	Black-billed Cuckoo	1994-06-15	E	3-Medium	---	Significantly Rare	G5	S2B
Bird	2786	Falco peregrinus anatum	American Peregrine Falcon	1989-Pre	E	4-Low	---	Endangered	G4T4	S1B,S2N
Bird	5170	Falco peregrinus anatum	American Peregrine Falcon	2015-05	E	3-Medium	---	Endangered	G4T4	S1B,S2N
Bird	37728	Loxia curvirostra	Red Crossbill	1989-06-29	H?	3-Medium	---	Special Concern	G5	S2
Bird	37809	Loxia curvirostra	Red Crossbill	2010-05-01	E	2-High	---	Special Concern	G5	S2
Bird	9171	Setophaga cerulea	Cerulean Warbler	2001-05-18	E	4-Low	---	Special Concern	G4	S2B
Butterfly	34808	Pontia protodice	Checkered White	2014-08-20	E	2-High	---	Significantly Rare	G5	S1S2
Butterfly	6335	Satyrium caryaevorus	Hickory Hairstreak	1994-06-23	E	3-Medium	---	Significantly Rare	G4	S1

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Crustacean	16149	Caecidotea carolinensis	Bennett's Mill Cave Water Slater	1977-03-19	H?	2-High	---	Endangered	G2G3	SH
Crustacean	33733	Cambarus eeseeohensis	Grandfather Mountain Crayfish	2016-08-22	E	3-Medium	---	Significantly Rare	G1	S2S3
Crustacean	32643	Cambarus johni	Carolina Foothills Crayfish	2014-07-07	E	3-Medium	---	Significantly Rare	G3	S3
Crustacean	31036	Cambarus johni	Carolina Foothills Crayfish	2017-05-02	E	3-Medium	---	Significantly Rare	G3	S3
Crustacean	32635	Cambarus johni	Carolina Foothills Crayfish	2002-05-01	E	3-Medium	---	Significantly Rare	G3	S3
Crustacean	34622	Cambarus johni	Carolina Foothills Crayfish	2012-03-13	E	3-Medium	---	Significantly Rare	G3	S3
Crustacean	33279	Cambarus johni	Carolina Foothills Crayfish	2004-10-06	E	3-Medium	---	Significantly Rare	G3	S3
Crustacean	33291	Cambarus johni	Carolina Foothills Crayfish	2005-04-15	E	3-Medium	---	Significantly Rare	G3	S3
Crustacean	31037	Cambarus johni	Carolina Foothills Crayfish	2010-06-02	E	3-Medium	---	Significantly Rare	G3	S3
Crustacean	33280	Cambarus johni	Carolina Foothills Crayfish	1985-04-17	H?	3-Medium	---	Significantly Rare	G3	S3
Crustacean	31020	Cambarus lenati	Broad River Stream Crayfish	2017-06-05	E	3-Medium	---	Significantly Rare	G2	S2
Crustacean	33486	Cambarus lenati	Broad River Stream Crayfish	2005-06-21	E	3-Medium	---	Significantly Rare	G2	S2
Dragonfly or Damselfly	32074	Aeshna tuberculifera	Black-tipped Darner	2016-09-27	E	3-Medium	---	Significantly Rare	G5	S1
Dragonfly or Damselfly	35163	Boyeria grafiana	Ocellated Darner	2014-05-13	E	4-Low	---	Significantly Rare	G5	S2?
Dragonfly or Damselfly	33442	Calopteryx amata	Superb Jewelwing	2004-Pre	H?	5-Very Low	---	Significantly Rare	G4	S1S2
Dragonfly or Damselfly	33446	Calopteryx amata	Superb Jewelwing	2004-Pre	H?	5-Very Low	---	Significantly Rare	G4	S1S2
Dragonfly or Damselfly	33783	Stylurus scudderi	Zebra Clubtail	2004-Pre	H?	5-Very Low	---	Significantly Rare	G4G5	S2?
Freshwater Bivalve	31016	Alasmidonta varicosa	Brook Floater	2017-07-31	E	3-Medium	---	Endangered	G3	S3

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Freshwater Bivalve	21727	Alasmidonta varicosa	Brook Floater	2016-09-07	B	3-Medium	---	Endangered	G3	S3
Freshwater Bivalve	8699	Alasmidonta varicosa	Brook Floater	1919	H	3-Medium	---	Endangered	G3	S3
Freshwater Bivalve	24823	Strophitus undulatus	Creeper	2003-10-02	E	3-Medium	---	Threatened	G5	S3
Freshwater Bivalve	35455	Villosa constricta	Notched Rainbow	2014-04-23	E	3-Medium	---	Threatened	G3	S3
Freshwater Bivalve	29441	Villosa constricta	Notched Rainbow	2015-06-25	E	3-Medium	---	Threatened	G3	S3
Freshwater Bivalve	31202	Villosa delumbis	Eastern Creekshell	2011-03-19	E	3-Medium	---	Significantly Rare	G4	S4
Freshwater Bivalve	29540	Villosa delumbis	Eastern Creekshell	2015-06-25	E	3-Medium	---	Significantly Rare	G4	S4
Freshwater Fish	32440	Carpiodes sp. cf. cyprinus	Carolina Quillback	2007-03-30	E	3-Medium	---	Significantly Rare	GNR	S2
Freshwater Fish	27489	Carpiodes sp. cf. cyprinus	Carolina Quillback	2007-06-28	E	3-Medium	---	Significantly Rare	GNR	S2
Freshwater Fish	32502	Etheostoma thalassinum	Seagreen Darter	2014-06-12	E	3-Medium	---	Significantly Rare	G4	S3
Freshwater Fish	13600	Micropterus coosae	Redeye Bass	1962-08	H	3-Medium	---	Significantly Rare	G5	S1
Freshwater or Terrestrial Gastropod	37670	Mesomphix vulgatus	Common Button	2004-09-25	E	3-Medium	---	Significantly Rare	G4	S2?
Freshwater or Terrestrial Gastropod	37702	Ventridens coelaxis	Bidentate Dome	2005-09-03	E	3-Medium	---	Special Concern	G3	S3?
Lichen	9187	Melanelia stygia	Alpine Camouflage Lichen	1989-Pre	E	4-Low	---	Significantly Rare Disjunct	G5	S1S2
Lichen	5594	Melanelia stygia	Alpine Camouflage Lichen	1991	E	3-Medium	---	Significantly Rare Disjunct	G5	S1S2
Liverwort	27609	Aneura sharpii	A Liverwort	2009-Pre	E	3-Medium	---	Significantly Rare Throughout	G1G2	S1

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Liverwort	22747	Aneura sharpii	A Liverwort	2005?	E	3-Medium	---	Significantly Rare Throughout	G1G2	S1
Liverwort	22746	Cephaloziella hampeana	A Liverwort	2005?	E	2-High	---	Significantly Rare Disjunct	G5	S1
Liverwort	28996	Cephaloziella spinicaulis	A Liverwort	2007-12	E	3-Medium	---	Significantly Rare Peripheral	G3G4	S1
Liverwort	38368	Cephaloziella spinicaulis	A Liverwort	2018-05-30	E	2-High	---	Significantly Rare Peripheral	G3G4	S1
Liverwort	27619	Chiloscyphus appalachianus	A Liverwort	2009-Pre	E	4-Low	---	Special Concern Vulnerable	G1G2Q	S1
Liverwort	9313	Chiloscyphus appalachianus	A Liverwort	1992-04-18	E	3-Medium	---	Special Concern Vulnerable	G1G2Q	S1
Liverwort	22029	Chiloscyphus muricatus	A Liverwort	1994-06-13	E	3-Medium	---	Special Concern Vulnerable	G5	S1
Liverwort	22028	Chiloscyphus muricatus	A Liverwort	1994-06-04	E	3-Medium	---	Special Concern Vulnerable	G5	S1
Liverwort	17861	Chiloscyphus muricatus	A Liverwort	1992-04-18	A	3-Medium	---	Special Concern Vulnerable	G5	S1
Liverwort	22142	Diplophyllum obtusatum	A Liverwort	1961-Pre	H	3-Medium	---	Significantly Rare Disjunct	G2?	S1
Liverwort	13463	Drepanolejeunea appalachiana	A Liverwort	1956-07-28	H	4-Low	---	Special Concern Vulnerable	G2?	S1
Liverwort	22008	Drepanolejeunea appalachiana	A Liverwort	1988-05-31	E	3-Medium	---	Special Concern Vulnerable	G2?	S1
Liverwort	27620	Frullania appalachiana	A Liverwort	2009-Pre	E	3-Medium	---	Significantly Rare Limited	G1?	S1?

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Liverwort	21905	Lejeunea blomquistii	A Liverwort	1994-06-13	E	3-Medium	---	Special Concern Vulnerable	G1G2	S1
Liverwort	21904	Lejeunea blomquistii	A Liverwort	1994-06-13	E	3-Medium	---	Special Concern Vulnerable	G1G2	S1
Liverwort	22064	Mannia californica	A Liverwort	1990-Pre	U	3-Medium	---	Significantly Rare Throughout	G3?	S1
Liverwort	27621	Mannia californica	A Liverwort	2009-Pre	E	3-Medium	---	Significantly Rare Throughout	G3?	S1
Liverwort	22176	Plagiochasma wrightii	A Liverwort	2006-04-18	E	3-Medium	---	Significantly Rare Disjunct	G3?	S1
Liverwort	22009	Plagiochila austinii	A Liverwort	1988-05-31	E	4-Low	---	Significantly Rare Throughout	G3	S1S2
Liverwort	22775	Plagiochila ludoviciana	A Liverwort	2005?	E	3-Medium	---	Significantly Rare Peripheral	G5	S1
Liverwort	4145	Plagiochila sullivantii var. spinigera	A Liverwort	1953-07-28	H	3-Medium	---	Significantly Rare Limited	G2T1	S1
Liverwort	15672	Plagiochila sullivantii var. sullivantii	A Liverwort	1953-07-28	H	4-Low	---	Significantly Rare Throughout	G2T2	S2
Liverwort	22023	Plagiochila sullivantii var. sullivantii	A Liverwort	1994-06-12	E	2-High	---	Significantly Rare Throughout	G2T2	S2
Liverwort	22030	Plagiochila sullivantii var. sullivantii	A Liverwort	1994-06-13	E	3-Medium	---	Significantly Rare Throughout	G2T2	S2
Liverwort	15085	Plagiochila virginica var. virginica	A Liverwort	2012-06-07	E	2-High	---	Significantly Rare Limited	G3T3	S1
Liverwort	27610	Plagiochila virginica var. virginica	A Liverwort	2009-Pre	E	3-Medium	---	Significantly Rare Limited	G3T3	S1
Liverwort	22779	Porella wataugensis	A Liverwort	2005?	E	3-Medium	---	Significantly Rare Limited	G1G2Q	S1

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Liverwort	21874	Porella wataugensis	A Liverwort	1994-06-12	E	3-Medium	---	Significantly Rare Limited	G1G2Q	S1
Liverwort	21926	Porella wataugensis	A Liverwort	1993	E	2-High	---	Significantly Rare Limited	G1G2Q	S1
Mammal	34083	Myotis leibii	Eastern Small-footed Bat	2011-08-01	E	2-High	---	Special Concern	G4	S2
Mammal	36072	Myotis lucifugus	Little Brown Bat	2011-08-01	E	2-High	---	Significantly Rare	G3	S2
Mammal	36116	Myotis lucifugus	Little Brown Bat	2012-02-09	D	2-High	---	Significantly Rare	G3	S2
Mammal	36073	Myotis lucifugus	Little Brown Bat	2011-08-01	E	2-High	---	Significantly Rare	G3	S2
Mammal	36113	Myotis lucifugus	Little Brown Bat	2011-08-02	E	2-High	---	Significantly Rare	G3	S2
Mammal	36115	Myotis lucifugus	Little Brown Bat	2009-02-10	E	2-High	---	Significantly Rare	G3	S2
Mammal	36110	Myotis lucifugus	Little Brown Bat	2011-08-01	E	4-Low	---	Significantly Rare	G3	S2
Mammal	36074	Myotis lucifugus	Little Brown Bat	2011-08-03	E	2-High	---	Significantly Rare	G3	S2
Mammal	35332	Myotis lucifugus	Little Brown Bat	2012-06-20	E	2-High	---	Significantly Rare	G3	S2
Mammal	36117	Myotis lucifugus	Little Brown Bat	2011-03-15	H?	1-Very High	---	Significantly Rare	G3	S2
Mammal	34363	Myotis septentrionalis	Northern Long-eared Bat	2001	E	4-Low	T-4(d)	Threatened	G1G2	S2
Mammal	34299	Myotis septentrionalis	Northern Long-eared Bat	2009-02-20	D	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34301	Myotis septentrionalis	Northern Long-eared Bat	2011-08-01	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	32160	Myotis septentrionalis	Northern Long-eared Bat	2006-06-28	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34303	Myotis septentrionalis	Northern Long-eared Bat	2011-08-01	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34311	Myotis septentrionalis	Northern Long-eared Bat	2002-06-30	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34323	Myotis septentrionalis	Northern Long-eared Bat	2011-08-01	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	35334	Myotis septentrionalis	Northern Long-eared Bat	2013-06-08	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	35350	Myotis septentrionalis	Northern Long-eared Bat	2013-06-12	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	35343	Myotis septentrionalis	Northern Long-eared Bat	2012-07-25	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	35351	Myotis septentrionalis	Northern Long-eared Bat	2013-07-07	E	2-High	T-4(d)	Threatened	G1G2	S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Mammal	19383	Neotoma magister	Allegheny Woodrat	2000-06-28	E	3-Medium	---	Special Concern	G3G4	S2S3
Mammal	36195	Perimyotis subflavus	Tricolored Bat	2011-08-01	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	36199	Perimyotis subflavus	Tricolored Bat	2015-02-27	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	36194	Perimyotis subflavus	Tricolored Bat	2002-06-30	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	36197	Perimyotis subflavus	Tricolored Bat	2011-08-03	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	36196	Perimyotis subflavus	Tricolored Bat	2011-08-01	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	36200	Perimyotis subflavus	Tricolored Bat	2015-02-27	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	36198	Perimyotis subflavus	Tricolored Bat	2016-02-25	E	1-Very High	---	Significantly Rare	G2G3	S3
Mammal	37239	Perimyotis subflavus	Tricolored Bat	2013-06-08	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	33034	Spilogale putorius	Eastern Spotted Skunk	2014-04-04	E	2-High	---	Game Animal	G4	S2
Mammal	32947	Spilogale putorius	Eastern Spotted Skunk	1982-Pre	H	5-Very Low	---	Game Animal	G4	S2
Mayfly	16370	Tsalia berneri	a mayfly	1991-01-09	H?	3-Medium	---	Significantly Rare	G4	S3
Moss	12789	Brachythecium rotaeanum	Rota's Feather Moss	1948-06-11	H	4-Low	---	Significantly Rare Disjunct	G3G4	S1
Moss	5634	Bryoerythrophyllum inaequalifolium	A Foot Moss	1967-09-23	H	3-Medium	---	Significantly Rare Disjunct	G4?	S1
Moss	8028	Bryoxiphium norvegicum	Sword Moss	1966-06-13	H	3-Medium	---	Significantly Rare Other	G5?	S1
Moss	28784	Bryum limbatum	A Moss	2007-04-23	E	4-Low	---	Significantly Rare Disjunct	G5?	S1?
Moss	27622	Campylopus oerstedianus	Oersted's Campylopus	2009-Pre	E	3-Medium	---	Significantly Rare Disjunct	G2G3	S1
Moss	15010	Cirriphyllum piliferum	Long Leaf Mustache Moss	1965-07-17	H	3-Medium	---	Significantly Rare Peripheral	G5	S1

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Moss	29085	Cleistocarpidium palustre	Prairie Pleuridium	2007-03-31	E	3-Medium	---	Significantly Rare Disjunct	G5?	S1
Moss	27623	Dichelyma capillaceum	Hair Claw Moss	2009-Pre	E	3-Medium	---	Significantly Rare Peripheral	G5	S1?
Moss	2866	Dichodontium pellucidum	Transparent Fork Moss	1951-04-27	H	3-Medium	---	Significantly Rare Peripheral	G5	S2
Moss	27624	Dicranella rufescens	Red Fork Moss	2009-Pre	E	3-Medium	---	Significantly Rare Other	G5?	S1?
Moss	27625	Dicranella varia	Variable Fork Moss	2009-Pre	E	3-Medium	---	Significantly Rare Other	G5	S1?
Moss	23638	Didymodon fallax	Fallacious Screw Moss	1951-04-27	H	3-Medium	---	Significantly Rare Other	G5	SH
Moss	23639	Didymodon tophaceus	Three-ranked Didymodon	1951-04-27	H	3-Medium	---	Significantly Rare Other	G5	S1?
Moss	2421	Encalypta procera	Extinguisher Moss	2012-06-07	E	3-Medium	---	Significantly Rare Disjunct	G5	S1
Moss	8884	Entodon concinnus	Lime Entodon	1951-04-27	H	3-Medium	---	Significantly Rare Peripheral	G4G5	S1
Moss	1339	Entodon sullivantii	Sullivant's Entodon	1965-07-06	H	3-Medium	---	Significantly Rare Other	G3G4	S2
Moss	22735	Entodon sullivantii	Sullivant's Entodon	2005	E	3-Medium	---	Significantly Rare Other	G3G4	S2
Moss	13410	Entodon sullivantii	Sullivant's Entodon	2012-06-07	E	2-High	---	Significantly Rare Other	G3G4	S2
Moss	5809	Eucladium verticillatum	Lime-seep Eucladium	2012-06-07	E	3-Medium	---	Significantly Rare Other	G4	S1
Moss	12478	Homalia trichomanoides	Lime Homalia	1965-07-17	F	3-Medium	---	Significantly Rare Peripheral	G5	S1
Moss	2784	Hygrohypnum closteri	Closter's Brook-hypnum	1950-08-26	H	3-Medium	---	Significantly Rare Throughout	G3	S1
Moss	27648	Lindbergia brachyptera	Lindberg's Maple-moss	2009-Pre	E	3-Medium	---	Significantly Rare Peripheral	G5	S1
Moss	22736	Macrocoma sullivantii	Sullivant's Maned-moss	2005-06-21	BC	2-High	---	Significantly Rare Disjunct	G3G5	S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Moss	23556	Orthotrichum strangulatum	Drummond Moss	1935-06-23	H	3-Medium	---	Significantly Rare Peripheral	G4	SH
Moss	23557	Orthotrichum strangulatum	Drummond Moss	1951-04-27	H	3-Medium	---	Significantly Rare Peripheral	G4	SH
Moss	27649	Oxyrrhynchium pringlei	Pringle's Water Feather Moss	2009-Pre	E	4-Low	---	Significantly Rare Disjunct	G2G3	S1
Moss	27611	Oxyrrhynchium pringlei	Pringle's Water Feather Moss	2009-Pre	E	3-Medium	---	Significantly Rare Disjunct	G2G3	S1
Moss	23435	Plagiomnium rostratum	Long-beaked Thread Moss	1965-07-06	H	3-Medium	---	Significantly Rare Peripheral	G5	S1?
Moss	10229	Platydictya confervoides	Alga-like Matted-moss	1950-08-26	H	4-Low	---	Significantly Rare Peripheral	G4G5	S1
Moss	27650	Platyhypnidium riparioides	Long-beaked Water Feather Moss	2009-Pre	E	4-Low	---	Significantly Rare Other	G4	S1?
Moss	27651	Pohlia lescuriana	Spherical Bulb Nodding Moss	2009-Pre	E	3-Medium	---	Significantly Rare Throughout	G4?	S1?
Moss	14541	Rhabdoweisia crenulata	Himalayan Ribbed-weissia	1988	E	4-Low	---	Significantly Rare Disjunct	G3G5	S1
Moss	15617	Rhachithecium perpusillum	Budding Tortula	1949-09-06	H	3-Medium	---	Significantly Rare Disjunct	G4G5	S1S2
Moss	9880	Scopelophila cataractae	Agoyan Cataract Moss	2018-05-28	E	3-Medium	---	Significantly Rare Disjunct	G3	S1
Moss	22698	Scopelophila ligulata	Copper Moss	1965-07-20	H	4-Low	---	Significantly Rare Other	G5?	S1
Moss	19398	Scopelophila ligulata	Copper Moss	1951-04-27	H	3-Medium	---	Significantly Rare Other	G5?	S1
Moss	15695	Scopelophila ligulata	Copper Moss	2018-05-28	E	3-Medium	---	Significantly Rare Other	G5?	S1
Moss	27652	Sphagnum fallax	Pretty Peatmoss	2009-Pre	E	3-Medium	---	Significantly Rare Peripheral	G5	S2
Moss	27653	Sphagnum flexuosum	Flexuous Peatmoss	2009-Pre	E	3-Medium	---	Significantly Rare Peripheral	G5	S1
Moss	27654	Sphagnum subsecundum	Orange Peatmoss	2009-Pre	E	3-Medium	---	Significantly Rare Peripheral	G5	S1

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Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Moss	27655	Sphagnum warnstorfii	Fen Peatmoss	2009-Pre	E	3-Medium	---	Significantly Rare Disjunct	G5	S1
Moth	38094	Lytrosis permagnaria	A Geometrid Moth	2017-05-16	E	2-High	---	Significantly Rare	G3G4	S2S3
Natural Community	22753	Acidic Cove Forest (Typic Subtype)	---	2017-09-05	AB	3-Medium	---	---	G5	S4
Natural Community	22742	Acidic Cove Forest (Typic Subtype)	---	2012-07-20	BC	4-Low	---	---	G5	S4
Natural Community	17436	Acidic Cove Forest (Typic Subtype)	---	2010	A	3-Medium	---	---	G5	S4
Natural Community	9879	Acidic Cove Forest (Typic Subtype)	---	2010	C?	4-Low	---	---	G5	S4
Natural Community	14539	Acidic Cove Forest (Typic Subtype)	---	2010	B?	4-Low	---	---	G5	S4
Natural Community	22704	Acidic Cove Forest (Typic Subtype)	---	2004-09-30	BC	4-Low	---	---	G5	S4
Natural Community	31486	Acidic Cove Forest (Typic Subtype)	---	2015-03-31	B	3-Medium	---	---	G5	S4
Natural Community	13375	Acidic Cove Forest (Typic Subtype)	---	2010	A	2-High	---	---	G5	S4
Natural Community	22707	Acidic Cove Forest (Typic Subtype)	---	2015-05-28	BC	2-High	---	---	G5	S4
Natural Community	8914	Acidic Cove Forest (Typic Subtype)	---	2014?	B	3-Medium	---	---	G5	S4
Natural Community	35398	Acidic Cove Forest (Typic Subtype)	---	2015-05-13	B	2-High	---	---	G5	S4
Natural Community	28425	Acidic Cove Forest (Typic Subtype)	---	2010	B	3-Medium	---	---	G5	S4
Natural Community	20798	Acidic Cove Forest (Typic Subtype)	---	2016	B	3-Medium	---	---	G5	S4
Natural Community	33605	Acidic Cove Forest (Typic Subtype)	---	2014-07-23	C	2-High	---	---	G5	S4
Natural Community	36034	Acidic Cove Forest (Typic Subtype)	---	2017-07-21	B	2-High	---	---	G5	S4
Natural Community	36223	Acidic Cove Forest (Typic Subtype)	---	2015-09-01	C	3-Medium	---	---	G5	S4

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Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	36632	Acidic Cove Forest (Typic Subtype)	---	2016-05-19	C	2-High	---	---	G5	S4
Natural Community	12140	Calcareous Oak-Walnut Forest	---	2004-08-25	B	2-High	---	---	G1Q	S1
Natural Community	4433	Calcareous Oak-Walnut Forest	---	2004-08-18	B?	3-Medium	---	---	G1Q	S1
Natural Community	18113	Canada Hemlock Forest (Typic Subtype)	---	2010	A	5-Very Low	---	---	G3G4	S1S2
Natural Community	9002	Canada Hemlock Forest (Typic Subtype)	---	2010	A?	4-Low	---	---	G3G4	S1S2
Natural Community	36031	Canada Hemlock Forest (Typic Subtype)	---	2015-06-04	A	2-High	---	---	G3G4	S1S2
Natural Community	31560	Canada Hemlock Forest (Typic Subtype)	---	2012-07-16	B	2-High	---	---	G3G4	S1S2
Natural Community	30629	Carolina Hemlock Forest (Mesic Subtype)	---	1992-04-19	A	4-Low	---	---	G1G2	S1
Natural Community	30627	Carolina Hemlock Forest (Mesic Subtype)	---	1980	A	4-Low	---	---	G1G2	S1
Natural Community	5813	Carolina Hemlock Forest (Pine Subtype)	---	1992-04-19	A	4-Low	---	---	G2	S1S2
Natural Community	19831	Carolina Hemlock Forest (Pine Subtype)	---	1991-03-17	B	4-Low	---	---	G2	S1S2
Natural Community	18573	Carolina Hemlock Forest (Pine Subtype)	---	1987	B	3-Medium	---	---	G2	S1S2
Natural Community	35402	Carolina Hemlock Forest (Pine Subtype)	---	2015-04-28	C	2-High	---	---	G2	S1S2
Natural Community	284	Carolina Hemlock Forest (Typic Subtype)	---	1980	NR	4-Low	---	---	G2	S2
Natural Community	22744	Carolina Hemlock Forest (Typic Subtype)	---	2004-09-25	A	3-Medium	---	---	G2	S2
Natural Community	20864	Carolina Hemlock Forest (Typic Subtype)	---	2014	B	3-Medium	---	---	G2	S2
Natural Community	33937	Carolina Hemlock Forest (Typic Subtype)	---	2013-06-24	C	2-High	---	---	G2	S2
Natural Community	596	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	A	3-Medium	---	---	G5	S5

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Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	22756	Chestnut Oak Forest (Dry Heath Subtype)	---	2017-09-05	B	3-Medium	---	---	G5	S5
Natural Community	17173	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	A	3-Medium	---	---	G5	S5
Natural Community	22741	Chestnut Oak Forest (Dry Heath Subtype)	---	2012-07-16	B	3-Medium	---	---	G5	S5
Natural Community	12841	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	BC	4-Low	---	---	G5	S5
Natural Community	22708	Chestnut Oak Forest (Dry Heath Subtype)	---	2016-06-09	B	2-High	---	---	G5	S5
Natural Community	33924	Chestnut Oak Forest (Dry Heath Subtype)	---	2013-07-01	A	2-High	---	---	G5	S5
Natural Community	35403	Chestnut Oak Forest (Dry Heath Subtype)	---	2015-05-13	AB	2-High	---	---	G5	S5
Natural Community	36215	Chestnut Oak Forest (Dry Heath Subtype)	---	2017-07-21	A	2-High	---	---	G5	S5
Natural Community	22780	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	BC	2-High	---	---	G5	S5
Natural Community	22661	Chestnut Oak Forest (Dry Heath Subtype)	---	2015-09-01	A	2-High	---	---	G5	S5
Natural Community	9026	Chestnut Oak Forest (Dry Heath Subtype)	---	2013	A	2-High	---	---	G5	S5
Natural Community	22654	Chestnut Oak Forest (Dry Heath Subtype)	---	2016-05-19	A	3-Medium	---	---	G5	S5
Natural Community	31484	Chestnut Oak Forest (Dry Heath Subtype)	---	2015-03-31	BC	3-Medium	---	---	G5	S5
Natural Community	12367	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	B	3-Medium	---	---	G5	S5
Natural Community	22679	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	BC	3-Medium	---	---	G5	S5
Natural Community	22702	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	B	2-High	---	---	G5	S5
Natural Community	14839	Chestnut Oak Forest (Dry Heath Subtype)	---	2012	B	2-High	---	---	G5	S5
Natural Community	27297	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	CD	2-High	---	---	G5	S5

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Natural Community	30280	Chestnut Oak Forest (Herb Subtype)	---	2010	A	5-Very Low	---	---	G4G5	S4
Natural Community	30277	Chestnut Oak Forest (Herb Subtype)	---	2010	BC	4-Low	---	---	G4G5	S4
Natural Community	35404	Chestnut Oak Forest (Herb Subtype)	---	2015-05-13	AB	2-High	---	---	G4G5	S4
Natural Community	20928	Chestnut Oak Forest (Herb Subtype)	---	2010	B	2-High	---	---	G4G5	S4
Natural Community	32709	Chestnut Oak Forest (Herb Subtype)	---	2013-09-26	C	2-High	---	---	G4G5	S4
Natural Community	33929	Chestnut Oak Forest (Herb Subtype)	---	2013-07-02	A	2-High	---	---	G4G5	S4
Natural Community	30306	Chestnut Oak Forest (Herb Subtype)	---	2010	C	3-Medium	---	---	G4G5	S4
Natural Community	37323	Chestnut Oak Forest (Herb Subtype)	---	2013	A	2-High	---	---	G4G5	S4
Natural Community	24736	Chestnut Oak Forest (Herb Subtype)	---	2010	BC	1-Very High	---	---	G4G5	S4
Natural Community	32403	Chestnut Oak Forest (Herb Subtype)	---	2013-07-19	B	2-High	---	---	G4G5	S4
Natural Community	34957	Chestnut Oak Forest (Herb Subtype)	---	2015-03-31	C	2-High	---	---	G4G5	S4
Natural Community	30279	Chestnut Oak Forest (Mesic Subtype)	---	2010	A	5-Very Low	---	---	G4	S3S4
Natural Community	1690	Chestnut Oak Forest (Mesic Subtype)	---	2008-04-25	A	3-Medium	---	---	G4	S3S4
Natural Community	36996	Chestnut Oak Forest (Mesic Subtype)	---	2013	A	2-High	---	---	G4	S3S4
Natural Community	33969	Chestnut Oak Forest (Mesic Subtype)	---	2014-08-12	BC	2-High	---	---	G4	S3S4
Natural Community	29128	Chestnut Oak Forest (Mesic Subtype)	---	2010	B	2-High	---	---	G4	S3S4
Natural Community	36225	Chestnut Oak Forest (Mesic Subtype)	---	2015-09-01	B	3-Medium	---	---	G4	S3S4
Natural Community	30278	Chestnut Oak Forest (White Pine Subtype)	---	2010	A	5-Very Low	---	---	G3	S3

Element Occurrences Documented Within a One-mile Radius of the Project Area

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Natural Community	28439	Chestnut Oak Forest (White Pine Subtype)	---	2010	B	2-High	---	---	G3	S3
Natural Community	496	Dry-Mesic Basic Oak--Hickory Forest (Piedmont Subtype)	---	2004-08-25	C	4-Low	---	---	G3G4	S3
Natural Community	20800	Dry-Mesic Oak--Hickory Forest (Piedmont Subtype)	---	2010	B	2-High	---	---	G4G5	S4
Natural Community	22687	Dry-Mesic Oak--Hickory Forest (Piedmont Subtype)	---	2010	CD	2-High	---	---	G4G5	S4
Natural Community	33933	Heath Bald (Catawba Rhododendron Subtype)	---	2013-06-24	B	2-High	---	---	G2	S2
Natural Community	10738	High Elevation Red Oak Forest (Heath Subtype)	---	2010	B	3-Medium	---	---	G4	S3
Natural Community	33928	High Elevation Red Oak Forest (Heath Subtype)	---	2013-07-02	A	2-High	---	---	G4	S3
Natural Community	30052	High Elevation Red Oak Forest (Heath Subtype)	---	2010	A	3-Medium	---	---	G4	S3
Natural Community	33938	High Elevation Red Oak Forest (Orchard Forest Subtype)	---	2013-06-24	A	2-High	---	---	G2	S2
Natural Community	33932	High Elevation Red Oak Forest (Typic Herb Subtype)	---	2013-07-02	A	2-High	---	---	G4	S3
Natural Community	12909	High Elevation Red Oak Forest (Typic Herb Subtype)	---	2010	A	3-Medium	---	---	G4	S3
Natural Community	33968	High Elevation Red Oak Forest (Typic Herb Subtype)	---	2014-08-12	C	2-High	---	---	G4	S3
Natural Community	2341	High Elevation Rocky Summit (Typic Subtype)	---	1991	E	3-Medium	---	---	G2	S2
Natural Community	19953	High Elevation Rocky Summit (Typic Subtype)	---	1997-08-19	A	3-Medium	---	---	G2	S2

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Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	30740	Low Elevation Acidic Glade (Biltmore Sedge Subtype)	---	2004-09-25	A	4-Low	---	---	G2G3	S2
Natural Community	30775	Low Elevation Basic Glade (Montane Subtype)	---	2004-09-25	A	4-Low	---	---	G2	S2
Natural Community	30085	Low Elevation Basic Glade (Montane Subtype)	---	2011	A	3-Medium	---	---	G2	S2
Natural Community	20926	Low Elevation Basic Glade (Montane Subtype)	---	2004-09-27	C	2-High	---	---	G2	S2
Natural Community	36329	Low Elevation Basic Glade (Montane Subtype)	---	2015-09-03	A	2-High	---	---	G2	S2
Natural Community	22745	Low Elevation Granitic Dome	---	2004-09-25	AB	3-Medium	---	---	G2	S2
Natural Community	22722	Low Elevation Granitic Dome	---	2014	C	2-High	---	---	G2	S2
Natural Community	30265	Low Elevation Rocky Summit (Acidic Subtype)	---		NR	3-Medium	---	---	G3?	S2
Natural Community	17824	Low Elevation Rocky Summit (Acidic Subtype)	---	1992-04-19	B	3-Medium	---	---	G3?	S2
Natural Community	28204	Low Elevation Rocky Summit (Acidic Subtype)	---	2013	B	2-High	---	---	G3?	S2
Natural Community	6275	Low Elevation Rocky Summit (Acidic Subtype)	---	1996	C?	3-Medium	---	---	G3?	S2
Natural Community	20513	Low Elevation Rocky Summit (Basic Subtype)	---	2005-06-21	B	2-High	---	---	G1	S1
Natural Community	36635	Low Elevation Rocky Summit (Basic Subtype)	---	2016-05-10	B	2-High	---	---	G1	S1
Natural Community	354	Low Elevation Rocky Summit (Quartzite Ledge Subtype)	---	2010	B	4-Low	---	---	G1	S1
Natural Community	32707	Low Elevation Seep (Floodplain Subtype)	---	2013-09-24	CD	3-Medium	---	---	G4	S2
Natural Community	31568	Low Elevation Seep (Montane Subtype)	---	2012-07-16	C	3-Medium	---	---	G2G3	S2S3
Natural Community	34367	Low Elevation Seep (Montane Subtype)	---	2014-05-13	C	2-High	---	---	G2G3	S2S3

Element Occurrences Documented Within a One-mile Radius of the Project Area

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Natural Community	17160	Low Elevation Seep (Piedmont/Mountain Springhead Subtype)	---	1993-10-26	B?	2-High	---	---	G2	S1
Natural Community	37324	Low Elevation Seep (Typic Subtype)	---	2013	B	2-High	---	---	G3?	S3
Natural Community	33602	Low Elevation Seep (Typic Subtype)	---	2014-07-23	CD	2-High	---	---	G3?	S3
Natural Community	36022	Low Mountain Pine Forest (Montane Pine Subtype)	---	2015-08-31	B	2-High	---	---	G3G4	S2?
Natural Community	36220	Low Mountain Pine Forest (Shortleaf Pine Subtype)	---	2015-09-04	C	2-High	---	---	G2G3	S2
Natural Community	32708	Montane Alluvial Forest (Large River Subtype)	---	2014-07-25	D	2-High	---	---	G2?	S1
Natural Community	16193	Montane Alluvial Forest (Small River Subtype)	---	1989	C	4-Low	---	---	G3	S1
Natural Community	31563	Montane Alluvial Forest (Small River Subtype)	---	2012-07-16	C	3-Medium	---	---	G3	S1
Natural Community	36028	Montane Alluvial Forest (Small River Subtype)	---	2015-06-04	C	2-High	---	---	G3	S1
Natural Community	14823	Montane Cliff (Acidic Herb Subtype)	---	1988-06-18	A?	4-Low	---	---	G3G4	S3
Natural Community	3156	Montane Cliff (Acidic Herb Subtype)	---	1990	NR	4-Low	---	---	G3G4	S3
Natural Community	7460	Montane Cliff (Acidic Herb Subtype)	---	1992-04-19	A	4-Low	---	---	G3G4	S3
Natural Community	14085	Montane Cliff (Acidic Herb Subtype)	---	1987	B	3-Medium	---	---	G3G4	S3
Natural Community	15226	Montane Cliff (Acidic Herb Subtype)	---	2012	A	3-Medium	---	---	G3G4	S3
Natural Community	31566	Montane Cliff (Acidic Herb Subtype)	---	2012-07-16	A	2-High	---	---	G3G4	S3
Natural Community	22675	Montane Cliff (Acidic Herb Subtype)	---	2004-08-25	C?	2-High	---	---	G3G4	S3

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Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	34959	Montane Cliff (Acidic Herb Subtype)	---	2015-03-30	C	2-High	---	---	G3G4	S3
Natural Community	1073	Montane Cliff (Calcareous Subtype)	---	2004-08-25	A	4-Low	---	---	G3G4	S1
Natural Community	36311	Montane Cliff (Calcareous Subtype)	---	2015-09-03	B	2-High	---	---	G3G4	S1
Natural Community	36328	Montane Cliff (Calcareous Subtype)	---	2015-09-03	C	2-High	---	---	G3G4	S1
Natural Community	10345	Montane Oak--Hickory Forest (Acidic Subtype)	---	2010	E	4-Low	---	---	G4G5	S4S5
Natural Community	22755	Montane Oak--Hickory Forest (Acidic Subtype)	---	2017-09-05	AB	3-Medium	---	---	G4G5	S4S5
Natural Community	22743	Montane Oak--Hickory Forest (Acidic Subtype)	---	2012-07-16	B	3-Medium	---	---	G4G5	S4S5
Natural Community	10526	Montane Oak--Hickory Forest (Acidic Subtype)	---	2010	C?	4-Low	---	---	G4G5	S4S5
Natural Community	12547	Montane Oak--Hickory Forest (Acidic Subtype)	---	2006-07-28	B?	4-Low	---	---	G4G5	S4S5
Natural Community	33935	Montane Oak--Hickory Forest (Acidic Subtype)	---	2013-07-01	A	2-High	---	---	G4G5	S4S5
Natural Community	11905	Montane Oak--Hickory Forest (Acidic Subtype)	---	2013	A	2-High	---	---	G4G5	S4S5
Natural Community	22703	Montane Oak--Hickory Forest (Acidic Subtype)	---	2016-06-08	B	2-High	---	---	G4G5	S4S5
Natural Community	32710	Montane Oak--Hickory Forest (Acidic Subtype)	---	2014-07-21	B	2-High	---	---	G4G5	S4S5
Natural Community	22662	Montane Oak--Hickory Forest (Acidic Subtype)	---	2015-09-04	A	2-High	---	---	G4G5	S4S5
Natural Community	20927	Montane Oak--Hickory Forest (Acidic Subtype)	---	2013-09-24	B	3-Medium	---	---	G4G5	S4S5
Natural Community	22632	Montane Oak--Hickory Forest (Acidic Subtype)	---	2016-05-19	BC	3-Medium	---	---	G4G5	S4S5
Natural Community	22681	Montane Oak--Hickory Forest (Acidic Subtype)	---	2010	C	2-High	---	---	G4G5	S4S5
Natural Community	36218	Montane Oak--Hickory Forest (Acidic Subtype)	---	2017-07-21	A	3-Medium	---	---	G4G5	S4S5

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	33603	Montane Oak--Hickory Forest (Acidic Subtype)	---	2014-07-23	B	3-Medium	---	---	G4G5	S4S5
Natural Community	22658	Montane Oak--Hickory Forest (Acidic Subtype)	---	2004-09-10	C	2-High	---	---	G4G5	S4S5
Natural Community	22686	Montane Oak--Hickory Forest (Acidic Subtype)	---	2010	A	2-High	---	---	G4G5	S4S5
Natural Community	34936	Montane Oak--Hickory Forest (Acidic Subtype)	---	2015-03-31	B	2-High	---	---	G4G5	S4S5
Natural Community	34345	Montane Oak--Hickory Forest (Acidic Subtype)	---	2014-07-25	B	2-High	---	---	G4G5	S4S5
Natural Community	22678	Montane Oak--Hickory Forest (Acidic Subtype)	---	2010	C?	3-Medium	---	---	G4G5	S4S5
Natural Community	25999	Montane Oak--Hickory Forest (Acidic Subtype)	---	2010	A?	3-Medium	---	---	G4G5	S4S5
Natural Community	22674	Montane Oak--Hickory Forest (Acidic Subtype)	---	2010	C?	2-High	---	---	G4G5	S4S5
Natural Community	27301	Montane Oak--Hickory Forest (Acidic Subtype)	---	2010	BC	3-Medium	---	---	G4G5	S4S5
Natural Community	36224	Montane Oak--Hickory Forest (Acidic Subtype)	---	2015-09-01	B	3-Medium	---	---	G4G5	S4S5
Natural Community	22685	Montane Oak--Hickory Forest (Acidic Subtype)	---	2010	C	3-Medium	---	---	G4G5	S4S5
Natural Community	35401	Montane Oak--Hickory Forest (Acidic Subtype)	---	2015-05-13	C	2-High	---	---	G4G5	S4S5
Natural Community	31562	Montane Oak--Hickory Forest (Basic Subtype)	---	2012-07-16	B	3-Medium	---	---	G3	S3
Natural Community	36217	Montane Oak--Hickory Forest (Basic Subtype)	---	2017-07-21	A	2-High	---	---	G3	S3
Natural Community	37006	Montane Oak--Hickory Forest (Basic Subtype)	---	2013	A	2-High	---	---	G3	S3
Natural Community	36688	Montane Oak--Hickory Forest (Basic Subtype)	---	2016-06-09	B	2-High	---	---	G3	S3
Natural Community	32402	Montane Oak--Hickory Forest (Basic Subtype)	---	2013-07-19	B	2-High	---	---	G3	S3
Natural Community	30125	Montane Oak--Hickory Forest (Basic Subtype)	---	2010	B?	2-High	---	---	G3	S3

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	31564	Montane Oak--Hickory Forest (Low Dry Subtype)	---	2013-07-18	AB	2-High	---	---	G2G3	S2
Natural Community	34365	Montane Oak--Hickory Forest (Low Dry Subtype)	---	2014-07-25	C	3-Medium	---	---	G2G3	S2
Natural Community	36017	Montane Oak--Hickory Forest (Low Dry Subtype)	---	2015-08-31	A	2-High	---	---	G2G3	S2
Natural Community	37322	Montane Oak--Hickory Forest (Low Dry Subtype)	---	2013	AB	2-High	---	---	G2G3	S2
Natural Community	36337	Montane Oak--Hickory Forest (Low Dry Subtype)	---	2015-09-03	B	2-High	---	---	G2G3	S2
Natural Community	32405	Montane Oak--Hickory Forest (Low Dry Subtype)	---	2013-09-24	C	2-High	---	---	G2G3	S2
Natural Community	36219	Montane Oak--Hickory Forest (Low Dry Subtype)	---	2015-09-04	C	2-High	---	---	G2G3	S2
Natural Community	33939	Northern Hardwood Forest (Beech Gap Subtype)	---	2013-06-24	BC	2-High	---	---	G1	S1S2
Natural Community	8025	Northern Hardwood Forest (Typic Subtype)	---	2013-07-03	A	2-High	---	---	G3G4	S3
Natural Community	7975	Northern Hardwood Forest (Typic Subtype)	---	2010	A?	4-Low	---	---	G3G4	S3
Natural Community	2394	Northern Hardwood Forest (Typic Subtype)	---	2010	A	4-Low	---	---	G3G4	S3
Natural Community	31565	Piedmont Headwater Stream Forest (Typic Subtype)	---	2012-07-16	C	3-Medium	---	---	G3G4	S3S4
Natural Community	20925	Piedmont Headwater Stream Forest (Typic Subtype)	---	2004-09-27	C	3-Medium	---	---	G3G4	S3S4
Natural Community	15979	Pine--Oak/Heath (High Elevation Subtype)	---	2010	NR	4-Low	---	---	G2	S2
Natural Community	6145	Pine--Oak/Heath (High Elevation Subtype)	---	2010	B?	3-Medium	---	---	G2	S2
Natural Community	14052	Pine--Oak/Heath (Typic Subtype)	---	2010	B	4-Low	---	---	G3	S3

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	2871	Pine--Oak/Heath (Typic Subtype)	---	1987	B	4-Low	---	---	G3	S3
Natural Community	12331	Pine--Oak/Heath (Typic Subtype)	---	2010	B	4-Low	---	---	G3	S3
Natural Community	12327	Pine--Oak/Heath (Typic Subtype)	---	1991-03-16	B	4-Low	---	---	G3	S3
Natural Community	37304	Pine--Oak/Heath (Typic Subtype)	---	2013	B	2-High	---	---	G3	S3
Natural Community	12901	Pine--Oak/Heath (Typic Subtype)	---	2010	A	3-Medium	---	---	G3	S3
Natural Community	35400	Pine--Oak/Heath (Typic Subtype)	---	2015-05-13	BC	2-High	---	---	G3	S3
Natural Community	36222	Pine--Oak/Heath (Typic Subtype)	---	2015-09-01	C	3-Medium	---	---	G3	S3
Natural Community	34912	Pine--Oak/Heath (Typic Subtype)	---	2015-03-30	B	2-High	---	---	G3	S3
Natural Community	31561	Pine--Oak/Heath (Typic Subtype)	---	2012-07-16	B	2-High	---	---	G3	S3
Natural Community	22754	Pine--Oak/Heath (Typic Subtype)	---	2017-09-05	B	2-High	---	---	G3	S3
Natural Community	2393	Pine--Oak/Heath (Typic Subtype)	---	2010	B?	3-Medium	---	---	G3	S3
Natural Community	22710	Pine--Oak/Heath (Typic Subtype)	---	2010	C	2-High	---	---	G3	S3
Natural Community	22682	Pine--Oak/Heath (Typic Subtype)	---	2010	BC	2-High	---	---	G3	S3
Natural Community	35374	Pine--Oak/Heath (Typic Subtype)	---	2015-05-20	C?	2-High	---	---	G3	S3
Natural Community	22659	Pine--Oak/Heath (Typic Subtype)	---	2010	BC	2-High	---	---	G3	S3
Natural Community	22656	Pine--Oak/Heath (Typic Subtype)	---	2010	C	2-High	---	---	G3	S3
Natural Community	33604	Pine--Oak/Heath (Typic Subtype)	---	2014-07-23	C	2-High	---	---	G3	S3

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	30136	Red Spruce--Fraser Fir Forest (Birch Transition Herb Subtype)	---	2014-07-10	A	4-Low	---	---	G2	S2
Natural Community	30194	Red Spruce--Fraser Fir Forest (Birch Transition Shrub Subtype)	---	2014-07-10	A	4-Low	---	---	G1?	S1
Natural Community	6031	Red Spruce--Fraser Fir Forest (Herb Subtype)	---	2014-07-10	A	3-Medium	---	---	G2	S2
Natural Community	816	Red Spruce--Fraser Fir Forest (Herb Subtype)	---	1989	B	2-High	---	---	G2	S2
Natural Community	30303	Red Spruce--Fraser Fir Forest (Rhododendron Subtype)	---	1989	B	2-High	---	---	G1	S1S2
Natural Community	30226	Rich Cove Forest (Boulderfield Subtype)	---	2010	A	3-Medium	---	---	G3	S2
Natural Community	22683	Rich Cove Forest (Foothills Intermediate Subtype)	---	2010	CD	3-Medium	---	---	G4?	S3
Natural Community	22680	Rich Cove Forest (Foothills Intermediate Subtype)	---	2010	CD	2-High	---	---	G4?	S3
Natural Community	37757	Rich Cove Forest (Foothills Intermediate Subtype)	---	2017-07-21	C	2-High	---	---	G4?	S3
Natural Community	36335	Rich Cove Forest (Foothills Intermediate Subtype)	---	2015	C	2-High	---	---	G4?	S3
Natural Community	36336	Rich Cove Forest (Foothills Rich Subtype)	---	2015-09-03	A	2-High	---	---	G2G3	S2
Natural Community	1217	Rich Cove Forest (Foothills Rich Subtype)	---	2010	A	3-Medium	---	---	G2G3	S2
Natural Community	22752	Rich Cove Forest (Montane Intermediate Subtype)	---	2010	AB	3-Medium	---	---	G4	S4

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	7999	Rich Cove Forest (Montane Intermediate Subtype)	---	2007-08-15	C?	4-Low	---	---	G4	S4
Natural Community	3321	Rich Cove Forest (Montane Intermediate Subtype)	---	2010	C	4-Low	---	---	G4	S4
Natural Community	18869	Rich Cove Forest (Montane Intermediate Subtype)	---	2017-03-24	B?	3-Medium	---	---	G4	S4
Natural Community	9692	Rich Cove Forest (Montane Intermediate Subtype)	---	2013-07-02	A	2-High	---	---	G4	S4
Natural Community	22706	Rich Cove Forest (Montane Intermediate Subtype)	---	2012-09-07	C	2-High	---	---	G4	S4
Natural Community	30216	Rich Cove Forest (Montane Intermediate Subtype)	---	2010	B	3-Medium	---	---	G4	S4
Natural Community	22631	Rich Cove Forest (Montane Intermediate Subtype)	---	2014-08-12	C	2-High	---	---	G4	S4
Natural Community	35399	Rich Cove Forest (Montane Intermediate Subtype)	---	2015-05-13	B	2-High	---	---	G4	S4
Natural Community	31487	Rich Cove Forest (Montane Intermediate Subtype)	---	2015-03-31	BC	3-Medium	---	---	G4	S4
Natural Community	22684	Rich Cove Forest (Montane Intermediate Subtype)	---	2010	C	3-Medium	---	---	G4	S4
Natural Community	22677	Rich Cove Forest (Montane Intermediate Subtype)	---	2010	BC	3-Medium	---	---	G4	S4
Natural Community	22673	Rich Cove Forest (Montane Intermediate Subtype)	---	2010	C	2-High	---	---	G4	S4

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	27292	Rich Cove Forest (Montane Intermediate Subtype)	---	2010	CD	2-High	---	---	G4	S4
Natural Community	30221	Rich Cove Forest (Montane Rich Subtype)	---	2010	AB	4-Low	---	---	G3G4	S3
Natural Community	22705	Rich Cove Forest (Montane Rich Subtype)	---	2010	B	3-Medium	---	---	G3G4	S3
Natural Community	30195	Rich Montane Seep	---	2010	A	4-Low	---	---	G3	S3
Natural Community	17139	Rich Montane Seep	---	1991	E	3-Medium	---	---	G3	S3
Natural Community	33967	Rich Montane Seep	---	2014-08-12	A	2-High	---	---	G3	S3
Natural Community	14352	Rocky Bar and Shore (Alder-Yellowroot Subtype)	---	1992-04-19	A	4-Low	---	---	G3G4	S3
Natural Community	30644	Rocky Bar and Shore (Twisted Sedge Subtype)	---	1992-04-19	A	4-Low	---	---	G3G4	S3
Natural Community	30086	Southern Mountain Pine--Oak Forest	---	2012-07-20	BC	2-High	---	---	G3G4	S1S2
Natural Community	32404	Southern Mountain Pine--Oak Forest	---	2014-07-21	C	2-High	---	---	G3G4	S1S2
Natural Community	36020	Southern Mountain Pine--Oak Forest	---	2015-08-31	A	2-High	---	---	G3G4	S1S2
Natural Community	33011	Southern Mountain Pine--Oak Forest	---	2014-03-21	NR	2-High	---	---	G3G4	S1S2
Natural Community	34366	Southern Mountain Pine--Oak Forest	---	2014-07-25	CD	2-High	---	---	G3G4	S1S2
Natural Community	36633	Spray Cliff	---	2016-05-19	C	2-High	---	---	G2	S2
Natural Community	11424	Swamp Forest--Bog Complex (Spruce Subtype)	---	2007-06-13	A	3-Medium	---	---	G2?	S1
Natural Community	13861	Swamp Forest--Bog Complex (Typic Subtype)	---	2005-10-21	C?	3-Medium	---	---	G2	S2

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Natural Community	14563	Swamp Forest--Bog Complex (Typic Subtype)	---	1993-10-26	D	2-High	---	---	G2	S2
Natural Community	14960	Upland Pool (Mountain Subtype)	---	1988-07-25	A?	2-High	---	---	G1	S1
Natural Community	656	White Pine Forest	---	1992-04-19	A?	4-Low	---	---	G2G3	S2
Reptile	1455	Crotalus horridus	Timber Rattlesnake	1983-07-08	E	4-Low	---	Special Concern	G4	S3
Reptile	19692	Crotalus horridus	Timber Rattlesnake	1974-08	H?	4-Low	---	Special Concern	G4	S3
Reptile	10478	Crotalus horridus	Timber Rattlesnake	1997-09-19	E	3-Medium	---	Special Concern	G4	S3
Reptile	11650	Crotalus horridus	Timber Rattlesnake	2015-05-28	E	3-Medium	---	Special Concern	G4	S3
Reptile	6500	Glyptemys muhlenbergii	Bog Turtle	1995-09-17	CD	3-Medium	Threatened Similar Appearance	Threatened	G3	S2
Reptile	18992	Glyptemys muhlenbergii	Bog Turtle	2014	CD	3-Medium	Threatened Similar Appearance	Threatened	G3	S2
Sawfly, Wasp, Bee, or Ant	37139	Bombus affinis	Rusty-patched Bumble Bee	1961-07-22	H	4-Low	Endangered	Significantly Rare	G1	S1
Stonefly	17137	Bolotoperla rossi	Smoky Willowfly	1992-02-10	E	3-Medium	---	Significantly Rare	G4	S3
Vascular Plant	20522	Alnus viridis ssp. crispa	Green Alder	2004-11-03	D	4-Low	---	Special Concern Vulnerable	G5T5	S1
Vascular Plant	2924	Anticlea glauca	White Camas	2012-06-07	C	3-Medium	---	Significantly Rare Peripheral	G5T4T5	S1
Vascular Plant	31668	Arabis patens	Spreading Rockcress	2012	D	2-High	---	Significantly Rare Throughout	G3	S1
Vascular Plant	14213	Arisaema stewardsonii	Bog Jack-in-the-pulpit	1994-05	AB	3-Medium	---	Significantly Rare Peripheral	G5T4T5	S2
Vascular Plant	25457	Arisaema stewardsonii	Bog Jack-in-the-pulpit	2012-08-12	B	2-High	---	Significantly Rare Peripheral	G5T4T5	S2

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Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	31758	Arisaema stewardsonii	Bog Jack-in-the-pulpit	2012	C	2-High	---	Significantly Rare Peripheral	G5T4T5	S2
Vascular Plant	17313	Asplenium bradleyi	Bradley's Spleenwort	1988-07-24	CD	3-Medium	---	Significantly Rare Peripheral	G4	S2
Vascular Plant	22350	Asplenium pinnatifidum	Lobed Spleenwort	2005-06-21	C?	2-High	---	Significantly Rare Peripheral	G4	S2
Vascular Plant	33889	Asplenium ruta-muraria var. cryptolepis	American Wall-rue	1936-06-14	H	3-Medium	---	Special Concern Vulnerable	G5T5	S1
Vascular Plant	18316	Asplenium ruta-muraria var. cryptolepis	American Wall-rue	2012-06-07	A	3-Medium	---	Special Concern Vulnerable	G5T5	S1
Vascular Plant	11575	Asplenium ruta-muraria var. cryptolepis	American Wall-rue	2004-08-18	E	3-Medium	---	Special Concern Vulnerable	G5T5	S1
Vascular Plant	13031	Asplenium ruta-muraria var. cryptolepis	American Wall-rue	1997-06-13	C	3-Medium	---	Special Concern Vulnerable	G5T5	S1
Vascular Plant	11383	Baptisia bracteata	Creamy Wild Indigo	1956-09-01	H	3-Medium	---	Special Concern Historical	G4G5T4?	SH
Vascular Plant	20966	Berberis canadensis	American Barberry	2013	AB	2-High	---	Special Concern Vulnerable	G3	S2
Vascular Plant	5115	Berberis canadensis	American Barberry	2003	D	3-Medium	---	Special Concern Vulnerable	G3	S2
Vascular Plant	13810	Berberis canadensis	American Barberry	1995-10	C	3-Medium	---	Special Concern Vulnerable	G3	S2
Vascular Plant	31571	Berberis canadensis	American Barberry	2012-04-10	BC	2-High	---	Special Concern Vulnerable	G3	S2
Vascular Plant	31572	Berberis canadensis	American Barberry	2012	C?	2-High	---	Special Concern Vulnerable	G3	S2

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Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	24171	Berberis canadensis	American Barberry	2005-06-22	C?	2-High	---	Special Concern Vulnerable	G3	S2
Vascular Plant	22352	Berberis canadensis	American Barberry	2005-06-14	D	2-High	---	Special Concern Vulnerable	G3	S2
Vascular Plant	31697	Botrychium lanceolatum var. angustisegmentum	Lance-leaf Moonwort	2012-04-10	B	2-High	---	Significantly Rare Peripheral	G5T4	S1
Vascular Plant	16230	Campanula aparinoides var. aparinoides	Marsh Bellflower	1983-04	F?	4-Low	---	Significantly Rare Peripheral	G5TNR	S2
Vascular Plant	4866	Campanula aparinoides var. aparinoides	Marsh Bellflower	1988-07-16	D	3-Medium	---	Significantly Rare Peripheral	G5TNR	S2
Vascular Plant	8204	Campanula aparinoides var. aparinoides	Marsh Bellflower	1972-08	H	3-Medium	---	Significantly Rare Peripheral	G5TNR	S2
Vascular Plant	11316	Campanula aparinoides var. aparinoides	Marsh Bellflower	1994-08-18	A	3-Medium	---	Significantly Rare Peripheral	G5TNR	S2
Vascular Plant	35906	Carex hitchcockiana	Hitchcock's Sedge	1995-07-11	E	2-High	---	Special Concern Vulnerable	G5	S1
Vascular Plant	20529	Carex roanensis	Roan Sedge	2003-06-19	E	3-Medium	---	Significantly Rare Throughout	G2G3	S2
Vascular Plant	4812	Carex roanensis	Roan Sedge	1986-06-25	B	2-High	---	Significantly Rare Throughout	G2G3	S2
Vascular Plant	21236	Celastrus scandens	American Bittersweet	2012-06-07	D	2-High	---	Endangered	G5	S2?
Vascular Plant	1843	Chelone cuthbertii	Cuthbert's Turtlehead	1993-10	C	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	18483	Chelone cuthbertii	Cuthbert's Turtlehead	1990-07-10	F?	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	23596	Chelone obliqua	Red Turtlehead	2005-Pre	E	4-Low	---	Significantly Rare Throughout	G4	S2
Vascular Plant	19453	Cirsium carolinianum	Carolina Thistle	2005-10-13	D	2-High	---	Endangered	G5	S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	26309	Clematis catesbyana	Coastal Virgin's-bower	2012-06-07	E	2-High	---	Significantly Rare Peripheral	G4G5	S2
Vascular Plant	26310	Clematis catesbyana	Coastal Virgin's-bower	1995-07-11	E	2-High	---	Significantly Rare Peripheral	G4G5	S2
Vascular Plant	22820	Collinsonia tuberosa	Piedmont Horsebalm	1996-09-13	E	3-Medium	---	Special Concern Vulnerable	G3G4	S1
Vascular Plant	3437	Collinsonia tuberosa	Piedmont Horsebalm	2005-10-21	A	2-High	---	Special Concern Vulnerable	G3G4	S1
Vascular Plant	34607	Collinsonia tuberosa	Piedmont Horsebalm	2014-09-10	A	1-Very High	---	Special Concern Vulnerable	G3G4	S1
Vascular Plant	34608	Collinsonia tuberosa	Piedmont Horsebalm	2013-11-12	CD	1-Very High	---	Special Concern Vulnerable	G3G4	S1
Vascular Plant	31694	Collinsonia tuberosa	Piedmont Horsebalm	2012	BC	2-High	---	Special Concern Vulnerable	G3G4	S1
Vascular Plant	26336	Corallorhiza wisteriana	Spring Coral-root	1995-04	F	2-High	---	Significantly Rare Other	G5	S1
Vascular Plant	23649	Cuscuta coryli	Hazel Dodder	2005-Pre	E	4-Low	---	Significantly Rare Throughout	G5?	S1?
Vascular Plant	21051	Delphinium exaltatum	Tall Larkspur	2012-06-07	B?	2-High	---	Endangered	G3	S2
Vascular Plant	9712	Dicentra eximia	Bleeding Heart	1969-05-01	H	3-Medium	---	Significantly Rare Peripheral	G4	S3
Vascular Plant	22605	Dicentra eximia	Bleeding Heart	2004-06-26	CD	2-High	---	Significantly Rare Peripheral	G4	S3
Vascular Plant	28124	Echinacea pallida	Pale Coneflower	1956-09-01	H	3-Medium	---	Significantly Rare Disjunct	G4	S1
Vascular Plant	10938	Echinacea purpurea	Purple Coneflower	1996	X?	2-High	---	Special Concern Vulnerable	G4	S1

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	25583	Echinacea purpurea	Purple Coneflower	2006-06-28	E	2-High	---	Special Concern Vulnerable	G4	S1
Vascular Plant	6498	Echinacea purpurea	Purple Coneflower	1949-08	H	3-Medium	---	Special Concern Vulnerable	G4	S1
Vascular Plant	35397	Echinacea purpurea	Purple Coneflower	2015-04-28	C?	2-High	---	Special Concern Vulnerable	G4	S1
Vascular Plant	23619	Eupatorium saltuense	Tall Boneset	2005-Pre	E	5-Very Low	---	Significantly Rare Limited	G4	S1?
Vascular Plant	34609	Eupatorium saltuense	Tall Boneset	2012	D	2-High	---	Significantly Rare Limited	G4	S1?
Vascular Plant	18314	Euphorbia purpurea	Glade Spurge	2008-07-04	B	2-High	---	Significantly Rare Throughout	G3	S3
Vascular Plant	19102	Filipendula rubra	Queen-of-the-prairie	1990-07-10	F?	3-Medium	---	Endangered	G4G5	S1
Vascular Plant	23236	Fothergilla major	Large Witch-alder	2006-04-15	E	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	463	Fothergilla major	Large Witch-alder	1992-09-05	E	2-High	---	Significantly Rare Throughout	G3	S3
Vascular Plant	26630	Fothergilla major	Large Witch-alder	1992-06-16	E	2-High	---	Significantly Rare Throughout	G3	S3
Vascular Plant	31677	Fothergilla major	Large Witch-alder	2012-03-30	B	2-High	---	Significantly Rare Throughout	G3	S3
Vascular Plant	34611	Fothergilla major	Large Witch-alder	2014-06-26	D	1-Very High	---	Significantly Rare Throughout	G3	S3
Vascular Plant	36036	Fothergilla major	Large Witch-alder	2015-09-01	D	2-High	---	Significantly Rare Throughout	G3	S3
Vascular Plant	27660	Gillenia stipulata	Indian Physic	2009-Pre	E	3-Medium	---	Threatened	G5	S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	23924	Hackelia virginiana	Virginia Stickseed	2005-Pre	E	5-Very Low	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	23926	Hackelia virginiana	Virginia Stickseed	2004-08-25	AB	3-Medium	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	27604	Helianthus laevigatus	Smooth Sunflower	2009-Pre	E	4-Low	---	Special Concern Vulnerable	G4	S3
Vascular Plant	34767	Helianthus laevigatus	Smooth Sunflower	2012-04-13	C?	3-Medium	---	Special Concern Vulnerable	G4	S3
Vascular Plant	34766	Helianthus laevigatus	Smooth Sunflower	2012-04-13	B?	3-Medium	---	Special Concern Vulnerable	G4	S3
Vascular Plant	13621	Helianthus laevigatus	Smooth Sunflower	1992-08	C	3-Medium	---	Special Concern Vulnerable	G4	S3
Vascular Plant	34765	Helianthus laevigatus	Smooth Sunflower	2009	E	3-Medium	---	Special Concern Vulnerable	G4	S3
Vascular Plant	27661	Helianthus laevigatus	Smooth Sunflower	2012-03-30	B	2-High	---	Special Concern Vulnerable	G4	S3
Vascular Plant	26379	Helianthus laevigatus	Smooth Sunflower	2006-09-14	E	2-High	---	Special Concern Vulnerable	G4	S3
Vascular Plant	8289	Hudsonia montana	Mountain Golden-heather	2011-10-05	C	2-High	Threatened	Threatened	G1	S1
Vascular Plant	8946	Hudsonia montana	Mountain Golden-heather	2011-10-05	B	2-High	Threatened	Threatened	G1	S1
Vascular Plant	19729	Hudsonia montana	Mountain Golden-heather	2004-Spring	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24447	Hudsonia montana	Mountain Golden-heather	2003-08	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24442	Hudsonia montana	Mountain Golden-heather	2004-Spring	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24450	Hudsonia montana	Mountain Golden-heather	1982	F	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24448	Hudsonia montana	Mountain Golden-heather	2004-Spring	D	2-High	Threatened	Threatened	G1	S1
Vascular Plant	24449	Hudsonia montana	Mountain Golden-heather	1982	F	2-High	Threatened	Threatened	G1	S1
Vascular Plant	33405	Hydrastis canadensis	Goldenseal	2001-07-18	E	2-High	---	Significantly Rare Other	G3G4	S3

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	23234	Hymenocallis occidentalis var. occidentalis	Hillside Spider-lily	1949-08-17	H	3-Medium	---	Special Concern Historical	G4?TNR	SH
Vascular Plant	9862	Isotria medeoloides	Small Whorled Pogonia	2005-09-10	D	3-Medium	Threatened	Threatened	G2?	S1
Vascular Plant	27667	Lathyrus pusillus	Tiny Peavine	2009-Pre	X?	4-Low	---	Significantly Rare Disjunct	G5?	SH
Vascular Plant	22858	Liatris aspera	Rough Blazing-star	2005?	E	3-Medium	---	Threatened	G4G5	S1
Vascular Plant	22859	Liatris aspera	Rough Blazing-star	2006-09-17	E	3-Medium	---	Threatened	G4G5	S1
Vascular Plant	22860	Liatris aspera	Rough Blazing-star	2005?	E	3-Medium	---	Threatened	G4G5	S1
Vascular Plant	14821	Liatris aspera	Rough Blazing-star	1969-09	F	3-Medium	---	Threatened	G4G5	S1
Vascular Plant	16424	Liatris aspera	Rough Blazing-star	2006-08-29	C	3-Medium	---	Threatened	G4G5	S1
Vascular Plant	10986	Liatris helleri	Heller's Blazing-star	2005-10-05	B	3-Medium	Threatened	Threatened	G2Q	S2
Vascular Plant	34786	Liatris squarrulosa	Earle's Blazing-star	2012-04-03	D	2-High	---	Significantly Rare Peripheral	G4G5	S2
Vascular Plant	31669	Liatris squarrulosa	Earle's Blazing-star	2012	C	2-High	---	Significantly Rare Peripheral	G4G5	S2
Vascular Plant	34785	Liatris squarrulosa	Earle's Blazing-star	2012-06-05	D	2-High	---	Significantly Rare Peripheral	G4G5	S2
Vascular Plant	22864	Liatris turgida	Shale-barren Blazing-star	2005?	E	3-Medium	---	Significantly Rare Throughout	G3	S1S2
Vascular Plant	36471	Lilium grayi	Gray's Lily	1898-06	H	5-Very Low	---	Threatened	G3	S1S2
Vascular Plant	27118	Lilium grayi	Gray's Lily	1938-06-30	H	4-Low	---	Threatened	G3	S1S2
Vascular Plant	11728	Lilium grayi	Gray's Lily	1990-07-10	F	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	8490	Lilium grayi	Gray's Lily	1991	C	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	14255	Lilium grayi	Gray's Lily	1988-06-20	B	2-High	---	Threatened	G3	S1S2
Vascular Plant	23806	Lysimachia tonsa	Southern Loosestrife	2005	E	5-Very Low	---	Significantly Rare Peripheral	G4	S2
Vascular Plant	10335	Malaxis bayardii	Appalachian Adder's-mouth	1995	C	3-Medium	---	Significantly Rare Throughout	G1G2	S1
Vascular Plant	31692	Matelea decipiens	Glade Milkvine	2013	C	1-Very High	---	Significantly Rare Peripheral	G5	S3
Vascular Plant	11303	Mononeuria groenlandica	Greenland Sandwort	2012-11-17	E	3-Medium	---	Threatened	G5	S2
Vascular Plant	22603	Mononeuria groenlandica	Greenland Sandwort	2004-09-14	D	2-High	---	Threatened	G5	S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	22602	Mononeuria groenlandica	Greenland Sandwort	2004-09-10	B	2-High	---	Threatened	G5	S2
Vascular Plant	5491	Monotropsis odorata	Sweet Pinesap	1993-04	B	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	7919	Monotropsis odorata	Sweet Pinesap	1997-06-13	C	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	12659	Monotropsis odorata	Sweet Pinesap	1994-04	D	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	3525	Monotropsis odorata	Sweet Pinesap	1995-04	C	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	3526	Monotropsis odorata	Sweet Pinesap	2003	D	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	27668	Monotropsis odorata	Sweet Pinesap	2009-Pre	E	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	33477	Monotropsis odorata	Sweet Pinesap	2001-07-21	E	2-High	---	Special Concern Vulnerable	G3	S3
Vascular Plant	26652	Monotropsis odorata	Sweet Pinesap	1992-06-08	E	2-High	---	Special Concern Vulnerable	G3	S3
Vascular Plant	22610	Monotropsis odorata	Sweet Pinesap	2004-05-13	CD	2-High	---	Special Concern Vulnerable	G3	S3
Vascular Plant	2972	Muhlenbergia sobolifera	Rock Muhly	1956-09-01	H	3-Medium	---	Special Concern Vulnerable	G5	S2
Vascular Plant	21310	Nabalus albus	Northern Rattlesnake-root	2014-09-24	A?	4-Low	---	Threatened	G5	S2?
Vascular Plant	15533	Oenothera perennis	Perennial Sundrops	1994-06	F	3-Medium	---	Special Concern Vulnerable	G5	S2
Vascular Plant	17463	Packera millefolium	Divided-leaf Ragwort	2004-09-14	D	3-Medium	---	Threatened	G3	S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	20968	Packera millefolium	Divided-leaf Ragwort	2004-10-06	C?	2-High	---	Threatened	G3	S2
Vascular Plant	31742	Packera millefolium	Divided-leaf Ragwort	2012	BC	2-High	---	Threatened	G3	S2
Vascular Plant	22870	Packera millefolium	Divided-leaf Ragwort	2012	B	2-High	---	Threatened	G3	S2
Vascular Plant	27606	Packera paupercula var. paupercula	Balsam Ragwort	2009-Pre	E	4-Low	---	Significantly Rare Peripheral	G5	S1?
Vascular Plant	22873	Packera paupercula var. paupercula	Balsam Ragwort	2005?	E	3-Medium	---	Significantly Rare Peripheral	G5	S1?
Vascular Plant	22874	Packera paupercula var. paupercula	Balsam Ragwort	2005?	E	3-Medium	---	Significantly Rare Peripheral	G5	S1?
Vascular Plant	22872	Packera paupercula var. paupercula	Balsam Ragwort	2005?	E	3-Medium	---	Significantly Rare Peripheral	G5	S1?
Vascular Plant	15682	Parnassia grandifolia	Large-leaved Grass-of-parnassus	2001-08	B	3-Medium	---	Threatened	G3	S2
Vascular Plant	12467	Parnassia grandifolia	Large-leaved Grass-of-parnassus	2005-10-21	B	1-Very High	---	Threatened	G3	S2
Vascular Plant	7167	Parnassia grandifolia	Large-leaved Grass-of-parnassus	1993-10	CD	2-High	---	Threatened	G3	S2
Vascular Plant	4859	Platanthera grandiflora	Large Purple-fringed Orchid	1991	E	4-Low	---	Threatened	G5	S2
Vascular Plant	29003	Platanthera herbiola	Northern Rein Orchid	2012-08-04	AB	2-High	---	Significantly Rare Peripheral	G4?T4Q	S1S2
Vascular Plant	31676	Polygala senega	Seneca Snakeroot	2013	A	2-High	---	Significantly Rare Disjunct	G4G5	S2
Vascular Plant	31698	Prunus alleghaniensis var. alleghaniensis	Allegheny Plum	2013-07-18	A	2-High	---	Significantly Rare Throughout	G4T4	S1
Vascular Plant	36307	Prunus alleghaniensis var. alleghaniensis	Allegheny Plum	2015-07-29	B	2-High	---	Significantly Rare Throughout	G4T4	S1
Vascular Plant	31450	Prunus alleghaniensis var. alleghaniensis	Allegheny Plum	2007-07-12	B	2-High	---	Significantly Rare Throughout	G4T4	S1
Vascular Plant	31699	Prunus alleghaniensis var. alleghaniensis	Allegheny Plum	2012-05-01	AB	2-High	---	Significantly Rare Throughout	G4T4	S1

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	31590	Prunus alleghaniensis var. alleghaniensis	Allegheny Plum	2005-06-22	B	2-High	---	Significantly Rare Throughout	G4T4	S1
Vascular Plant	22883	Quercus prinoides	Dwarf Chinquapin Oak	2005?	E	4-Low	---	Endangered	G5	S1
Vascular Plant	31665	Quercus prinoides	Dwarf Chinquapin Oak	2012-02-02	D	2-High	---	Endangered	G5	S1
Vascular Plant	31664	Quercus prinoides	Dwarf Chinquapin Oak	2012-03-30	CD	2-High	---	Endangered	G5	S1
Vascular Plant	4323	Rhododendron vaseyi	Pink-shell Azalea	1977-09-05	H	4-Low	---	Significantly Rare Limited	G3	S3
Vascular Plant	14656	Rhododendron vaseyi	Pink-shell Azalea	1994-05-13	CD	3-Medium	---	Significantly Rare Limited	G3	S3
Vascular Plant	4415	Robinia hispida var. fertilis	Fruitful Locust	1922-06	H	3-Medium	---	Significantly Rare Other	G4T1Q	S1
Vascular Plant	15340	Robinia hispida var. kelseyi	Kelsey's Locust	1977-05-03	H	3-Medium	---	Significantly Rare Other	G4T1	S1
Vascular Plant	31433	Robinia viscosa	Clammy Locust	2005	Ei	3-Medium	---	Significantly Rare Throughout	G3	S1
Vascular Plant	33549	Rubus idaeus ssp. strigosus	Red Raspberry	1984-06-27	E	3-Medium	---	Threatened	G5T5	S2?
Vascular Plant	22798	Sceptridium jenmanii	Alabama Grape-fern	2005?	E	4-Low	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	2133	Sceptridium jenmanii	Alabama Grape-fern	1995-10	D	3-Medium	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	22799	Sceptridium jenmanii	Alabama Grape-fern	2005?	E	3-Medium	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	22795	Sceptridium jenmanii	Alabama Grape-fern	2005?	E	3-Medium	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	27717	Sceptridium jenmanii	Alabama Grape-fern	2009-Pre	X?	3-Medium	---	Special Concern Vulnerable	G3G4	S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	6128	Sceptridium jenmanii	Alabama Grape-fern	1992-04	D	3-Medium	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	22800	Sceptridium jenmanii	Alabama Grape-fern	2012	C?	2-High	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	27718	Sceptridium jenmanii	Alabama Grape-fern	2009-Pre	E	2-High	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	10340	Sceptridium oneidense	Blunt-lobed Grape-fern	1993-09	D	3-Medium	---	Significantly Rare Peripheral	G4	S2
Vascular Plant	31756	Scutellaria ovata ssp. rugosa var. 1	Appalachian Skullcap	2012-05-18	BC	2-High	---	Significantly Rare Throughout	G1?Q	S1
Vascular Plant	2300	Shortia galacifolia var. brevistyla	Northern Oconee Bells	1986-05-16	D	3-Medium	---	Endangered	G3T2	S2
Vascular Plant	7650	Shortia galacifolia var. brevistyla	Northern Oconee Bells	2011	C?	3-Medium	---	Endangered	G3T2	S2
Vascular Plant	8775	Shortia galacifolia var. brevistyla	Northern Oconee Bells	2011	A	3-Medium	---	Endangered	G3T2	S2
Vascular Plant	5426	Shortia galacifolia var. brevistyla	Northern Oconee Bells	2018-03-18	A	2-High	---	Endangered	G3T2	S2
Vascular Plant	10339	Shortia galacifolia var. brevistyla	Northern Oconee Bells	2013-07	BC	3-Medium	---	Endangered	G3T2	S2
Vascular Plant	12961	Shortia galacifolia var. brevistyla	Northern Oconee Bells	2013-07	BC	2-High	---	Endangered	G3T2	S2
Vascular Plant	6867	Shortia galacifolia var. brevistyla	Northern Oconee Bells	2013-07	A	1-Very High	---	Endangered	G3T2	S2
Vascular Plant	19665	Shortia galacifolia var. brevistyla	Northern Oconee Bells	2013-07-17	BC	2-High	---	Endangered	G3T2	S2
Vascular Plant	24236	Shortia galacifolia var. brevistyla	Northern Oconee Bells	2013-07	C	2-High	---	Endangered	G3T2	S2
Vascular Plant	24235	Shortia galacifolia var. brevistyla	Northern Oconee Bells	2013-07	BC	2-High	---	Endangered	G3T2	S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	17202	Silene ovata	Mountain Catchfly	1986-09-10	B	3-Medium	---	Special Concern Vulnerable	G3	S3
Vascular Plant	32300	Silene ovata	Mountain Catchfly	2013-06-24	C	2-High	---	Special Concern Vulnerable	G3	S3
Vascular Plant	36308	Sisyrinchium dichotomum	White Irisette	2017-06-30	C	2-High	Endangered	Endangered	G2	S2
Vascular Plant	31724	Smilax lasioneura	Blue Ridge Carrion-flower	2012-05-01	B	2-High	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	31720	Smilax lasioneura	Blue Ridge Carrion-flower	2012	B	2-High	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	31725	Smilax lasioneura	Blue Ridge Carrion-flower	2012-04-13	D	2-High	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	35208	Smilax lasioneura	Blue Ridge Carrion-flower	2013	CD	2-High	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	21479	Solidago rigida var. rigida	Prairie Bold Goldenrod	2012-06-07	E	2-High	---	Threatened	G5T5	S1
Vascular Plant	25306	Solidago squarrosa	Squarrose Goldenrod	1955-08-13	H	4-Low	---	Significantly Rare Peripheral	G4?	S1
Vascular Plant	23906	Solidago ulmifolia	Elm-leaf Goldenrod	2005-Pre	E	4-Low	---	Significantly Rare Disjunct	G5	S1?
Vascular Plant	27612	Solidago ulmifolia	Elm-leaf Goldenrod	2009-Pre	E	3-Medium	---	Significantly Rare Disjunct	G5	S1?
Vascular Plant	35209	Solidago ulmifolia	Elm-leaf Goldenrod	2014-09-02	A	1-Very High	---	Significantly Rare Disjunct	G5	S1?
Vascular Plant	14837	Stenanthium leimanthoides	Pinebarren Death-camas	1990-07-01	D	3-Medium	---	Threatened	G4Q	S1
Vascular Plant	23577	Thalictrum macrostylum	Small-leaved Meadowrue	2006-06-28	B	2-High	---	Significantly Rare Throughout	G3G4	S2
Vascular Plant	31755	Thalictrum macrostylum	Small-leaved Meadowrue	2012	D	2-High	---	Significantly Rare Throughout	G3G4	S2
Vascular Plant	33941	Thaspium pinnatifidum	Mountain Thaspium	2014-09-24	B?	2-High	---	Threatened	G2G3	S1
Vascular Plant	33574	Thaspium pinnatifidum	Mountain Thaspium	1995-07-10	E	2-High	---	Threatened	G2G3	S1

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	14333	Thermopsis fraxinifolia	Ash-leaved Golden-banner	1965-05-28	H	4-Low	---	Special Concern Vulnerable	G3?	S2?
Vascular Plant	6235	Thermopsis fraxinifolia	Ash-leaved Golden-banner	2013-06-24	B	4-Low	---	Special Concern Vulnerable	G3?	S2?
Vascular Plant	10257	Thermopsis fraxinifolia	Ash-leaved Golden-banner	2000-08-05	A	3-Medium	---	Special Concern Vulnerable	G3?	S2?
Vascular Plant	31673	Thermopsis fraxinifolia	Ash-leaved Golden-banner	2012-04-10	BC	2-High	---	Special Concern Vulnerable	G3?	S2?
Vascular Plant	11116	Thermopsis mollis	Appalachian Golden-banner	2001-06-22	B	3-Medium	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	10839	Thermopsis mollis	Appalachian Golden-banner	2001-08	B	3-Medium	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	20969	Thermopsis mollis	Appalachian Golden-banner	2012	A	2-High	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	14102	Thermopsis mollis	Appalachian Golden-banner	1990-04	D	3-Medium	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	1026	Thermopsis mollis	Appalachian Golden-banner	1992-04	D	3-Medium	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	13276	Thermopsis mollis	Appalachian Golden-banner	1993-10	C	3-Medium	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	31638	Thermopsis mollis	Appalachian Golden-banner	2012-Spring	A	1-Very High	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	22611	Thermopsis mollis	Appalachian Golden-banner	2003-09-17	F?	2-High	---	Special Concern Vulnerable	G3G4	S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	36571	Tradescantia virginiana	Virginia Spiderwort	2016-05-10	B?	2-High	---	Threatened	G5	S2
Vascular Plant	31674	Tradescantia virginiana	Virginia Spiderwort	2012-06-05	AB	2-High	---	Threatened	G5	S2
Vascular Plant	36305	Tradescantia virginiana	Virginia Spiderwort	2015-07-29	C	2-High	---	Threatened	G5	S2
Vascular Plant	23938	Trichostema setaceum	Narrowleaf Bluecurls	2005-Pre	E	5-Very Low	---	Significantly Rare Throughout	G5	S2
Vascular Plant	8611	Trillium simile	Sweet White Trillium	1995-04	D	3-Medium	---	Threatened	G3	S2
Vascular Plant	19768	Trillium simile	Sweet White Trillium	1994-Pre	E	3-Medium	---	Threatened	G3	S2
Vascular Plant	19997	Trillium simile	Sweet White Trillium	1994-Pre	E	3-Medium	---	Threatened	G3	S2
Vascular Plant	36306	Woodsia appalachiana	Appalachian Cliff Fern	2015-07-29	C	2-High	---	Significantly Rare Peripheral	G4	S2
Vascular Plant	22070	Woodsia appalachiana	Appalachian Cliff Fern	2005-08-16	C	2-High	---	Significantly Rare Peripheral	G4	S2

Natural Areas Documented Within a One-mile Radius of the Project Area

Site Name	Representational Rating	Collective Rating
Black Mountains/Bald Knob	R3 (High)	C3 (High)
Beartree Ridge	R3 (High)	C4 (Moderate)
Newberry Creek Gorge	R3 (High)	C4 (Moderate)
Sevenmile Ridge Wetlands	R1 (Exceptional)	C3 (High)
Brackettown Valley Meadow	R3 (High)	C4 (Moderate)
Pinnacle Mountain/Mill Creek	R2 (Very High)	C2 (Very High)
Christmount Natural Area	R5 (General)	C5 (General)
Mackey Mountain	R2 (Very High)	C5 (General)
Duggers Creek Forests	R5 (General)	C5 (General)
Linville Falls	R1 (Exceptional)	C3 (High)
North Fork Watershed	R1 (Exceptional)	C1 (Exceptional)
Johns Creek Natural Area	R2 (Very High)	C5 (General)
Montreat Watershed	R3 (High)	C3 (High)
Rockhouse Creek Forests	R2 (Very High)	C3 (High)
Laurel Ridges	R2 (Very High)	C4 (Moderate)
Bear Creek Natural Area	R2 (Very High)	C5 (General)
Hickorynut Mountain	R1 (Exceptional)	C2 (Very High)
Catawba Headwaters/Fortune Field	R3 (High)	C4 (Moderate)
Morgan Mountain -- Ledbetter Mountain	R2 (Very High)	C3 (High)
Jones Mountain/French Mountain	R5 (General)	C5 (General)

Natural Areas Documented Within a One-mile Radius of the Project Area

Site Name	Representational Rating	Collective Rating
The Loop/Gillespie Gap	R5 (General)	C4 (Moderate)
Upper Pepper Creek Natural Area	R5 (General)	C5 (General)
Honeycutt Cove Natural Area	R5 (General)	C5 (General)
Bald Mountain Natural Areas	R1 (Exceptional)	C5 (General)
Woods Mountain/Singecat Ridge	R1 (Exceptional)	C4 (Moderate)
Brackettown Seep	R2 (Very High)	C4 (Moderate)
Wildacres Escarpment Slopes	R4 (Moderate)	C4 (Moderate)
Bob's Creek Pocket Wilderness	R2 (Very High)	C1 (Exceptional)
Montford Cove/Chestnut Mountain	R5 (General)	C5 (General)
Mike Mountain--Pinnacle Mountain	R2 (Very High)	C1 (Exceptional)
Yellowtop/Biggerstaff Mountain	R1 (Exceptional)	C1 (Exceptional)
Edmondson Mountain	R2 (Very High)	C4 (Moderate)
Sunnyvale Slopes	R5 (General)	C5 (General)
Linville Gorge	R1 (Exceptional)	C1 (Exceptional)
Linville Caverns	R1 (Exceptional)	C1 (Exceptional)
Muddy Creek Bog and Slopes	R1 (Exceptional)	C3 (High)
Celo Community Natural Area	R1 (Exceptional)	C2 (Very High)
Toms Creek Natural Area	R1 (Exceptional)	C5 (General)
Rollins/South Mountains Natural Area	R1 (Exceptional)	C1 (Exceptional)
Lone Mountain Natural Area	R2 (Very High)	C2 (Very High)
Black Mountain Overlook Natural Area	R3 (High)	C5 (General)
Crabtree Creek Falls Natural Area	R1 (Exceptional)	C5 (General)
Cross Mountain	R4 (Moderate)	C5 (General)
Little Tablerock Mountain	R5 (General)	C4 (Moderate)
Linville Mountain Dolomite Areas	R1 (Exceptional)	C2 (Very High)
Box Creek Wilderness Natural Area	R1 (Exceptional)	C1 (Exceptional)
Camel Knob	R4 (Moderate)	C4 (Moderate)
FRB/North Toe River/Nolichucky River Aquatic Habitat	R2 (Very High)	C2 (Very High)

Managed Areas Documented Within a One-mile Radius of the Project Area

Managed Area Name	Owner	Owner Type
Pisgah National Forest - Grandfather Ranger District	US Forest Service	Federal
Pisgah National Forest - Appalachian Ranger District	US Forest Service	Federal
NC Clean Water Management Trust Fund Easement	NC DNCR, Clean Water Management Trust Fund	State
NC Department of Transportation Mitigation Site	NC Department of Transportation	State
Blue Ridge Parkway	US National Park Service	Federal
NC Division of Mitigation Services Easement	NC DEQ, Division of Mitigation Services	State

Managed Areas Documented Within a One-mile Radius of the Project Area

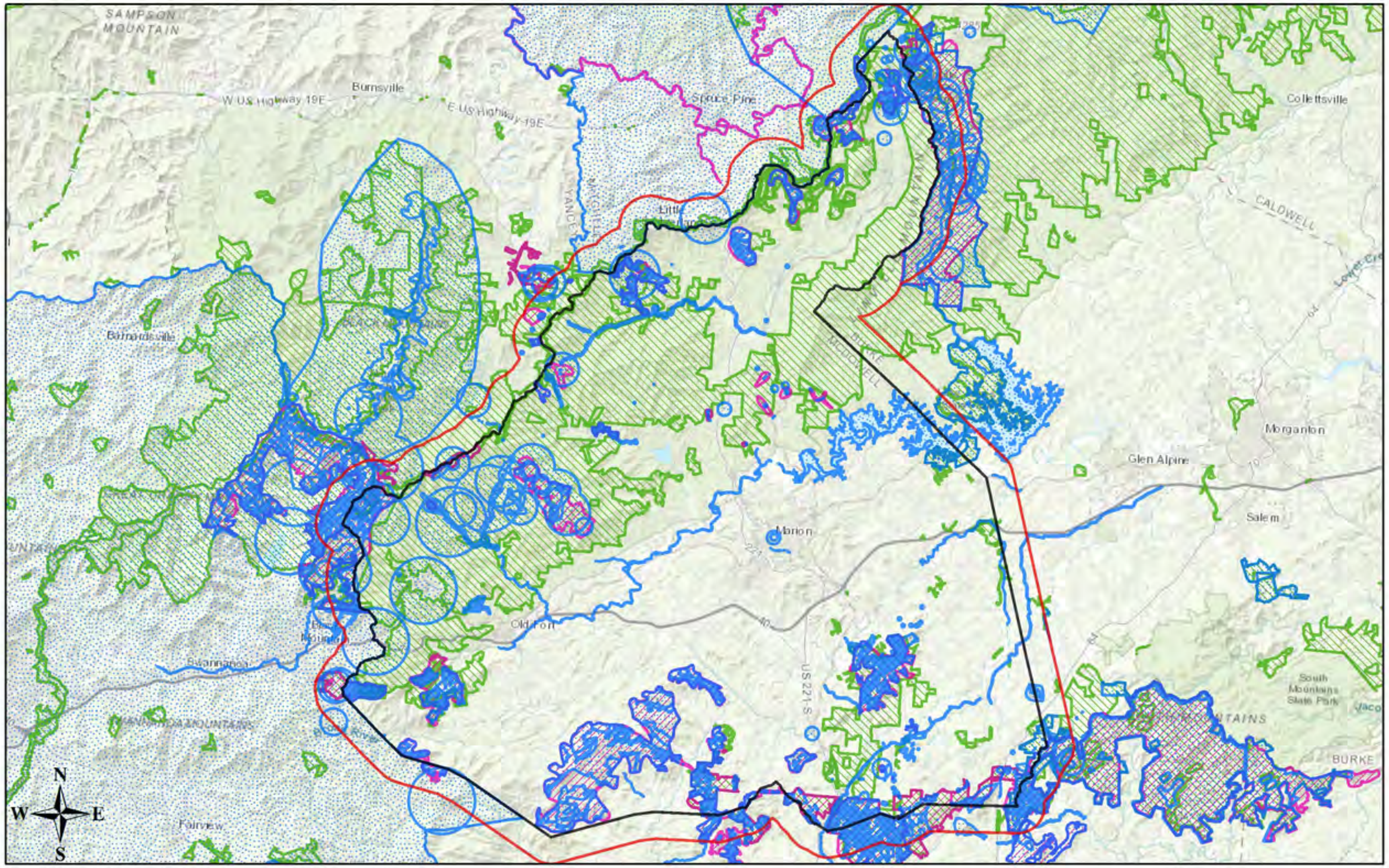
Managed Area Name	Owner	Owner Type
NC Division of Mitigation Services Easement	NC DEQ, Division of Mitigation Services	State
Southern Appalachian Highlands Conservancy Easement	Southern Appalachian Highlands Conservancy	Private
Conservation Trust for North Carolina Easement	Conservation Trust for North Carolina	Private
South Mountains Game Land	NC Wildlife Resources Commission	State
South Mountains Game Land Dedicated Nature Preserve	NC Wildlife Resources Commission	State
Box Creek Wilderness and Camel Knob Registered Heritage Area	130 of Chatham, LLC	Private
NC Wildlife Resources Commission Easement	NC Wildlife Resources Commission	State
Pisgah National Forest - Linville Gorge Wilderness	US Forest Service	Federal
Linville Gorge Registered Heritage Area	US Forest Service	Federal
Foothills Conservancy of North Carolina Preserve	Foothills Conservancy of North Carolina	Private
Pisgah Game Land	NC Wildlife Resources Commission	State
Lake James State Park	NC DNCR, Division of Parks and Recreation	State
Black Mountains Registered Heritage Area	US Forest Service	Federal
Pisgah Game Land Dedicated Nature Preserve	NC Wildlife Resources Commission	State
Foothills Conservancy of North Carolina Easement	Foothills Conservancy of North Carolina	Private
Montreat Watershed (Mountain Retreat) Registered Heritage Area	Mountain Retreat	Private
Conservation Trust for North Carolina Preserve	Conservation Trust for North Carolina	Private
Blue Ridge Parkway Easement	US National Park Service	Federal
Morgan Mountain--Ledbetter Mountain Registered Heritage Area	130 of Chatham, LLC	Private
North Fork Watershed (BRP/NPS) Registered Heritage Area	US National Park Service	Federal
Mike Mountain--Pinnacle Mountain Registered Heritage Area	130 of Chatham, LLC	Private
Armstrong Fish Hatchery	NC Wildlife Resources Commission	State
Celo Community Registered Heritage Area	Celo Community, Inc	Private
Lake James State Park Dedicated Nature Preserve	NC DNCR, Division of Parks and Recreation	State
Linville Falls Registered Heritage Area	US National Park Service	Federal
Laurel Ridges Registered Heritage Area	US National Park Service	Federal
Montreat Watershed (Montreat Cottagers) Registered Heritage Area	Montreat Cottagers	Private
Edmondson Mountain Registered Heritage Area	130 of Chatham LLC	Private
Linville River State Natural and Scenic River	NC DNCR, Division of Parks and Recreation	State
Sunnyvale Slopes Registered Heritage Area	130 of Chatham, LLC	Private
Linville Caverns Registered Heritage Area	Private Individual	Private

Managed Areas Documented Within a One-mile Radius of the Project Area

Managed Area Name	Owner	Owner Type
Caraway Plant Conservation Preserve Dedicated Nature Preserve	North Carolina Department of Agriculture, Plant Conservation Program	
Marion Fish Hatchery	NC Wildlife Resources Commission	State
Johns Creek Natural Area Registered Heritage Area	US Forest Service	Federal
Muddy Creek Watershed Restoration Site	NC Wildlife Resources Commission	State

Definitions and an explanation of status designations and codes can be found at https://ncnhde.natureserve.org/content/help. Data query generated on September 17, 2018; source: NCNHP, Q3 July 2018. Please resubmit your information request if more than one year elapses before project initiation as new information is continually added to the NCNHP database.

NCNHDE-6952: Clearinghouse 19-0040 - McDowell County



September 17, 2018

Project Boundary

Buffered Project Boundary

Natural Heritage Element Occurrence (NHEO)

NHP Natural Area (NHNA)

Managed Area (MAREA)

1:325,445

0 2.75 5.5 11 mi

0 4.5 9 18 km

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

North Carolina Department of Natural and Cultural Resources
Natural Heritage Program

Governor Roy Cooper | Secretary Susi H. Hamilton

NCNHDE-6953

September 17, 2018

Attn: Crystal Best
North Carolina Clearinghouse

RE: Clearinghouse 19-0040 - Watauga County

Dear North Carolina Clearinghouse:

The North Carolina Natural Heritage Program (NCNHP) appreciates the opportunity to provide information about natural heritage resources for the project referenced above.

A query of the NCNHP database indicates that there are records for rare species, important natural communities, natural areas, and/or conservation/managed areas within the proposed project boundary. These results are presented in the attached 'Documented Occurrences' tables and map.

The attached 'Potential Occurrences' table summarizes rare species and natural communities that have been documented within a one-mile radius of the property boundary. The proximity of these records suggests that these natural heritage elements may potentially be present in the project area if suitable habitat exists. Tables of natural areas and conservation/managed areas within a one-mile radius of the project area, if any, are also included in this report.

If a Federally-listed species is documented within the project area or indicated within a one-mile radius of the project area, the NCNHP recommends contacting the US Fish and Wildlife Service (USFWS) for guidance. Contact information for USFWS offices in North Carolina is found here:
https://www.fws.gov/offices/Directory/ListOffices.cfm?statecode=37.

Please note that natural heritage element data are maintained for the purposes of conservation planning, project review, and scientific research, and are not intended for use as the primary criteria for regulatory decisions. Information provided by the NCNHP database may not be published without prior written notification to the NCNHP, and the NCNHP must be credited as an information source in these publications. Maps of NCNHP data may not be redistributed without permission.

Also please note that the NC Natural Heritage Program may follow this letter with additional correspondence if a Dedicated Nature Preserve, Registered Heritage Area, Clean Water Management Trust Fund easement, or an occurrence of a Federally-listed species is documented near the project area.

If you have questions regarding the information provided in this letter or need additional assistance, please contact Rodney A. Butler at rodney.butler@ncdcr.gov or 919-707-8603.

Sincerely,
NC Natural Heritage Program

MAILING ADDRESS:
1651 Mail Service Center
Raleigh, NC 27699-1651

Telephone: (919) 707-8107
www.ncnhp.org

LOCATION:
121 West Jones Street
Raleigh, NC 27603

Natural Heritage Element Occurrences, Natural Areas, and Managed Areas Intersecting the Project Area
Clearinghouse 19-0040 - Watauga County
September 17, 2018
NCNHDE-6953

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Amphibian	5337	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	2017-08-01	AB	3-Medium	---	Special Concern	G3G4T2	S3
Amphibian	26666	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	2017-07-10	B	3-Medium	---	Special Concern	G3G4T2	S3
Amphibian	34399	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	2017-08-24	E	3-Medium	---	Special Concern	G3G4T2	S3
Amphibian	34398	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	2017-06-28	E	3-Medium	---	Special Concern	G3G4T2	S3
Amphibian	27572	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	2009-08-19	E	3-Medium	---	Special Concern	G3G4T2	S3
Amphibian	20344	Desmognathus organi	Northern Pygmy Salamander	2004-07-18	E	3-Medium	---	Significantly Rare	G3	S2S3
Amphibian	20346	Desmognathus organi	Northern Pygmy Salamander	2004-04-28	B?	3-Medium	---	Significantly Rare	G3	S2S3
Amphibian	20347	Desmognathus organi	Northern Pygmy Salamander	2005-07-21	E	3-Medium	---	Significantly Rare	G3	S2S3
Amphibian	6833	Eurycea longicauda longicauda	Longtail Salamander	1949-08-23	H	3-Medium	---	Special Concern	G5T5	S1S2
Amphibian	18845	Eurycea longicauda longicauda	Longtail Salamander	1967-08-24	H	3-Medium	---	Special Concern	G5T5	S1S2
Amphibian	27859	Eurycea longicauda longicauda	Longtail Salamander	2009-07-15	E	3-Medium	---	Special Concern	G5T5	S1S2
Amphibian	32106	Eurycea longicauda longicauda	Longtail Salamander	2012-07-10	E	1-Very High	---	Special Concern	G5T5	S1S2
Amphibian	3888	Plethodon welleri	Weller's Salamander	2017-05-05	E	3-Medium	---	Special Concern	G3	S2
Amphibian	1581	Plethodon welleri	Weller's Salamander	1984-09-29	H?	2-High	---	Special Concern	G3	S2

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Arachnid	16555	Microhexura montivaga	Spruce-fir Moss Spider	2007	B?	2-High	Endangered	Significantly Rare	G1	S1
Bird	3283	Aegolius acadicus	Northern Saw-whet Owl	1999-05-14	D?	3-Medium	---	Threatened	G5	S2B,S2N
Bird	1668	Aegolius acadicus	Northern Saw-whet Owl	2004-03-23	E	3-Medium	---	Threatened	G5	S2B,S2N
Bird	6413	Aegolius acadicus	Northern Saw-whet Owl	1992-07-22	B?	3-Medium	---	Threatened	G5	S2B,S2N
Bird	6778	Aegolius acadicus	Northern Saw-whet Owl	2002-06-15	E	3-Medium	---	Threatened	G5	S2B,S2N
Bird	24924	Catharus guttatus	Hermit Thrush	2007-05-26	E	3-Medium	---	Significantly Rare	G5	S2B,S5N
Bird	13453	Certhia americana	Brown Creeper	1988-06-18	D?	3-Medium	---	Special Concern	G5	S3B,S5N
Bird	8959	Coccyzus erythropthalmus	Black-billed Cuckoo	1988-06-18	E	3-Medium	---	Significantly Rare	G5	S2B
Bird	28624	Dolichonyx oryzivorus	Bobolink	2010-06	B?	3-Medium	---	Significantly Rare	G5	S1B
Bird	28623	Dolichonyx oryzivorus	Bobolink	2011-05-28	B?	3-Medium	---	Significantly Rare	G5	S1B
Bird	15855	Empidonax alnorum	Alder Flycatcher	2002-06-15	BC	3-Medium	---	Significantly Rare	G5	S2B
Bird	17776	Empidonax alnorum	Alder Flycatcher	1992-07-24	A	3-Medium	---	Significantly Rare	G5	S2B
Bird	38039	Haliaeetus leucocephalus	Bald Eagle	2017-Summer	E	2-High	Bald/Golden Eagle Protection Act	Threatened	G5	S3B,S3N
Bird	37812	Loxia curvirostra	Red Crossbill	2016-07-27	E	2-High	---	Special Concern	G5	S2
Bird	29643	Passerculus sandwichensis	Savannah Sparrow	2011-05-29	BC	3-Medium	---	Significantly Rare	G5	S2B,S5N
Bird	26454	Pooecetes gramineus	Vesper Sparrow	2012-06-19	AB	3-Medium	---	Special Concern	G5	S2B,S2N
Bird	16145	Pooecetes gramineus	Vesper Sparrow	2008-07-24	AB	3-Medium	---	Special Concern	G5	S2B,S2N

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Bird	22189	Pooecetes gramineus	Vesper Sparrow	2009-05-11	E	3-Medium	---	Special Concern	G5	S2B,S2N
Bird	96	Pooecetes gramineus	Vesper Sparrow	1998-05-06	E	3-Medium	---	Special Concern	G5	S2B,S2N
Bird	21070	Setophaga cerulea	Cerulean Warbler	2004-05-28	E	3-Medium	---	Special Concern	G4	S2B
Bird	8119	Setophaga cerulea	Cerulean Warbler	1982-05-22	E	3-Medium	---	Special Concern	G4	S2B
Bird	15988	Setophaga magnolia	Magnolia Warbler	1988-06-19	AB	3-Medium	---	Significantly Rare	G5	S2B
Bird	15083	Vermivora chrysoptera	Golden-winged Warbler	2017-06-21	E	3-Medium	---	Special Concern	G4	S2S3B
Bird	37914	Vermivora chrysoptera	Golden-winged Warbler	2016-05-25	E	2-High	---	Special Concern	G4	S2S3B
Bird	14288	Vireo gilvus	Warbling Vireo	2002-05-03	E	3-Medium	---	Significantly Rare	G5	S2B
Bird	8407	Vireo gilvus	Warbling Vireo	2002-05	E	2-High	---	Significantly Rare	G5	S2B
Butterfly	35817	Erora laeta	Early Hairstreak	2015-08-05	E	2-High	---	Significantly Rare	GU	S2S3
Butterfly	24961	Polites mystic	Long Dash	2007-06-21	CD	3-Medium	---	Significantly Rare	G5	S1
Butterfly	11433	Satyrium caryaevorus	Hickory Hairstreak	2001-07-06	E	3-Medium	---	Significantly Rare	G4	S1
Dragonfly or Damselfly	35373	Gomphus adelphus	Mustached Clubtail	2015-05-28	E	2-High	---	Significantly Rare	G4G5	S1S2
Dragonfly or Damselfly	33220	Gomphus lineatifrons	Splendid Clubtail	2014-06-05	E	3-Medium	---	Significantly Rare	G4	S2
Dragonfly or Damselfly	25225	Lestes congener	Spotted Spreadwing	2007-08-18	E	2-High	---	Significantly Rare	G5	S1
Dragonfly or Damselfly	31177	Somatochlora elongata	Ski-tipped Emerald	2012-06-20	E	3-Medium	---	Significantly Rare	G5	S2S3
Dragonfly or Damselfly	31178	Stylurus scudderi	Zebra Clubtail	2012-06-19	E	3-Medium	---	Significantly Rare	G4G5	S2?
Dragonfly or Damselfly	33382	Sympetrum obtrusum	White-faced Meadowhawk	2011-08-08	E	3-Medium	---	Significantly Rare	G5	S1

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Freshwater Bivalve	1195	Elliptio dilatata	Spike	2014-10-02	E	3-Medium	---	Special Concern	G5	S2
Freshwater Bivalve	6468	Lasmigona subviridis	Green Floater	2014-09-16	E	3-Medium	---	Endangered	G3	S2
Freshwater Bivalve	3754	Lasmigona subviridis	Green Floater	2004-08-11	E	3-Medium	---	Endangered	G3	S2
Freshwater Fish	1385	Etheostoma kanawhae	Kanawha Darter	2014-09-09	E	3-Medium	---	Significantly Rare	G4	S3
Freshwater Fish	10405	Etheostoma kanawhae	Kanawha Darter	2016-06-09	E	3-Medium	---	Significantly Rare	G4	S3
Freshwater Fish	13450	Exoglossum laurae	Tonguetied Minnow	2016-06-17	E	3-Medium	---	Significantly Rare	G4	S2
Freshwater Fish	5716	Exoglossum laurae	Tonguetied Minnow	2017-07-12	E	3-Medium	---	Significantly Rare	G4	S2
Freshwater Fish	28412	Notropis sp. 1	Kanawha Rosyface Shiner	2016-06-08	E	3-Medium	---	Significantly Rare	GNR	S2
Freshwater Fish	28411	Notropis sp. 1	Kanawha Rosyface Shiner	2017-07-12	E	3-Medium	---	Significantly Rare	GNR	S2
Freshwater Fish	38081	Percina gymnocephala	Appalachia Darter	2016-06-09	E	3-Medium	---	Significantly Rare	G4	S2
Freshwater Fish	38080	Percina gymnocephala	Appalachia Darter	2016-06-08	E	3-Medium	---	Significantly Rare	G4	S2
Freshwater Fish	10772	Phenacobius teretulus	Kanawha Minnow	2008-09-16	E	3-Medium	---	Special Concern	G3G4	S3
Freshwater Fish	17815	Phenacobius teretulus	Kanawha Minnow	2016-06-08	E	3-Medium	---	Special Concern	G3G4	S3
Freshwater or Terrestrial Gastropod	37642	Appalachina sayana	Spike-lip Crater	2005-10-10	E	3-Medium	---	Significantly Rare	G5T5	S2S3
Freshwater or Terrestrial Gastropod	37647	Discus bryanti	Sawtooth Disc	2002-11-09	E	3-Medium	---	Special Concern	G3	S2
Freshwater or Terrestrial Gastropod	10020	Inflectarius downieanus	Dwarf Globelet	2003-09-10	E	3-Medium	---	Significantly Rare	G3	S1S2

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Freshwater or Terrestrial Gastropod	6943	Inflectarius subpalliatus	Velvet Covert	2003-09-10	E	3-Medium	---	Special Concern	G2	S2S3
Freshwater or Terrestrial Gastropod	72	Leptoxis dilatata	Seep Mudalia	2008-10-16	E	3-Medium	---	Special Concern	G3	S3
Freshwater or Terrestrial Gastropod	35734	Leptoxis dilatata	Seep Mudalia	2008-10-16	E	3-Medium	---	Special Concern	G3	S3
Freshwater or Terrestrial Gastropod	37666	Mesodon andrewsae	Balsam Globe	2001-Summer	E	3-Medium	---	Significantly Rare	G3	S2S3
Freshwater or Terrestrial Gastropod	37667	Mesodon andrewsae	Balsam Globe	1978-Post	H?	3-Medium	---	Significantly Rare	G3	S2S3
Freshwater or Terrestrial Gastropod	37673	Mesomphix vulgatus	Common Button	1984-10-27	H?	3-Medium	---	Significantly Rare	G4	S2?
Freshwater or Terrestrial Gastropod	37681	Pallifera hemphilli	Black Mantleslug	2005-07-27	E	2-High	---	Special Concern	G4	S2S3
Freshwater or Terrestrial Gastropod	7117	Paravitrea andrewsae	High Mountain Supercoil	2003-09-10	E	3-Medium	---	Special Concern	G2	S2
Freshwater or Terrestrial Gastropod	37685	Paravitrea lamellidens	Lamellate Supercoil	2005-08-31	E	3-Medium	---	Special Concern	G2	S2S3
Freshwater or Terrestrial Gastropod	37689	Paravitrea reesei	Round Supercoil	2005-08-31	E	3-Medium	---	Significantly Rare	G3	S2?
Freshwater or Terrestrial Gastropod	37701	Ventridens coelaxis	Bidentate Dome	2005-08-25	E	3-Medium	---	Special Concern	G3	S3?
Freshwater or Terrestrial Gastropod	37703	Ventridens coelaxis	Bidentate Dome	1983-10-31	E	3-Medium	---	Special Concern	G3	S3?

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Freshwater or Terrestrial Gastropod	1221	Ventridens collisella	Sculptured Dome	2003-09-10	E	3-Medium	---	Significantly Rare	G4	S2?
Lichen	17687	Cetraria arenaria	Sand-loving Iceland Lichen	1994-08-10	D	3-Medium	---	Special Concern Vulnerable	G4	S2
Lichen	3579	Cetraria arenaria	Sand-loving Iceland Lichen	1994-07-19	A	3-Medium	---	Special Concern Vulnerable	G4	S2
Lichen	19609	Cetraria arenaria	Sand-loving Iceland Lichen	1994-07-20	A	3-Medium	---	Special Concern Vulnerable	G4	S2
Liverwort	22053	Aneura sharpii	A Liverwort	1991-02-02	E	3-Medium	---	Significantly Rare Throughout	G1G2	S1
Liverwort	22052	Aneura sharpii	A Liverwort	1991-02-02	E	3-Medium	---	Significantly Rare Throughout	G1G2	S1
Liverwort	7835	Bazzania nudicaulis	A Liverwort	1999-08-12	E	3-Medium	---	Significantly Rare Throughout	G2G3	S2
Liverwort	21746	Metzgeria temperata	A Liverwort	1999-08-12	E	3-Medium	---	Significantly Rare Disjunct	G4	S1S2
Liverwort	8875	Mylia taylorii	A Liverwort	1989-07-15	E	3-Medium	---	Significantly Rare Disjunct	G5	S1
Liverwort	21759	Sphenolobopsis pearsonii	A Liverwort	1999-08-12	E	3-Medium	---	Significantly Rare Other	G2?	S2
Mammal	22047	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	2005-08-23	E	3-Medium	Endangered	Endangered	G3G4T2	S1
Mammal	33927	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	1980-01-01	H	3-Medium	Endangered	Endangered	G3G4T2	S1
Mammal	32220	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	2016-08-11	E	2-High	Endangered	Endangered	G3G4T2	S1
Mammal	37776	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	2014-05-19	E	2-High	Endangered	Endangered	G3G4T2	S1

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Mammal	37786	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	2014-04-18	E	2-High	Endangered	Endangered	G3G4T2	S1
Mammal	37780	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	2013-04-08	E	2-High	Endangered	Endangered	G3G4T2	S1
Mammal	13831	Glaucomys sabrinus coloratus	Carolina Northern Flying Squirrel	2015-03-04	B?	2-High	Endangered	Endangered	G5T2	S2
Mammal	8068	Glaucomys sabrinus coloratus	Carolina Northern Flying Squirrel	1990-06-28-29	E	3-Medium	Endangered	Endangered	G5T2	S2
Mammal	7510	Mustela nivalis	Least Weasel	2003-09-20	E	3-Medium	---	Game Animal	G5	S2
Mammal	24741	Myotis leibii	Eastern Small-footed Bat	2006-06-08	E	2-High	---	Special Concern	G4	S2
Mammal	34120	Myotis leibii	Eastern Small-footed Bat	2011-08-02	E	2-High	---	Special Concern	G4	S2
Mammal	34118	Myotis leibii	Eastern Small-footed Bat	2011-08-03	E	2-High	---	Special Concern	G4	S2
Mammal	34119	Myotis leibii	Eastern Small-footed Bat	2003-07-21	E	2-High	---	Special Concern	G4	S2
Mammal	36102	Myotis lucifugus	Little Brown Bat	2003-07-13	E	3-Medium	---	Significantly Rare	G3	S2
Mammal	36101	Myotis lucifugus	Little Brown Bat	2004-06-29	E	2-High	---	Significantly Rare	G3	S2
Mammal	34841	Myotis lucifugus	Little Brown Bat	2011-06-07	E	2-High	---	Significantly Rare	G3	S2
Mammal	34839	Myotis lucifugus	Little Brown Bat	2011-08-03	A?	2-High	---	Significantly Rare	G3	S2
Mammal	36104	Myotis lucifugus	Little Brown Bat	2011-08-01	E	3-Medium	---	Significantly Rare	G3	S2
Mammal	32155	Myotis septentrionalis	Northern Long-eared Bat	2003-08-14	E	3-Medium	T-4(d)	Threatened	G1G2	S2
Mammal	32764	Myotis septentrionalis	Northern Long-eared Bat	2004-06-29	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	32159	Myotis septentrionalis	Northern Long-eared Bat	2006-02-21	D?	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34379	Myotis septentrionalis	Northern Long-eared Bat	2003-07-22	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34376	Myotis septentrionalis	Northern Long-eared Bat	2011-08-03	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34378	Myotis septentrionalis	Northern Long-eared Bat	2003-07-08	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34377	Myotis septentrionalis	Northern Long-eared Bat	2003-07-12	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34861	Myotis septentrionalis	Northern Long-eared Bat	2011-06-20	E	2-High	T-4(d)	Threatened	G1G2	S2

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Mammal	38339	Neotoma magister	Allegheny Woodrat	1997-01-27	E	3-Medium	---	Special Concern	G3G4	S2S3
Mammal	36284	Perimyotis subflavus	Tricolored Bat	2011-08-03	E	3-Medium	---	Significantly Rare	G2G3	S3
Mammal	36286	Perimyotis subflavus	Tricolored Bat	2006-02-21	D	2-High	---	Significantly Rare	G2G3	S3
Mammal	36283	Perimyotis subflavus	Tricolored Bat	2004-06-29	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	34926	Perimyotis subflavus	Tricolored Bat	2011-06-20	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	38351	Sorex dispar blitchi	Southern Rock Shrew	2012-06-08	E	3-Medium	---	Significantly Rare	G4T3T4	S3
Mayfly	35301	Ephemerella floripara	a mayfly	1990-03-06	H?	3-Medium	---	Significantly Rare	G3Q	S2
Moss	12959	Leptodontium excelsum	Grandfather Mountain Leptodontium	1999-08-12	E	3-Medium	---	Significantly Rare Limited	G2	S1
Moss	12516	Leptodontium flexifolium	Pale-margined Leptodontium	1989-07-15	E	3-Medium	---	Significantly Rare Disjunct	G5	S1
Moss	22011	Lindbergia brachyptera	Lindberg's Maple-moss	1990-05-06	E	3-Medium	---	Significantly Rare Peripheral	G5	S1
Moss	16741	Rhytidium rugosum	Golden Tundra-moss	1978	H	3-Medium	---	Significantly Rare Peripheral	G5	S2
Moss	8308	Rhytidium rugosum	Golden Tundra-moss	1987-12-22	A	3-Medium	---	Significantly Rare Peripheral	G5	S2
Moss	696	Rhytidium rugosum	Golden Tundra-moss	1986-07-09	AB	3-Medium	---	Significantly Rare Peripheral	G5	S2
Moss	3759	Rhytidium rugosum	Golden Tundra-moss	2002-07-18	E	3-Medium	---	Significantly Rare Peripheral	G5	S2
Moss	7698	Sphagnum angustifolium	Narrowleaf Peatmoss	1984-05-25	A	3-Medium	---	Significantly Rare Disjunct	G5	S1
Moss	15717	Sphagnum capillifolium	Northern Peatmoss	1994-08-11	E	2-High	---	Significantly Rare Peripheral	G5	S1
Moss	3143	Sphagnum contortum	Contorted Peatmoss	2006	E	3-Medium	---	Threatened	G5	S1
Moss	4633	Sphagnum flexuosum	Flexuous Peatmoss	1993-08-17	A	3-Medium	---	Significantly Rare Peripheral	G5	S1

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Moss	22348	Sphagnum fuscum	Brown Peatmoss	1993-08-17	C	3-Medium	---	Significantly Rare Peripheral	G5	S1
Moss	22726	Sphagnum russowii	Russow's Peatmoss	1993-08-16	E	3-Medium	---	Significantly Rare Disjunct	G5	S1
Moss	3564	Sphagnum squarrosum	Squarrose Peatmoss	1939	H	3-Medium	---	Significantly Rare Peripheral	G5	S1
Moss	10765	Sphagnum subsecundum	Orange Peatmoss	1994-08-11	E	2-High	---	Significantly Rare Peripheral	G5	S1
Moss	13751	Sphagnum warnstorfii	Fen Peatmoss	1984-05-25	A	2-High	---	Significantly Rare Disjunct	G5	S1
Moss	22915	Tortula papillosa	Papillose Tortula	1998-09-29	E	3-Medium	---	Significantly Rare Peripheral	G5	S1
Moth	33238	Arctia caja	Great Tiger Moth	2014-07-20	B?	3-Medium	---	Significantly Rare	G5	S1
Natural Community	251	Acidic Cove Forest (Typic Subtype)	---	2010	B	3-Medium	---	---	G5	S4
Natural Community	10950	Acidic Cove Forest (Typic Subtype)	---	2013-10-15	A	2-High	---	---	G5	S4
Natural Community	37754	Acidic Cove Forest (Typic Subtype)	---	2016	C	3-Medium	---	---	G5	S4
Natural Community	26156	Acidic Cove Forest (Typic Subtype)	---	2018-05-17	A	2-High	---	---	G5	S4
Natural Community	11963	Acidic Cove Forest (Typic Subtype)	---	2010	C	3-Medium	---	---	G5	S4
Natural Community	32655	Acidic Cove Forest (Typic Subtype)	---	2013-10-13	C	3-Medium	---	---	G5	S4
Natural Community	15191	Acidic Cove Forest (Typic Subtype)	---	2012	C	3-Medium	---	---	G5	S4
Natural Community	3927	Canada Hemlock Forest (Typic Subtype)	---	2010	A	3-Medium	---	---	G3G4	S1S2
Natural Community	1149	Carolina Hemlock Forest (Typic Subtype)	---	1997-05-23	C	3-Medium	---	---	G2	S2
Natural Community	4776	Carolina Hemlock Forest (Typic Subtype)	---	1999-06-30	C?	2-High	---	---	G2	S2
Natural Community	37752	Chestnut Oak Forest (Dry Heath Subtype)	---	2016	C	3-Medium	---	---	G5	S5

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	2590	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	B	3-Medium	---	---	G5	S5
Natural Community	32181	Chestnut Oak Forest (Dry Heath Subtype)	---	2018-05-17	E	3-Medium	---	---	G5	S5
Natural Community	32656	Chestnut Oak Forest (Herb Subtype)	---	2013-10-13	C	3-Medium	---	---	G4G5	S4
Natural Community	32657	Chestnut Oak Forest (Mesic Subtype)	---	2013-10-13	B	3-Medium	---	---	G4	S3S4
Natural Community	9072	Fraser Fir Forest (Herb Subtype)	---	2006	B	3-Medium	---	---	G1	S1
Natural Community	30200	Fraser Fir Forest (Rhododendron Subtype)	---	2006	B	3-Medium	---	---	G1	S1
Natural Community	5099	Grassy Bald (Grass Subtype)	---	2010-08-26	BC	2-High	---	---	G1	S1
Natural Community	30631	Grassy Bald (Sedge Subtype)	---	2010-08-26	BC	2-High	---	---	G1	S1
Natural Community	2111	Heath Bald (Catawba Rhododendron Subtype)	---	2007	A	2-High	---	---	G2	S2
Natural Community	30356	Heath Bald (Low Elevation Subtype)	---	2010	A	3-Medium	---	---	G2G3	S1
Natural Community	7954	High Elevation Birch Boulderfield Forest	---	2003-06-17	C	3-Medium	---	---	G3	S2
Natural Community	9101	High Elevation Birch Boulderfield Forest	---	2011-09-26	C	3-Medium	---	---	G3	S2
Natural Community	35379	High Elevation Birch Boulderfield Forest	---	2015-05-26	BC	2-High	---	---	G3	S2
Natural Community	25096	High Elevation Boggy Seep	---	2012-06-12	C?	2-High	---	---	G2	S2
Natural Community	30064	High Elevation Red Oak Forest (Heath Subtype)	---	2010	B	3-Medium	---	---	G4	S3
Natural Community	29465	High Elevation Red Oak Forest (Heath Subtype)	---	2010	C	2-High	---	---	G4	S3
Natural Community	30004	High Elevation Red Oak Forest (Heath Subtype)	---	2010-08-28	C	2-High	---	---	G4	S3

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	29937	High Elevation Red Oak Forest (Orchard Forest Subtype)	---	2010	B	2-High	---	---	G2	S2
Natural Community	8832	High Elevation Red Oak Forest (Rich Subtype)	---	2015-05-27	B	3-Medium	---	---	G2	S3
Natural Community	1433	High Elevation Red Oak Forest (Rich Subtype)	---	2017-04-24	A	3-Medium	---	---	G2	S3
Natural Community	35369	High Elevation Red Oak Forest (Rich Subtype)	---	2015-05-26	B	2-High	---	---	G2	S3
Natural Community	14662	High Elevation Red Oak Forest (Typic Herb Subtype)	---	2010	B	3-Medium	---	---	G4	S3
Natural Community	3804	High Elevation Red Oak Forest (Typic Herb Subtype)	---	2010-08-28	C	3-Medium	---	---	G4	S3
Natural Community	19877	High Elevation Rocky Summit (High Peak Subtype)	---	2006	A	2-High	---	---	G1	S1
Natural Community	16804	High Elevation Rocky Summit (High Peak Subtype)	---	1988-08-17	A	2-High	---	---	G1	S1
Natural Community	30676	High Elevation Rocky Summit (High Peak Subtype)	---	1988-08-16	A	2-High	---	---	G1	S1
Natural Community	19537	High Elevation Rocky Summit (Typic Subtype)	---	2010-08-28	A	3-Medium	---	---	G2	S2
Natural Community	9934	High Elevation Rocky Summit (Typic Subtype)	---	2010-08-26	C	3-Medium	---	---	G2	S2
Natural Community	18901	High Elevation Rocky Summit (Typic Subtype)	---	1986-07-09	A	2-High	---	---	G2	S2
Natural Community	29464	High Elevation Rocky Summit (Typic Subtype)	---	1999-08-26	B	2-High	---	---	G2	S2
Natural Community	19720	High Elevation Rocky Summit (Typic Subtype)	---	1988-08-16	A	2-High	---	---	G2	S2
Natural Community	29813	High Elevation Rocky Summit (Typic Subtype)	---	1999-08-26	CD	2-High	---	---	G2	S2

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	30124	Low Montane Red Oak Forest	---	2010	B	3-Medium	---	---	G4?	S4?
Natural Community	32654	Montane Cliff (Acidic Herb Subtype)	---	2013-10-13	B	3-Medium	---	---	G3G4	S3
Natural Community	9770	Montane Cliff (Acidic Herb Subtype)	---	1997-05-23	C	2-High	---	---	G3G4	S3
Natural Community	3229	Montane Cliff (Acidic Herb Subtype)	---	1999-08-19	C	2-High	---	---	G3G4	S3
Natural Community	32697	Montane Cliff (Calcareous Subtype)	---	2013-10-15	BC	2-High	---	---	G3G4	S1
Natural Community	31589	Montane Oak--Hickory Forest (Acidic Subtype)	---	2010	E	2-High	---	---	G4G5	S4S5
Natural Community	29814	Montane Oak--Hickory Forest (Acidic Subtype)	---	2010	C	2-High	---	---	G4G5	S4S5
Natural Community	11091	Montane Oak--Hickory Forest (Basic Subtype)	---	2010	B	3-Medium	---	---	G3	S3
Natural Community	29466	Montane Oak--Hickory Forest (Basic Subtype)	---	2010	BC	2-High	---	---	G3	S3
Natural Community	2733	Montane Oak--Hickory Forest (Basic Subtype)	---	2010	C	3-Medium	---	---	G3	S3
Natural Community	17148	Northern Hardwood Forest (Beech Gap Subtype)	---	2003-07-27	A	3-Medium	---	---	G1	S1S2
Natural Community	10090	Northern Hardwood Forest (Beech Gap Subtype)	---	2003-06-20	B?	3-Medium	---	---	G1	S1S2
Natural Community	15137	Northern Hardwood Forest (Beech Gap Subtype)	---	2010-08-26	B	3-Medium	---	---	G1	S1S2
Natural Community	6186	Northern Hardwood Forest (Beech Gap Subtype)	---	1987-05-27	B?	3-Medium	---	---	G1	S1S2
Natural Community	5574	Northern Hardwood Forest (Rich Subtype)	---	2017-08-30	A	2-High	---	---	G3	S3
Natural Community	30177	Northern Hardwood Forest (Rich Subtype)	---	2010-08-28	AB	3-Medium	---	---	G3	S3

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	14351	Northern Hardwood Forest (Rich Subtype)	---	2015-05-26	BC	3-Medium	---	---	G3	S3
Natural Community	8177	Northern Hardwood Forest (Rich Subtype)	---	2013-10-15	A	2-High	---	---	G3	S3
Natural Community	273	Northern Hardwood Forest (Typic Subtype)	---	2010-08-28	AB	3-Medium	---	---	G3G4	S3
Natural Community	3763	Northern Hardwood Forest (Typic Subtype)	---	2017-04-24	B	2-High	---	---	G3G4	S3
Natural Community	16900	Northern Hardwood Forest (Typic Subtype)	---	2010	C	3-Medium	---	---	G3G4	S3
Natural Community	29939	Northern Hardwood Forest (Typic Subtype)	---	2017-08-30	C	2-High	---	---	G3G4	S3
Natural Community	16407	Piedmont/Mountain Semipermanent Impoundment (Montane Marsh Subtype)	---	2010	A	3-Medium	---	---	G3	S3S4
Natural Community	28348	Piedmont/Mountain Semipermanent Impoundment (Montane Marsh Subtype)	---	2009-07-28	E	2-High	---	---	G3	S3S4
Natural Community	30610	Piedmont/Mountain Semipermanent Impoundment (Open Water Subtype)	---	2010	A	3-Medium	---	---	G4G5	S4
Natural Community	30611	Piedmont/Mountain Semipermanent Impoundment (Shrub Subtype)	---	2010	A	3-Medium	---	---	G4	S4
Natural Community	10983	Pine--Oak/Heath (Typic Subtype)	---	2010	B	3-Medium	---	---	G3	S3
Natural Community	32658	Pine--Oak/Heath (Typic Subtype)	---	2013-10-13	C	3-Medium	---	---	G3	S3
Natural Community	9902	Red Spruce--Fraser Fir Forest (Herb Subtype)	---	2006	B	2-High	---	---	G2	S2
Natural Community	12868	Rich Cove Forest (Boulderfield Subtype)	---	2010	A	3-Medium	---	---	G3	S2

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	32659	Rich Cove Forest (Boulderfield Subtype)	---	2013-10-13	B	3-Medium	---	---	G3	S2
Natural Community	304	Rich Cove Forest (Montane Intermediate Subtype)	---	2010-08-28	BC	2-High	---	---	G4	S4
Natural Community	12086	Rich Cove Forest (Montane Intermediate Subtype)	---	2017-04-24	B	2-High	---	---	G4	S4
Natural Community	18469	Rich Cove Forest (Montane Intermediate Subtype)	---	2010	A	3-Medium	---	---	G4	S4
Natural Community	2473	Rich Cove Forest (Montane Intermediate Subtype)	---	2010	B	2-High	---	---	G4	S4
Natural Community	29938	Rich Cove Forest (Montane Intermediate Subtype)	---	2011-09-26	B	2-High	---	---	G4	S4
Natural Community	32696	Rich Cove Forest (Montane Intermediate Subtype)	---	2013-10-15	C	2-High	---	---	G4	S4
Natural Community	32660	Rich Cove Forest (Montane Intermediate Subtype)	---	2013-10-13	C	3-Medium	---	---	G4	S4
Natural Community	30353	Rich Montane Seep	---	2011	A	3-Medium	---	---	G3	S3
Natural Community	2692	Rich Montane Seep	---	2015-05-27	A	3-Medium	---	---	G3	S3
Natural Community	11527	Rich Montane Seep	---	2017-04-24	AB	2-High	---	---	G3	S3
Natural Community	14041	Rich Montane Seep	---	1998-06-26	B?	2-High	---	---	G3	S3
Natural Community	10131	Rich Montane Seep	---	2017-08-30	A	2-High	---	---	G3	S3
Natural Community	570	Rich Montane Seep	---	1998-07-01	C	2-High	---	---	G3	S3

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	29787	Rich Montane Seep	---	1999-08-17	BC	2-High	---	---	G3	S3
Natural Community	19468	Rich Montane Seep	---	1998-06-30	C	2-High	---	---	G3	S3
Natural Community	29752	Rich Montane Seep	---	2010-08-24	AB	2-High	---	---	G3	S3
Natural Community	35370	Rich Montane Seep	---	2015-05-26	BC	2-High	---	---	G3	S3
Natural Community	8679	Rich Montane Seep	---	1986-06-16	A	2-High	---	---	G3	S3
Natural Community	15454	Southern Appalachian Bog (Long Hope Valley Subtype)	---	2005-05-02	A	2-High	---	---	G1	S1
Natural Community	5224	Southern Appalachian Bog (Long Hope Valley Subtype)	---	2006-07-20	A	2-High	---	---	G1	S1
Natural Community	10900	Southern Appalachian Bog (Long Hope Valley Subtype)	---	2006-07-20	A	2-High	---	---	G1	S1
Natural Community	16304	Southern Appalachian Bog (Typic Subtype)	---	1990-06-20	C	3-Medium	---	---	G1G2	S1S2
Natural Community	18429	Southern Appalachian Bog (Typic Subtype)	---	2009-07-28	A	2-High	---	---	G1G2	S1S2
Natural Community	13544	Southern Appalachian Bog (Typic Subtype)	---	2017-08-30	A	2-High	---	---	G1G2	S1S2
Natural Community	3707	Spray Cliff	---	1997-05-23	E	2-High	---	---	G2	S2
Natural Community	13534	Spray Cliff	---	1999-08-19	BC	2-High	---	---	G2	S2
Natural Community	25098	Swamp Forest--Bog Complex (Typic Subtype)	---	2007-07-02	B?	2-High	---	---	G2	S2
Reptile	20382	Crotalus horridus	Timber Rattlesnake	2004-05-28	E	3-Medium	---	Special Concern	G4	S3
Stonefly	7713	Bolotoperla rossi	Smoky Willowfly	1990-03-05	H?	3-Medium	---	Significantly Rare	G4	S3

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Stonefly	17693	Bolotoperla rossi	Smoky Willowfly	1990-03-06	H?	3-Medium	---	Significantly Rare	G4	S3
Vascular Plant	10227	Aconitum reclinatum	Trailing Wolfsbane	1982	H	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	11993	Aconitum reclinatum	Trailing Wolfsbane	1999-07-13	B	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	2864	Aconitum reclinatum	Trailing Wolfsbane	2015-05-27	A	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	36646	Aconitum reclinatum	Trailing Wolfsbane	2015-05-21	A	2-High	---	Significantly Rare Throughout	G3	S3
Vascular Plant	7780	Aconitum reclinatum	Trailing Wolfsbane	1995-07-13	AB	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	16002	Aconitum reclinatum	Trailing Wolfsbane	2013-10-15	B	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	8453	Aconitum reclinatum	Trailing Wolfsbane	2013-09-05	B	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	19531	Aconitum reclinatum	Trailing Wolfsbane	1998-06-18	BC	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	3352	Aconitum reclinatum	Trailing Wolfsbane	1988-08-17	B	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	15447	Aconitum reclinatum	Trailing Wolfsbane	1994-08-12	BC	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	13807	Aconitum reclinatum	Trailing Wolfsbane	1998-06-30	B	3-Medium	---	Significantly Rare Throughout	G3	S3

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	18982	Aconitum reclinatum	Trailing Wolfsbane	1982-06-30	H	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	18276	Aconitum reclinatum	Trailing Wolfsbane	1992-07-28	C	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	15117	Anthoxanthum hirtum	Holy Grass	1969-05-27	H	3-Medium	---	Significantly Rare Disjunct	G5	S1
Vascular Plant	11295	Arisaema stewardsonii	Bog Jack-in-the-pulpit	1977-05-15	H	3-Medium	---	Significantly Rare Peripheral	G5T4T5	S2
Vascular Plant	26130	Arisaema stewardsonii	Bog Jack-in-the-pulpit	1999-07-13	E	3-Medium	---	Significantly Rare Peripheral	G5T4T5	S2
Vascular Plant	26146	Brachyelytrum aristosum	Northern Shorthusk	1999-07-13	E	2-High	---	Significantly Rare Peripheral	G5	S3
Vascular Plant	26147	Brachyelytrum aristosum	Northern Shorthusk	1999-07-13	E	2-High	---	Significantly Rare Peripheral	G5	S3
Vascular Plant	1781	Bromus ciliatus	Fringed Brome	1993-09	A	3-Medium	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	16468	Caltha palustris var. palustris	Marsh-marigold	1990-05	D	3-Medium	---	Endangered	G5T5	S1
Vascular Plant	368	Cardamine clematitis	Mountain Bittercress	2017-05-13	B	3-Medium	---	Significantly Rare Throughout	G3	S2S3
Vascular Plant	5387	Cardamine clematitis	Mountain Bittercress	1991-07-24	A	3-Medium	---	Significantly Rare Throughout	G3	S2S3
Vascular Plant	20002	Cardamine clematitis	Mountain Bittercress	1994-07-20	A	3-Medium	---	Significantly Rare Throughout	G3	S2S3
Vascular Plant	16481	Cardamine rotundifolia	Mountain Watercress	1968-05-23	H	3-Medium	---	Threatened	G4	S2
Vascular Plant	749	Cardamine rotundifolia	Mountain Watercress	1998-06-18	E	3-Medium	---	Threatened	G4	S2
Vascular Plant	25082	Cardamine rotundifolia	Mountain Watercress	2004-07-15	AB	2-High	---	Threatened	G4	S2
Vascular Plant	26204	Carex baileyi	Bailey's Sedge	1999-07-15	E	2-High	---	Significantly Rare Peripheral	G4	S2
Vascular Plant	25003	Carex baileyi	Bailey's Sedge	2007-07-02	A	2-High	---	Significantly Rare Peripheral	G4	S2

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	26206	Carex buxbaumii	Brown Bog Sedge	1999-07-13	B?	2-High	---	Special Concern Vulnerable	G5	S2
Vascular Plant	26205	Carex buxbaumii	Brown Bog Sedge	1999-07-15	A	2-High	---	Special Concern Vulnerable	G5	S2
Vascular Plant	23760	Carex buxbaumii	Brown Bog Sedge	2007-07-02	AB	2-High	---	Special Concern Vulnerable	G5	S2
Vascular Plant	26207	Carex buxbaumii	Brown Bog Sedge	1970-06-27	H	2-High	---	Special Concern Vulnerable	G5	S2
Vascular Plant	8776	Carex oligosperma	Few-seeded Sedge	2006-07-22	A	3-Medium	---	Endangered	G5	S1
Vascular Plant	26209	Carex oligosperma	Few-seeded Sedge	1999-07-15	AB	2-High	---	Endangered	G5	S1
Vascular Plant	25088	Carex roanensis	Roan Sedge	2007-07-02	E	2-High	---	Significantly Rare Throughout	G2G3	S2
Vascular Plant	4617	Carex trisperma	Three-seeded Sedge	2007	A	3-Medium	---	Endangered	G5	S1
Vascular Plant	26920	Carex trisperma	Three-seeded Sedge	2007-07	D?	2-High	---	Endangered	G5	S1
Vascular Plant	25139	Chamerion platyphyllum	Fireweed	2011-06-28	B	2-High	---	Endangered	G5T5	S1
Vascular Plant	36467	Chamerion platyphyllum	Fireweed	2011-pre	B?	3-Medium	---	Endangered	G5T5	S1
Vascular Plant	33188	Chamerion platyphyllum	Fireweed	2006-08-07	E	2-High	---	Endangered	G5T5	S1
Vascular Plant	33193	Chelone cuthbertii	Cuthbert's Turtlehead	2006-08-06	E	2-High	---	Special Concern Vulnerable	G3	S3
Vascular Plant	33805	Chelone cuthbertii	Cuthbert's Turtlehead	2007-07-07	E	2-High	---	Special Concern Vulnerable	G3	S3
Vascular Plant	33811	Chelone obliqua	Red Turtlehead	2006-07-28	E	2-High	---	Significantly Rare Throughout	G4	S2
Vascular Plant	3103	Cladium mariscoides	Twig-rush	1984	A	3-Medium	---	Significantly Rare Other	G5	S3
Vascular Plant	28390	Corallorhiza maculata var. maculata	Spotted Coralroot	1972-08-22	H	3-Medium	---	Significantly Rare Peripheral	G5T5	S1

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	17741	Crocanthemum propinquum	Creeping Sunrose	1993	CD	3-Medium	---	Threatened	G4	S1
Vascular Plant	5439	Cystopteris fragilis	Fragile Fern	1994	E	3-Medium	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	24657	Cystopteris tenuis	Upland Bladder-fern	2002-06	E	3-Medium	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	26228	Dactylorhiza viridis	Long-bracted Frog Orchid	1999-07-13	E	2-High	---	Endangered	G5T5	S1
Vascular Plant	18204	Delphinium exaltatum	Tall Larkspur	2017-07	A	2-High	---	Endangered	G3	S2
Vascular Plant	15564	Dicentra eximia	Bleeding Heart	1965-05-09	H	3-Medium	---	Significantly Rare Peripheral	G4	S3
Vascular Plant	26850	Epilobium ciliatum ssp. ciliatum	American Willow-herb	2017-08-30	BC	2-High	---	Significantly Rare Peripheral	G5T5	S2
Vascular Plant	17198	Filipendula rubra	Queen-of-the-prairie	1978-06-25	F	3-Medium	---	Endangered	G4G5	S1
Vascular Plant	38340	Filipendula rubra	Queen-of-the-prairie	2018-06	E	2-High	---	Endangered	G4G5	S1
Vascular Plant	38336	Filipendula rubra	Queen-of-the-prairie	2018-06	E	2-High	---	Endangered	G4G5	S1
Vascular Plant	4719	Gentianopsis crinita	Fringed Gentian	2011-09-27	A	3-Medium	---	Threatened	G5	S1
Vascular Plant	11218	Geum geniculatum	Bent Avens	2017-06-20	A	3-Medium	---	Special Concern Vulnerable	G2	S1S2
Vascular Plant	12204	Geum geniculatum	Bent Avens	1995-07-13	A	3-Medium	---	Special Concern Vulnerable	G2	S1S2
Vascular Plant	16573	Geum geniculatum	Bent Avens	1995-07-25	A	3-Medium	---	Special Concern Vulnerable	G2	S1S2
Vascular Plant	646	Geum radiatum	Spreading Avens	1999-09-18	A	3-Medium	Endangered	Endangered	G2	S2
Vascular Plant	13056	Geum radiatum	Spreading Avens	2002-07-18	AB	3-Medium	Endangered	Endangered	G2	S2
Vascular Plant	7594	Geum radiatum	Spreading Avens	2007-09	C	2-High	Endangered	Endangered	G2	S2
Vascular Plant	28206	Geum radiatum	Spreading Avens	2000s	F	2-High	Endangered	Endangered	G2	S2
Vascular Plant	19790	Houstonia montana	Roan Mountain Bluet	1994-08	E	3-Medium	Endangered	Endangered	G5T2	S2
Vascular Plant	17319	Houstonia montana	Roan Mountain Bluet	2001-08-24	B	3-Medium	Endangered	Endangered	G5T2	S2
Vascular Plant	28219	Houstonia montana	Roan Mountain Bluet	2001-08-24	A	3-Medium	Endangered	Endangered	G5T2	S2
Vascular Plant	19791	Houstonia montana	Roan Mountain Bluet	1994-08-10	C	3-Medium	Endangered	Endangered	G5T2	S2
Vascular Plant	3578	Houstonia montana	Roan Mountain Bluet	1999-09-18	A	3-Medium	Endangered	Endangered	G5T2	S2
Vascular Plant	3561	Houstonia montana	Roan Mountain Bluet	2002-07-18	AB	3-Medium	Endangered	Endangered	G5T2	S2
Vascular Plant	10891	Houstonia montana	Roan Mountain Bluet	1992-07-15	AB	2-High	Endangered	Endangered	G5T2	S2

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	264	Houstonia montana	Roan Mountain Bluet	1994-07-20	A	2-High	Endangered	Endangered	G5T2	S2
Vascular Plant	5993	Houstonia montana	Roan Mountain Bluet	2004-07	A	2-High	Endangered	Endangered	G5T2	S2
Vascular Plant	8590	Hydrastis canadensis	Goldenseal	1975-05-20	H	3-Medium	---	Significantly Rare Other	G3G4	S3
Vascular Plant	4487	Ilex collina	Long-stalked Holly	2007-07-02	AB	2-High	---	Special Concern Vulnerable	G3	S1
Vascular Plant	16371	Ilex collina	Long-stalked Holly	2012-06-20	A	2-High	---	Special Concern Vulnerable	G3	S1
Vascular Plant	14524	Ilex collina	Long-stalked Holly	2006-07-19	B	2-High	---	Special Concern Vulnerable	G3	S1
Vascular Plant	26119	Ilex collina	Long-stalked Holly	2006-07-16	AB	2-High	---	Special Concern Vulnerable	G3	S1
Vascular Plant	25307	Ilex collina	Long-stalked Holly	2006-07-19	B?	2-High	---	Special Concern Vulnerable	G3	S1
Vascular Plant	25707	Ilex collina	Long-stalked Holly	2006-07-20	A	2-High	---	Special Concern Vulnerable	G3	S1
Vascular Plant	26836	Ilex collina	Long-stalked Holly	2007-07-02	B	2-High	---	Special Concern Vulnerable	G3	S1
Vascular Plant	15091	Liatris helleri	Heller's Blazing-star	1989-06-27	C	3-Medium	Threatened	Threatened	G2Q	S2
Vascular Plant	7533	Liatris helleri	Heller's Blazing-star	1994-08-10	A	3-Medium	Threatened	Threatened	G2Q	S2
Vascular Plant	19047	Liatris helleri	Heller's Blazing-star	1991-08-27	A	3-Medium	Threatened	Threatened	G2Q	S2
Vascular Plant	14959	Liatris helleri	Heller's Blazing-star	1994-08	BC	3-Medium	Threatened	Threatened	G2Q	S2
Vascular Plant	14309	Liatris helleri	Heller's Blazing-star	1995-07-15	A	3-Medium	Threatened	Threatened	G2Q	S2
Vascular Plant	18726	Lilium canadense var. canadense	Yellow Canada Lily	2002-06	E	2-High	---	Endangered	G5T4?	S1
Vascular Plant	1677	Lilium grayi	Gray's Lily	2010-06-21	A	2-High	---	Threatened	G3	S1S2
Vascular Plant	9153	Lilium grayi	Gray's Lily	1961-06-24	X	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	12072	Lilium grayi	Gray's Lily	2017-07-19	A	2-High	---	Threatened	G3	S1S2
Vascular Plant	12300	Lilium grayi	Gray's Lily	2006-07-06	BC	2-High	---	Threatened	G3	S1S2

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	15548	Lilium grayi	Gray's Lily	2017-06-20	A	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	10508	Lilium grayi	Gray's Lily	2013-07-01	D	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	17133	Lilium grayi	Gray's Lily	2002-06	E	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	11076	Lilium grayi	Gray's Lily	1987-05-27	B	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	26112	Lilium grayi	Gray's Lily	2008-06-24	E	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	9985	Lilium grayi	Gray's Lily	1970-06-22	H	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	26232	Lilium grayi	Gray's Lily	2008-06-24	E	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	26234	Lilium grayi	Gray's Lily	2008-06-24	E	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	26111	Lilium grayi	Gray's Lily	2008-06-24	B?	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	27119	Lilium grayi	Gray's Lily	1967-07-09	H	2-High	---	Threatened	G3	S1S2
Vascular Plant	26110	Lilium grayi	Gray's Lily	2006-07-21	E	2-High	---	Threatened	G3	S1S2
Vascular Plant	24755	Lilium grayi	Gray's Lily	2006-07-06	A	2-High	---	Threatened	G3	S1S2
Vascular Plant	25393	Lilium grayi	Gray's Lily	2006-Pre	F	2-High	---	Threatened	G3	S1S2
Vascular Plant	13238	Lilium grayi	Gray's Lily	1992-06-24	D	2-High	---	Threatened	G3	S1S2
Vascular Plant	24798	Lilium grayi	Gray's Lily	2008-06-24	E	2-High	---	Threatened	G3	S1S2
Vascular Plant	27071	Lilium grayi	Gray's Lily	2007-06	D	2-High	---	Threatened	G3	S1S2
Vascular Plant	26109	Lilium grayi	Gray's Lily	1999-07-13	E	2-High	---	Threatened	G3	S1S2
Vascular Plant	4419	Lilium philadelphicum var. philadelphicum	Wood Lily	2009-07-28	C?	3-Medium	---	Endangered	G5T4T5	S2
Vascular Plant	4760	Lilium philadelphicum var. philadelphicum	Wood Lily	2017-07-26	A	3-Medium	---	Endangered	G5T4T5	S2
Vascular Plant	6620	Liparis loeselii	Fen Orchid	1969	H	3-Medium	---	Endangered	G5	S1
Vascular Plant	4839	Lonicera canadensis	American Fly-honeysuckle	1968-04-27	H	3-Medium	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	8891	Lonicera canadensis	American Fly-honeysuckle	2017-04-24	A	2-High	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	16992	Lonicera canadensis	American Fly-honeysuckle	1994-05-25	E	3-Medium	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	19588	Lonicera canadensis	American Fly-honeysuckle	2017-08-30	A	2-High	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	26125	Lonicera canadensis	American Fly-honeysuckle	1994-05-25	E	3-Medium	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	26123	Lonicera canadensis	American Fly-honeysuckle	2006-07-16	E	2-High	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	26124	Lonicera canadensis	American Fly-honeysuckle	2006-07-22	E	2-High	---	Significantly Rare Peripheral	G5	S2

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	5579	Lycopodiella inundata	Bog Clubmoss	2002-12-12	A	3-Medium	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	6170	Meehania cordata	Meehania	1974-07-18	H	3-Medium	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	3376	Meehania cordata	Meehania	1969-06-18	H	3-Medium	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	13384	Meehania cordata	Meehania	2003-06-19	A	3-Medium	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	29753	Meehania cordata	Meehania	2010-08-24	A?	3-Medium	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	6459	Meehania cordata	Meehania	2011-09-26	AB	3-Medium	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	35368	Meehania cordata	Meehania	2015-05-26	A	2-High	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	1283	Meehania cordata	Meehania	2006-07-19	B	2-High	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	25447	Menyanthes trifoliata	Buckbean	2012-06-20	E	2-High	---	Threatened	G5	S1
Vascular Plant	25446	Menyanthes trifoliata	Buckbean	2012-06-20	B?	2-High	---	Threatened	G5	S1
Vascular Plant	27185	Micranthes caroliniana	Carolina Saxifrage	1968-05-03	H	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	17649	Micranthes caroliniana	Carolina Saxifrage	1975-04	H	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	18980	Micranthes caroliniana	Carolina Saxifrage	1994-07-19	C	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	15131	Micranthes caroliniana	Carolina Saxifrage	1994-07-20	B	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	14123	Micranthes caroliniana	Carolina Saxifrage	1997-05-23	E	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	22697	Micranthes caroliniana	Carolina Saxifrage	2005-10-29	A	2-High	---	Significantly Rare Throughout	G3	S3

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	20500	Micranthes caroliniana	Carolina Saxifrage	2004-03-09	A	2-High	---	Significantly Rare Throughout	G3	S3
Vascular Plant	19923	Micranthes pensylvanica	Swamp Saxifrage	2007-07-02	A	3-Medium	---	Endangered	G5	S1
Vascular Plant	17356	Micranthes pensylvanica	Swamp Saxifrage	1988-06-17	A	3-Medium	---	Endangered	G5	S1
Vascular Plant	23532	Micranthes pensylvanica	Swamp Saxifrage	2004-05-04	E	2-High	---	Endangered	G5	S1
Vascular Plant	26097	Oenothera perennis	Perennial Sundrops	2006-07-20	BC	2-High	---	Special Concern Vulnerable	G5	S2
Vascular Plant	26848	Oenothera perennis	Perennial Sundrops	2007-07-02	BC	2-High	---	Special Concern Vulnerable	G5	S2
Vascular Plant	24587	Packera crawfordii	Bog Ragwort	2006-07-28	E	2-High	---	Significantly Rare Throughout	G2G3	S1
Vascular Plant	18559	Packera schweinitziana	Schweinitz's Ragwort	1987-07-16	B	3-Medium	---	Threatened	G5?	S2
Vascular Plant	16586	Packera schweinitziana	Schweinitz's Ragwort	1987-07-16	A	3-Medium	---	Threatened	G5?	S2
Vascular Plant	7749	Parnassia grandifolia	Large-leaved Grass-of-parnassus	2002-09-30	E	2-High	---	Threatened	G3	S2
Vascular Plant	34745	Platanthera grandiflora	Large Purple-fringed Orchid	2014-07-29	E	3-Medium	---	Threatened	G5	S2
Vascular Plant	23548	Platanthera herbiola	Northern Rein Orchid	2004-06-17	E	3-Medium	---	Significantly Rare Peripheral	G4?T4Q	S1S2
Vascular Plant	26229	Platanthera peramoena	Purple Fringeless Orchid	1999-07-13	E	2-High	---	Threatened	G5	S2
Vascular Plant	37125	Platanthera shriveri	Shriver's Purple Fringed Orchid	2016-06-25	D	2-High	---	Significantly Rare Throughout	G1	S1
Vascular Plant	2752	Rhododendron vaseyi	Pink-shell Azalea	1995-07-15	A	3-Medium	---	Significantly Rare Limited	G3	S3
Vascular Plant	11171	Rhododendron vaseyi	Pink-shell Azalea	1994-07-20	A	3-Medium	---	Significantly Rare Limited	G3	S3
Vascular Plant	25292	Rhynchospora alba	Northern White Beaksedge	2006-07-22	A	3-Medium	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	25293	Rhynchospora alba	Northern White Beaksedge	1984	E	2-High	---	Significantly Rare Peripheral	G5	S2

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	24773	Rhynchospora alba	Northern White Beaksedge	2006-07-23	A	2-High	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	25857	Rhynchospora alba	Northern White Beaksedge	2006-07-26	A	2-High	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	25294	Rhynchospora alba	Northern White Beaksedge	1984	E	2-High	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	7010	Solidago spithamaea	Blue Ridge Goldenrod	1989-06-29	B	3-Medium	Threatened	Threatened	G2	S2
Vascular Plant	4651	Solidago spithamaea	Blue Ridge Goldenrod	1991-08-01	BD	2-High	Threatened	Threatened	G2	S2
Vascular Plant	15238	Solidago uliginosa var. uliginosa	Bog Goldenrod	1984-05-25	A	3-Medium	---	Significantly Rare Peripheral	G4G5T4T5	S1S2
Vascular Plant	9680	Solidago uliginosa var. uliginosa	Bog Goldenrod	2002-06	E	2-High	---	Significantly Rare Peripheral	G4G5T4T5	S1S2
Vascular Plant	28689	Spiranthes ochroleuca	Yellow Ladies'-tresses	2005-Pre	A	3-Medium	---	Threatened	G4	S1
Vascular Plant	28686	Spiranthes ochroleuca	Yellow Ladies'-tresses	2003-09-23	A	2-High	---	Threatened	G4	S1
Vascular Plant	28684	Spiranthes ochroleuca	Yellow Ladies'-tresses	2005-09	E	2-High	---	Threatened	G4	S1
Vascular Plant	36797	Stachys appalachiana	Appalachian Hedge-nettle	1958-07-25	H	3-Medium	---	Significantly Rare Limited	GNR	S1
Vascular Plant	4062	Taxus canadensis	Canada Yew	1988-06-17	A	3-Medium	---	Threatened	G5	S1
Vascular Plant	25249	Taxus canadensis	Canada Yew	2006-07-22	A?	2-High	---	Threatened	G5	S1
Vascular Plant	8020	Taxus canadensis	Canada Yew	2012-06-20	B	2-High	---	Threatened	G5	S1
Vascular Plant	17648	Trichophorum cespitosum	Deerhair Bulrush	1991-08-27	A	3-Medium	---	Significantly Rare Disjunct	G5	S2S3
Vascular Plant	14393	Trichophorum cespitosum	Deerhair Bulrush	1991-08-01	B	3-Medium	---	Significantly Rare Disjunct	G5	S2S3
Vascular Plant	2846	Turritis glabra	Tower Mustard	1966-07	H	3-Medium	---	Endangered	G5	S1
Vascular Plant	15008	Turritis glabra	Tower Mustard	1958-06	H	3-Medium	---	Endangered	G5	S1
Vascular Plant	18694	Turritis glabra	Tower Mustard	1970-05	F	3-Medium	---	Endangered	G5	S1
Vascular Plant	26120	Utricularia cornuta	Horned Bladderwort	2006-07	E	2-High	---	Threatened	G5	S1S2
Vascular Plant	25302	Utricularia cornuta	Horned Bladderwort	2006-07-19	B	2-High	---	Threatened	G5	S1S2
Vascular Plant	17040	Utricularia minor	Small Bladderwort	1970-06-27	H	3-Medium	---	Special Concern Historical	G5	SH
Vascular Plant	25301	Vaccinium macrocarpon	Cranberry	2006-07-19	A	1-Very High	---	Threatened	G5	S2
Vascular Plant	24779	Vaccinium macrocarpon	Cranberry	2006-07-19	C	1-Very High	---	Threatened	G5	S2

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	25633	Vaccinium macrocarpon	Cranberry	2006-07-20	A	2-High	---	Threatened	G5	S2
Vascular Plant	26098	Vaccinium macrocarpon	Cranberry	2006-07-20	A?	2-High	---	Threatened	G5	S2
Vascular Plant	25632	Vaccinium macrocarpon	Cranberry	2006-07-19	A	2-High	---	Threatened	G5	S2
Vascular Plant	3385	Vaccinium macrocarpon	Cranberry	2017-08-30	BC	2-High	---	Threatened	G5	S2
Vascular Plant	3721	Veronica americana	American Speedwell	1986-06-18	B	3-Medium	---	Threatened	G5	S2
Vascular Plant	1708	Veronica americana	American Speedwell	1998-07-01	NR	3-Medium	---	Threatened	G5	S2

Natural Areas Documented Within Project Area

Site Name	Representational Rating	Collective Rating
Grandview Overlook Slopes	R5 (General)	C4 (Moderate)
Trivett Branch Forests and Seeps	R3 (High)	C4 (Moderate)
Gilley Field Station Forests	R5 (General)	C5 (General)
Moses Cone Park/Rich Mountain	R5 (General)	C5 (General)
Moses Cone Park/Flat Top Mountain	R5 (General)	C5 (General)
Sims Creek Old Growth Forest	R3 (High)	C4 (Moderate)
Dutch Creek Falls	R5 (General)	C4 (Moderate)
Valle Mountain	R5 (General)	C5 (General)
Rocky Face	R5 (General)	C5 (General)
Snakeden Mountain	R5 (General)	C5 (General)
Stone Mountain (Locust Gap)	R2 (Very High)	C4 (Moderate)
South Fork Laurel Creek/Dugger Mountain	R5 (General)	C4 (Moderate)
WAT/Watauga River Aquatic Habitat	R3 (High)	C4 (Moderate)
Howards Creek Floodplain	R2 (Very High)	C4 (Moderate)
Snake Mountain	R1 (Exceptional)	C2 (Very High)
Deep Gap	R5 (General)	C4 (Moderate)
Beech Creek Natural Area	R1 (Exceptional)	C1 (Exceptional)
Long Hope Valley/Elk Knob/The Peak	R1 (Exceptional)	C1 (Exceptional)
Julian Price Park Wetlands Natural Area	R2 (Very High)	C3 (High)
NEW/South Fork New River Aquatic Habitat	R1 (Exceptional)	C2 (Very High)
Beech Creek Slopes	R1 (Exceptional)	C4 (Moderate)
Grandfather Mountain	R1 (Exceptional)	C1 (Exceptional)
Hanging Rock Mountain	R1 (Exceptional)	C2 (Very High)
White Rock	R5 (General)	C5 (General)
Doe Fork Seeps and Forests	R4 (Moderate)	C4 (Moderate)
Dun Vegan Mountain	R3 (High)	C3 (High)
Tater Hill Natural Area	R1 (Exceptional)	C1 (Exceptional)

Natural Areas Documented Within Project Area

Site Name	Representational Rating	Collective Rating
Appalachian State University Forest	R3 (High)	C5 (General)

Managed Areas Documented Within Project Area*

Managed Area Name	Owner	Owner Type
Pisgah National Forest - Grandfather Ranger District	US Forest Service	Federal
NC Clean Water Management Trust Fund Easement	NC DNCR, Clean Water Management Trust Fund	State
NC Department of Transportation Mitigation Site	NC Department of Transportation	State
Blue Ridge Parkway	US National Park Service	Federal
Wetland Reserve Program Easement	US Department of Agriculture, Natural Resources Conservation Service	Federal
NC Division of Mitigation Services Easement	NC DEQ, Division of Mitigation Services	State
Conservation Trust for North Carolina Easement	Conservation Trust for North Carolina	Private
Nature Conservancy Easement	The Nature Conservancy	Private
NC Agricultural Development and Farmland Preservation Trust Fund Easement	NC Department of Agriculture	State
Blue Ridge Conservancy Easement	Blue Ridge Conservancy	Private
Foothills Conservancy of North Carolina Preserve	Foothills Conservancy of North Carolina	Private
Elk Knob State Park	NC DNCR, Division of Parks and Recreation	State
Grandfather Mountain State Park	NC DNCR, Division of Parks and Recreation	State
Grandfather Mountain State Park Dedicated Nature Preserve	NC DNCR, Division of Parks and Recreation	State
Elk Knob State Park Dedicated Nature Preserve	NC DNCR, Division of Parks and Recreation	State
New River Conservancy	National Committee for the New River	Private
Blue Ridge Conservancy Preserve	Blue Ridge Conservancy	Private
Conservation Trust for North Carolina Preserve	Conservation Trust for North Carolina	Private
Tater Hill Plant Conservation Preserve	NC Department of Agriculture, Plant Conservation Program	State
Blue Ridge Parkway Easement	US National Park Service	Federal
Watauga County Open Space	Watauga County: multiple local government	Local Government
Tater Hill Plant Conservation Preserve Dedicated Nature Preserve	NC Department of Agriculture, Plant Conservation Program	State
Grandfather Mountain Preserve	The Nature Conservancy	Private
Grandfather Mountain Preserve Dedicated Nature Preserve	The Nature Conservancy	Private
Grandfather Mountain Corridor Registered Heritage Area	US National Park Service	Federal
Elk Knob Game Land	Kathleen Love, Len Moretz	Private
Avery County Open Space	Avery County: multiple local government	Local Government

Managed Areas Documented Within Project Area*

Managed Area Name	Owner	Owner Type
NC Department of Cultural Resources Easement	NC DNCR, Division of State Historic Sites and Properties	State
Bear Paw State Natural Area	NC DNCR, Division of Parks and Recreation	State
Bear Paw State Natural Area Dedicated Nature Preserve	NC DNCR, Division of Parks and Recreation	State
Valle Mountain Registered Heritage Area	Valle Crucis Conference Center	Private
Beech Creek Bog State Natural Area	NC DNCR, Division of Parks and Recreation	State
Julian Price Park Wetlands Registered Heritage Area	US National Park Service	Federal
Beech Creek Slopes Registered Heritage Area	130 of Chatham, LLC	Private
Beech Creek Bog State Natural Area Dedicated Nature Preserve	NC DNCR, Division of Parks and Recreation	State
Appalachian State University Dedicated Nature Preserve	Appalachian State University	State
Valle Crucis Scenic Overlook	NC DNCR, Division of State Historic Sites and Properties	State
Long Hope Valley Preserve	The Nature Conservancy	Private
Beech Creek Bog Unique Wetland	NC DNCR, Division of Parks and Recreation	State
Deep Gap Bog Registered Heritage Area	US National Park Service	Federal
South Fork New River-Boone Greenway	Appalachian State University	State
NC State University Easement	North Carolina State University	State

*NOTE: If the proposed project intersects with a conservation/managed area, please contact the landowner directly for additional information. If the project intersects with a Dedicated Nature Preserve (DNP), Registered Natural Heritage Area (RHA), or Federally-listed species, NCNHP staff may provide additional correspondence regarding the project.

Definitions and an explanation of status designations and codes can be found at https://ncnhde.natureserve.org/content/help. Data query generated on September 17, 2018; source: NCNHP, Q3 July 2018. Please resubmit your information request if more than one year elapses before project initiation as new information is continually added to the NCNHP database.

Natural Heritage Element Occurrences, Natural Areas, and Managed Areas Within a One-mile Radius of the Project Area
Clearinghouse 19-0040 - Watauga County
September 17, 2018
NCNHDE-6953

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Amphibian	5337	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	2017-08-01	AB	3-Medium	---	Special Concern	G3G4T2	S3
Amphibian	26666	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	2017-07-10	B	3-Medium	---	Special Concern	G3G4T2	S3
Amphibian	34399	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	2017-08-24	E	3-Medium	---	Special Concern	G3G4T2	S3
Amphibian	34398	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	2017-06-28	E	3-Medium	---	Special Concern	G3G4T2	S3
Amphibian	27572	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	2009-08-19	E	3-Medium	---	Special Concern	G3G4T2	S3
Amphibian	20344	Desmognathus organi	Northern Pygmy Salamander	2004-07-18	E	3-Medium	---	Significantly Rare	G3	S2S3
Amphibian	20346	Desmognathus organi	Northern Pygmy Salamander	2004-04-28	B?	3-Medium	---	Significantly Rare	G3	S2S3
Amphibian	37468	Desmognathus organi	Northern Pygmy Salamander	1993-04-10	E	4-Low	---	Significantly Rare	G3	S2S3
Amphibian	20347	Desmognathus organi	Northern Pygmy Salamander	2005-07-21	E	3-Medium	---	Significantly Rare	G3	S2S3
Amphibian	6833	Eurycea longicauda longicauda	Longtail Salamander	1949-08-23	H	3-Medium	---	Special Concern	G5T5	S1S2
Amphibian	18845	Eurycea longicauda longicauda	Longtail Salamander	1967-08-24	H	3-Medium	---	Special Concern	G5T5	S1S2
Amphibian	27859	Eurycea longicauda longicauda	Longtail Salamander	2009-07-15	E	3-Medium	---	Special Concern	G5T5	S1S2
Amphibian	32106	Eurycea longicauda longicauda	Longtail Salamander	2012-07-10	E	1-Very High	---	Special Concern	G5T5	S1S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Amphibian	3888	Plethodon welleri	Weller's Salamander	2017-05-05	E	3-Medium	---	Special Concern	G3	S2
Amphibian	1581	Plethodon welleri	Weller's Salamander	1984-09-29	H?	2-High	---	Special Concern	G3	S2
Arachnid	16555	Microhexura montivaga	Spruce-fir Moss Spider	2007	B?	2-High	Endangered	Significantly Rare	G1	S1
Bird	18030	Accipiter striatus	Sharp-shinned Hawk	1984-07-11	E	4-Low	---	Significantly Rare	G5	S1B,S4N
Bird	16774	Aegolius acadicus	Northern Saw-whet Owl	1995-04-18	B	4-Low	---	Threatened	G5	S2B,S2N
Bird	3283	Aegolius acadicus	Northern Saw-whet Owl	1999-05-14	D?	3-Medium	---	Threatened	G5	S2B,S2N
Bird	1668	Aegolius acadicus	Northern Saw-whet Owl	2004-03-23	E	3-Medium	---	Threatened	G5	S2B,S2N
Bird	6413	Aegolius acadicus	Northern Saw-whet Owl	1992-07-22	B?	3-Medium	---	Threatened	G5	S2B,S2N
Bird	6778	Aegolius acadicus	Northern Saw-whet Owl	2002-06-15	E	3-Medium	---	Threatened	G5	S2B,S2N
Bird	24924	Catharus guttatus	Hermit Thrush	2007-05-26	E	3-Medium	---	Significantly Rare	G5	S2B,S5N
Bird	10641	Catharus guttatus	Hermit Thrush	2011-05-13	E	3-Medium	---	Significantly Rare	G5	S2B,S5N
Bird	13697	Certhia americana	Brown Creeper	2011-05-13	E	4-Low	---	Special Concern	G5	S3B,S5N
Bird	13453	Certhia americana	Brown Creeper	1988-06-18	D?	3-Medium	---	Special Concern	G5	S3B,S5N
Bird	2569	Coccyzus erythropthalmus	Black-billed Cuckoo	1985	B?	4-Low	---	Significantly Rare	G5	S2B
Bird	8959	Coccyzus erythropthalmus	Black-billed Cuckoo	1988-06-18	E	3-Medium	---	Significantly Rare	G5	S2B
Bird	28624	Dolichonyx oryzivorus	Bobolink	2010-06	B?	3-Medium	---	Significantly Rare	G5	S1B
Bird	28623	Dolichonyx oryzivorus	Bobolink	2011-05-28	B?	3-Medium	---	Significantly Rare	G5	S1B
Bird	12214	Empidonax alnorum	Alder Flycatcher	1992-07-23	C	3-Medium	---	Significantly Rare	G5	S2B

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Bird	15855	Empidonax alnorum	Alder Flycatcher	2002-06-15	BC	3-Medium	---	Significantly Rare	G5	S2B
Bird	17776	Empidonax alnorum	Alder Flycatcher	1992-07-24	A	3-Medium	---	Significantly Rare	G5	S2B
Bird	38039	Haliaeetus leucocephalus	Bald Eagle	2017-Summer	E	2-High	Bald/Golden Eagle Protection Act	Threatened	G5	S3B,S3N
Bird	37812	Loxia curvirostra	Red Crossbill	2016-07-27	E	2-High	---	Special Concern	G5	S2
Bird	6612	Loxia curvirostra	Red Crossbill	1979-06	H?	4-Low	---	Special Concern	G5	S2
Bird	29643	Passerculus sandwichensis	Savannah Sparrow	2011-05-29	BC	3-Medium	---	Significantly Rare	G5	S2B,S5N
Bird	2044	Poecile atricapillus	Black-capped Chickadee	1984-07	D	4-Low	---	Special Concern	G5	S3
Bird	9775	Poecile atricapillus	Black-capped Chickadee	1990-04-21	E	3-Medium	---	Special Concern	G5	S3
Bird	26454	Pooecetes gramineus	Vesper Sparrow	2012-06-19	AB	3-Medium	---	Special Concern	G5	S2B,S2N
Bird	16145	Pooecetes gramineus	Vesper Sparrow	2008-07-24	AB	3-Medium	---	Special Concern	G5	S2B,S2N
Bird	22189	Pooecetes gramineus	Vesper Sparrow	2009-05-11	E	3-Medium	---	Special Concern	G5	S2B,S2N
Bird	96	Pooecetes gramineus	Vesper Sparrow	1998-05-06	E	3-Medium	---	Special Concern	G5	S2B,S2N
Bird	24918	Setophaga cerulea	Cerulean Warbler	2007-06	E	4-Low	---	Special Concern	G4	S2B
Bird	21070	Setophaga cerulea	Cerulean Warbler	2004-05-28	E	3-Medium	---	Special Concern	G4	S2B
Bird	8119	Setophaga cerulea	Cerulean Warbler	1982-05-22	E	3-Medium	---	Special Concern	G4	S2B
Bird	34517	Setophaga coronata	Yellow-rumped Warbler	2014-05-30	E	3-Medium	---	Significantly Rare	G5	S1B,S5N
Bird	13996	Setophaga magnolia	Magnolia Warbler	2011-05-13	BC	4-Low	---	Significantly Rare	G5	S2B

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Bird	15902	Setophaga magnolia	Magnolia Warbler	1989-07-02	B	4-Low	---	Significantly Rare	G5	S2B
Bird	15988	Setophaga magnolia	Magnolia Warbler	1988-06-19	AB	3-Medium	---	Significantly Rare	G5	S2B
Bird	16983	Thryomanes bewickii	Bewick's Wren	1973-07-26	X	4-Low	---	Endangered	G5	SXB
Bird	15083	Vermivora chrysoptera	Golden-winged Warbler	2017-06-21	E	3-Medium	---	Special Concern	G4	S2S3B
Bird	37914	Vermivora chrysoptera	Golden-winged Warbler	2016-05-25	E	2-High	---	Special Concern	G4	S2S3B
Bird	37899	Vermivora chrysoptera	Golden-winged Warbler	2008-06	E	4-Low	---	Special Concern	G4	S2S3B
Bird	37889	Vermivora cyanoptera	Blue-winged Warbler	2016-06-13	E	2-High	---	Significantly Rare	G5	S2B
Bird	19891	Vireo gilvus	Warbling Vireo	1979-06	H	4-Low	---	Significantly Rare	G5	S2B
Bird	14958	Vireo gilvus	Warbling Vireo	1975-06	X	4-Low	---	Significantly Rare	G5	S2B
Bird	14288	Vireo gilvus	Warbling Vireo	2002-05-03	E	3-Medium	---	Significantly Rare	G5	S2B
Bird	8407	Vireo gilvus	Warbling Vireo	2002-05	E	2-High	---	Significantly Rare	G5	S2B
Butterfly	35817	Erora laeta	Early Hairstreak	2015-08-05	E	2-High	---	Significantly Rare	GU	S2S3
Butterfly	20080	Euphydryas phaeton	Baltimore Checkerspot	2012-06-12	AB	4-Low	---	Significantly Rare	G4	S2
Butterfly	31179	Polites mystic	Long Dash	2012-06-20	B?	4-Low	---	Significantly Rare	G5	S1
Butterfly	24961	Polites mystic	Long Dash	2007-06-21	CD	3-Medium	---	Significantly Rare	G5	S1
Butterfly	19837	Polygonia faunus	Green Comma	1938	H	4-Low	---	Significantly Rare	G5	S1S2
Butterfly	28790	Polygonia progne	Gray Comma	2008-09-13	E	5-Very Low	---	Significantly Rare	G5	S1
Butterfly	24802	Pyrgus wyandot	Appalachian Grizzled Skipper	2007-04-29	C?	3-Medium	---	Significantly Rare	G1G2Q	S1

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Butterfly	23047	Pyrgus wyandot	Appalachian Grizzled Skipper	2006-04-16	C?	3-Medium	---	Significantly Rare	G1G2Q	S1
Butterfly	11433	Satyrium caryaevorus	Hickory Hairstreak	2001-07-06	E	3-Medium	---	Significantly Rare	G4	S1
Caddisfly	16934	Palaeagapetus celsus	a caddisfly	1984-08-28	H?	3-Medium	---	Significantly Rare	G5	S2
Dragonfly or Damselfly	35373	Gomphus adelphus	Mustached Clubtail	2015-05-28	E	2-High	---	Significantly Rare	G4G5	S1S2
Dragonfly or Damselfly	33220	Gomphus lineatifrons	Splendid Clubtail	2014-06-05	E	3-Medium	---	Significantly Rare	G4	S2
Dragonfly or Damselfly	25225	Lestes congener	Spotted Spreadwing	2007-08-18	E	2-High	---	Significantly Rare	G5	S1
Dragonfly or Damselfly	31271	Macromia margarita	Mountain River Cruiser	1987-08-18	E	4-Low	---	Significantly Rare	G3	S2?
Dragonfly or Damselfly	33713	Somatochlora elongata	Ski-tipped Emerald	2006-07-09	E	5-Very Low	---	Significantly Rare	G5	S2S3
Dragonfly or Damselfly	31177	Somatochlora elongata	Ski-tipped Emerald	2012-06-20	E	3-Medium	---	Significantly Rare	G5	S2S3
Dragonfly or Damselfly	33782	Stylurus scudderi	Zebra Clubtail	2004-Pre	H?	5-Very Low	---	Significantly Rare	G4G5	S2?
Dragonfly or Damselfly	33783	Stylurus scudderi	Zebra Clubtail	2004-Pre	H?	5-Very Low	---	Significantly Rare	G4G5	S2?
Dragonfly or Damselfly	31178	Stylurus scudderi	Zebra Clubtail	2012-06-19	E	3-Medium	---	Significantly Rare	G4G5	S2?
Dragonfly or Damselfly	33382	Sympetrum obtrusum	White-faced Meadowhawk	2011-08-08	E	3-Medium	---	Significantly Rare	G5	S1
Freshwater Bivalve	1195	Elliptio dilatata	Spike	2014-10-02	E	3-Medium	---	Special Concern	G5	S2
Freshwater Bivalve	6468	Lasmigona subviridis	Green Floater	2014-09-16	E	3-Medium	---	Endangered	G3	S2
Freshwater Bivalve	3754	Lasmigona subviridis	Green Floater	2004-08-11	E	3-Medium	---	Endangered	G3	S2
Freshwater Fish	1385	Etheostoma kanawhae	Kanawha Darter	2014-09-09	E	3-Medium	---	Significantly Rare	G4	S3
Freshwater Fish	7820	Etheostoma kanawhae	Kanawha Darter	2017-07-14	E	3-Medium	---	Significantly Rare	G4	S3

Element Occurrences Documented Within a One-mile Radius of the Project Area

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Freshwater Fish	10405	Etheostoma kanawhae	Kanawha Darter	2016-06-09	E	3-Medium	---	Significantly Rare	G4	S3
Freshwater Fish	13450	Exoglossum laurae	Tonguetied Minnow	2016-06-17	E	3-Medium	---	Significantly Rare	G4	S2
Freshwater Fish	5716	Exoglossum laurae	Tonguetied Minnow	2017-07-12	E	3-Medium	---	Significantly Rare	G4	S2
Freshwater Fish	28413	Notropis sp. 1	Kanawha Rosyface Shiner	2017-07-14	E	3-Medium	---	Significantly Rare	GNR	S2
Freshwater Fish	28412	Notropis sp. 1	Kanawha Rosyface Shiner	2016-06-08	E	3-Medium	---	Significantly Rare	GNR	S2
Freshwater Fish	28411	Notropis sp. 1	Kanawha Rosyface Shiner	2017-07-12	E	3-Medium	---	Significantly Rare	GNR	S2
Freshwater Fish	38081	Percina gymnocephala	Appalachia Darter	2016-06-09	E	3-Medium	---	Significantly Rare	G4	S2
Freshwater Fish	38080	Percina gymnocephala	Appalachia Darter	2016-06-08	E	3-Medium	---	Significantly Rare	G4	S2
Freshwater Fish	10772	Phenacobius teretulus	Kanawha Minnow	2008-09-16	E	3-Medium	---	Special Concern	G3G4	S3
Freshwater Fish	17815	Phenacobius teretulus	Kanawha Minnow	2016-06-08	E	3-Medium	---	Special Concern	G3G4	S3
Freshwater or Terrestrial Gastropod	37642	Appalachina sayana	Spike-lip Crater	2005-10-10	E	3-Medium	---	Significantly Rare	G5T5	S2S3
Freshwater or Terrestrial Gastropod	37647	Discus bryanti	Sawtooth Disc	2002-11-09	E	3-Medium	---	Special Concern	G3	S2
Freshwater or Terrestrial Gastropod	37652	Helicodiscus fimbriatus	Fringed Coil	2004-07-13	E	2-High	---	Special Concern	G4	S2
Freshwater or Terrestrial Gastropod	10020	Inflectarius downieanus	Dwarf Globelet	2003-09-10	E	3-Medium	---	Significantly Rare	G3	S1S2
Freshwater or Terrestrial Gastropod	6943	Inflectarius subpalliatus	Velvet Covert	2003-09-10	E	3-Medium	---	Special Concern	G2	S2S3

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Freshwater or Terrestrial Gastropod	72	Leptoxis dilatata	Seep Mudalia	2008-10-16	E	3-Medium	---	Special Concern	G3	S3
Freshwater or Terrestrial Gastropod	35734	Leptoxis dilatata	Seep Mudalia	2008-10-16	E	3-Medium	---	Special Concern	G3	S3
Freshwater or Terrestrial Gastropod	37666	Mesodon andrewsae	Balsam Globe	2001-Summer	E	3-Medium	---	Significantly Rare	G3	S2S3
Freshwater or Terrestrial Gastropod	37661	Mesodon andrewsae	Balsam Globe	2000-07-26	E	3-Medium	---	Significantly Rare	G3	S2S3
Freshwater or Terrestrial Gastropod	37667	Mesodon andrewsae	Balsam Globe	1978-Post	H?	3-Medium	---	Significantly Rare	G3	S2S3
Freshwater or Terrestrial Gastropod	37673	Mesomphix vulgatus	Common Button	1984-10-27	H?	3-Medium	---	Significantly Rare	G4	S2?
Freshwater or Terrestrial Gastropod	37681	Pallifera hemphilli	Black Mantleslug	2005-07-27	E	2-High	---	Special Concern	G4	S2S3
Freshwater or Terrestrial Gastropod	7117	Paravitrea andrewsae	High Mountain Supercoil	2003-09-10	E	3-Medium	---	Special Concern	G2	S2
Freshwater or Terrestrial Gastropod	37685	Paravitrea lamellidens	Lamellate Supercoil	2005-08-31	E	3-Medium	---	Special Concern	G2	S2S3
Freshwater or Terrestrial Gastropod	37689	Paravitrea reesei	Round Supercoil	2005-08-31	E	3-Medium	---	Significantly Rare	G3	S2?
Freshwater or Terrestrial Gastropod	37701	Ventridens coelaxis	Bidentate Dome	2005-08-25	E	3-Medium	---	Special Concern	G3	S3?
Freshwater or Terrestrial Gastropod	37703	Ventridens coelaxis	Bidentate Dome	1983-10-31	E	3-Medium	---	Special Concern	G3	S3?

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Freshwater or Terrestrial Gastropod	37696	Ventridens coelaxis	Bidentate Dome	2004-05-08	E	2-High	---	Special Concern	G3	S3?
Freshwater or Terrestrial Gastropod	1221	Ventridens collisella	Sculptured Dome	2003-09-10	E	3-Medium	---	Significantly Rare	G4	S2?
Freshwater or Terrestrial Gastropod	37710	Ventridens lawae	Rounded Dome	2004-07-13	E	2-High	---	Significantly Rare	G4	S2S3
Lichen	17687	Cetraria arenaria	Sand-loving Iceland Lichen	1994-08-10	D	3-Medium	---	Special Concern Vulnerable	G4	S2
Lichen	3579	Cetraria arenaria	Sand-loving Iceland Lichen	1994-07-19	A	3-Medium	---	Special Concern Vulnerable	G4	S2
Lichen	19609	Cetraria arenaria	Sand-loving Iceland Lichen	1994-07-20	A	3-Medium	---	Special Concern Vulnerable	G4	S2
Lichen	11029	Cetraria arenaria	Sand-loving Iceland Lichen	1998-09-10	E	3-Medium	---	Special Concern Vulnerable	G4	S2
Lichen	17393	Ephebe americana	A Rockshag Lichen	1957-08-01	H	3-Medium	---	Significantly Rare Throughout	G2G3	S1
Lichen	2021	Gymnoderma lineare	Rock Gnome Lichen	2003-04-29	B	3-Medium	Endangered	Endangered	G3	S3
Lichen	6841	Gymnoderma lineare	Rock Gnome Lichen	2003-04-28	C	3-Medium	Endangered	Endangered	G3	S3
Lichen	1655	Gymnoderma lineare	Rock Gnome Lichen	1989	CD	3-Medium	Endangered	Endangered	G3	S3
Lichen	18973	Gymnoderma lineare	Rock Gnome Lichen	2003-04-27	A	3-Medium	Endangered	Endangered	G3	S3
Lichen	20161	Gymnoderma lineare	Rock Gnome Lichen	1991-07-24	D	2-High	Endangered	Endangered	G3	S3
Lichen	28205	Gymnoderma lineare	Rock Gnome Lichen	2008	E	2-High	Endangered	Endangered	G3	S3
Liverwort	22053	Aneura sharpii	A Liverwort	1991-02-02	E	3-Medium	---	Significantly Rare Throughout	G1G2	S1
Liverwort	22052	Aneura sharpii	A Liverwort	1991-02-02	E	3-Medium	---	Significantly Rare Throughout	G1G2	S1

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Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Liverwort	7835	Bazzania nudicaulis	A Liverwort	1999-08-12	E	3-Medium	---	Significantly Rare Throughout	G2G3	S2
Liverwort	21740	Bazzania nudicaulis	A Liverwort	1999-08-12	E	3-Medium	---	Significantly Rare Throughout	G2G3	S2
Liverwort	21739	Bazzania nudicaulis	A Liverwort	1999-08-12	E	2-High	---	Significantly Rare Throughout	G2G3	S2
Liverwort	21738	Bazzania nudicaulis	A Liverwort	1999-05-27	E	2-High	---	Significantly Rare Throughout	G2G3	S2
Liverwort	21746	Metzgeria temperata	A Liverwort	1999-08-12	E	3-Medium	---	Significantly Rare Disjunct	G4	S1S2
Liverwort	21744	Metzgeria temperata	A Liverwort	1999-08-12	E	2-High	---	Significantly Rare Disjunct	G4	S1S2
Liverwort	8875	Mylia taylorii	A Liverwort	1989-07-15	E	3-Medium	---	Significantly Rare Disjunct	G5	S1
Liverwort	6001	Plagiochila austinii	A Liverwort	1991-05-25	E	3-Medium	---	Significantly Rare Throughout	G3	S1S2
Liverwort	21733	Plagiochila corniculata	A Liverwort	1999-08-12	E	2-High	---	Significantly Rare Disjunct	G4?	S2
Liverwort	22191	Plagiochila sullivantii var. sullivantii	A Liverwort	1966	H	4-Low	---	Significantly Rare Throughout	G2T2	S2
Liverwort	1751	Plagiochila sullivantii var. sullivantii	A Liverwort	1991-05-25	E	3-Medium	---	Significantly Rare Throughout	G2T2	S2
Liverwort	21759	Sphenolobopsis pearsonii	A Liverwort	1999-08-12	E	3-Medium	---	Significantly Rare Other	G2?	S2
Liverwort	5951	Sphenolobopsis pearsonii	A Liverwort	1999-08-12	E	3-Medium	---	Significantly Rare Other	G2?	S2
Liverwort	21758	Sphenolobopsis pearsonii	A Liverwort	1999-08-12	E	2-High	---	Significantly Rare Other	G2?	S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Mammal	22047	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	2005-08-23	E	3-Medium	Endangered	Endangered	G3G4T2	S1
Mammal	17827	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	1992-05-15	E	3-Medium	Endangered	Endangered	G3G4T2	S1
Mammal	33927	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	1980-01-01	H	3-Medium	Endangered	Endangered	G3G4T2	S1
Mammal	32220	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	2016-08-11	E	2-High	Endangered	Endangered	G3G4T2	S1
Mammal	9820	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	2016-02-04	E	2-High	Endangered	Endangered	G3G4T2	S1
Mammal	37776	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	2014-05-19	E	2-High	Endangered	Endangered	G3G4T2	S1
Mammal	37786	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	2014-04-18	E	2-High	Endangered	Endangered	G3G4T2	S1
Mammal	37779	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	2014-05-19	E	2-High	Endangered	Endangered	G3G4T2	S1
Mammal	37785	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	2013-04-23	E	2-High	Endangered	Endangered	G3G4T2	S1
Mammal	37780	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	2013-04-08	E	2-High	Endangered	Endangered	G3G4T2	S1
Mammal	13831	Glaucomys sabrinus coloratus	Carolina Northern Flying Squirrel	2015-03-04	B?	2-High	Endangered	Endangered	G5T2	S2
Mammal	8068	Glaucomys sabrinus coloratus	Carolina Northern Flying Squirrel	1990-06-28-29	E	3-Medium	Endangered	Endangered	G5T2	S2
Mammal	7510	Mustela nivalis	Least Weasel	2003-09-20	E	3-Medium	---	Game Animal	G5	S2
Mammal	24741	Myotis leibii	Eastern Small-footed Bat	2006-06-08	E	2-High	---	Special Concern	G4	S2
Mammal	34120	Myotis leibii	Eastern Small-footed Bat	2011-08-02	E	2-High	---	Special Concern	G4	S2
Mammal	34118	Myotis leibii	Eastern Small-footed Bat	2011-08-03	E	2-High	---	Special Concern	G4	S2
Mammal	34119	Myotis leibii	Eastern Small-footed Bat	2003-07-21	E	2-High	---	Special Concern	G4	S2
Mammal	36102	Myotis lucifugus	Little Brown Bat	2003-07-13	E	3-Medium	---	Significantly Rare	G3	S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Mammal	36101	Myotis lucifugus	Little Brown Bat	2004-06-29	E	2-High	---	Significantly Rare	G3	S2
Mammal	34841	Myotis lucifugus	Little Brown Bat	2011-06-07	E	2-High	---	Significantly Rare	G3	S2
Mammal	34839	Myotis lucifugus	Little Brown Bat	2011-08-03	A?	2-High	---	Significantly Rare	G3	S2
Mammal	36104	Myotis lucifugus	Little Brown Bat	2011-08-01	E	3-Medium	---	Significantly Rare	G3	S2
Mammal	32155	Myotis septentrionalis	Northern Long-eared Bat	2003-08-14	E	3-Medium	T-4(d)	Threatened	G1G2	S2
Mammal	32764	Myotis septentrionalis	Northern Long-eared Bat	2004-06-29	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	32159	Myotis septentrionalis	Northern Long-eared Bat	2006-02-21	D?	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34379	Myotis septentrionalis	Northern Long-eared Bat	2003-07-22	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34376	Myotis septentrionalis	Northern Long-eared Bat	2011-08-03	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34378	Myotis septentrionalis	Northern Long-eared Bat	2003-07-08	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34377	Myotis septentrionalis	Northern Long-eared Bat	2003-07-12	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	34861	Myotis septentrionalis	Northern Long-eared Bat	2011-06-20	E	2-High	T-4(d)	Threatened	G1G2	S2
Mammal	1233	Neotoma magister	Allegheny Woodrat	1987-Pre	H?	5-Very Low	---	Special Concern	G3G4	S2S3
Mammal	38339	Neotoma magister	Allegheny Woodrat	1997-01-27	E	3-Medium	---	Special Concern	G3G4	S2S3
Mammal	36130	Perimyotis subflavus	Tricolored Bat	1992-05-15	D	3-Medium	---	Significantly Rare	G2G3	S3
Mammal	36284	Perimyotis subflavus	Tricolored Bat	2011-08-03	E	3-Medium	---	Significantly Rare	G2G3	S3
Mammal	36286	Perimyotis subflavus	Tricolored Bat	2006-02-21	D	2-High	---	Significantly Rare	G2G3	S3
Mammal	36283	Perimyotis subflavus	Tricolored Bat	2004-06-29	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	34926	Perimyotis subflavus	Tricolored Bat	2011-06-20	E	2-High	---	Significantly Rare	G2G3	S3
Mammal	38351	Sorex dispar blitchi	Southern Rock Shrew	2012-06-08	E	3-Medium	---	Significantly Rare	G4T3T4	S3
Mammal	5494	Sylvilagus obscurus	Appalachian Cottontail	1987-Pre	E	5-Very Low	---	Game Animal	G4	S3
Mayfly	35301	Ephemerella floripara	a mayfly	1990-03-06	H?	3-Medium	---	Significantly Rare	G3Q	S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Moss	19622	Brachythecium populeum	Matted Feather Moss	1891-07-25	H	4-Low	---	Significantly Rare Peripheral	G5	S1
Moss	22638	Brachythecium rotaeanum	Rota's Feather Moss	1923-06-16	H	5-Very Low	---	Significantly Rare Disjunct	G3G4	S1
Moss	22649	Buxbaumia minakatae	Hump-backed Elves	1965-04-10	H	4-Low	---	Significantly Rare Throughout	G2G4	SH
Moss	17641	Homalia trichomanoides	Lime Homalia	1991-05-25	E	3-Medium	---	Significantly Rare Peripheral	G5	S1
Moss	12959	Leptodontium excelsum	Grandfather Mountain Leptodontium	1999-08-12	E	3-Medium	---	Significantly Rare Limited	G2	S1
Moss	21753	Leptodontium excelsum	Grandfather Mountain Leptodontium	1999-08-12	E	3-Medium	---	Significantly Rare Limited	G2	S1
Moss	21752	Leptodontium excelsum	Grandfather Mountain Leptodontium	1999-08-12	E	2-High	---	Significantly Rare Limited	G2	S1
Moss	12516	Leptodontium flexifolium	Pale-margined Leptodontium	1989-07-15	E	3-Medium	---	Significantly Rare Disjunct	G5	S1
Moss	22011	Lindbergia brachyptera	Lindberg's Maple-moss	1990-05-06	E	3-Medium	---	Significantly Rare Peripheral	G5	S1
Moss	23334	Pohlia lescuriana	Spherical Bulb Nodding Moss	1984-08-30	H	5-Very Low	---	Significantly Rare Throughout	G4?	S1?
Moss	16741	Rhytidium rugosum	Golden Tundra-moss	1978	H	3-Medium	---	Significantly Rare Peripheral	G5	S2
Moss	7007	Rhytidium rugosum	Golden Tundra-moss	1998-09-10	E	3-Medium	---	Significantly Rare Peripheral	G5	S2
Moss	8308	Rhytidium rugosum	Golden Tundra-moss	1987-12-22	A	3-Medium	---	Significantly Rare Peripheral	G5	S2
Moss	696	Rhytidium rugosum	Golden Tundra-moss	1986-07-09	AB	3-Medium	---	Significantly Rare Peripheral	G5	S2
Moss	3759	Rhytidium rugosum	Golden Tundra-moss	2002-07-18	E	3-Medium	---	Significantly Rare Peripheral	G5	S2
Moss	430	Rhytidium rugosum	Golden Tundra-moss	1994-06-24	A	3-Medium	---	Significantly Rare Peripheral	G5	S2
Moss	7698	Sphagnum angustifolium	Narrowleaf Peatmoss	1984-05-25	A	3-Medium	---	Significantly Rare Disjunct	G5	S1

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Moss	17544	Sphagnum capillifolium	Northern Peatmoss	1845	H	4-Low	---	Significantly Rare Peripheral	G5	S1
Moss	15717	Sphagnum capillifolium	Northern Peatmoss	1994-08-11	E	2-High	---	Significantly Rare Peripheral	G5	S1
Moss	3143	Sphagnum contortum	Contorted Peatmoss	2006	E	3-Medium	---	Threatened	G5	S1
Moss	23039	Sphagnum fallax	Pretty Peatmoss	1994-08-11	E	3-Medium	---	Significantly Rare Peripheral	G5	S2
Moss	4633	Sphagnum flexuosum	Flexuous Peatmoss	1993-08-17	A	3-Medium	---	Significantly Rare Peripheral	G5	S1
Moss	22348	Sphagnum fuscum	Brown Peatmoss	1993-08-17	C	3-Medium	---	Significantly Rare Peripheral	G5	S1
Moss	22726	Sphagnum russowii	Russow's Peatmoss	1993-08-16	E	3-Medium	---	Significantly Rare Disjunct	G5	S1
Moss	3564	Sphagnum squarrosum	Squarrose Peatmoss	1939	H	3-Medium	---	Significantly Rare Peripheral	G5	S1
Moss	10765	Sphagnum subsecundum	Orange Peatmoss	1994-08-11	E	2-High	---	Significantly Rare Peripheral	G5	S1
Moss	13751	Sphagnum warnstorfii	Fen Peatmoss	1984-05-25	A	2-High	---	Significantly Rare Disjunct	G5	S1
Moss	22915	Tortula papillosa	Papillose Tortula	1998-09-29	E	3-Medium	---	Significantly Rare Peripheral	G5	S1
Moth	33238	Arctia caja	Great Tiger Moth	2014-07-20	B?	3-Medium	---	Significantly Rare	G5	S1
Natural Community	25329	Acidic Cove Forest (Typic Subtype)	---	2010	B	3-Medium	---	---	G5	S4
Natural Community	24394	Acidic Cove Forest (Typic Subtype)	---	2006-06-07	A	3-Medium	---	---	G5	S4
Natural Community	25930	Acidic Cove Forest (Typic Subtype)	---	2017-03-08	A	2-High	---	---	G5	S4
Natural Community	32175	Acidic Cove Forest (Typic Subtype)	---	2013-06-19	A	2-High	---	---	G5	S4
Natural Community	251	Acidic Cove Forest (Typic Subtype)	---	2010	B	3-Medium	---	---	G5	S4
Natural Community	11964	Acidic Cove Forest (Typic Subtype)	---	20110	C	4-Low	---	---	G5	S4

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Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	10950	Acidic Cove Forest (Typic Subtype)	---	2013-10-15	A	2-High	---	---	G5	S4
Natural Community	37754	Acidic Cove Forest (Typic Subtype)	---	2016	C	3-Medium	---	---	G5	S4
Natural Community	26156	Acidic Cove Forest (Typic Subtype)	---	2018-05-17	A	2-High	---	---	G5	S4
Natural Community	11963	Acidic Cove Forest (Typic Subtype)	---	2010	C	3-Medium	---	---	G5	S4
Natural Community	32655	Acidic Cove Forest (Typic Subtype)	---	2013-10-13	C	3-Medium	---	---	G5	S4
Natural Community	15191	Acidic Cove Forest (Typic Subtype)	---	2012	C	3-Medium	---	---	G5	S4
Natural Community	25367	Acidic Cove Forest (Typic Subtype)	---	2010	C	2-High	---	---	G5	S4
Natural Community	3927	Canada Hemlock Forest (Typic Subtype)	---	2010	A	3-Medium	---	---	G3G4	S1S2
Natural Community	1149	Carolina Hemlock Forest (Typic Subtype)	---	1997-05-23	C	3-Medium	---	---	G2	S2
Natural Community	4776	Carolina Hemlock Forest (Typic Subtype)	---	1999-06-30	C?	2-High	---	---	G2	S2
Natural Community	25369	Carolina Hemlock Forest (Typic Subtype)	---	2006-07-24	C	2-High	---	---	G2	S2
Natural Community	25330	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	A	3-Medium	---	---	G5	S5
Natural Community	8768	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	BC	4-Low	---	---	G5	S5
Natural Community	25929	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	B?	3-Medium	---	---	G5	S5
Natural Community	28318	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	B	2-High	---	---	G5	S5
Natural Community	37752	Chestnut Oak Forest (Dry Heath Subtype)	---	2016	C	3-Medium	---	---	G5	S5
Natural Community	2590	Chestnut Oak Forest (Dry Heath Subtype)	---	2010	B	3-Medium	---	---	G5	S5
Natural Community	32181	Chestnut Oak Forest (Dry Heath Subtype)	---	2018-05-17	E	3-Medium	---	---	G5	S5

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Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	32656	Chestnut Oak Forest (Herb Subtype)	---	2013-10-13	C	3-Medium	---	---	G4G5	S4
Natural Community	25368	Chestnut Oak Forest (Herb Subtype)	---	2010	C	3-Medium	---	---	G4G5	S4
Natural Community	30296	Chestnut Oak Forest (Mesic Subtype)	---	2010	BC	4-Low	---	---	G4	S3S4
Natural Community	32657	Chestnut Oak Forest (Mesic Subtype)	---	2013-10-13	B	3-Medium	---	---	G4	S3S4
Natural Community	37151	Chestnut Oak Forest (Mesic Subtype)	---	2017-03-08	B	2-High	---	---	G4	S3S4
Natural Community	24398	Chestnut Oak Forest (White Pine Subtype)	---	2010	A	2-High	---	---	G3	S3
Natural Community	9072	Fraser Fir Forest (Herb Subtype)	---	2006	B	3-Medium	---	---	G1	S1
Natural Community	30200	Fraser Fir Forest (Rhododendron Subtype)	---	2006	B	3-Medium	---	---	G1	S1
Natural Community	5099	Grassy Bald (Grass Subtype)	---	2010-08-26	BC	2-High	---	---	G1	S1
Natural Community	30631	Grassy Bald (Sedge Subtype)	---	2010-08-26	BC	2-High	---	---	G1	S1
Natural Community	2111	Heath Bald (Catawba Rhododendron Subtype)	---	2007	A	2-High	---	---	G2	S2
Natural Community	30356	Heath Bald (Low Elevation Subtype)	---	2010	A	3-Medium	---	---	G2G3	S1
Natural Community	30357	Heath Bald (Sand Myrtle Subtype)	---	2010	A	3-Medium	---	---	G1	S1
Natural Community	12320	High Elevation Birch Boulderfield Forest	---	1988-08-18	A	4-Low	---	---	G3	S2
Natural Community	7954	High Elevation Birch Boulderfield Forest	---	2003-06-17	C	3-Medium	---	---	G3	S2
Natural Community	9101	High Elevation Birch Boulderfield Forest	---	2011-09-26	C	3-Medium	---	---	G3	S2
Natural Community	35379	High Elevation Birch Boulderfield Forest	---	2015-05-26	BC	2-High	---	---	G3	S2
Natural Community	25096	High Elevation Boggy Seep	---	2012-06-12	C?	2-High	---	---	G2	S2

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Natural Community	30064	High Elevation Red Oak Forest (Heath Subtype)	---	2010	B	3-Medium	---	---	G4	S3
Natural Community	32178	High Elevation Red Oak Forest (Heath Subtype)	---		NR	3-Medium	---	---	G4	S3
Natural Community	29465	High Elevation Red Oak Forest (Heath Subtype)	---	2010	C	2-High	---	---	G4	S3
Natural Community	30004	High Elevation Red Oak Forest (Heath Subtype)	---	2010-08-28	C	2-High	---	---	G4	S3
Natural Community	29937	High Elevation Red Oak Forest (Orchard Forest Subtype)	---	2010	B	2-High	---	---	G2	S2
Natural Community	8832	High Elevation Red Oak Forest (Rich Subtype)	---	2015-05-27	B	3-Medium	---	---	G2	S3
Natural Community	1433	High Elevation Red Oak Forest (Rich Subtype)	---	2017-04-24	A	3-Medium	---	---	G2	S3
Natural Community	35369	High Elevation Red Oak Forest (Rich Subtype)	---	2015-05-26	B	2-High	---	---	G2	S3
Natural Community	14662	High Elevation Red Oak Forest (Typic Herb Subtype)	---	2010	B	3-Medium	---	---	G4	S3
Natural Community	3189	High Elevation Red Oak Forest (Typic Herb Subtype)	---	2010	C?	2-High	---	---	G4	S3
Natural Community	3804	High Elevation Red Oak Forest (Typic Herb Subtype)	---	2010-08-28	C	3-Medium	---	---	G4	S3
Natural Community	19877	High Elevation Rocky Summit (High Peak Subtype)	---	2006	A	2-High	---	---	G1	S1
Natural Community	6182	High Elevation Rocky Summit (High Peak Subtype)	---	1986-08-27	A	3-Medium	---	---	G1	S1
Natural Community	16804	High Elevation Rocky Summit (High Peak Subtype)	---	1988-08-17	A	2-High	---	---	G1	S1

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Natural Community	30676	High Elevation Rocky Summit (High Peak Subtype)	---	1988-08-16	A	2-High	---	---	G1	S1
Natural Community	19537	High Elevation Rocky Summit (Typic Subtype)	---	2010-08-28	A	3-Medium	---	---	G2	S2
Natural Community	9934	High Elevation Rocky Summit (Typic Subtype)	---	2010-08-26	C	3-Medium	---	---	G2	S2
Natural Community	18901	High Elevation Rocky Summit (Typic Subtype)	---	1986-07-09	A	2-High	---	---	G2	S2
Natural Community	29464	High Elevation Rocky Summit (Typic Subtype)	---	1999-08-26	B	2-High	---	---	G2	S2
Natural Community	25370	High Elevation Rocky Summit (Typic Subtype)	---	2006-07-24	B	2-High	---	---	G2	S2
Natural Community	19720	High Elevation Rocky Summit (Typic Subtype)	---	1988-08-16	A	2-High	---	---	G2	S2
Natural Community	8251	High Elevation Rocky Summit (Typic Subtype)	---	1999-10-10	C	2-High	---	---	G2	S2
Natural Community	29813	High Elevation Rocky Summit (Typic Subtype)	---	1999-08-26	CD	2-High	---	---	G2	S2
Natural Community	24396	Low Elevation Acidic Glade (Grass Subtype)	---	2006-06-07	B	2-High	---	---	G1G2	S2
Natural Community	30124	Low Montane Red Oak Forest	---	2010	B	3-Medium	---	---	G4?	S4?
Natural Community	24397	Low Mountain Pine Forest (Montane Pine Subtype)	---	2006-06-07	BC	2-High	---	---	G3G4	S2?
Natural Community	32654	Montane Cliff (Acidic Herb Subtype)	---	2013-10-13	B	3-Medium	---	---	G3G4	S3
Natural Community	24395	Montane Cliff (Acidic Herb Subtype)	---	2006-06-07	A	2-High	---	---	G3G4	S3
Natural Community	9770	Montane Cliff (Acidic Herb Subtype)	---	1997-05-23	C	2-High	---	---	G3G4	S3
Natural Community	3229	Montane Cliff (Acidic Herb Subtype)	---	1999-08-19	C	2-High	---	---	G3G4	S3
Natural Community	13253	Montane Cliff (Calcareous Subtype)	---	1988-08-18	A	2-High	---	---	G3G4	S1

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Natural Community	32697	Montane Cliff (Calcareous Subtype)	---	2013-10-15	BC	2-High	---	---	G3G4	S1
Natural Community	31589	Montane Oak--Hickory Forest (Acidic Subtype)	---	2010	E	2-High	---	---	G4G5	S4S5
Natural Community	29814	Montane Oak--Hickory Forest (Acidic Subtype)	---	2010	C	2-High	---	---	G4G5	S4S5
Natural Community	11091	Montane Oak--Hickory Forest (Basic Subtype)	---	2010	B	3-Medium	---	---	G3	S3
Natural Community	29466	Montane Oak--Hickory Forest (Basic Subtype)	---	2010	BC	2-High	---	---	G3	S3
Natural Community	2733	Montane Oak--Hickory Forest (Basic Subtype)	---	2010	C	3-Medium	---	---	G3	S3
Natural Community	28325	Montane Oak--Hickory Forest (Basic Subtype)	---	2010	C	2-High	---	---	G3	S3
Natural Community	17148	Northern Hardwood Forest (Beech Gap Subtype)	---	2003-07-27	A	3-Medium	---	---	G1	S1S2
Natural Community	10090	Northern Hardwood Forest (Beech Gap Subtype)	---	2003-06-20	B?	3-Medium	---	---	G1	S1S2
Natural Community	15137	Northern Hardwood Forest (Beech Gap Subtype)	---	2010-08-26	B	3-Medium	---	---	G1	S1S2
Natural Community	6186	Northern Hardwood Forest (Beech Gap Subtype)	---	1987-05-27	B?	3-Medium	---	---	G1	S1S2
Natural Community	30193	Northern Hardwood Forest (Rich Subtype)	---	2016-06-09	AB	4-Low	---	---	G3	S3
Natural Community	19496	Northern Hardwood Forest (Rich Subtype)	---	2010	B	4-Low	---	---	G3	S3
Natural Community	5574	Northern Hardwood Forest (Rich Subtype)	---	2017-08-30	A	2-High	---	---	G3	S3
Natural Community	30177	Northern Hardwood Forest (Rich Subtype)	---	2010-08-28	AB	3-Medium	---	---	G3	S3
Natural Community	14351	Northern Hardwood Forest (Rich Subtype)	---	2015-05-26	BC	3-Medium	---	---	G3	S3

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	8177	Northern Hardwood Forest (Rich Subtype)	---	2013-10-15	A	2-High	---	---	G3	S3
Natural Community	4959	Northern Hardwood Forest (Typic Subtype)	---	2017-05-05	A	4-Low	---	---	G3G4	S3
Natural Community	15939	Northern Hardwood Forest (Typic Subtype)	---	2010	A?	4-Low	---	---	G3G4	S3
Natural Community	273	Northern Hardwood Forest (Typic Subtype)	---	2010-08-28	AB	3-Medium	---	---	G3G4	S3
Natural Community	3763	Northern Hardwood Forest (Typic Subtype)	---	2017-04-24	B	2-High	---	---	G3G4	S3
Natural Community	7347	Northern Hardwood Forest (Typic Subtype)	---	2010	A	4-Low	---	---	G3G4	S3
Natural Community	32176	Northern Hardwood Forest (Typic Subtype)	---	2013-06-19	AB	2-High	---	---	G3G4	S3
Natural Community	16900	Northern Hardwood Forest (Typic Subtype)	---	2010	C	3-Medium	---	---	G3G4	S3
Natural Community	29939	Northern Hardwood Forest (Typic Subtype)	---	2017-08-30	C	2-High	---	---	G3G4	S3
Natural Community	16407	Piedmont/Mountain Semipermanent Impoundment (Montane Marsh Subtype)	---	2010	A	3-Medium	---	---	G3	S3S4
Natural Community	28348	Piedmont/Mountain Semipermanent Impoundment (Montane Marsh Subtype)	---	2009-07-28	E	2-High	---	---	G3	S3S4
Natural Community	30610	Piedmont/Mountain Semipermanent Impoundment (Open Water Subtype)	---	2010	A	3-Medium	---	---	G4G5	S4
Natural Community	30611	Piedmont/Mountain Semipermanent Impoundment (Shrub Subtype)	---	2010	A	3-Medium	---	---	G4	S4
Natural Community	25331	Pine--Oak/Heath (Typic Subtype)	---	2010	BC	2-High	---	---	G3	S3

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	10983	Pine--Oak/Heath (Typic Subtype)	---	2010	B	3-Medium	---	---	G3	S3
Natural Community	25928	Pine--Oak/Heath (Typic Subtype)	---	2014	C	2-High	---	---	G3	S3
Natural Community	32658	Pine--Oak/Heath (Typic Subtype)	---	2013-10-13	C	3-Medium	---	---	G3	S3
Natural Community	30248	Red Spruce--Fraser Fir Forest (Birch Transition Herb Subtype)	---	2010	B	4-Low	---	---	G2	S2
Natural Community	30249	Red Spruce--Fraser Fir Forest (Birch Transition Shrub Subtype)	---	2010	A	3-Medium	---	---	G1?	S1
Natural Community	30247	Red Spruce--Fraser Fir Forest (Boulderfield Subtype)	---	2006	A	4-Low	---	---	G1	S1
Natural Community	9902	Red Spruce--Fraser Fir Forest (Herb Subtype)	---	2006	B	2-High	---	---	G2	S2
Natural Community	30246	Red Spruce--Fraser Fir Forest (Rhododendron Subtype)	---	2010	B	3-Medium	---	---	G1	S1S2
Natural Community	12868	Rich Cove Forest (Boulderfield Subtype)	---	2010	A	3-Medium	---	---	G3	S2
Natural Community	32659	Rich Cove Forest (Boulderfield Subtype)	---	2013-10-13	B	3-Medium	---	---	G3	S2
Natural Community	304	Rich Cove Forest (Montane Intermediate Subtype)	---	2010-08-28	BC	2-High	---	---	G4	S4
Natural Community	19459	Rich Cove Forest (Montane Intermediate Subtype)	---	2010	C	4-Low	---	---	G4	S4
Natural Community	12086	Rich Cove Forest (Montane Intermediate Subtype)	---	2017-04-24	B	2-High	---	---	G4	S4
Natural Community	7516	Rich Cove Forest (Montane Intermediate Subtype)	---	2010	C	4-Low	---	---	G4	S4

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	14689	Rich Cove Forest (Montane Intermediate Subtype)	---	2010	B	4-Low	---	---	G4	S4
Natural Community	18469	Rich Cove Forest (Montane Intermediate Subtype)	---	2010	A	3-Medium	---	---	G4	S4
Natural Community	37753	Rich Cove Forest (Montane Intermediate Subtype)	---	2016	B	6-Unknown	---	---	G4	S4
Natural Community	2473	Rich Cove Forest (Montane Intermediate Subtype)	---	2010	B	2-High	---	---	G4	S4
Natural Community	29938	Rich Cove Forest (Montane Intermediate Subtype)	---	2011-09-26	B	2-High	---	---	G4	S4
Natural Community	32696	Rich Cove Forest (Montane Intermediate Subtype)	---	2013-10-15	C	2-High	---	---	G4	S4
Natural Community	32660	Rich Cove Forest (Montane Intermediate Subtype)	---	2013-10-13	C	3-Medium	---	---	G4	S4
Natural Community	8283	Rich Cove Forest (Montane Rich Subtype)	---	2010	AB	4-Low	---	---	G3G4	S3
Natural Community	8003	Rich Cove Forest (Montane Rich Subtype)	---	2010	A	4-Low	---	---	G3G4	S3
Natural Community	5761	Rich Montane Seep	---	1989	A	4-Low	---	---	G3	S3
Natural Community	30353	Rich Montane Seep	---	2011	A	3-Medium	---	---	G3	S3
Natural Community	2692	Rich Montane Seep	---	2015-05-27	A	3-Medium	---	---	G3	S3
Natural Community	11527	Rich Montane Seep	---	2017-04-24	AB	2-High	---	---	G3	S3
Natural Community	14041	Rich Montane Seep	---	1998-06-26	B?	2-High	---	---	G3	S3

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	10131	Rich Montane Seep	---	2017-08-30	A	2-High	---	---	G3	S3
Natural Community	570	Rich Montane Seep	---	1998-07-01	C	2-High	---	---	G3	S3
Natural Community	29787	Rich Montane Seep	---	1999-08-17	BC	2-High	---	---	G3	S3
Natural Community	19468	Rich Montane Seep	---	1998-06-30	C	2-High	---	---	G3	S3
Natural Community	29752	Rich Montane Seep	---	2010-08-24	AB	2-High	---	---	G3	S3
Natural Community	35370	Rich Montane Seep	---	2015-05-26	BC	2-High	---	---	G3	S3
Natural Community	8679	Rich Montane Seep	---	1986-06-16	A	2-High	---	---	G3	S3
Natural Community	15454	Southern Appalachian Bog (Long Hope Valley Subtype)	---	2005-05-02	A	2-High	---	---	G1	S1
Natural Community	5224	Southern Appalachian Bog (Long Hope Valley Subtype)	---	2006-07-20	A	2-High	---	---	G1	S1
Natural Community	4748	Southern Appalachian Bog (Long Hope Valley Subtype)	---	2006-07-20	A	2-High	---	---	G1	S1
Natural Community	10900	Southern Appalachian Bog (Long Hope Valley Subtype)	---	2006-07-20	A	2-High	---	---	G1	S1
Natural Community	16304	Southern Appalachian Bog (Typic Subtype)	---	1990-06-20	C	3-Medium	---	---	G1G2	S1S2
Natural Community	18429	Southern Appalachian Bog (Typic Subtype)	---	2009-07-28	A	2-High	---	---	G1G2	S1S2
Natural Community	13544	Southern Appalachian Bog (Typic Subtype)	---	2017-08-30	A	2-High	---	---	G1G2	S1S2
Natural Community	3707	Spray Cliff	---	1997-05-23	E	2-High	---	---	G2	S2
Natural Community	13534	Spray Cliff	---	1999-08-19	BC	2-High	---	---	G2	S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	18922	Swamp Forest--Bog Complex (Spruce Subtype)	---	1989-09-21	A	4-Low	---	---	G2?	S1
Natural Community	18229	Swamp Forest--Bog Complex (Typic Subtype)	---	1989-09-21	NR	4-Low	---	---	G2	S2
Natural Community	25098	Swamp Forest--Bog Complex (Typic Subtype)	---	2007-07-02	B?	2-High	---	---	G2	S2
Reptile	20382	Crotalus horridus	Timber Rattlesnake	2004-05-28	E	3-Medium	---	Special Concern	G4	S3
Reptile	361	Glyptemys muhlenbergii	Bog Turtle	2014-06-06	AB	3-Medium	Threatened Similar Appearance	Threatened	G3	S2
Reptile	26132	Glyptemys muhlenbergii	Bog Turtle	2008-06-03	CD	3-Medium	Threatened Similar Appearance	Threatened	G3	S2
Sawfly, Wasp, Bee, or Ant	37110	Bombus affinis	Rusty-patched Bumble Bee	1934-Summer	H	4-Low	Endangered	Significantly Rare	G1	S1
Sawfly, Wasp, Bee, or Ant	37109	Bombus affinis	Rusty-patched Bumble Bee	1921-08-17	H	4-Low	Endangered	Significantly Rare	G1	S1
Sawfly, Wasp, Bee, or Ant	37143	Bombus affinis	Rusty-patched Bumble Bee	1908-09-11	H	4-Low	Endangered	Significantly Rare	G1	S1
Sawfly, Wasp, Bee, or Ant	37145	Bombus affinis	Rusty-patched Bumble Bee	1975-07-27	H?	5-Very Low	Endangered	Significantly Rare	G1	S1
Stonefly	7713	Bolotoperla rossi	Smoky Willowfly	1990-03-05	H?	3-Medium	---	Significantly Rare	G4	S3
Stonefly	17693	Bolotoperla rossi	Smoky Willowfly	1990-03-06	H?	3-Medium	---	Significantly Rare	G4	S3
Vascular Plant	10227	Aconitum reclinatum	Trailing Wolfsbane	1982	H	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	14357	Aconitum reclinatum	Trailing Wolfsbane	2006-07-20	A	2-High	---	Significantly Rare Throughout	G3	S3
Vascular Plant	11993	Aconitum reclinatum	Trailing Wolfsbane	1999-07-13	B	3-Medium	---	Significantly Rare Throughout	G3	S3

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	2864	Aconitum reclinatum	Trailing Wolfsbane	2015-05-27	A	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	9495	Aconitum reclinatum	Trailing Wolfsbane	1997-06-17	B	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	36646	Aconitum reclinatum	Trailing Wolfsbane	2015-05-21	A	2-High	---	Significantly Rare Throughout	G3	S3
Vascular Plant	7780	Aconitum reclinatum	Trailing Wolfsbane	1995-07-13	AB	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	16002	Aconitum reclinatum	Trailing Wolfsbane	2013-10-15	B	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	8453	Aconitum reclinatum	Trailing Wolfsbane	2013-09-05	B	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	19531	Aconitum reclinatum	Trailing Wolfsbane	1998-06-18	BC	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	2220	Aconitum reclinatum	Trailing Wolfsbane	1989	A	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	3352	Aconitum reclinatum	Trailing Wolfsbane	1988-08-17	B	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	15447	Aconitum reclinatum	Trailing Wolfsbane	1994-08-12	BC	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	13807	Aconitum reclinatum	Trailing Wolfsbane	1998-06-30	B	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	18982	Aconitum reclinatum	Trailing Wolfsbane	1982-06-30	H	3-Medium	---	Significantly Rare Throughout	G3	S3

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	18435	Aconitum reclinatum	Trailing Wolfsbane	1998-09-17	B	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	18276	Aconitum reclinatum	Trailing Wolfsbane	1992-07-28	C	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	24404	Allium allegheniense	Allegheny Onion	2006-07-24	C?	2-High	---	Significantly Rare Throughout	G3?	S1
Vascular Plant	15117	Anthoxanthum hirtum	Holy Grass	1969-05-27	H	3-Medium	---	Significantly Rare Disjunct	G5	S1
Vascular Plant	11295	Arisaema stewardsonii	Bog Jack-in-the-pulpit	1977-05-15	H	3-Medium	---	Significantly Rare Peripheral	G5T4T5	S2
Vascular Plant	26130	Arisaema stewardsonii	Bog Jack-in-the-pulpit	1999-07-13	E	3-Medium	---	Significantly Rare Peripheral	G5T4T5	S2
Vascular Plant	34746	Athyrium angustum	Northern Lady Fern	2013-09-10	E	2-High	---	Significantly Rare Peripheral	G5T5	S1
Vascular Plant	5211	Brachyelytrum aristosum	Northern Shorthusk	1995-07-13	E	4-Low	---	Significantly Rare Peripheral	G5	S3
Vascular Plant	17473	Brachyelytrum aristosum	Northern Shorthusk	1978-07-10	E	4-Low	---	Significantly Rare Peripheral	G5	S3
Vascular Plant	26146	Brachyelytrum aristosum	Northern Shorthusk	1999-07-13	E	2-High	---	Significantly Rare Peripheral	G5	S3
Vascular Plant	26147	Brachyelytrum aristosum	Northern Shorthusk	1999-07-13	E	2-High	---	Significantly Rare Peripheral	G5	S3
Vascular Plant	16173	Bromus ciliatus	Fringed Brome	1993-09	A	3-Medium	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	1781	Bromus ciliatus	Fringed Brome	1993-09	A	3-Medium	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	2939	Calamagrostis canadensis var. canadensis	Canada Reed Grass	1969-09-27	H	4-Low	---	Significantly Rare Peripheral	G5T5	S1
Vascular Plant	20084	Calamagrostis canadensis var. canadensis	Canada Reed Grass	1991-10-20	A	3-Medium	---	Significantly Rare Peripheral	G5T5	S1

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Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	33919	Caltha palustris var. palustris	Marsh-marigold	1972-04-22	H	4-Low	---	Endangered	G5T5	S1
Vascular Plant	4414	Caltha palustris var. palustris	Marsh-marigold	1979-05-01	H	4-Low	---	Endangered	G5T5	S1
Vascular Plant	16468	Caltha palustris var. palustris	Marsh-marigold	1990-05	D	3-Medium	---	Endangered	G5T5	S1
Vascular Plant	368	Cardamine clematitis	Mountain Bittercress	2017-05-13	B	3-Medium	---	Significantly Rare Throughout	G3	S2S3
Vascular Plant	7141	Cardamine clematitis	Mountain Bittercress	2014-05-26	B	3-Medium	---	Significantly Rare Throughout	G3	S2S3
Vascular Plant	5387	Cardamine clematitis	Mountain Bittercress	1991-07-24	A	3-Medium	---	Significantly Rare Throughout	G3	S2S3
Vascular Plant	9253	Cardamine clematitis	Mountain Bittercress	1994-08-30	A	3-Medium	---	Significantly Rare Throughout	G3	S2S3
Vascular Plant	9254	Cardamine clematitis	Mountain Bittercress	1991-08-25	A	3-Medium	---	Significantly Rare Throughout	G3	S2S3
Vascular Plant	20002	Cardamine clematitis	Mountain Bittercress	1994-07-20	A	3-Medium	---	Significantly Rare Throughout	G3	S2S3
Vascular Plant	17038	Cardamine clematitis	Mountain Bittercress	1989	A	3-Medium	---	Significantly Rare Throughout	G3	S2S3
Vascular Plant	16481	Cardamine rotundifolia	Mountain Watercress	1968-05-23	H	3-Medium	---	Threatened	G4	S2
Vascular Plant	1990	Cardamine rotundifolia	Mountain Watercress	1998-09-17	B	3-Medium	---	Threatened	G4	S2
Vascular Plant	749	Cardamine rotundifolia	Mountain Watercress	1998-06-18	E	3-Medium	---	Threatened	G4	S2
Vascular Plant	25082	Cardamine rotundifolia	Mountain Watercress	2004-07-15	AB	2-High	---	Threatened	G4	S2
Vascular Plant	28518	Carex arctata	Black Sedge	2006-02	E	5-Very Low	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	28517	Carex baileyi	Bailey's Sedge	2007-06-24	A	4-Low	---	Significantly Rare Peripheral	G4	S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	26204	Carex baileyi	Bailey's Sedge	1999-07-15	E	2-High	---	Significantly Rare Peripheral	G4	S2
Vascular Plant	25003	Carex baileyi	Bailey's Sedge	2007-07-02	A	2-High	---	Significantly Rare Peripheral	G4	S2
Vascular Plant	25137	Carex baileyi	Bailey's Sedge	1999-07-15	E	2-High	---	Significantly Rare Peripheral	G4	S2
Vascular Plant	26206	Carex buxbaumii	Brown Bog Sedge	1999-07-13	B?	2-High	---	Special Concern Vulnerable	G5	S2
Vascular Plant	26205	Carex buxbaumii	Brown Bog Sedge	1999-07-15	A	2-High	---	Special Concern Vulnerable	G5	S2
Vascular Plant	23760	Carex buxbaumii	Brown Bog Sedge	2007-07-02	AB	2-High	---	Special Concern Vulnerable	G5	S2
Vascular Plant	26207	Carex buxbaumii	Brown Bog Sedge	1970-06-27	H	2-High	---	Special Concern Vulnerable	G5	S2
Vascular Plant	25129	Carex lasiocarpa var. americana	Slender Sedge	1999-Summer	E	3-Medium	---	Significantly Rare Peripheral	G5T5	S1
Vascular Plant	8776	Carex oligosperma	Few-seeded Sedge	2006-07-22	A	3-Medium	---	Endangered	G5	S1
Vascular Plant	26209	Carex oligosperma	Few-seeded Sedge	1999-07-15	AB	2-High	---	Endangered	G5	S1
Vascular Plant	26294	Carex roanensis	Roan Sedge	2006	B	4-Low	---	Significantly Rare Throughout	G2G3	S2
Vascular Plant	25088	Carex roanensis	Roan Sedge	2007-07-02	E	2-High	---	Significantly Rare Throughout	G2G3	S2
Vascular Plant	4617	Carex trisperma	Three-seeded Sedge	2007	A	3-Medium	---	Endangered	G5	S1
Vascular Plant	28807	Carex trisperma	Three-seeded Sedge	1999-07-15	E	3-Medium	---	Endangered	G5	S1
Vascular Plant	26920	Carex trisperma	Three-seeded Sedge	2007-07	D?	2-High	---	Endangered	G5	S1
Vascular Plant	25138	Carex vesicaria	Inflated Sedge	1989-1999	E	3-Medium	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	21229	Celastrus scandens	American Bittersweet	1958-07-25	H	4-Low	---	Endangered	G5	S2?
Vascular Plant	11732	Chamerion platyphyllum	Fireweed	1941-08-30	H	4-Low	---	Endangered	G5T5	S1
Vascular Plant	25139	Chamerion platyphyllum	Fireweed	2011-06-28	B	2-High	---	Endangered	G5T5	S1

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Vascular Plant	36467	Chamerion platyphyllum	Fireweed	2011-pre	B?	3-Medium	---	Endangered	G5T5	S1
Vascular Plant	33188	Chamerion platyphyllum	Fireweed	2006-08-07	E	2-High	---	Endangered	G5T5	S1
Vascular Plant	33193	Chelone cuthbertii	Cuthbert's Turtlehead	2006-08-06	E	2-High	---	Special Concern Vulnerable	G3	S3
Vascular Plant	33805	Chelone cuthbertii	Cuthbert's Turtlehead	2007-07-07	E	2-High	---	Special Concern Vulnerable	G3	S3
Vascular Plant	33811	Chelone obliqua	Red Turtlehead	2006-07-28	E	2-High	---	Significantly Rare Throughout	G4	S2
Vascular Plant	33810	Chelone obliqua	Red Turtlehead	2006-07-18	E	2-High	---	Significantly Rare Throughout	G4	S2
Vascular Plant	3103	Cladium mariscoides	Twig-rush	1984	A	3-Medium	---	Significantly Rare Other	G5	S3
Vascular Plant	33836	Cladium mariscoides	Twig-rush	1999-07-15	E	2-High	---	Significantly Rare Other	G5	S3
Vascular Plant	4399	Conioselinum chinense	Hemlock-parsley	1995-07-13	A	3-Medium	---	Threatened	G5	S1
Vascular Plant	28390	Corallorhiza maculata var. maculata	Spotted Coralroot	1972-08-22	H	3-Medium	---	Significantly Rare Peripheral	G5T5	S1
Vascular Plant	17741	Crocanthemum propinquum	Creeping Sunrose	1993	CD	3-Medium	---	Threatened	G4	S1
Vascular Plant	5439	Cystopteris fragilis	Fragile Fern	1994	E	3-Medium	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	24657	Cystopteris tenuis	Upland Bladder-fern	2002-06	E	3-Medium	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	26228	Dactylorhiza viridis	Long-bracted Frog Orchid	1999-07-13	E	2-High	---	Endangered	G5T5	S1
Vascular Plant	18204	Delphinium exaltatum	Tall Larkspur	2017-07	A	2-High	---	Endangered	G3	S2
Vascular Plant	31850	Dendrolycopodium dendroideum	Prickly Ground-pine	1989-06-05	E	2-High	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	4784	Dicentra eximia	Bleeding Heart	1971-05	H	4-Low	---	Significantly Rare Peripheral	G4	S3
Vascular Plant	15564	Dicentra eximia	Bleeding Heart	1965-05-09	H	3-Medium	---	Significantly Rare Peripheral	G4	S3

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	34747	Epilobium ciliatum ssp. ciliatum	American Willow-herb	2013-09-10	E	2-High	---	Significantly Rare Peripheral	G5T5	S2
Vascular Plant	26850	Epilobium ciliatum ssp. ciliatum	American Willow-herb	2017-08-30	BC	2-High	---	Significantly Rare Peripheral	G5T5	S2
Vascular Plant	17198	Filipendula rubra	Queen-of-the-prairie	1978-06-25	F	3-Medium	---	Endangered	G4G5	S1
Vascular Plant	38340	Filipendula rubra	Queen-of-the-prairie	2018-06	E	2-High	---	Endangered	G4G5	S1
Vascular Plant	38336	Filipendula rubra	Queen-of-the-prairie	2018-06	E	2-High	---	Endangered	G4G5	S1
Vascular Plant	4719	Gentianopsis crinita	Fringed Gentian	2011-09-27	A	3-Medium	---	Threatened	G5	S1
Vascular Plant	11218	Geum geniculatum	Bent Avens	2017-06-20	A	3-Medium	---	Special Concern Vulnerable	G2	S1S2
Vascular Plant	12204	Geum geniculatum	Bent Avens	1995-07-13	A	3-Medium	---	Special Concern Vulnerable	G2	S1S2
Vascular Plant	6360	Geum geniculatum	Bent Avens	1995-07-13	A	3-Medium	---	Special Concern Vulnerable	G2	S1S2
Vascular Plant	3682	Geum geniculatum	Bent Avens	1995-07-25	BC	3-Medium	---	Special Concern Vulnerable	G2	S1S2
Vascular Plant	16573	Geum geniculatum	Bent Avens	1995-07-25	A	3-Medium	---	Special Concern Vulnerable	G2	S1S2
Vascular Plant	35154	Geum radiatum	Spreading Avens	2008-08-04	E	4-Low	Endangered	Endangered	G2	S2
Vascular Plant	646	Geum radiatum	Spreading Avens	1999-09-18	A	3-Medium	Endangered	Endangered	G2	S2
Vascular Plant	13056	Geum radiatum	Spreading Avens	2002-07-18	AB	3-Medium	Endangered	Endangered	G2	S2
Vascular Plant	28207	Geum radiatum	Spreading Avens	2013-05-03	D	2-High	Endangered	Endangered	G2	S2
Vascular Plant	953	Geum radiatum	Spreading Avens	2008	CD	2-High	Endangered	Endangered	G2	S2
Vascular Plant	7594	Geum radiatum	Spreading Avens	2007-09	C	2-High	Endangered	Endangered	G2	S2
Vascular Plant	28206	Geum radiatum	Spreading Avens	2000s	F	2-High	Endangered	Endangered	G2	S2
Vascular Plant	19790	Houstonia montana	Roan Mountain Bluet	1994-08	E	3-Medium	Endangered	Endangered	G5T2	S2
Vascular Plant	1723	Houstonia montana	Roan Mountain Bluet	1998-09-10	E	3-Medium	Endangered	Endangered	G5T2	S2
Vascular Plant	17319	Houstonia montana	Roan Mountain Bluet	2001-08-24	B	3-Medium	Endangered	Endangered	G5T2	S2
Vascular Plant	28219	Houstonia montana	Roan Mountain Bluet	2001-08-24	A	3-Medium	Endangered	Endangered	G5T2	S2
Vascular Plant	19791	Houstonia montana	Roan Mountain Bluet	1994-08-10	C	3-Medium	Endangered	Endangered	G5T2	S2
Vascular Plant	25887	Houstonia montana	Roan Mountain Bluet	1998-09-02	AC	3-Medium	Endangered	Endangered	G5T2	S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

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Vascular Plant	3578	Houstonia montana	Roan Mountain Bluet	1999-09-18	A	3-Medium	Endangered	Endangered	G5T2	S2
Vascular Plant	3561	Houstonia montana	Roan Mountain Bluet	2002-07-18	AB	3-Medium	Endangered	Endangered	G5T2	S2
Vascular Plant	10891	Houstonia montana	Roan Mountain Bluet	1992-07-15	AB	2-High	Endangered	Endangered	G5T2	S2
Vascular Plant	264	Houstonia montana	Roan Mountain Bluet	1994-07-20	A	2-High	Endangered	Endangered	G5T2	S2
Vascular Plant	5993	Houstonia montana	Roan Mountain Bluet	2004-07	A	2-High	Endangered	Endangered	G5T2	S2
Vascular Plant	28218	Houstonia montana	Roan Mountain Bluet	1991-08-27	F	2-High	Endangered	Endangered	G5T2	S2
Vascular Plant	19186	Houstonia montana	Roan Mountain Bluet	1992-08-08	A	2-High	Endangered	Endangered	G5T2	S2
Vascular Plant	14036	Houstonia montana	Roan Mountain Bluet	2001-09-09	D	2-High	Endangered	Endangered	G5T2	S2
Vascular Plant	8590	Hydrastis canadensis	Goldenseal	1975-05-20	H	3-Medium	---	Significantly Rare Other	G3G4	S3
Vascular Plant	4487	Ilex collina	Long-stalked Holly	2007-07-02	AB	2-High	---	Special Concern Vulnerable	G3	S1
Vascular Plant	16371	Ilex collina	Long-stalked Holly	2012-06-20	A	2-High	---	Special Concern Vulnerable	G3	S1
Vascular Plant	14524	Ilex collina	Long-stalked Holly	2006-07-19	B	2-High	---	Special Concern Vulnerable	G3	S1
Vascular Plant	26118	Ilex collina	Long-stalked Holly	2006-07-18	E	2-High	---	Special Concern Vulnerable	G3	S1
Vascular Plant	26119	Ilex collina	Long-stalked Holly	2006-07-16	AB	2-High	---	Special Concern Vulnerable	G3	S1
Vascular Plant	25307	Ilex collina	Long-stalked Holly	2006-07-19	B?	2-High	---	Special Concern Vulnerable	G3	S1
Vascular Plant	25707	Ilex collina	Long-stalked Holly	2006-07-20	A	2-High	---	Special Concern Vulnerable	G3	S1
Vascular Plant	26836	Ilex collina	Long-stalked Holly	2007-07-02	B	2-High	---	Special Concern Vulnerable	G3	S1

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Vascular Plant	26117	Ilex collina	Long-stalked Holly	1999-07-15	AB	2-High	---	Special Concern Vulnerable	G3	S1
Vascular Plant	15091	Liatris helleri	Heller's Blazing-star	1989-06-27	C	3-Medium	Threatened	Threatened	G2Q	S2
Vascular Plant	1627	Liatris helleri	Heller's Blazing-star	1998-09-10	E	3-Medium	Threatened	Threatened	G2Q	S2
Vascular Plant	7533	Liatris helleri	Heller's Blazing-star	1994-08-10	A	3-Medium	Threatened	Threatened	G2Q	S2
Vascular Plant	19047	Liatris helleri	Heller's Blazing-star	1991-08-27	A	3-Medium	Threatened	Threatened	G2Q	S2
Vascular Plant	7021	Liatris helleri	Heller's Blazing-star	1991-08-16	D	3-Medium	Threatened	Threatened	G2Q	S2
Vascular Plant	14959	Liatris helleri	Heller's Blazing-star	1994-08	BC	3-Medium	Threatened	Threatened	G2Q	S2
Vascular Plant	14309	Liatris helleri	Heller's Blazing-star	1995-07-15	A	3-Medium	Threatened	Threatened	G2Q	S2
Vascular Plant	3096	Liatris helleri	Heller's Blazing-star	1981-08-04	F	2-High	Threatened	Threatened	G2Q	S2
Vascular Plant	10278	Liatris helleri	Heller's Blazing-star	2007-09-04	B	2-High	Threatened	Threatened	G2Q	S2
Vascular Plant	18726	Lilium canadense var. canadense	Yellow Canada Lily	2002-06	E	2-High	---	Endangered	G5T4?	S1
Vascular Plant	2219	Lilium grayi	Gray's Lily	2002-06-15	AC	4-Low	---	Threatened	G3	S1S2
Vascular Plant	1677	Lilium grayi	Gray's Lily	2010-06-21	A	2-High	---	Threatened	G3	S1S2
Vascular Plant	27073	Lilium grayi	Gray's Lily	2007	B	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	9153	Lilium grayi	Gray's Lily	1961-06-24	X	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	12072	Lilium grayi	Gray's Lily	2017-07-19	A	2-High	---	Threatened	G3	S1S2
Vascular Plant	12300	Lilium grayi	Gray's Lily	2006-07-06	BC	2-High	---	Threatened	G3	S1S2
Vascular Plant	15548	Lilium grayi	Gray's Lily	2017-06-20	A	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	10508	Lilium grayi	Gray's Lily	2013-07-01	D	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	14936	Lilium grayi	Gray's Lily	1978-06-18	H?	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	17415	Lilium grayi	Gray's Lily	2012-06-09	A	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	17133	Lilium grayi	Gray's Lily	2002-06	E	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	5521	Lilium grayi	Gray's Lily	1988-06-18	C	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	26233	Lilium grayi	Gray's Lily	2008-06-24	E	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	11076	Lilium grayi	Gray's Lily	1987-05-27	B	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	12857	Lilium grayi	Gray's Lily	1998-09-17	D	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	26112	Lilium grayi	Gray's Lily	2008-06-24	E	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	9985	Lilium grayi	Gray's Lily	1970-06-22	H	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	26232	Lilium grayi	Gray's Lily	2008-06-24	E	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	26234	Lilium grayi	Gray's Lily	2008-06-24	E	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	26111	Lilium grayi	Gray's Lily	2008-06-24	B?	3-Medium	---	Threatened	G3	S1S2
Vascular Plant	27119	Lilium grayi	Gray's Lily	1967-07-09	H	2-High	---	Threatened	G3	S1S2
Vascular Plant	26108	Lilium grayi	Gray's Lily	2006-07-18	E	2-High	---	Threatened	G3	S1S2

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Vascular Plant	26110	Lilium grayi	Gray's Lily	2006-07-21	E	2-High	---	Threatened	G3	S1S2
Vascular Plant	24755	Lilium grayi	Gray's Lily	2006-07-06	A	2-High	---	Threatened	G3	S1S2
Vascular Plant	25393	Lilium grayi	Gray's Lily	2006-Pre	F	2-High	---	Threatened	G3	S1S2
Vascular Plant	13238	Lilium grayi	Gray's Lily	1992-06-24	D	2-High	---	Threatened	G3	S1S2
Vascular Plant	24798	Lilium grayi	Gray's Lily	2008-06-24	E	2-High	---	Threatened	G3	S1S2
Vascular Plant	27071	Lilium grayi	Gray's Lily	2007-06	D	2-High	---	Threatened	G3	S1S2
Vascular Plant	26107	Lilium grayi	Gray's Lily	1999-07-15	B?	2-High	---	Threatened	G3	S1S2
Vascular Plant	26109	Lilium grayi	Gray's Lily	1999-07-13	E	2-High	---	Threatened	G3	S1S2
Vascular Plant	4419	Lilium philadelphicum var. philadelphicum	Wood Lily	2009-07-28	C?	3-Medium	---	Endangered	G5T4T5	S2
Vascular Plant	4760	Lilium philadelphicum var. philadelphicum	Wood Lily	2017-07-26	A	3-Medium	---	Endangered	G5T4T5	S2
Vascular Plant	6620	Liparis loeselii	Fen Orchid	1969	H	3-Medium	---	Endangered	G5	S1
Vascular Plant	4839	Lonicera canadensis	American Fly-honeysuckle	1968-04-27	H	3-Medium	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	8891	Lonicera canadensis	American Fly-honeysuckle	2017-04-24	A	2-High	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	16992	Lonicera canadensis	American Fly-honeysuckle	1994-05-25	E	3-Medium	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	19588	Lonicera canadensis	American Fly-honeysuckle	2017-08-30	A	2-High	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	26125	Lonicera canadensis	American Fly-honeysuckle	1994-05-25	E	3-Medium	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	26123	Lonicera canadensis	American Fly-honeysuckle	2006-07-16	E	2-High	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	26124	Lonicera canadensis	American Fly-honeysuckle	2006-07-22	E	2-High	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	5579	Lycopodiella inundata	Bog Clubmoss	2002-12-12	A	3-Medium	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	20375	Malaxis bayardii	Appalachian Adder's-mouth	1933-Pre	H	4-Low	---	Significantly Rare Throughout	G1G2	S1
Vascular Plant	16379	Meehania cordata	Meehania	1958-06	H	4-Low	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	24767	Meehania cordata	Meehania	2006	E	4-Low	---	Significantly Rare Peripheral	G5	S2

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Vascular Plant	6170	Meehania cordata	Meehania	1974-07-18	H	3-Medium	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	3376	Meehania cordata	Meehania	1969-06-18	H	3-Medium	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	13384	Meehania cordata	Meehania	2003-06-19	A	3-Medium	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	29753	Meehania cordata	Meehania	2010-08-24	A?	3-Medium	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	6459	Meehania cordata	Meehania	2011-09-26	AB	3-Medium	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	35368	Meehania cordata	Meehania	2015-05-26	A	2-High	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	26101	Meehania cordata	Meehania	1999-07-15	C?	2-High	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	1283	Meehania cordata	Meehania	2006-07-19	B	2-High	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	25447	Menyanthes trifoliata	Buckbean	2012-06-20	E	2-High	---	Threatened	G5	S1
Vascular Plant	25446	Menyanthes trifoliata	Buckbean	2012-06-20	B?	2-High	---	Threatened	G5	S1
Vascular Plant	27185	Micranthes caroliniana	Carolina Saxifrage	1968-05-03	H	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	17649	Micranthes caroliniana	Carolina Saxifrage	1975-04	H	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	18980	Micranthes caroliniana	Carolina Saxifrage	1994-07-19	C	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	15131	Micranthes caroliniana	Carolina Saxifrage	1994-07-20	B	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	14123	Micranthes caroliniana	Carolina Saxifrage	1997-05-23	E	3-Medium	---	Significantly Rare Throughout	G3	S3
Vascular Plant	22697	Micranthes caroliniana	Carolina Saxifrage	2005-10-29	A	2-High	---	Significantly Rare Throughout	G3	S3

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Vascular Plant	20500	Micranthes caroliniana	Carolina Saxifrage	2004-03-09	A	2-High	---	Significantly Rare Throughout	G3	S3
Vascular Plant	5467	Micranthes pensylvanica	Swamp Saxifrage	1969-05	H	4-Low	---	Endangered	G5	S1
Vascular Plant	19923	Micranthes pensylvanica	Swamp Saxifrage	2007-07-02	A	3-Medium	---	Endangered	G5	S1
Vascular Plant	17356	Micranthes pensylvanica	Swamp Saxifrage	1988-06-17	A	3-Medium	---	Endangered	G5	S1
Vascular Plant	23532	Micranthes pensylvanica	Swamp Saxifrage	2004-05-04	E	2-High	---	Endangered	G5	S1
Vascular Plant	34748	Muhlenbergia sobolifera	Rock Muhly	2013-06-05	E	2-High	---	Special Concern Vulnerable	G5	S2
Vascular Plant	26097	Oenothera perennis	Perennial Sundrops	2006-07-20	BC	2-High	---	Special Concern Vulnerable	G5	S2
Vascular Plant	26848	Oenothera perennis	Perennial Sundrops	2007-07-02	BC	2-High	---	Special Concern Vulnerable	G5	S2
Vascular Plant	24587	Packera crawfordii	Bog Ragwort	2006-07-28	E	2-High	---	Significantly Rare Throughout	G2G3	S1
Vascular Plant	7782	Packera paupercula var. paupercula	Balsam Ragwort	1963-08	H	5-Very Low	---	Significantly Rare Peripheral	G5	S1?
Vascular Plant	13765	Packera schweinitziana	Schweinitz's Ragwort	1987-07-08	E	4-Low	---	Threatened	G5?	S2
Vascular Plant	18559	Packera schweinitziana	Schweinitz's Ragwort	1987-07-16	B	3-Medium	---	Threatened	G5?	S2
Vascular Plant	16586	Packera schweinitziana	Schweinitz's Ragwort	1987-07-16	A	3-Medium	---	Threatened	G5?	S2
Vascular Plant	33934	Parnassia grandifolia	Large-leaved Grass-of-parnassus	2014-09-23	B	2-High	---	Threatened	G3	S2
Vascular Plant	7749	Parnassia grandifolia	Large-leaved Grass-of-parnassus	2002-09-30	E	2-High	---	Threatened	G3	S2
Vascular Plant	33512	Parnassia grandifolia	Large-leaved Grass-of-parnassus	2006-07-18	E	2-High	---	Threatened	G3	S2
Vascular Plant	5152	Platanthera grandiflora	Large Purple-fringed Orchid	2007-06-24	E	4-Low	---	Threatened	G5	S2
Vascular Plant	20092	Platanthera grandiflora	Large Purple-fringed Orchid	1991	BC	4-Low	---	Threatened	G5	S2
Vascular Plant	7354	Platanthera grandiflora	Large Purple-fringed Orchid	2002-07-18	E	4-Low	---	Threatened	G5	S2

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Vascular Plant	34745	Platanthera grandiflora	Large Purple-fringed Orchid	2014-07-29	E	3-Medium	---	Threatened	G5	S2
Vascular Plant	23548	Platanthera herbiola	Northern Rein Orchid	2004-06-17	E	3-Medium	---	Significantly Rare Peripheral	G4?T4Q	S1S2
Vascular Plant	26229	Platanthera peramoena	Purple Fringeless Orchid	1999-07-13	E	2-High	---	Threatened	G5	S2
Vascular Plant	37125	Platanthera shriveri	Shriver's Purple Fringed Orchid	2016-06-25	D	2-High	---	Significantly Rare Throughout	G1	S1
Vascular Plant	22123	Polemonium reptans var. reptans	Jacob's Ladder	1974-05	H	4-Low	---	Threatened	G5T5	S1
Vascular Plant	6009	Pyrola elliptica	Elliptic Shinleaf	1970-05-16	H	4-Low	---	Endangered	G5	S1
Vascular Plant	539	Rhodiola rosea	Roseroot	1932-Pre	H	5-Very Low	---	Endangered	G5	SH
Vascular Plant	2752	Rhododendron vaseyi	Pink-shell Azalea	1995-07-15	A	3-Medium	---	Significantly Rare Limited	G3	S3
Vascular Plant	11171	Rhododendron vaseyi	Pink-shell Azalea	1994-07-20	A	3-Medium	---	Significantly Rare Limited	G3	S3
Vascular Plant	25292	Rhynchospora alba	Northern White Beaksedge	2006-07-22	A	3-Medium	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	25293	Rhynchospora alba	Northern White Beaksedge	1984	E	2-High	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	24773	Rhynchospora alba	Northern White Beaksedge	2006-07-23	A	2-High	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	25857	Rhynchospora alba	Northern White Beaksedge	2006-07-26	A	2-High	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	25294	Rhynchospora alba	Northern White Beaksedge	1984	E	2-High	---	Significantly Rare Peripheral	G5	S2
Vascular Plant	11227	Solidago spithamaea	Blue Ridge Goldenrod	1991-07-26	B	3-Medium	Threatened	Threatened	G2	S2
Vascular Plant	7010	Solidago spithamaea	Blue Ridge Goldenrod	1989-06-29	B	3-Medium	Threatened	Threatened	G2	S2
Vascular Plant	10659	Solidago spithamaea	Blue Ridge Goldenrod	1991-08-21	C	3-Medium	Threatened	Threatened	G2	S2
Vascular Plant	4651	Solidago spithamaea	Blue Ridge Goldenrod	1991-08-01	BD	2-High	Threatened	Threatened	G2	S2
Vascular Plant	11238	Solidago spithamaea	Blue Ridge Goldenrod	1991-08-27	A	2-High	Threatened	Threatened	G2	S2
Vascular Plant	10660	Solidago spithamaea	Blue Ridge Goldenrod	1991-07-24	B	2-High	Threatened	Threatened	G2	S2
Vascular Plant	15238	Solidago uliginosa var. uliginosa	Bog Goldenrod	1984-05-25	A	3-Medium	---	Significantly Rare Peripheral	G4G5T4T5	S1S2

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Vascular Plant	9680	Solidago uliginosa var. uliginosa	Bog Goldenrod	2002-06	E	2-High	---	Significantly Rare Peripheral	G4G5T 4T5	S1S2
Vascular Plant	13683	Spiranthes ochroleuca	Yellow Ladies'-tresses	1960-10-08	H	4-Low	---	Threatened	G4	S1
Vascular Plant	28689	Spiranthes ochroleuca	Yellow Ladies'-tresses	2005-Pre	A	3-Medium	---	Threatened	G4	S1
Vascular Plant	28686	Spiranthes ochroleuca	Yellow Ladies'-tresses	2003-09-23	A	2-High	---	Threatened	G4	S1
Vascular Plant	28684	Spiranthes ochroleuca	Yellow Ladies'-tresses	2005-09	E	2-High	---	Threatened	G4	S1
Vascular Plant	36797	Stachys appalachiana	Appalachian Hedge-nettle	1958-07-25	H	3-Medium	---	Significantly Rare Limited	GNR	S1
Vascular Plant	20060	Stenanthium leimanthoides	Pinebarren Death-camas	1991-08-17	AB	3-Medium	---	Threatened	G4Q	S1
Vascular Plant	19621	Stenanthium leimanthoides	Pinebarren Death-camas	1991-08-17	A	3-Medium	---	Threatened	G4Q	S1
Vascular Plant	4062	Taxus canadensis	Canada Yew	1988-06-17	A	3-Medium	---	Threatened	G5	S1
Vascular Plant	25249	Taxus canadensis	Canada Yew	2006-07-22	A?	2-High	---	Threatened	G5	S1
Vascular Plant	8020	Taxus canadensis	Canada Yew	2012-06-20	B	2-High	---	Threatened	G5	S1
Vascular Plant	26104	Taxus canadensis	Canada Yew	1999-07-15	E	2-High	---	Threatened	G5	S1
Vascular Plant	26230	Tradescantia virginiana	Virginia Spiderwort	1999-07-15	E	2-High	---	Threatened	G5	S2
Vascular Plant	15786	Trichophorum cespitosum	Deerhair Bulrush	2017-07-12	A	2-High	---	Significantly Rare Disjunct	G5	S2S3
Vascular Plant	17648	Trichophorum cespitosum	Deerhair Bulrush	1991-08-27	A	3-Medium	---	Significantly Rare Disjunct	G5	S2S3
Vascular Plant	4809	Trichophorum cespitosum	Deerhair Bulrush	1991-07-25	A	3-Medium	---	Significantly Rare Disjunct	G5	S2S3
Vascular Plant	14393	Trichophorum cespitosum	Deerhair Bulrush	1991-08-01	B	3-Medium	---	Significantly Rare Disjunct	G5	S2S3
Vascular Plant	19824	Turritis glabra	Tower Mustard	1971-06	H	4-Low	---	Endangered	G5	S1
Vascular Plant	2846	Turritis glabra	Tower Mustard	1966-07	H	3-Medium	---	Endangered	G5	S1
Vascular Plant	15008	Turritis glabra	Tower Mustard	1958-06	H	3-Medium	---	Endangered	G5	S1
Vascular Plant	18694	Turritis glabra	Tower Mustard	1970-05	F	3-Medium	---	Endangered	G5	S1
Vascular Plant	26120	Utricularia cornuta	Horned Bladderwort	2006-07	E	2-High	---	Threatened	G5	S1S2
Vascular Plant	25302	Utricularia cornuta	Horned Bladderwort	2006-07-19	B	2-High	---	Threatened	G5	S1S2
Vascular Plant	17040	Utricularia minor	Small Bladderwort	1970-06-27	H	3-Medium	---	Special Concern Historical	G5	SH
Vascular Plant	25301	Vaccinium macrocarpon	Cranberry	2006-07-19	A	1-Very High	---	Threatened	G5	S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	24779	Vaccinium macrocarpon	Cranberry	2006-07-19	C	1-Very High	---	Threatened	G5	S2
Vascular Plant	25633	Vaccinium macrocarpon	Cranberry	2006-07-20	A	2-High	---	Threatened	G5	S2
Vascular Plant	26099	Vaccinium macrocarpon	Cranberry	2006-07-18	CD	2-High	---	Threatened	G5	S2
Vascular Plant	26098	Vaccinium macrocarpon	Cranberry	2006-07-20	A?	2-High	---	Threatened	G5	S2
Vascular Plant	25632	Vaccinium macrocarpon	Cranberry	2006-07-19	A	2-High	---	Threatened	G5	S2
Vascular Plant	3385	Vaccinium macrocarpon	Cranberry	2017-08-30	BC	2-High	---	Threatened	G5	S2
Vascular Plant	6355	Veronica americana	American Speedwell	1973-06	H	4-Low	---	Threatened	G5	S2
Vascular Plant	1032	Veronica americana	American Speedwell	1966-07	H	4-Low	---	Threatened	G5	S2
Vascular Plant	3721	Veronica americana	American Speedwell	1986-06-18	B	3-Medium	---	Threatened	G5	S2
Vascular Plant	1708	Veronica americana	American Speedwell	1998-07-01	NR	3-Medium	---	Threatened	G5	S2

Natural Areas Documented Within a One-mile Radius of the Project Area

Site Name	Representational Rating	Collective Rating
Grandview Overlook Slopes	R5 (General)	C4 (Moderate)
Trivett Branch Forests and Seeps	R3 (High)	C4 (Moderate)
Gilley Field Station Forests	R5 (General)	C5 (General)
Moses Cone Park/Rich Mountain	R5 (General)	C5 (General)
Moses Cone Park/Flat Top Mountain	R5 (General)	C5 (General)
Sims Creek Old Growth Forest	R3 (High)	C4 (Moderate)
Dutch Creek Falls	R5 (General)	C4 (Moderate)
Valle Mountain	R5 (General)	C5 (General)
Rocky Face	R5 (General)	C5 (General)
Third Knob	R5 (General)	C5 (General)
Snakeden Mountain	R5 (General)	C5 (General)
Stone Mountain (Locust Gap)	R2 (Very High)	C4 (Moderate)
South Fork Laurel Creek/Dugger Mountain	R5 (General)	C4 (Moderate)
WAT/Watauga River Aquatic Habitat	R3 (High)	C4 (Moderate)
Howards Creek Floodplain	R2 (Very High)	C4 (Moderate)
Snake Mountain	R1 (Exceptional)	C2 (Very High)
Deep Gap	R5 (General)	C4 (Moderate)
Beech Creek Natural Area	R1 (Exceptional)	C1 (Exceptional)
Buffalo Creek Gorge	R3 (High)	C4 (Moderate)
Long Hope Valley/Elk Knob/The Peak	R1 (Exceptional)	C1 (Exceptional)
Julian Price Park Wetlands Natural Area	R2 (Very High)	C3 (High)
NEW/South Fork New River Aquatic Habitat	R1 (Exceptional)	C2 (Very High)

Natural Areas Documented Within a One-mile Radius of the Project Area

Site Name	Representational Rating	Collective Rating
Beech Creek Slopes	R1 (Exceptional)	C4 (Moderate)
Grandfather Mountain	R1 (Exceptional)	C1 (Exceptional)
Pack Hill/Thunderhole Creek	R5 (General)	C5 (General)
Racket Creek Slopes	R4 (Moderate)	C5 (General)
Blowing Rock Cliffs	R3 (High)	C3 (High)
Hanging Rock Mountain	R1 (Exceptional)	C2 (Very High)
White Rock	R5 (General)	C5 (General)
NEW/North Fork New River Aquatic Habitat	R2 (Very High)	C3 (High)
Doe Fork Seeps and Forests	R4 (Moderate)	C4 (Moderate)
Backbone Ridge	R4 (Moderate)	C4 (Moderate)
Dun Vegan Mountain	R3 (High)	C3 (High)
Tater Hill Natural Area	R1 (Exceptional)	C1 (Exceptional)
Appalachian State University Forest	R3 (High)	C5 (General)

Managed Areas Documented Within a One-mile Radius of the Project Area

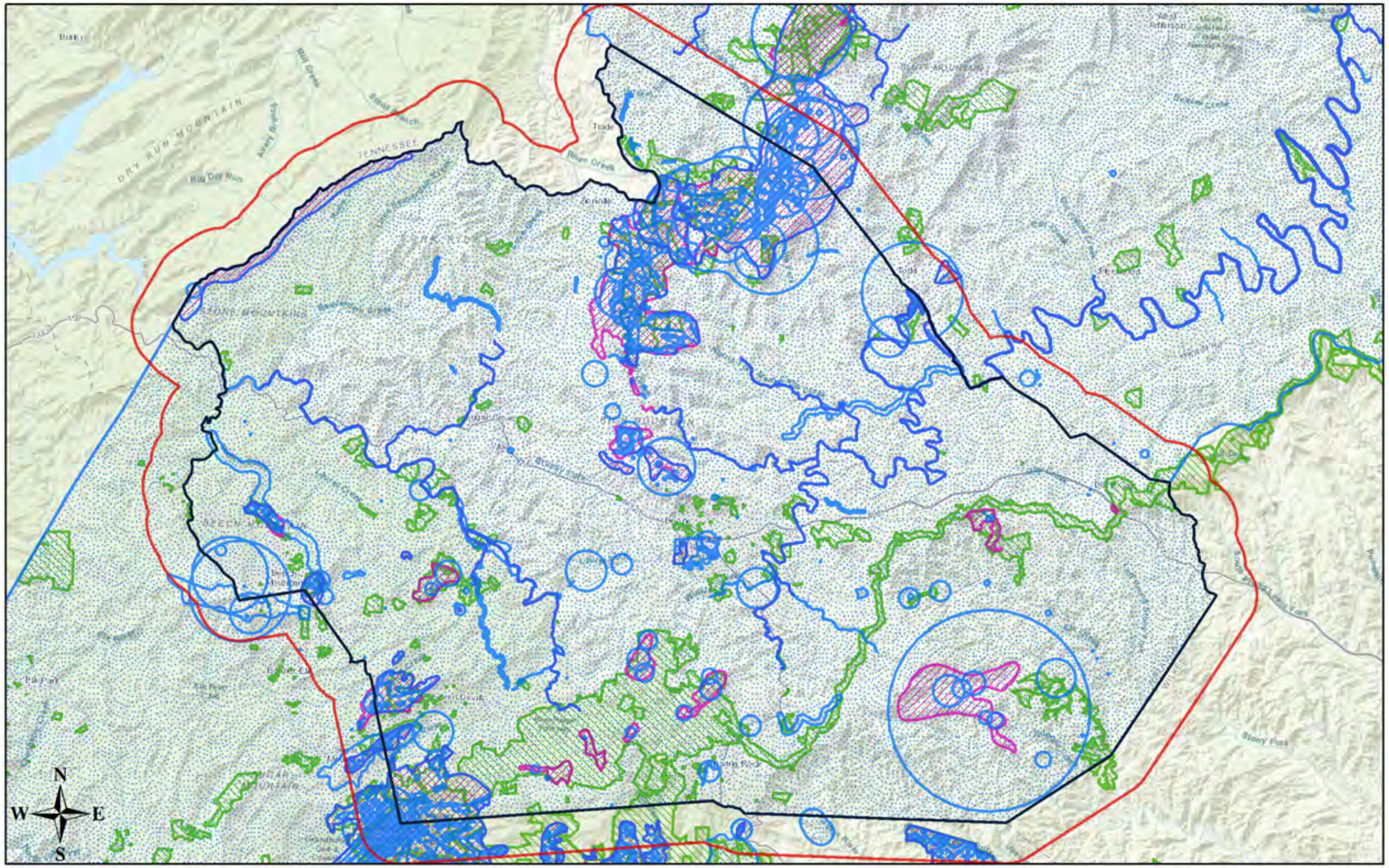
Managed Area Name	Owner	Owner Type
Pisgah National Forest - Grandfather Ranger District	US Forest Service	Federal
NC Clean Water Management Trust Fund Easement	NC DNCR, Clean Water Management Trust Fund	State
NC Department of Transportation Mitigation Site	NC Department of Transportation	State
Blue Ridge Parkway	US National Park Service	Federal
Wetland Reserve Program Easement	US Department of Agriculture, Natural Resources Conservation Service	Federal
NC Division of Mitigation Services Easement	NC DEQ, Division of Mitigation Services	State
Conservation Trust for North Carolina Easement	Conservation Trust for North Carolina	Private
Nature Conservancy Easement	The Nature Conservancy	Private
NC Agricultural Development and Farmland Preservation Trust Fund Easement	NC Department of Agriculture	State
North American Land Trust Easement	North American Land Trust	Private
Blue Ridge Conservancy Easement	Blue Ridge Conservancy	Private
Buffalo Cove Game Land	NC Wildlife Resources Commission	State
Buffalo Cove Game Land Dedicated Nature Preserve	NC Wildlife Resources Commission	State
Foothills Conservancy of North Carolina Preserve	Foothills Conservancy of North Carolina	Private
Elk Knob State Park	NC DNCR, Division of Parks and Recreation	State
Foothills Conservancy of North Carolina Easement	Foothills Conservancy of North Carolina	Private
Grandfather Mountain State Park	NC DNCR, Division of Parks and Recreation	State
Grandfather Mountain State Park Dedicated Nature Preserve	NC DNCR, Division of Parks and Recreation	State

Managed Areas Documented Within a One-mile Radius of the Project Area

Managed Area Name	Owner	Owner Type
Elk Knob State Park Dedicated Nature Preserve	NC DNCR, Division of Parks and Recreation	State
New River Conservancy	National Committee for the New River	Private
Blue Ridge Conservancy Preserve	Blue Ridge Conservancy	Private
Conservation Trust for North Carolina Preserve	Conservation Trust for North Carolina	Private
Tater Hill Plant Conservation Preserve	NC Department of Agriculture, Plant Conservation Program	State
Blue Ridge Parkway Easement	US National Park Service	Federal
Watauga County Open Space	Watauga County: multiple local government	Local Government
Tater Hill Plant Conservation Preserve Dedicated Nature Preserve	NC Department of Agriculture, Plant Conservation Program	State
Grandfather Mountain Preserve	The Nature Conservancy	Private
Grandfather Mountain Preserve Dedicated Nature Preserve	The Nature Conservancy	Private
Grandfather Mountain Corridor Registered Heritage Area	US National Park Service	Federal
Elk Knob Game Land	Kathleen Love, Len Moretz	Private
Avery County Open Space	Avery County: multiple local government	Local Government
Backbone Ridge State Forest	NC Department of Agriculture, Forest Service	State
Backbone Ridge State Forest Dedicated Nature Preserve		State
NC Department of Cultural Resources Easement	NC DNCR, Division of State Historic Sites and Properties	State
Bear Paw State Natural Area	NC DNCR, Division of Parks and Recreation	State
Bear Paw State Natural Area Dedicated Nature Preserve	NC DNCR, Division of Parks and Recreation	State
Valle Mountain Registered Heritage Area	Valle Crucis Conference Center	Private
Beech Creek Bog State Natural Area	NC DNCR, Division of Parks and Recreation	State
Julian Price Park Wetlands Registered Heritage Area	US National Park Service	Federal
Wilson Creek National Wild and Scenic River	US Forest Service	Federal
Beech Creek Slopes Registered Heritage Area	130 of Chatham, LLC	Private
Beech Creek Bog State Natural Area Dedicated Nature Preserve	NC DNCR, Division of Parks and Recreation	State
Appalachian State University Dedicated Nature Preserve	Appalachian State University	State
Valle Crucis Scenic Overlook	NC DNCR, Division of State Historic Sites and Properties	State
Long Hope Valley Preserve	The Nature Conservancy	Private
Beech Creek Bog Unique Wetland	NC DNCR, Division of Parks and Recreation	State
Deep Gap Bog Registered Heritage Area	US National Park Service	Federal
South Fork New River-Boone Greenway	Appalachian State University	State
NC State University Easement	North Carolina State University	State

Definitions and an explanation of status designations and codes can be found at https://ncnhde.natureserve.org/content/help. Data query generated on September 17, 2018; source: NCNHP, Q3 July 2018. Please resubmit your information request if more than one year elapses before project initiation as new information is continually added to the NCNHP database.

NCNHDE-6953: Clearinghouse 19-0040 - Watauga County



September 17, 2018

1:214,507

0 1.75 3.5 7 mi

0 2.75 5.5 11 km

Project Boundary

Buffered Project Boundary

Natural Heritage Element Occurrence (NHEO)

NHP Natural Area (NHNA)

Managed Area (MAREA)

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

COMMONWEALTH of VIRGINIA

Department of Historic Resources

Matt Strickler
Secretary of Natural Resources

2801 Kensington Avenue, Richmond, Virginia 23221

Julie V. Langan
Director

Tel: (804) 367-2323
Fax: (804) 367-2391
www.dhr.virginia.gov

June 30, 2018

Clinton E. Jones, Manager
Biological and Cultural Compliance
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, TN 37902

Re: Tennessee Valley Authority
Transmission System Vegetation Management
Programmatic Environmental Impact Statement
DHR Project No. 2018-0394
Received June 4, 2018

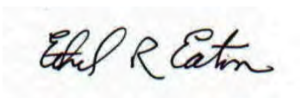
Dear Mr. Jones:

Thank you for your letter of June 1, 2018 requesting the comments of the Department of Historic Resources (DHR) on the document titled, *Transmission System Vegetation Management Programmatic Environmental Impact Statement* (PEIS). The draft PEIS was prepared by the Tennessee Valley Authority to address potential environmental, social, and economic impacts associated with the proposed management of vegetation within its existing transmission rights-of-way (ROW). We understand that the management of individual transmission line segments will tier from the PEIS as needed and provide more site-specific review and analysis under Section 106 of the National Historic Preservation Act of 1966, as amended. It is also our understanding that the programmatic agreement (PA) currently in development with DHR, the Advisory Council on Historic Preservation, six other State Historic Preservation Officers and appropriate federally recognized Tribes will address the majority of activities associated with transmission ROW vegetation management. As presented in Table S-1.Summary of Impacts Associated with Vegetation Management Methods, background research will be used to identify potential resources present within the project's area of potential effects, and routinely is followed-up with resource verification via a site visit and coordination with vegetation management planners to further identify actual resource limits and prescribe appropriate Best Management Practices (BMPs) on a site-specific basis. Appropriate protective/mitigative measures will be implemented in accordance with the PA now in development.

Based on the documentation provided in the draft PEIS, DHR supports the TVA's preferred alternative, Alternative C: Condition-Based Control Strategy (End State: Meadow-Like). We have no additional comments.

If you have any questions concerning our comments, or if we may provide any further assistance, please do not hesitate to contact me at (804) 482-6088.

Sincerely,



Ethel R. Eaton, Ph.D., Senior Policy Analyst
Review and Compliance Division

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From:	Howard, Janine
To:	Masters, Anita E
Cc:	Amy Ewing; Janine Howard
Subject:	Fwd: ESSLog# 39338_18-120F_TVAVegManagement_DGIF_AME20180912
Date:	Friday, September 14, 2018 6:59:42 AM
Attachments:	image001.png Species known from TN Drainages in Virginia.docx

TVA External Message. Please use caution when opening.

Good Morning Ms. Masters,

Please see the below comments from Virginia's Department of Game and Inland Fisheries on the TVA Transmission System Vegetation Management draft PEIS. DEQ has already issued its formal report, however please take DGIF's comments into consideration as you move forward.

Thank you,

Janine Howard
Environmental Impact Review Coordinator
Virginia Department of Environmental Quality
1111 East Main Street, Suite 1400
Richmond, VA 23219
804-698-4299

For program updates and public notices please subscribe to the OEIR News Feed

---------- Forwarded message ---------
From: **Amy Ewing** <amy.ewing@dgif.virginia.gov>
Date: Thu, Sep 13, 2018 at 3:58 PM
Subject: ESSLog# 39338_18-120F_TVAVegManagement_DGIF_AME20180912
To: Janine Howard <janine.howard@deq.virginia.gov>
Cc: rr nhreview <nhreview@dcr.virginia.gov>

Janine,

We have reviewed the Environmental Impact Statement (EIS) for Tennessee Valley Authority's (TVA, Authority) vegetation management plan, implemented in the right of ways under their electric lines (transmission, distribution, etc). We support efforts to better manage the vegetation within TVA's right of ways in a manner that improves wildlife habitat while also providing safety to the infrastructure and those who work on it. We are generally supportive of *Alternative C: Condition-Based Control Strategy – End State Meadow-Like*, the Authority's preferred alternative. We agree that meadow-like habitat provides suitable habitat for many pollinators, birds, and other wildlife and that such habitat should result in minimization of vegetation management over the long term.

However, we believe that *Alternative D: Condition-Based Control Strategy – End-State Compatible Vegetation Variable by Zone*, if implemented appropriately, would result in habitat suitable for a wider variety of wildlife species, reduce loss of forested habitat, and provide enhanced ecosystem services, such as temperature regulation, soil retention, and encroachment by invasive species. We find that creating a "soft edge" along a forest line, allowing for a more gradual vegetative transition from canopy to grasslands reduces wildlife impacts associated with forest fragmentation such as invasive species encroachment, modified predator/prey interactions, and increased temperature at the forest edge. It seems Alternative D may better allow for this type of habitat transition and diversity. We do understand that a management plan that requires site-specific design and management is not appropriate in all situations.

The region of Virginia included within TVA's service area is known to support a number of federally and state listed species as well as a number of Species of Greatest Conservation Need (SGCN) as identified in Virginia's 2015 Wildlife Action Plan. We compiled a list of listed species and SGCN known from Tennessee drainages within Virginia, parts of which are located outside of TVA's service area, and have attached that list. We recommend consideration of these species when assessing potential adverse impacts resulting from removal of existing vegetation, planting of native meadow-like habitat, and long term management of that habitat. We also recommend TVA review Virginia's 2015 Wildlife Action Plan, accessible at www.bewildvirginia.org, to understand the species and habitats unique to this region.

We recommend that all tree removal and ground clearing adhere to a time of year restriction protective of resident and migratory songbird nesting from March 15 through August 15 of any year. We recommend coordination with the USFWS regarding potential impacts upon federally Threatened northern long-eared bats associated with tree removal.

We recommend that the applicant avoid and minimize impacts to undisturbed forest, wetlands, and streams to the fullest extent practicable. We recommend maintaining undisturbed naturally vegetated buffers of at least 100 feet in width around all on-site wetlands and on both sides of all perennial and intermittent streams.

This project is located within 2 miles of a documented occurrence of a state or federal threatened or endangered plant or insect species and/or other Natural Heritage coordination species. Therefore, we recommend coordination with VDCR-DNH regarding the protection of these resources.

We recommend close coordination with VDGIF staff in the region, located in our Marion and Blacksburg's office, to ensure appropriate consideration of listed species and designated resources under our jurisdiction, including threatened and endangered wildlife and the habitats that support them. Contact information can be found at the following: https://www.dgif.virginia.gov/about/offices/

Thanks, Amy

Amy Ewing

Environmental Services Biologist

Manager, Fish and Wildlife Information Services

P 804.367.2211

A 7870 Villa Park Drive, P.O. Box 90778, Henrico, VA 23228-0778

www.dgif.virginia.gov

CONSERVE. CONNECT. PROTECT.

Species known from TN Drainages in Virginia

VA Dept. of Game and Inland Fisheries

9/13/2018 - AME

TN Drainage/NF Holston River

BOVA#	status	tier	Common name	Scientific name	Database(s)
060169	FESE	Ia	Bean, Tennessee	Venustaconcha trabalis	SppObs
060030	FESE	Ia	Combshell, Cumberlandian	Epioblasma brevidens	SppObs
060031	FESE	Ia	Mussel, oyster	Epioblasma capsaeformis	SppObs
060035	FESE	Ia	Mussel, snuffbox	Epioblasma triquetra	SppObs
060051	FESE	Ia	Pigtoe, finerayed	Fusconaia cuneolus	SppObs,TEWater
060052	FESE	Ia	Pigtoe, shiny	Fusconaia cor	SppObs,TEWater
060122	FESE	Ia	Rabbitsfoot, rough	Theliderma cylindrica	SppObs
060021	FESE	Ib	Spectaclecase	Margaritifera monodonta	SppObs
060094	FESE	Ic	Pearlymussel, littlewing	Pegias fabula	SppObs,TEWater
050021	FESE	IIa	Bat, gray	Myotis grisescens	SppObs
060121	FESE	IIa	Kidneyshell, fluted	Ptychobranchus subtentus	SppObs,TEWater
060083	FESE	IIa	Pearlymussel, slabside	Pleuronaia dolabelloides	SppObs,TEWater
060034	FESE		Blossom, green	Epioblasma gubernaculum	SppObs
050022	FTST	Ia	Bat, northern long-eared	Myotis septentrionalis	SppObs
010330	FTST	Ib	Chub, spotfin	Erimonax monachus	SppObs,TEWater
050020	SE	Ia	Bat, little brown	Myotis lucifugus	SppObs
050027	SE	Ia	Bat, tri-colored	Perimyotis subflavus	SppObs
010430	SE	Ib	Dace, Tennessee	Chrosomus tennesseensis	SppObs,TEWater
060007	SE	Ib	Mussel, slippershell	Alasmidonta viridis	SppObs,TEWater
060139	SE	IIc	Lilliput, purple	Toxolasma lividum	SppObs,TEWater
060172	SE	IIIc	Pigtoe, Ohio	Pleurobema cordatum	SppObs
040096	ST	Ia	Falcon, peregrine	Falco peregrinus	SppObs
040293	ST	Ia	Shrike, loggerhead	Lanius ludovicianus	SppObs
060173	ST	Ia	Pigtoe, Atlantic	Fusconaia masoni	SppObs
010342	ST	Ic	Darter, sickle	Percina williamsi	SppObs,TEWater
060069	ST	IIIa	Riversnail, spiny	Io fluvialis	SppObs,TEWater
060086	ST	IIIa	Sandshell, black	Ligumia recta	SppObs
020020	CC	Ia	Hellbender, eastern	Cryptobranchus alleganiensis alleganiensis	SppObs
030012	CC	IVa	Rattlesnake, timber	Crotalus horridus	SppObs
040092		Ia	Eagle, golden	Aquila chrysaetos	SppObs
040306		Ia	Warbler, golden-winged	Vermivora chrysoptera	SppObs

050024		Ia	Myotis, eastern small-footed	Myotis leibii	SppObs
040213		Ic	Owl, northern saw-whet	Aegolius acadicus	SppObs
010341		IIa	Logperch, blotchside	Percina burtoni	SppObs
040052		IIa	Duck, American black	Anas rubripes	SppObs
040033		IIa	Egret, snowy	Egretta thula	SppObs
060050		IIa	Pigtoe, Tennessee	Pleuronaia barnesiana	SppObs
020030		IIb	Salamander, green	Aneides aeneus	SppObs
010351		IIc	Minnow, fatlips	Phenacobius crassilabrum	SppObs
010075		IIc	Shiner, popeye	Notropis ariommus	SppObs
020081		IIc	Salamander, southern zigzag	Plethodon ventralis	SppObs
060004		IIc	Elktoe	Alasmidonta marginata	SppObs

TN Drainage/SF Holston River

BOVA#	status	tier	Common name	Scientific name	Database(s)
060052	FESE	Ia	Pigtoe, shiny	Fusconaia cor	SppObs
050067	FESE	Ic	Squirrel, Carolina northern flying	Glaucomys sabrinus coloratus	SppObs
060094	FESE	Ic	Pearlymussel, littlewing	Pegias fabula	SppObs
050021	FESE	IIa	Bat, gray	Myotis grisescens	SppObs
050035	FESE	IIa	Bat, Virginia big-eared	Corynorhinus townsendii virginianus	SppObs
060121	FESE	IIa	Kidneyshell, fluted	Ptychobranchus subtentus	SppObs,TEWater
060083	FESE	IIa	Pearlymussel, slabside	Pleuronaia dolabelloides	SppObs,TEWater
060036	FESE		Riffleshell, tan	Epioblasma florentina walkeri	TEWater
050022	FTST	Ia	Bat, northern long-eared	Myotis septentrionalis	SppObs
010330	FTST	Ib	Chub, spotfin	Erimonax monachus	SppObs,TEWater
050020	SE	Ia	Bat, little brown	Myotis lucifugus	SppObs
050027	SE	Ia	Bat, tri-colored	Perimyotis subflavus	SppObs
010430	SE	Ib	Dace, Tennessee	Chrosomus tennesseensis	SppObs,TEWater
010344	SE	Ic	Darter, sharphead	Etheostoma acuticeps	SppObs,TEWater
060080	SE	IIa	Heelsplitter, Tennessee	Lasmigona holstonia	SppObs,TEWater
040293	ST	Ia	Shrike, loggerhead	Lanius ludovicianus	SppObs
010352	ST	Ib	Darter, greenfin	Etheostoma chlorobranchium	SppObs,TEWater
010342	ST	Ic	Darter, sickle	Percina williamsi	SppObs,TEWater
060086	ST	IIIa	Sandshell, black	Ligumia recta	SppObs,TEWater
010076	ST	IVc	Shiner, emerald	Notropis atherinoides	SppObs
020020	CC	Ia	Hellbender, eastern	Cryptobranchus alleganiensis alleganiensis	SppObs

030012	CC	IVa	Rattlesnake, timber	Crotalus horridus	SppObs
040306		Ia	Warbler, golden-winged	Vermivora chrysoptera	SppObs
050024		Ia	Myotis, eastern small-footed	Myotis leibii	SppObs
060236		Ia	Riffleshell, Golden	Epioblasma aureola	SppObs
020078		Ib	Salamander, Weller's	Plethodon welleri	SppObs
040213		Ic	Owl, northern saw-whet	Aegolius acadicus	SppObs
020011		IIa	Frog, mountain chorus	Pseudacris brachyphona	SppObs
060050		IIa	Pigtoe, Tennessee	Pleuronaia barnesiana	SppObs
010351		IIc	Minnow, fatlips	Phenacobius crassilabrum	SppObs
010075		IIc	Shiner, popeye	Notropis ariommus	SppObs
060004		IIc	Elktoe	Alasmidonta marginata	SppObs
080101		IIc	Clubtail, Cherokee	Gomphus consanguis	SppObs

TN Drainage/Upper Clinch River

BOVA#	status	tier	Common name	Scientific name	Database(s)
010333	FESE	Ia	Darter, duskytail	Etheostoma percnurum	SppObs,TEWater
050023	FESE	Ia	Bat, Indiana	Myotis sodalis	SppObs
060147	FESE	Ia	Bean, Purple	Villosa perpurpurea	SppObs,TEWater
060169	FESE	Ia	Bean, Tennessee	Venustaconcha trabalis	SppObs,TEWater
060030	FESE	Ia	Combshell, Cumberlandian	Epioblasma brevidens	SppObs,TEWater
060023	FESE	Ia	Fanshell	Cyprogenia stegaria	SppObs,TEWater
060125	FESE	Ia	Monkeyface (pearlymussel), Appalachian	Theliderma sparsa	SppObs,TEWater
060123	FESE	Ia	Monkeyface (pearlymussel), Cumberland	Theliderma intermedia	SppObs,TEWater
060031	FESE	Ia	Mussel, oyster	Epioblasma capsaeformis	SppObs,TEWater
060035	FESE	Ia	Mussel, snuffbox	Epioblasma triquetra	SppObs,TEWater
060020	FESE	Ia	Pearlymussel, birdwing	Lemiox rimosus	SppObs,TEWater
060024	FESE	Ia	Pearlymussel, dromedary	Dromus dromas	SppObs,TEWater
060051	FESE	Ia	Pigtoe, finerayed	Fusconaia cuneolus	SppObs,TEWater
060171	FESE	Ia	Pigtoe, rough	Pleurobema plenum	SppObs,TEWater
060052	FESE	Ia	Pigtoe, shiny	Fusconaia cor	SppObs,TEWater
060122	FESE	Ia	Rabbitsfoot, rough	Theliderma cylindrica	SppObs,TEWater
060082	FESE	Ib	Pearlymussel, cracking	Hemistena lata	SppObs,TEWater
060021	FESE	Ib	Spectaclecase	Margaritifera monodonta	SppObs,TEWater
060094	FESE	Ic	Pearlymussel, littlewing	Pegias fabula	SppObs,TEWater
050021	FESE	IIa	Bat, gray	Myotis grisescens	SppObs
050035	FESE	IIa	Bat, Virginia big-eared	Corynorhinus townsendii virginianus	SppObs

060121	FESE	IIa	Kidneyshell, fluted	Ptychobranchus subtentus	SppObs,TEWater
060110	FESE	IIa	Mussel, sheepnose	Plethobasus cyphyus	SppObs,TEWater
060083	FESE	IIa	Pearlymussel, slabside	Pleuronaia dolabelloides	SppObs,TEWater
060034	FESE		Blossom, green	Epioblasma gubernaculum	SppObs
010331	FTST	Ia	Madtom, yellowfin	Noturus flavipinnis	SppObs,TEWater
050022	FTST	Ia	Bat, northern long-eared	Myotis septentrionalis	SppObs
010111	FTST	Ic	Chub, slender	Erimystax cahni	TEWater
010450	FTST		Dace, Blackside	Chrosomus cumberlandensis	SppObs,TEWater
050020	SE	Ia	Bat, little brown	Myotis lucifugus	SppObs
050027	SE	Ia	Bat, tri-colored	Perimyotis subflavus	SppObs
060007	SE	Ib	Mussel, slippershell	Alasmidonta viridis	SppObs,TEWater
060080	SE	IIa	Heelsplitter, Tennessee	Lasmigona holstonia	SppObs,TEWater
060174	SE	IIa	Pigtoe, pyramid	Pleurobema rubrum	SppObs,TEWater
060027	SE	IIIa	Elephantear	Elliptio crassidens	SppObs,TEWater
060168	SE	IIIb	Deertoe	Truncilla truncata	SppObs,TEWater
060172	SE	IIIc	Pigtoe, Ohio	Pleurobema cordatum	SppObs,TEWater
040267	SE		Wren, Bewick's	Thryomanes bewickii	SppObs
040293	ST	Ia	Shrike, loggerhead	Lanius ludovicianus	SppObs
010342	ST	Ic	Darter, sickle	Percina williamsi	SppObs,TEWater
010433	ST	IIb	Darter, golden	Etheostoma denoncourti	SppObs,TEWater
060069	ST	IIIa	Riversnail, spiny	Io fluvialis	SppObs,TEWater
060086	ST	IIIa	Sandshell, black	Ligumia recta	SppObs,TEWater
010335	ST	IIIc	Shiner, steelcolor	Cyprinella whipplei	SppObs,TEWater
060124	ST	IVb	Pimpleback	Cyclonaias pustulosa	SppObs,TEWater
010362	ST	IVc	Darter, western sand	Ammocrypta clara	SppObs,TEWater
010334	ST	IVc	Paddlefish	Polyodon spathula	SppObs
010076	ST	IVc	Shiner, emerald	Notropis atherinoides	SppObs,TEWater
060163	ST	IVc	Papershell, fragile	Leptodea fragilis	SppObs,TEWater
020020	CC	Ia	Hellbender, eastern	Cryptobranchus alleganiensis alleganiensis	SppObs
030012	CC	IVa	Rattlesnake, timber	Crotalus horridus	SppObs
010449		Ia	Dace, Clinch	Chrosomus sp. cf. saylori	SppObs
040092		Ia	Eagle, golden	Aquila chrysaetos	SppObs
040306		Ia	Warbler, golden-winged	Vermivora chrysoptera	SppObs
050024		Ia	Myotis, eastern small-footed	Myotis leibii	SppObs
060236		Ia	Riffleshell, Golden	Epioblasma aureola	SppObs
010343		Ib	Darter, ashy	Etheostoma cinereum	SppObs
010341		IIa	Logperch, blotchside	Percina burtoni	SppObs
020011		IIa	Frog, mountain chorus	Pseudacris brachyphona	SppObs
040033		IIa	Egret, snowy	Egretta thula	SppObs

060050		IIa	Pigtoe, Tennessee	Pleuronaia barnesiana	SppObs
020030		IIb	Salamander, green	Aneides aeneus	SppObs
010075		IIc	Shiner, popeye	Notropis ariommus	SppObs
040304		IIc	Warbler, Swainson's	Limnothlypis swainsonii	SppObs
060004		IIc	Elktoe	Alasmidonta marginata	SppObs

TN Drainage/Powell River

BOVA#	status	tier	Common name	Scientific name	Database(s)
050023	FESE	Ia	Bat, Indiana	Myotis sodalis	SppObs
060169	FESE	Ia	Bean, Tennessee	Venustaconcha trabalis	SppObs
060030	FESE	Ia	Combshell, Cumberlandian	Epioblasma brevidens	SppObs
060023	FESE	Ia	Fanshell	Cyprogenia stegaria	SppObs
060125	FESE	Ia	Monkeyface (pearlymussel), Appalachian	Theliderma sparsa	SppObs
060123	FESE	Ia	Monkeyface (pearlymussel), Cumberland	Theliderma intermedia	SppObs
060031	FESE	Ia	Mussel, oyster	Epioblasma capsaeformis	SppObs
060035	FESE	Ia	Mussel, snuffbox	Epioblasma triquetra	SppObs
060020	FESE	Ia	Pearlymussel, birdwing	Lemiox rimosus	SppObs
060024	FESE	Ia	Pearlymussel, dromedary	Dromus dromas	SppObs
060051	FESE	Ia	Pigtoe, finerayed	Fusconaia cuneolus	SppObs
060052	FESE	Ia	Pigtoe, shiny	Fusconaia cor	SppObs
060122	FESE	Ia	Rabbitsfoot, rough	Theliderma cylindrica	SppObs
060082	FESE	Ib	Pearlymussel, cracking	Hemistena lata	SppObs
060094	FESE	Ic	Pearlymussel, littlewing	Pegias fabula	SppObs
050021	FESE	IIa	Bat, gray	Myotis grisescens	SppObs
050035	FESE	IIa	Bat, Virginia big-eared	Corynorhinus townsendii virginianus	SppObs
060121	FESE	IIa	Kidneyshell, fluted	Ptychobranchus subtentus	SppObs
060110	FESE	IIa	Mussel, sheepnose	Plethobasus cyphyus	SppObs
060083	FESE	IIa	Pearlymussel, slabside	Pleuronaia dolabelloides	SppObs
070048	FESE	IIIc	Isopod, Lee County Cave	Lirceus usdagalun	SppObs
010331	FTST	Ia	Madtom, yellowfin	Noturus flavipinnis	SppObs
050022	FTST	Ia	Bat, northern long-eared	Myotis septentrionalis	SppObs
010111	FTST	Ic	Chub, slender	Erimystax cahni	SppObs
010450	FTST		Dace, Blackside	Chrosomus cumberlandensis	SppObs
050020	SE	Ia	Bat, little brown	Myotis lucifugus	SppObs
050027	SE	Ia	Bat, tri-colored	Perimyotis subflavus	SppObs
060170	SE	Ia	Ghostsnail, thankless	Holsingeria unthanksensis	SppObs
060080	SE	IIa	Heelsplitter, Tennessee	Lasmigona holstonia	SppObs

060174	SE	IIa	Pigtoe, pyramid	Pleurobema rubrum	SppObs
060055	SE	IIc	Elimia, spider	Elimia arachnoidea	SppObs
060027	SE	IIIa	Elephantear	Elliptio crassidens	SppObs
060168	SE	IIIb	Deertoe	Truncilla truncata	SppObs
040293	ST	Ia	Shrike, loggerhead	Lanius ludovicianus	SppObs
060069	ST	IIIa	Riversnail, spiny	Io fluvialis	SppObs
060086	ST	IIIa	Sandshell, black	Ligumia recta	SppObs
010335	ST	IIIc	Shiner, steelcolor	Cyprinella whipplei	SppObs
060124	ST	IVb	Pimpleback	Cyclonaias pustulosa	SppObs
010362	ST	IVc	Darter, western sand	Ammocrypta clara	SppObs
010076	ST	IVc	Shiner, emerald	Notropis atherinoides	SppObs
060163	ST	IVc	Papershell, fragile	Leptodea fragilis	SppObs
020020	CC	Ia	Hellbender, eastern	Cryptobranchus alleganiensis alleganiensis	SppObs
040306		Ia	Warbler, golden-winged	Vermivora chrysoptera	SppObs
050024		Ia	Myotis, eastern small-footed	Myotis leibii	SppObs
070181		Ic	Crayfish, Big Stone	Cambarus magerae	SppObs
010341		IIa	Logperch, blotchside	Percina burtoni	SppObs
020011		IIa	Frog, mountain chorus	Pseudacris brachyphona	SppObs
040320		IIa	Warbler, cerulean	Setophaga cerulea	SppObs
060050		IIa	Pigtoe, Tennessee	Pleuronaia barnesiana	SppObs
070146		IIa	Crayfish, Spiny Scale	Cambarus jezerinaci	SppObs
020030		IIb	Salamander, green	Aneides aeneus	SppObs
010075		IIc	Shiner, popeye	Notropis ariommus	SppObs
060004		IIc	Elktoe	Alasmidonta marginata	SppObs
080219		IIc	Roachfly, lobed	Tallaperla lobata	SppObs

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Appendix C – Public Comments on the Draft PEIS

Project Name	TVA Vegetation Management EIS
Wood Project Number:	325217078
Subject:	Public Comments on Draft EIS
Prepared by/Date:	KEB, 10-23-18
Checked by/Date:	WJE, 10-24-18

Comment Transmittal Type	Last Name	First Name	Organization/Agency	Comment	Date Received
Telephone		Anonymous		I am sure you're getting plenty of calls on account of the TVA wanting to hack down 16,000 miles of trees. I've been an environmentalist, I'm 76 yrs old. I spent many a year in Oklahoma saving trees when the Dutch elm disease was killing the American elm tree. I took it upon myself to make an injection system on the trees and I saved a ton of trees that were dying of the Dutch elm disease. Now why would I want to spend my time saving trees and I see TVA wanting to cut down trees. That's not something I like at all.	9/18/2018
Telephone		Anonymous		Down with trees. Pave the world.	9/9/2018
Telephone		Anonymous		In regards to the article in the Memphis Commericial Appeal. I don't think trees should be cut under the wires for the TVA. It is too much of an expense and we don't need to lose all those trees.	9/20/2018
Email		Lousep		I would have gone to the meeting in Bowling Green had I known about it before but saw it in the paper the night after. Your group had sprayed my garden tomatoes, orka, and squash plus part of my grass the week before. I don't think you have the right to destroy my property because there is no way that it was going to interfere with the lines. Now I have no garden and a bare spot that washes every time it rains. You are over stepping when you destroy property that will not hurt anything. I can understand you cutting trees that are tall enough to get in the lines but leave everything else alone.	9/10/2018
Email	Albiston	Robert and Lucinda		My wife and I are long-time residents of west Knoxville and have lived in several subdivisions and neighborhoods. We currently live in the Gettysvue subdivision. We are dismayed the the TVA is again sending out people to chainsaw the landscape in a wide (150 feet) along the power lines throughout the area. Having followed the reasons given out by the TVA, we are frankly horrified that such short-sighted, destructive behavior would be adopted. No one lives on a grid, schematic, or a map--we live in neighborhoods! Scarifying the land with toxic defoliant is also part of the plan as presented. This is simply a scorched earth policy that disregards the impact on health of pets, children, and wildlife. The TVA, despite it's many benefits to this region, is about to establish itself as a significant cause of heat increase throughout our residential neighborhoods and as a chief promulgator of ugliness throughout Knox County. The plan involves an unjustifiable cost to the rate payer. We can not state it more strongly than to say STOP this destructive plan now and in the future. Please send these thought on in hope of finding an enlightened audience which is able to do a better job than that currently underway.	9/14/2018
TVA Public Site	Arrowood	Nicole		I do not want my trees cut. They are beautiful and provide a tremendous value to my home, my neighborhood, and the planet. Regardless of whether TVA determines (for it's own purposes) that there is no or low impact - it is a huge impact to me and my family. I DO NOT WANT MY TREES CUT - my beautiful magnolia, my evergreen tree, and my big maple. Stay out of my trees and off my property, please.	9/21/2018

Comment Transmittal Type	Last Name	First Name	Organization/Agency	Comment	Date Received
Telephone	Aviotti	Pete		I was reading a guest column this morning by a person named Vance Sherwood about TVA cutting trees. The way I understand things, any easement that TVA or any other electric company has the rights to, they have the rights to do whatever they need to within that easement to protect power lines. So Mr. Sherwood is wrong in his column he had in the paper this morning and I for one support TVA in whatever you're doing.	9/19/2018
Telephone	Baily	Ms.		Your name and number is listed in an article of the Daily Herald in Columbia, TN. I'm calling to lend our voice to those who want to help you folks of the TVA maintain your original 80 year old policy on tree cutting. I don't think that we personally are in the line of fire, but I thought I would call because trees are the lungs of the earth.	9/18/2018
TVA Public Site	Ballin	Josie	Homeowner/voter	I oppose changes to the previous TVA policy that allowed trees and other vegetation to be trimmed as needed. That is clearly the least damaging to the soil, vegetation and trees, and wildlife. Furthermore, your Environmental Impact Study offers no consideration at all to the impact of your clear-cutting and chemical treatment on property values.	9/22/2018
Telephone	Bass	Ann		I am calling about this cutting of 16,000 miles of trees and I'm in disagreement with that. It doesn't seem like it has hurt anything in the past 80 years and I've been urged to contact you. I've put you on my facebook page and that ought to get you 3,000-4,000 more calls. Just think about it before ya'll do something that drastic.	9/19/2018
Email	Bettice	Gerald		I appeal to you in favor of the previous TVA policy about clear cutting trees. I oppose the policy that would increase the large numbers of trees that costing millions and millions of dollars to remove and that will punish our environment and our utility bills. Thank you for considering this	9/20/2018
Email	Blane	Dianne		Please do not change or otherwise amend your policy to allow the clear-cutting of some 16,000 miles of trees!!! It makes no sense and will destroy more of our beautiful Tennessee landscape!!!Thank you for your attention to my urgent plea.	9/18/2018
TVA Public Site	Boyd	Brandy		Stop destroying the natural areas and cutting down trees unnecessarily. Destruction of tres growth leads to wash out and erosion. The loss of habitat forces animals into human populated areas, resulting in damage to personal property, injury and death of wildlife. And stop putting chemicals on everything! You do not need to adovt a scorched Earth policy and contaminate the soil and water supply with herbicides and insecticides. I oppose changes to the previous TVA policy that allowed trees and other vegetation to be trimmed as needed. That is clearly the least damaging to the soil, vegetation and trees, and wildlife. Furthermore, your Environmental Impact Study offers no consideration at all to the impact of your clear-cutting and chemical treatment on property values.	9/22/2018
Email	Brewer	John		I recently read an article in the Memphis Commercial Appeal discussing TVA's policy of clearing a 150-foot wide strip along all power line right of ways. Like the author in the article, I too think this width of clearing is excessive. If trees are mature at the normal right of way width, not many, if any, would be 150-feet tall. No redwoods in theTVA area. Please record my concern as a TVA rate payer. Thank you	9/25/2018
Email	Brown	Larry F.		I'm a resident of Knox County. I understand that TVA is inviting comment on a proposed policy for managing vegetation under TVA transmission lines. The new policy, I'm told, will allow for clear-cutting a 150 foot wide lane under the power lines. As best I can tell, no compelling justification has been offered for changing the existing policy for vegetation management —which allows property owners to handle what vegetation is not directly under the transmission lines. I am against the proposed policy, which seems both entirely unnecessary and environmentally destructive.	9/10/2018

Comment Transmittal Type	Last Name	First Name	Organization/Agency	Comment	Date Received
Email	Burris	Randall and Jane		Lacking any evidence of potential impact sufficient to justify such expense, we strongly discourage such a program of tree cutting. It's not as if power outages were rare; the chance of one more, surely unlikely, is not sufficient justification.	9/14/2018
Email	Carnes	Nancy		I have recently become aware that TVA is again proposing to clear cut a 150-foot wide path through 16,000 miles of transmission lines at the cost of millions of dollars. I believe this is an unnecessary waste of money, not to mention unnecessary loss of trees. I prefer the earlier, longstanding policy of allowing property owners to tend to trees, etc., that are located to the side of TVA's transmission lines. No new policy is needed.	9/19/2018
Email	Carroll	Jewell		I am a resident of Chattanooga TN. I do NOT want a change in TVA's policy. There is absolutely no valid reason to cut a 150' wide swath of trees around the transmission lines. 1) The financial cost is too high. 2) The environmental cost is too high. 3) The chemicals to be sprayed afterward are dangerous to both the health of citizens and the environment.	9/15/2018
Email	Carson	Joseph		Unless TVA's proposed policy for tree-cutting is similar to the large majority of other utilities around the Country, I oppose it.	9/15/2018
Email	Carter	Linda		One more time I guess we are going to have to rise up and say enough is enough! DO NOT CHANGE THE RULES ABOUT CLEAR CUTTING! To destroy every living green thing within 150 feet of a transmission line for 16,000 miles is not only ridiculous but is insane! Each of those trees outside of the footprint of the line serves a purpose, to de-pollute our region of the country! This time I will urge a class action lawsuit that will serve as a FINAL reminder that you are not the government, we the people are the government!	9/14/2018
Email	Cartor	Joyce M.		I would like to register my agreement with Drs. Vance and Donna Sherwood, and the other former litigants, in their firm belief that there is no true good reason for TVA to once again try to engage in clear-cutting trees under transmission lines. There is simply no real evidence to indicate that this is necessary, and, more importantly, why in today's world of serious climate change problems would TVA want to kill millions of trees??	9/9/2018
Telephone	Chanslow	Gene		I read the article in the Sentinel and would like to voice my opinion. From what I know about it, I would rather TVA keep the old policy in place. I am a property owner under the power lines and I have had problems in the past.	9/28/2018
Email	Chapman	Larry and Barbara		I was surprised to read about the new policy TVA has adopted for cutting trees. Please keep to the old policy.	9/18/2018
Email	Chesney	Karen		I protest TVA proposals to resume unwarranted clear cutting of trees that pose no threat to power lines!! Follow the judges orders and the reasonable sense of property owners.	9/15/2018
Email	Cook	Barbara		I live in Knoxville, TN, and wish to communicate my strong disagreement with any changes to the subject policy. There is no pressing need for changes. TVA would be better served to save the costs associated with the proposed changes and redirect those funds toward activities that reduce customer rates!	9/14/2018
TVA Public Site	Cook	Denise		Goats. They eat everything and fit every terrain. If you were to get cashmere goats you could also sell their fur and make more than enough money to cover their upkeep. It's a win win situation.	9/12/2018
TVA Public Site	Crone	Saj	Sierra Club	For the love of God, don't wipe out all that vegetation. Let the neighbors trim it as needed.	9/22/2018
Email	Crossno	Jerry and Ellalyn		We are totally opposed to increasing the width of the power line right of way to 150 feet! There is no reason to do so.	9/14/2018

Comment Transmittal Type	Last Name	First Name	Organization/Agency	Comment	Date Received
Email	Crowe	Nick and Mary Ann		We respectfully request that TVA reject proposed changes in its vegetation management policy which would result in huge scars in the yards of Tennesseans and incur major costs in the process. It is our understanding that the Federal Electric Regulatory Commission did not demand that such clearing take place and that no one in the TVA has admitted to making such a decision, which suggests that whoever thought this was a good idea is not willing to face the ire of TVA's customers. Please leave your earlier policy (managing vegetation directly under the power lines) in place rather than destroying vegetation that is unlikely to ever cause problems with the power lines. If TVA really feels the need to spend nearly a fifth of a billion dollars, perhaps it should put the lines underground, which would seem a better option to protect them.	9/18/2018
Email	Dailey	Brian		I'm emailing you about an article recently published in the Knox News Sentinel. I grew up in east Tennessee and still live in Nashville. I have hunted, hiked, and farmed in areas around highpower transmission lines. My dad is an electrician that has worked for TVA in the past. I'm familiar with some of TVAs approaches, but I'm very much opposed to changing the guidelines around trimming vegetation around power lines unless there are clear, compelling reasons to do so. So far, there has been nothing like that presented to justify a change. Please consider the impact that a change would have on the state. Vegetation removes CO2 from the atmosphere and policy changes that may appear small on the face may have large, unintended side effects. Please reconsider this policy change. (attachment: Vance Sherwood Opinion piece in Knoxville News Sentinal)	9/14/2018
TVA Public Site	Dalrymple	Christine		I oppose changes to the previous TVA policy that allowed trees and other vegetation to be trimmed as needed. That is clearly the least damaging to the soil, vegetation and trees, and wildlife. Furthermore, your Environmental Impact Study offers no consideration at all to the impact of your clear-cutting and chemical treatment on property values.	9/22/2018
Email	Daniels	Raymond		Read the opinion in the 9/14/19 Knox News Sentinel. Your tree cutting plan is absurd! To say you are the government and can doing anything you want makes me want to vomit. Like Trump, you will soon find out only the people have the power.	9/14/2018
Email	DeLauder	Caprice		I do not agree with your new tree-cutting policy. I believe that the earlier policy is sufficient to keep power transmission possible.	9/16/2018
Email	Dilley	Al		Thanks for allowing me the opportunity to share information about our environmentally friendly service, utilizing goats and sheep, that provides TVA another option to help achieve their preferred Alternative C Plan. Goats are another tool available for Land Managers to mitigate vegetation in fragile ecosystems, preventing harm to the biota. Utilizing sheep, in solar farms, eliminates panel damage from projectiles thrown by power equipment and also eliminate debris from accumulating on panels creating higher labor cost of cleaning panels. We're here for Land Managers and Companies that want to make a commitment to the environment by utilizing sustainability practices using goats and sheep to mitigate their vegetational concerns. Also, utilizing animals compliments their environmental principles, creating positive Public Relations for their advertising efforts. Logistics and difficultly of browse determines cost which widely varies up to $5000.00+ per acre. Studies and reports will be forwarded in a following e-mail. (attachments Dilley a-g).	9/12/2018
Email	Dodson	Don		TVA needs to keep their earlier policy and does NOT need a new more destructive policy!	9/18/2018
Telephone	Drewly	Dean		Leave the trees alone.	9/19/2019
Email	Eklund	Len and Donna		Keep the old rules and do not enact the new vegetation management proposal.	9/14/2018

Comment Transmittal Type	Last Name	First Name	Organization/Agency	Comment	Date Received
Email	Eldridge	John E.		I am writing to give TVA my feelings about what I understand is on the drawing board: TVA has plans to cut more trees from around its powerlines. It is my understanding that for 80 years the old TVA and tree cutting policy took care of the powerlines and also left most trees standing. I fail to see why TVA has to now be so much more vicious with its chain saws, especially in a time of global warming. Please register me as one citizen who opposes changing the 80 year old "let trees live" policy. Thank you for your consideration.	9/11/2018
Email	Ellis	Lisa E.		I think everyone wants to keep utility lines protected, but there are reasonable methods and draconian methods. Clear cutting everything within 50 ft radius is ridiculous. We cannot get rids if all trees that " might potentially grow tall enough to blow over and damage a line". That's ridiculous!! We need trees as much as we need power lines! Do NOT allow this destructive clear cutting to be approved. Use reason in protecting power lines. We can not EVER 100% protect against every risk. That's called life. There will always be some degree of risk in living. Please use reason in the way you inflict your opinion in other people's property.	9/14/2018
Email	Eskew	Tate A.		I am sending you a missive pertaining to the recent article published on the Knox News website.(1) It appears to me that the policy that has been intact historically is the best situation for not only the TVA transmission lines, but for the local ecology, neighbors, and fauna. It would also save our co-op and tax payers a tremendous amount of money. It would be a terrible policy to cut such a wide swath for such a long range of carbon sequestering forest. If the numbers are presented correctly in the article (150' x 16,000 miles) that would be equitable of 290,909 acres. These forests are vital to our local ecosystem and planetary health. That amount of a 50 year old forest sequesters 8,730,000,000 pounds of carbon dioxide and would emit 6,402,000,000 pounds of oxygen per calendar year. This would have a very broad effect on our biome. To compound the problem even further by spraying poisons such as glyphosate on the affected regions would be catastrophic to vital habitat and animals. I would hope that you would please reconsider this new policy.	9/14/2018
Telephone	Eubanks	Phil		I'm calling in response to a newspaper article in the paper yesterday written by a man named Vance Sherwood. I agree with what Mr. Sherwood is saying. I don't think TVA should be cutting down and clear cutting trees under TVA power lines. I think they ought to go back to what they used to do which is just maintain the area and not cut trees down.	9/20/2018
Email	Evans	Cornelia and William		We want to be on record as believing that TVA should NOT adopt a new policy in regard to tree trimming but should remain using the policy that saves our natural resource, our trees. There is NO need to clear cut to such an extent under the power lines as has been done in the last few years.	9/17/2018
Letter	Feathers	Susan	Sierra Club	The proposed solutions focus on the reliability of the grid through well funtioning of the Tranmission Lines (TL). Reducing vegetation to meadow-like conditions (the agency's preferred maintenance plan) would significantly reduce the functioning of the targeted trees whose maintenance of water supply, flood control and networks of multiple communities of life--soil organisms and small animals-- which have no focus in the plans---would be adversley affected. Kentucky as a state has been reduced to a meadow over centures of clearing for human purposes. However, I recognize the issue for the power companies. Therefore, I recomment a plan somewhere in the middle--least harm to nature while assuring resonable functioning of TL and human safety. And, let's use the harvested wood for something good.	10/1/2018
Email	Forman	Carol		I am opposed to changing the management policy for transmission lines and the use of toxic chemicals to kill all vegetation under those lines. I would need to see valid data to address this change from a program long in use in order to remove my opposition. Thank you for addressing my concerns.	9/14/2018

Comment Transmittal Type	Last Name	First Name	Organization/Agency	Comment	Date Received
Telephone	Foster-Allen	Terry		I have learned today about TVA's plan to clear cut the property around the 16,000 miles of TVA clearing. I want to protest this. I would like to keep the plan that has worked for 80 years and not institue a new one. It would be very expensive and environmentally unsafe.	9/20/2018
Email	Fraser	Kathryn		I am writing to express my views regarding TVA's vegetation management plan. I understand that currently, as a result of a court order, TVA manages vegetation directly under its lines while leaving to the property owner the responsibility of maintaining what grows off to the side of those lines. I understand TVA is considering a change to that policy. I write to express my opinion that I favor TVA keeping its current court-ordered plan, which I understand to have been TVA's plan for decades (at least until 2012). While I'm not an expert, I believe there could be a negative environmental impact from a change in TVA's vegetation management plan that includes cutting down possibly a million trees in a time of global warming. The policy currently in place has worked well for 80 years, and there is no need to change that policy. Thank you for the opportunity to express my concerns.	9/11/2018
Telephone	Freeman	Kathryn K.		No to indiscriminately clear cutting. Notify landowners before coming out. KUB and TVA have cut trees that shouldnt be cut. Ask the people cutting the trees to put themselves in the place of the landowner and ask what they would do if it were them.	9/27/2018
Email	Gibbons	Beverly		As a citizen very concerned for the health and beauty of our state, as well as the global environment, I am writing to strongly oppose TVA's potential change of the court-ordered policy that was also TVA's own policy for nearly 80 years. Clear-cutting 150 feet along power lines needlessly destroys trees and bushes which provide forage for valuable insects, habitat for native animals, and protection from some of the negative effects of global warming and pollution - as well as contributing to our state's natural beauty. In addition to the negative environmental and esthetic impact of TVA's proposed change in this policy, there would be an enormous expense involved in clear-cutting trees along thousands of miles of power lines across multiple states. Rate payers will surely be negatively impacted as this cost is inevitably passed on, increasing the economic strain on vulnerable citizens who may already be struggling to pay utility bills. For all these reasons I am deeply opposed to any change from the current court-ordered policy for TVA's management of vegetation under its power lines - the same policy which TVA itself had explained and defended in two of its prior publications. The destructive environmental and economic impact of this proposed change dictates that the current court-ordered policy should not be altered or ignored.	9/21/2018
TVA Public Site	Goss	Sandra	Tennessee Citizens for Wilderness Planning	Thanks for the opportunity to comment on the Draft Programmatic Environmental Impact Statement for vegetation management practices along the transmission line Rights of Way (ROW). These comments are submitted on behalf of Tennessee Citizens for Wilderness Planning, an Oak Ridge-based environmental and conservation not-for-profit organization. TCWP partners with TVA on the maintenance of Whites Creek Trail and the Worthington Cemetery Ecological Study Area. Additionally, with the help of TVA personnel, TCWP has been able to offer Kids in the Creek programs in rural areas. TCWP appreciates opportunities to work with TVA. TCWP endorses Alternative D: Condition-Based Control Strategy (End State: Variable by Zone).	10/1/2018
Email	Greene	Alice		I am in favor of maintaining the earlier policy on tree cutting and we do not need a new policy. It is cost effective to maintain the earlier policy and it protects our trees	9/15/2018

Comment Transmittal Type	Last Name	First Name	Organization/Agency	Comment	Date Received
Email	Greenman	Mark		Please no not waste nearly $200,000,000 of ratepayer's money cutting 16,000 miles of trees that have the misfortune of being located near a TVA transmission line AND then poisoning the ground. This is an absurd plan that only a large government agency could conceive.	9/14/2018
Email	Gregory	Brian		My name is Brian Gregory. In 2010 TVA came to my aunts house (or they were possibly contractors working on TVAs behalf) demanding to cut down two trees in her yard saying they were too close to the power lines. However, these trees were all planted in an even row and were not a threat to the power lines. Cutting one was no more necessary than cutting all of them. They stated they had to cut down at least one or two trees and they would give her some new saplings in return. All of this was confusing to her and she reluctantly agreed. I called TVA myself and asked about this and was still not clear as to what was going on or why. My grandfather (who passed in 2002) planted these trees when he built the house and I hated to see them go. I thought this whole thing was very unnecessary. At this point after reading about the policy changes and the plans to cut 16,000 miles of trees, I am stating I would like for the TVA to go back to its original policy concerning trees near the side of transmission lines and not waste the time or money needed for this project.	9/18/2018
TVA Public Site	Halcomb	Ethan		My home is located approximately 3 miles west of the Sequoyah nuclear plant and my property includes roughly 3 acres of land where TVA has ROW to control vegetation for 3 sets of 161 kv transmission lines. I have lived in my home for over 18 years and have witnessed various TVA vegetation control methods and am in favor of the most recent herbicide technique. From my personal observations, this technique has not had a negative impact on wildlife, brush & grass vegetation, or health issues within my family & friends. I would be in favor of adopting this technique for long term use. I would welcome environmental study of my property if it would benefit herbicide treatment in the future	9/5/2018
TVA Public Site	Hargis	Paula		We own TVA property where lines are located. I heard on the news you have ideas of what to do with the property but cannot find where those ideas are listed. Can we get that list? Also how do we find out what restrictions we have on building on those properties in reference to poximative of our home	8/13/2018
Telephone	Hart	Victor		Do not do a 150 foot wide clear cut. Leave it as it has been.	9/17/2018
Email	Hembree	Julie		I oppose changing the tree cutting policy to cut essentially 150-foot span of trees under, along the power lines. I support using the earlier policy and do not see any need to change. The change would be ridiculously expensive, thus leading to raising rates and there is no need to cut 75 feet on either side of the lines----you do not need a new policy-----stick with the policy managing directly under the lines which worked quite well for more than 75 years.	9/16/2018
Email	Hillon	Don		Please convey that I feel it makes no sense to spend money that doesn't need to be spent on a perceived problem. Please revert to your previous policy concerning right-of-way clearing. Thank you.	9/15/2018
Email	Hobson	Leonard		TVA's clear cut policy under power line right's away has overstepped it's authority. I am in complete agreement with the need to keep potential risks from interference with these high lines, but it seems as though TVA has gone far beyond the footprint needed to keep the lines free of obstructions.	9/14/2018
Email	Holland	Richard	Packaging Corporation of America	I attended the TVA Public Meeting on the Vegetation Management EIS in Memphis today. After reviewing the alternatives, I recommend TVA proceed with Alternative C.	9/13/2018
Telephone	Howard	David		I have property in Tennessee and I am appalled to learn of this new TVA policy revoking the 80 year old policy from years past. Cutting these trees down. What are you thinking? Please reassess your priority and come to your senses. Vance's guest column in the Memphis Commercial Appeal is what caught my attention. Thank you very much.	9/19/2019

Comment Transmittal Type	Last Name	First Name	Organization/Agency	Comment	Date Received
Email	Hulley	Nancy		I was disturbed to read about the policy of removing trees on private property outlines by Vance Sherwood in The Knoxville News Sentinel. Please let's have some consideration of our environment and not consider changing this policy to allow this sort of wanton destruction of our trees and greenery.	9/15/2018
Public meeting	Huston	Willie		We purchased our 13.5 acres piece of land three years ago and have been reacclimating it due to poor logging practices for the prupose of forest farming and homesteading. The "edges" where powerlines run are a sizeable portion of our focus due to collection of walnuts, acorns, elderberry, etc. Due to what I've witnessed thus far, I would like to suggest that if trees must be taken, that they are replaced by low growing shrublike trees such as elderberry, hazelnut, willows, cattail and etc. These are examples of trees that don't reach above 10'-30' and like to be cut back and are good for holding the soil, honey-bee pollination, purifying runoff water and etc. These can be purchased for $0.30-$0.45 a tree from MO St. University Nursery. Many options such as elderberry can often be seeded for nearly no costs and grow in nearly every soil and weather condition and keep other things from growing there (like big trees) and won't need resseding or planted again!! Plus it helps the land, ecology, and provides food!! I would be open to discussion about this proposal as well as others including individual property agreements, NRCS/USDA conservation working programs, and transition to renewable energy (cutting powerline costs, trails, and capitalizing on renewable energy) if contacted. Thank you!	10/1/2018
Email	Hylton	Josie K.		There was policy in which trees were not cut. Somehow this policy was stopped and much money is to be spent to cut many, many trees. This a major mistake. We need as many trees as possible for health reasons as well as beauty. This current policy of tree cutting must be stopped immediately and permanently.	9/14/2018
Email	Ingle	LaQuita		I am opposed to changing the management policy for transmission lines and the use of toxic chemicals to kill all vegetation under those lines. I would need to see valid data to address this change from a program long in use in order to remove my opposition.	9/17/2018
Email	Jones	Carey		As a National Park Ranger for 22 years, I know something about the need to preserve trees. Leave the policy of clearing for power lines the way it has been, and do not widen the swath to 150 feet. Allow responsible homeowners to take care of their property. TVA can advise when necessary to protect power lines.	9/14/2018
Telephone	Kirk	Albert		I want to state my complete opposition to your tree cutting policy. In a previous house in Memphis, we suffered from that. Several mature trees were taken down that were a long way from the power lines.	9/20/2018

Comment Transmittal Type	Last Name	First Name	Organization/Agency	Comment	Date Received
Email	Larrabee	Alan		TVA's previous policy of only cutting trees and vegetation directly under transmission wires worked well and an expensive and expansive change to 150 feet is not necessary and is detrimental to the well being of people and the environment. For your consideration, some facts about the importance of trees: Trees provide something called "attention restoration." There is a lot of research published through several studies from William Sullivan, professor of landscape architecture at the University of Illinois at Urbana - Champaign that document the beneficial effects of trees on the health of humans. Let me quote from an article that appeared in a Lions Club publication: "All of us have a limited capacity to pay attention during any period of time. . . As our attention runs out, we're more likely to be irritable, and abilities to solve and to plan ahead decrease. If you think that means a parent in this state is more likely to strike out in frustration, or a student is more likely to blow off an exam, you're right. when that happens, being near trees and other vegetation can help restore our ability to pay attention. . . . a view of a green space . . . is a micro-resting spot for the mind . . . People function more effectively when they have a green view. . . In the 1990s, Sullivan and his colleague Frances Kuo, director of the University of Illinois at Urbana-Champaign's Landscape and Human Health Laboratory, found that residents of Chicago's public housing who had trees outside were less likely to threaten violence against their children, as compared with residents of the same housing project who did not have trees nearby. The more green space, the less mentally fatigued people were and the less they engaged in domestic violence..." This article goes on to document other critical benefits of trees: They produce oxygen, correctly placed - reduce air-conditioning costs, cool the air in a process called evapotranspiration, reduce street repaving costs because a tree shaded street needs only to be repaved 2.5 times in 30 years; whereas, an unshaded street needs to be repaved 6 times in 30 years. Any policy that removes trees unnecessarily is a bad policy and should be corrected. All people engaged in any project that involves tree removal should carefully consider the benefits of trees and should never remove trees that do not need to be removed. People are beginning to recognize the benefits of trees and vegetation and correctly insist that tree removal be as limited as possible.	9/19/2018
Telephone	Lingie	David		I am fundamentally opposed to the change to the old vegetation management program which was much less damaging to the environment and worked fine. There is no reason to spend a huge amount of additional money on a policy that is huge fisted and is environmentally destructive.	9/17/2018
Email	Lofaro	Michael A. and Nancy		We wish to register our opposition to any change in your tree-cutting policy that would result in clear-cutting. The present trimming policy is a sound way to maintain electrical service and safety without the additional cost of clearcutting and its destruction of the natural beauty in our region. Please place our opinion before the group reviewing this policy.	9/16/2018
TVA Public Site	Loughery	Richard	Edison Electric Institute	Support Alternative C.	10/1/2018
Email	MacGillivray	Bill		I am concerned that TVA is attempting to resurrect a tree-cutting policy that has been blocked in the court in the past, and represents a radical and destructive change in TVA's own conservation policies for many years. I fail to understand the benefit to TVA to wreak such wide destruction upon our environment. It certainly does not and cannot benefit the public. I believe TVA, as a government entity (it's right there in your email address) has the obligation to respond to the wider public's concerns for this environmentally destructive policy. I have written my senators and congress men about this as well.This policy must be reversed. Return to a policy that protected power lines and trees for 80 years.	9/19/2018

Comment Transmittal Type	Last Name	First Name	Organization/Agency	Comment	Date Received
TVA Public Site	Marion	Sandra		I oppose changes to the previous TVA policy that allowed trees and other vegetation to be trimmed as needed. That is clearly the least damaging to the solid, vegetation and trees, and wildlife. Furthermore, your Environmental Impact Study offers no consideration at all to the impact of your clear-cutting and chemical treatment on properly values.	9/22/2018
Email	Massingale	Lynn		Like many across the state, I oppose what I understand is TVA's desire to change its policy re:tree cutting near power lines. TVA does many things well but it's leaders have a duty to balance the region's engergy needs with the beauty and liveablty of our wonderful area. I have no power lines on or near my property but oppose any change due to our common interest which we hope comes to be shared by you and others at TVA.	9/14/2018
Email	May	Amanda		I am writing this letter on behave of my neighbors whom TVA is about to spend a ridiculous amount of taxpayers money. In spring of 2012 TVA showed up in our backyard in the form of a bunch of guys with chainsaws who said they would soon be cutting down all our trees. Had to be done, they assured us, because very soon those trees (which had long since reached their full height) might grow into TVA's transmission lines 75 feet away. If this happened, we were told, power might be knocked out, and our neighbors electrocuted. This was a change. For more than 75 years TVA had managed vegetation directly under its lines but left it to property owners to tend what grew off to the side. The new policy was to clear-cut everything underneath and also off to the side creating a 150-foot swath of destruction. And they would add poison when it was all done to make sure nothing came back. Why change? After all this meant: 1) spending nearly a fifth of a billion dollars to clear-cut a 150-foot-wide path through 16,000 miles (that's right, 16,000 miles) of transmission lines across seven states and 2) cutting down trees that had been there since TVA was first established without causing blackouts and electrocutions. No matter, TVA told us. They had to come down. Why? The official story line was that a tree in Alabama had touched a high voltage line, made power go out for a few hours locally, caused the Federal government to fine TVA, and–this is the good part–led the Federal Electric Regulatory Commission (FERC) to demand that TVA clear-cut everything. Hence, here they were in our back yard. And maybe yours too. Except this was mostly made up. Yes, a misbehaving tree did cut out power for a little while in Alabama, but, no, FERC did not then demand that TVA clear-cut millions of trees. In fact, FERC forced TVA to admit as much publicly. So why did TVA change their largely successful 80-year-old policy and suddenly want to spend lots of money to come into our yards and cut down everything they could lay their hands on? No one knows. A group of us sued TVA to find out, and though we made them stop this nonsense for a while, we still do not know why they changed a policy that had worked for 80 years. In fact, TVA repeatedly said during the suit it couldn't find any record of who made the decision to change or why. In any event, after two losses on appeal, TVA was ordered to stop. A TVA attorney sat in my kitchen in 2012 drinking my coffee and told me, "We are the Federal government, and we can do whatever we want." And maybe so, because now they are back. TVA is currently asking your opinion on officially changing their previously successful 80-year-old policy. If you agree to the change, they have your permission to wander into your back yards with chain saws and bull dozers and create an Agent Orange-like strip half a football field wide and 16,000 miles long across seven states . . . and to do it for reasons they cannot state. This is one of those	9/24/2018
TVA Public Site	Mccoy	Curtis		We don't need to fix something thats not broke. There is not a problem except someone needs an explanation for their job so let the trees alone	9/19/2018
Public meeting	McDonald	Kevin		Thank you for the information I was given and the opportunity to comment. I tend to agree with the TVA Alt C as the best way to maintain the vegetation, wildlife, an aland owneres	9/4/2018
Email	McMekin	James W.		I am writing you to register my register my opposition to proposed changes to the TVA vegetation policy. Clear cutting and poisoning such a wide strip is extreme. There must be some more sensible middle ground taking into account the environmental impacts and property owners issues.	9/14/2018

Comment Transmittal Type	Last Name	First Name	Organization/Agency	Comment	Date Received
Email	McPeters	Mary Ann		Please do not change the tree cutting policy. 150 feet is way more space than is needed. It's also too costly. Surely TVA can find something more useful to do with the money - maybe a bit longer before a rate increase.	9/17/2018
Email	McVeigh	Marilyn		Your plan you've had for 80 years has worked. Please do not change. Trees are good for our environment.	9/19/2018
Email	Moss	Sarah Rimer		I am writing to express my concerns about the plans to cut vegetation within and under 75 feet of TVA's power lines, both because of the negative environmental impact of cutting an estimated one million trees, and the cost of such an undertaking. Please adhere to the court ordered policy!	9/19/2018
Telephone	Oakbreag	Frank		I am part of the lawsuit. TVA previously cleared the ROW on my property and did it incorrectly. They left logs in place in locations I could not get to them. TVA never notified anyone they were coming until the contractor showed up. They cut and then don't remove the cut vegetation until I call them and tell them I want it removed. In Kentucky, there was an orchard owner that had an agreement with TVA to self-maintain the orchard. TVA cut it down even though it would never have reached the power lines. I chose Alternative A to let landowner maintain the ROW ourselves. I disagree with TVA's philosophy on dealing with landowners and would like to be contacted before they come on my land.	9/27/2018
Email	Ogle	Mary		There is no reason that vegetation needs to be cleared from an area of 75 feet from each side of a transmission line. Don't change your previous policy regarding clearing underneath the lines.	9/20/2018
Telephone	Panodie	Marilyn		I read the article in today's newspaper. Absolutely ridiculous that TVA would slaughter these trees across land that has been shared by TVA and property owners for 80 years. Please stop it. It's wrong.	9/18/2018
TVA Public Site	Patten	Andrea		I oppose changes to the previous TVA policy that allowed trees and other vegetation to be trimmed only as needed. It should be obvious that the impact of clear-cutting and chemical treatment of vegetation has potential to create tremendously negative long-term issues for homeowners and wildlife in the area.	9/24/2018
Email	Pennebaker	Pat		In the "Environment" section of TVA's website there are two specific statements which would make the practice to "slash and burn" areas under the power lines totally unacceptable and incongruous with TVA's stated commitment. In one section it says, "We are committed to clean air and a clean water supply for our region, as well as historical, cultural and environmental protection. " In the following section…"promote proactive environmental sustainability in a balanced and ecologically sound manner." It is understandable that trees which could touch transmission lines have to be removed, but removing all trees is totally unnecessary, and certainly not "ecologically sound." It destroys wildlife, as well as its habitat. To poison massive areas with toxic herbicide is unacceptable. The herbicide used is potent enough to destroy and keep the vegetation from coming back. This is potentially very harmful to wildlife AND to humans. The makers of "Roundup" are currently involvedin a major lawsuit alleging that it can cause cancer. Herbicide not only kills grass and weeds, but can unintentionally kill or harm numerous other living things – including people. TVA's previous policy was used successfully for many years. Do not change it to something that would cost more money – and cause more destruction.	9/21/2018
Email	Peterson	Thea		I am totally opposed to the 150' clear cut on power transmission lines. This is far too wide a path. A much more prudent and cost effective method would be to cut down only those trees tall enough to cause a problem. It is pretty obvious that this issue has seldom been a problem in the past. The amount of tax payer dollars that would be used to cut out a 150' swath of 16,000 miles of trees is unwise and careless use of our money. Please change this policy - it is not a sound one.	9/14/2018

Comment Transmittal Type	Last Name	First Name	Organization/Agency	Comment	Date Received
Telephone	Phillips	Gene		This is the dumbest thing I ever heard of. First TVA wastes money building walls for a flood; Then TVA lied about the coal ash spill which could have been cleaned up for a fraction of what was spent. Then TVA lied by saying FERC demanded they cut down the trees but FERC made TVA admit in court that FERC didn't make them do it. I don't know where TVA comes up with some of these ideas. I guess people that are sitting behind their desks are just thinking up stuff so they have something to do. You must have to have stupid on your job application to be hired by TVA. TVA doesn't need to clear cut all those trees and widen the ROW to 150 ft.	10/1/2018
TVA Public Site	Presnell	Janice Ellen	Citizen of North Carolina	It doesn't require an advanced degree for anyone who thinks on the larger picture to realize that cutting trees and vegetation and spraying herbicide on the ground will lead to erosion and the unfortunate consequences of a barren land. Trimming trees requires knowledge and skills and is necessary at times. Yet having a policy to that promotes soil erosion and consequenceial problems is poor planning. Of course that will affect property values, take away from the inherent beauty of our beautiful mountains and creates additional burdens for humans as well as others. Mass use of the policy that allows such a practice is selfish and not well thought out. Please reconsider this policy. Thank You!	9/22/2018
Email	Ray	Jane		No. I do not believe that TVA should cut trees that are not any where near power lines. I think that this is wasteful of TVA money and time. Why change the policy and not be able to tell the public why - to not really be able to justify the cutting down of trees that would never fall on any power line and disrupt service. Crazy and wasteful.	9/23/2018
Telephone	Raymond	Ed		I would like to comment.	9/17/2018
Telephone	Raymond	Sherrie		Do not use herbicides. Err on the side of caution and don't use Roundup given the lawsuit in California. Give homeowner the respect and don't cut down trees that don't need to be cut down. Trim if needed, but don't cut them down	9/27/2018
Email	Renier	Carolyn		I do not understand TVA's extreme tree cutting policy as described in the Knox News-Sentinel on 9/14/18. The earlier policy seemed adequate and did not require TVA to lie about why it needs a new one …… so, I also believe there is no need for a new one.	9/14/2017
Telephone	Revora	Dave		I would like to see TVA keep the old policy and not make any new changes.	9/21/2018

Comment Transmittal Type	Last Name	First Name	Organization/Agency	Comment	Date Received
Email	Ringe	Axel	Tennessee Chapter Sierra Club	The Tennessee Chapter Sierra Club appreciates the opportunity to provide comments on behalf of our more than 9,000 members and more than 100,000 supporters on TVA's draft Programmatic Environmental Impact Statement programmatically addressing the impacts of system-wide vegetation management practices along its rights-of-way ("ROW"). For more than 75 years TVA managed vegetation on its right-of-ways (ROW) by keeping vegetation in the "wire zone" or "floor" in early successional habitat limited to herbaceous and grass species, with some selected low-growing trees allowed in cooperation with partnering landowners. Likewise, TVA kept a portion of what they label the "border zone" under the same management regime. However, TVA allowed trees to remain in the "buffer" zone as long as they did pose a hazard or danger to the transmission lines. The guiding principle was to keep vegetation further than, or potentially further than, 10 feet from the lines. This was considered to be the minimum distance required to prevent flashover. During all that time, TVA did not experience any instances of trees interfering with or falling on transmission lines and causing power outages. However, following an incident in Ohio in August 2003, in which a tree fell onto a transmission line and initiated a cascade of events resulting in blackouts over most of northeastern North America, the Federal Energy Regulatory Commission issued rules designed to prevent a re-occurrence of such an event. TVA has interpreted the FERC policy as a mandate to clear the full extent of their deeded ROW's from all woody vegetation. TVA justified this new scorched earth policy by promoting the public perception that any transmission line incident would result in fines of millions of dollars. Fortunately, following the Sherwood vs. TVA litigation, TVA agreed to go back to their historic vegetation management practices and develop a PEIS to reach a decision on how to manage their ROW's in the future. The Sierra Club opposes the preferred alternative C identified in the PEIS. We do not believe the history of TVA vegetation management, nor the rules set forth by NERC or the guidance set forth in ANSI A300 (Part 7) Integrated Vegetation Management Draft 4 Version 1 warrant or justify such a draconian vegetation management policy.	10/1/2018
Email	Rogers	William Henry		I just want to be on record as opposing any change to TVA's tree cutting policy. FERC's demand to clear-cut a swath of all vegetation by 150 feet under and beside TVA transmission lines seems just way over the top. As I understand it, TVA's in-place 80-year old policy for vegetation clearance has been working just fine for most folks. Why change when most folks are happy with the status quo? The great majority of power outages are from distributors power lines, not TVA's. Thanks for the opportunity to express my feelings about this matter.	9/14/2018
Email	Runyan	Tom		If true, TVA is repugnant, repulsive, arrogant, and no longer trustworthy. Perhaps it should be sold after all. Would like to see TVA respond to this.	9/14/2018
TVA Public Site	Russell	Helen		The attitude of TVA to clear cut along power line tracts without regard to property owners rights is despicable. All rules and regulations regarding groundwater contamination, water runoff and soil erosion should apply to actions taken by the TVA in the same way they apply to other landowners and developers. Disregarding these rules should not be an option. I therefore oppose changes to the previous TVA policy that allowed trees and other vegetation to be trimmed as needed. That is clearly the least damaging to the soil, vegetation and trees, and wildlife. Furthermore, your Environmental Impact Study offers no consideration at all to the impact of your clear-cutting and chemical treatment on property values. Please reconsider your actions.	9/26/2018

Comment Transmittal Type	Last Name	First Name	Organization/Agency	Comment	Date Received
Email	Sanders	Michael W.		This email is in response to Dr. Vance Sherwood's letter in today's News Sentinel newspaper. I was deeply disturbed learning that TVA may be changing their tree cutting policy. My wife and I live in the Holston Hills section of Knoxville because of our appreciation of the old trees here. Preserving our area's trees is extremely important to us. I want to encourage TVA to take a conservative approach to preserving our natural habitat. TVA needs to return to their old policy of respecting our environment and not cutting trees unnecessarily. Unnecessary cutting of trees adversely affects our environment by contributing to global warming. In addition, it destroys the beauty of our country. I welcome hearing back from you regarding how you plan to advise TVA. I hope you do the right thing for all our sake.	9/14/2018
TVA Public Site	Sargent	Jennifer		What is wrong with your understanding of the environment and your stewardship of it so future generations can also benefit from its riches. First its the aquifer and your desire to use clean water indiscriminately and now you are using the same unthinking approach to the environment. I totally oppose changes to the previous TVA policy that allowed trees and other vegetation to be trimmed as needed. That is clearly the least damaging to the soil, vegetation, trees, and wildlife. Furthermore, your Environmental Impact Study offers no consideration at all to the impact of your clear-cutting and chemical treatment on property values. Start working with your customers instead of working against them.	9/22/2018
Telephone	Scott	Karen		I am calling to appeal the change in the previous policy about clear cutting trees. I oppose the policy because it would increase the large number of trees that would be cut down. It's going to cost millions and millions of dollars to remove them and that is going to punish our environments and utility bills. I just want you to know that is not a good thing.	9/21/2018
Telephone	Sevotti	Michael		I just became aware that they want to cut all these trees down and I'm totally against that. I feel it is a waste of money and tax payer money especially and it is going to hurt the environment. We do enough stupid things in this world to do something like this. Please have TVA reconsider this terrible, terrible decision.	9/20/2018
Email	Shaffer	Frank		Once again, TVA is planning to spend a lot of money on a problem that does not exist and raising our rates as you do it. This plan to have a 150 ft. clear path around TVA power lines is both wasteful and unnecessary. Your earlier policy in place for 80 years was just fine. Keep it and stop this wasteful spending that makes us pay more for power. Thanks very much.	9/19/2018

Comment Transmittal Type	Last Name	First Name	Organization/Agency	Comment	Date Received
Email	Silverstein	Larry	knoxtrees	I am writing to associate myself with the comment submitted by Mr. Don Vowell. I am opposed to the choice of Alternative C as the preferred alternative policy. It is hard to fathom how TVA can claim that Alternative C will not have an extremely harmful impact on many aspects of the environment. It means continuing the cutting to the ground millions of trees and spraying herbicides on gardens, farmland, pastures, and landscaped property over many thousands of acres of land. The only vegetation it would allow can hardly be called a tree. There are alternatives to this proposed policy which would protect TVA's transmission lines and have a much less drastic impact on the environment. Instead, TVA prefers an unnecessary and expensive policy that will be very destructive. The Alabama tree that caused what I believe may be the only fine against TVA several years ago, was growing directly beneath the lines. I have copies of all of the relevant reports about that episode. TVA was negligent. TVA did not contest the fine because it knew it was guilty. TVA needed that $175,000 fine to attempt to justify the policy that followed. That fine, however, is no justification for clearing the entire width of the right of way of trees and other vegetation which will never interfere with the transmission lines. Such drastic action is not required by FERC and is not necessary, and yet will cause great destruction to private and public property, and harm the environment. TVA's claim of greater discretion can be used on individual properties under Alternative C gives no comfort after what has been done in the past. TVA had told the U.S. District Court that it had stopped its policy. It was proven that TVA had not stopped its policy and TVA was ultimately forced to admit fault in Court after a lengthy litigation of the issues and two opinions by the 6th Circuit Court of Appeals. Plain and simply, TVA can not be trusted to do the right thing even when it tells the Court what it intends to do. If TVA ends up with this policy of Alternative C, it will forever prove that TVA does not care about the environment. It will be another very shameful episode in TVA's once proud history. This result, following a very shameful period of the past 7 years with TVA's most recent policy, will truly be a travesty and will no doubt result in another round of litigation in the future. The recent litigation should have sent a message to the leadership at TVA. Lessons should have been learned, but apparently have not been learned, and the proper instructions have not been given to those in charge of producing this EIS. The scathing opinions of the 6th Circuit Court of Appeals have been ignored except for the	10/1/2018
Email	Slavin	Robert Jeff		I am a long time TVA customer and resident of Knoxville. I strongly am in favor of the current court ordered option regarding vegetation control under TVA power lines. It is my understanding that this had been TVA's own policy until 2012 as explained in TVA's 1997 and 2005 publications. In addition, the scientific evidence for global warming is indisputable. Felling large number of trees under TVA power lines further contributes to this global threat.	9/9/2018
TVA Public Site	Sloves	Felicitas		I oppose changes to the previous TVA policy that allowed trees and other vegetation to be trimmed as needed. That is clearly the least damaging to the soil, vegetation and trees, and wildlife. Furthermore, your Environmental Impact Study offers no consideration at all to the impact of your clear-cutting and chemical treatment on property values.	9/22/2018

Comment Transmittal Type	Last Name	First Name	Organization/Agency	Comment	Date Received
Email	Sloves	Harold		This correspondence is in response to TVA's draft EIS and TVA's expressed preference for Alternative C. Let me be clear: Not only is this unacceptable, but TVA's semantic dance is abhorrent. TVA references its adoption of an Integrated Vegetation Management (IVM) approach... If this is really true, then where is TVA's expressed commitment to a site-specific assessment as part of Alternative C as stipulated in IVM practices. TVA says "Trust us," which has never been a good idea. In fact, TVA's approach is simply a return to its policy of clear-cutting, with no respect for site-specific implications, soil erosion, the indefinite displacement of wildlife, homeowners' lifestyles, enjoyment of their property, nor the impact on property values. Indeed, TVA is cavalier about the environmental impacts of its preferred approach, actually stating that moderate long-term impacts were acceptable. With specific reference to Alternative C, TVA writes, "The effects of Alternative C include both short-term and long-termimpacts"; (Chapter 4 page 246). Let me be clear: Only Alternative A is acceptable. Buried in this mammoth document is TVA's own admission that as a result of Alternative A, "impacts from this alternative on the natural environment are minor"; (Chapter 4, page 241).	9/24/2018
Email	Smith	Kim	Knoxville Public Defender's Office	I am writing regarding TVA's vegetation management plan. I understand that as of now TVA manages vegetation directly under it's lines while leaving to the property owner the responsibility of maintaining what grows off to the side of those lines. Apparently TVA is considering a change to that policy. I am writing to say that I think TVA should keep the present court-ordered plan that they have been doing for the past 80 years. I absolutely believe there could be a negative environmental impact from a change in TVA's vegetation management plan that includes cutting down possibly a million trees in a time of global warming. Thank you.	9/11/2018
Email	Spratley	Carolyn		It makes no sense to spend a ton of money to solve a problem that does not exist. Your earlier policy was fine and a new one is not needed.	9/19/2018
Telephone	Stanley	B.J.		I'm calling to register my feelings about TVA cutting so far away from the lines. I read the article in the paper and I'm against it.	9/20/2018
Email	Stephens	Mark	Knoxville Public Defender's Office	I am writing as a concerned citizen to express my views regarding TVA's vegetation management plan. I understand that currently - as a result of a court order - TVA manages vegetation directly under it's lines while leaving to the property owner the responsibility of maintaining what grows off to the side of those lines. I understand TVA is considering a change to that policy. In light of the contemplated change, I write to express my opinion that I favor TVA keeping the present - courtordered plan - which I understand to have been TVA's plan for decades (at least until 2012). Further, while I'm not an expert, I believe there could be a negative environmental impact from a change in TVA's vegetation management plan that includes cutting down possibly a million trees in a time of global warming. Thank you for the opportunity to express my concerns.	9/11/2018
Email	Stone	Kay		I believe your old vegetation policy is sufficient. We do not need a new one.	9/18/2018
Email	Stouder	Richard		I oppose government stupidity. And I oppose the TVA clear cutting a swath for 16k miles. The old policy worked - if it ain't broke...especially since TVA can give no sane rationale.	9/14/2018

Comment Transmittal Type	Last Name	First Name	Organization/Agency	Comment	Date Received
TVA Public Site	Strobush	Carol		If the TVA worked with the Forestry Division on how to clear lines and area environmentally, there would be no fires like there is in the Western area of our country. TVA is supposed to be conservation wise, but like MLGW, they are not. I have lived in TVA area most of my life and they CAN be good. Thsy can also be devastatingly bad.	9/22/2018
	Swann	Trenta and Roy		We are concerned with the recent news regarding the agent orange type chemical which we understand is in the recent proposal for your vegetation management policy update. The main TVA line goes through our property at 830 Kyker Ferry Rd Kodak TN 37764. Our house is literally along the right of way. We have 100 acres and we are definitely opposed to any changes in the current policy as it would affect us and our livestock. You reach me at 865-933-6471	
Email	Tabler	Michael	Knoxville Public Defender's Office	I am writing to register my concern over proposed changes to TVA's vegetation management plan. I support the current plan in which TVA manages vegetation directly under it's lines while leaving to the property owner the responsibility of maintaining what grows off to the side of those lines. I believe a change to this policy, which I understand has been successful for approximately 80 years, will be detrimental to the environment. While less concerning, I expect a change in TVA's policy will also result in damage done to property values and homeowners' right to enjoy the natural beauty of their property. Such outcomes seem unnecessary considering TVA has been so successful in maintaining vegetation up to this point without the need to clear cut many trees. I oppose any change to TVA's current policy, and I appreciate your willingness to take public opinion into account on a change that will have wide-ranging negative effects on the community.	9/11/2018
Telephone	Taylor	Bryan		In the past I have had my hayfields driven through and was not compensated. No one contacted me asking to come on my property. Leave the landowners the right to maintain their own trees.	9/27/2018
Telephone	Thompson	Katherine		I, as a voting person, would love to see this plan stopped of cutting all the trees. The plan we have in place with TVA is fine. It is just another waste of money in a company that blows money like it is water. If you could please stop. We are one of the most visited states for the beauty of our state in America. People don't want to see huge swaths of forest cut down. I used to work for the forestry.	9/19/2018
Email	Tipton	Fredda		It has recently come to my attention that TVA is reviewing their previously successful 80 year policy regarding maintenance around transmission lines which could result in clear cutting of millions of trees across seven states and wanted to express my opinion on this matter which is that I am STRONGLY opposed to it. In the present day of global warming and a blatant disregard for the environment by politicians, I feel that clear cutting of trees would only add insult to injury. Further, loss of natural beauty and animal habitats provided by trees would be a real tragedy for those of us who enjoy spending time outdoors. I respectfully request that TVA maintain its current policy of managing vegetation directly under its lines and leaving all other vegetation alone for all living creatures, both human and animal, to enjoy. We need to protect Mother Nature, not destroy her. Thank you for your time.	9/14/2018

Comment Transmittal Type	Last Name	First Name	Organization/Agency	Comment	Date Received
TVA Public Site	Townsend	Akisha		Though I would like to make more extensive comments, the current timeframe does not allow me to do so. Therefore, I would respectfully request that more time in the form of an extension be afforded for those in the impacted areas to more thoroughly review the draft EIS and thoughtfully comment. Based upon what I've reviewed to date, I would prefer that the most selective approach is chosen for managing vegetation along ROWs. Specifically, that only vegetation posing a substantial and imminent danger be managed, even if the cost of electing this option is passed on to me as a consumer. The more certain threats to human health and well-being and disruption to wildlife through such a far reaching vegetation management program appear to far outweigh the cost of a projected or actual temporary inconvenience. I have a number of questions about the project: 1. The cost over 20 years of each plan has been made available. How much of this cost will be borne by individual consumers on an annual basis? 2. Which right of ways will be impacted and how much notice will residents in those areas receive? 3. Will TVA be willing to re-plant compatible trees in the instance that trees in a right of way are cleared? It is presently my understanding that re-planting will be up to the consumer. 4. Has TVA consulted third party organizations specializing in the most sustainable practices for vegetation management? Thank you for your consideration of these comments.	10/1/2018
TVA Public Site	Turner	Leslie		It is criminal to take actions that will adversely impact generations to come with no regard to the wishes of the landowners or the public. Clear cutting and dumping toxic chemicals over large areas to retard future growth is wrong. Dumping chemicals that could end up in our water system just to prevent having to mow to keep growth down is wrong.	9/24/2018
Email	Vanelli	Ruth		Please do not change your earlier policy on tree cutting. This policy has worked just fine and the idea to change it, spend tons of money, and destroy trees that have taken years to grow, is absolutely criminal. Thank you for your consideration.	9/19/2018
Telephone	Vaughn	James		I agree with much of the meadow concept because historically much of the area, including the Cumberland Plateau, was Savannah grasslands. However, the indiscriminate spraying of herbicides affects more than just the target species and many times affects native species of plants. There are several acres of high quality Savannah grasses on a ROW near where I live that I am trying to preserve. In my observations, these grasslands had more bumblebees and other insects than all of the rest of the ROW that I walk regularly. I would like to have a hard copy of the PEIS	9/27/2018
Email	Vowell	Don	Plaintiffs in Sherwood v. TVA	I submitted a Comment and Supplemental Comment on the scope of the environmental impact statement on behalf of the plaintiffs in Sherwood v. TVA. The draft environmental impact statement did not address or did not adequately address the points made in the Comment and Supplemental Comment, so I am re-submitting (by attachment to this email) the very same Comment and Supplemental Comment in response to the draft environmental impact statement. Thank you for your consideration. Attached comments submitted during scoping.	9/30/2018
Email	Weber	Melinda G.		Please do not change the long-standing policy regarding trees near TVA power lines! This seems non-sensical and unnecessary.	9/14/2018

Comment Transmittal Type	Last Name	First Name	Organization/Agency	Comment	Date Received
Email	Weeks	Sarah		I understand that TVA is considering changing the procedures for managing vegetation under and near TVA powerlines. I also understand that you are currently accepting input from the public regarding this change. I am emailing you today to let you know that I do not agree with a change in the procedure to expand the clearance of vegetation to a 150' wide pathway. I believe that the procedures that are currently in place are adequate to protect both the powerlines and the public.	9/14/2018
Email	Westbrook Jr.	John E.		I know we have a requirement to manage the vegetation, but please do not use herbicides. I own a cabin in the Murphy, NC area and Blue Ridge Mountain EMC used Roundup to control the vegetation and it ended up in my well water. I could not use the water for months and it cost me money to have the water tested. With the recent lawsuit verdict in CA, I would recommend no herbicides.	8/13/2018
Email	Wetzel	Chris		Instead use the old policy of cutting under the power lines.	9/20/2018
Email	Williams	Gerry M.		I am happy with TVA's earlier policy and do not think we need a new one. We have been maintaining our trees for 28 years and are happy to continue that maintenance. Thank you for your attention to this matter.	9/26/2018
Email	Williams	Mark W.		Please acknowledge that this is my request that TVA retain its earlier vegetation management policy, and does not need a new one.	9/18/2018
Email	Williams	Richard E.		This is a request that TVA continue it's earlier policy on vegetation management. We do not feel there is a need for a new policy.	9/26/2018
Email	Wooten	Margaret		Wanted to send an email regarding the recent proposed changes to TVA's vegetation management policies. I believe that TVA should stick to current court-ordered policy and allow property owners to manage their own land on the sides of TVA's lines. I don't understand why you've changed the policy to begin with-it doesn't make any sense to spend so much money and create a 150-ft wide swath of destruction without even being able to state the reasons for doing so. I support keeping the current policy and don't think that you need a new one.	9/10/2018
Email	Wright	Avery Taylor		I've read the four options, but I'm not overly familiar with the specifics. I'd just like to suggest that whatever plan TVA goes with, we work in conjunction with the TN's Dept of Environment & Conservation's "Natural Heritage Program" to help promote the proliferation of vulnerable, rare, and threatened natural plantlife. With the sheer scale of this project, I also think there could be a good opportunity to partner with a local university in establishing test sites to help with future environmental mgmt. Last, I think TVA should set clearly defined goals of what success would look like. Such metrics could be erosion, shortterm impact to local vegetation and wildlife, long-term impact to vegetation and wildlife, proliferation of endangered natural species, % reduction in invasive non-native species. Thank you for the opportunity to provide feedback!	8/14/2018
	Ziemer	Becky		I oppose changes to the previous TVA policy that allowed trees and other vegetation to be trimmed as needed. That is clearly the least damaging to the soil, vegetation and trees, and wildlife. Furthermore, your Environmental Impact Study offers no consideration at all to the impact of your clear-cutting and chemical treatment on property values. This is irresponsible and lazy!!!	

From:	ROBERT ALBISTON
To:	Masters, Anita E
Cc:	Lucinda Albiston; Vance Sherwood
Subject:	Tree clearaning
Date:	Friday, September 14, 2018 10:15:03 AM

TVA External Message. Please use caution when opening.

Dear Ms. Masters,

My wife and I are long-time residents of west Knoxville and have lived in several subdivisions and neighborhoods. We currently live in the Gettysvue subdivision.

We are dismayed the the TVA is again sending out people to chainsaw the landscape in a wide (150 feet) along the power lines throughout the area. Having followed the reasons given out by the TVA, we are frankly horrified that such short-sighted, destructive behavior would be adopted.

No one lives on a grid, schematic, or a map--we live in neighborhoods!

Scarifying the land with toxic defoliant is also part of the plan as presented. This is simply a scorched earth policy that disregards the impact on health of pets, children, and wildlife.

The TVA, despite it's many benefits to this region, is about to establish itself as a significant cause of heat increase throughout our residential neighborhoods and as a chief promulgator of ugliness throughout Knox County.

The plan involves an unjustifiable cost to the rate payer.

We can not state it more strongly than to say STOP this destructive plan now and in the future. Please send these thought on in hope of finding an enlightened audience which is able to do a better job than that currently underway.

Thank you for your kind attention,

Robert and Lucinda Albiston
[redacted]

From:	Jerry and Judy
To:	Masters, Anita E
Subject:	Tree policy
Date:	Thursday, September 20, 2018 4:02:59 PM

TVA External Message. Please use caution when opening.

I appeal to you in favor of the previous TVA policy about clear cutting trees. I oppose the policy that would increase the large numbers of trees that costing millions and millions of dollars to remove and that will punish our environment and our utility bills.
Thank you for considering this.
Gerald Bettice
38122

From:	Deedee Blane
To:	Masters, Anita E
Subject:	TVA"s Tree-cutting Policy
Date:	Tuesday, September 18, 2018 4:16:56 PM

TVA External Message. Please use caution when opening.

Subject: TVA's Tree-Cutting Policy
Date: September 18, 2018 at 9:02:02 AM EDT
To: aemasaters@tva.gov

Dear Ms. Masters:

Please do not change or otherwise amend your policy to allow the clear-cutting of some 16,000 miles of trees!!! It makes no sense and will destroy more of our beautiful Tennessee landscape!!!

Thank you for your attention to my urgent plea.

Sincerely,

Dianne Blane
[redacted]

Sent from my iPad

From: john brewer
To: Masters, Anita E
Subject: TVA"s excessive tree clearing policy
Date: Tuesday, September 25, 2018 2:59:10 PM

TVA External Message. Please use caution when opening.

I recently read an article in the Memphis *Commercial Appeal* discussing TVA's policy of clearing a 150-foot wide strip along all power line right of ways.
Like the author in the article, I too think this width of clearing is excessive. If trees are mature at the normal right of way width, not many, if any, would be 150-feet tall. No redwoods in theTVA area.
Please record my concern as a TVA rate payer.
Thank you

John Brewer [redacted]

From: Larry Brown
To: Masters, Anita E
Subject: TVA vegetation management proposal
Date: Monday, September 10, 2018 3:02:51 PM

TVA External Message. Please use caution when opening.

Dear Ms. Masters--
I’m a resident of Knox County. I understand that TVA is inviting comment on a proposed policy for managing vegetation under TVA transmission lines. The new policy, I’m told, will allow for clear-cutting a 150 foot wide lane under the power lines. As best I can tell, no compelling justification has been offered for changing the existing policy for vegetation management — which allows property owners to handle what vegetation is not directly under the transmission lines. I am against the proposed policy, which seems both entirely unnecessary and environmentally destructive.
Larry F. Brown
[redacted]

From:	Randall D Burris
To:	Masters, Anita E
Subject:	Tree cutting
Date:	Friday, September 14, 2018 3:21:47 PM

TVA External Message. Please use caution when opening.

Lacking any evidence of potential impact sufficient to justify such expense, we strongly discourage such a program of tree cutting. It's not as if power outages were rare; the chance of one more, surely unlikely, is not sufficient justification.

Randall and Jane Burris

From: Nancy Carnes
To: Masters, Anita E
Subject: TVA Clear Cutting Proposal
Date: Wednesday, September 19, 2018 12:36:58 PM

TVA External Message. Please use caution when opening.

I have recently become aware that TVA is again proposing to clear cut a 150-foot wide path through 16,000 miles of transmission lines at the cost of millions of dollars. I believe this is an unnecessary waste of money, not to mention unnecessary loss of trees. I prefer the earlier, longstanding policy of allowing property owners to tend to trees, etc., that are located to the side of TVA's transmission lines. No new policy is needed.

Sincerely,
Nancy Carnes

Sent from my iPhone

From:	Jewell Carroll
To:	Masters, Anita E
Subject:	New Tree cutting/chemical spraying policy
Date:	Saturday, September 15, 2018 7:18:54 PM

TVA External Message. Please use caution when opening.

Ms. Masters,

I am a resident of Chattanooga TN. I do NOT want a change in TVA's policy. There is absolutely no valid reason to cut a 150' wide swath of trees around the transmission lines.

1) The financial cost is too high.

2) The environmental cost is too high.

3) The chemicals to be sprayed afterward are dangerous to both the health of citizens and the environment.

Thank you,
Jewell Carroll

From: joseph carson
To: Masters, Anita E
Subject: FW: oppose TVA altering tree cutting policy
Date: Saturday, September 15, 2018 1:40:56 PM

TVA External Message. Please use caution when opening.

Dear Ms. Masters,
Unless TVA's proposed policy for tree-cutting is similar to the large majority of other utilities around the Country, I oppose it.
Respectfully,
Joseph Carson, PE
[redacted]

From: Linda
To: Masters, Anita E
Subject: Tree cutting regulations
Date: Friday, September 14, 2018 6:29:25 AM

TVA External Message. Please use caution when opening.

One more time I guess we are going to have to rise up and say enough is enough! DO NOT CHANGE THE RULES ABOUT CLEAR CUTTING! To destroy every living green thing within 150 feet of a transmission line for 16,000 miles is not only ridiculous but is insane!

Each of those trees outside of the footprint of the line serves a purpose, to de-pollute our region of the country!

This time I will urge a class action lawsuit that will serve as a FINAL reminder that you are not the government, **we the people are the government!**

Linda Carter
Counce, Tennessee

From:	Joyce Cartor
To:	Masters, Anita E
Subject:	TVA vegetation management
Date:	Sunday, September 9, 2018 10:12:08 AM

TVA External Message. Please use caution when opening.

Dear Ms. Masters:

I would like to register my agreement with Drs. Vance and Donna Sherwood, and the other former litigants, in their firm belief that there is no true good reason for TVA to once again try to engage in clear-cutting trees under transmission lines. There is simply no real evidence to indicate that this is necessary, and, more importantly, why in today's world of serious climate change problems would TVA want to kill millions of trees??

Sincerely.

Joyce M. Cartor
Knoxville, TN

From:	Bobbi Chapman
To:	Masters, Anita E
Subject:	New TVA policy
Date:	Tuesday, September 18, 2018 1:07:57 PM

TVA External Message. Please use caution when opening.

Dear Ms Masters:

I was surprised to read about the new policy TVA has adopted for cutting trees. Please keep to the old policy.

Thank you,

Larry and Barbara Chapman
Loudon

From: [redacted]
To: Masters, Anita E
Subject: NO TREE CUTTING IN BACKYARDS!!
Date: Saturday, September 15, 2018 7:04:04 AM

TVA External Message. Please use caution when opening.

I protest TBA proposals to resume unwarranted clear cutting of trees that pose no threat to power lines!!
Follow the judges orders and the reasonable sense of property owners.
Karen Chesney

Sent from my Verizon, Samsung Galaxy smartphone

From: [redacted]
To: Masters, Anita E
Subject: Proposed Changes to Vegetation Mgmt. Policy
Date: Friday, September 14, 2018 9:49:15 AM

TVA External Message. Please use caution when opening.

I live in Knoxville, TN, and wish to communicate my strong disagreement with any changes to the subject policy. There is no pressing need for changes. TVA would be better served to save the costs associated with the proposed changes and redirect those funds toward activities that reduce customer rates!

Thank you,

Barbara Cook

Sent from my LG Mobile

From:	Masters, Anita E
To:	"Boulware, Karen"; "Elzinga, William J"
Cc:	Roelofs, Tricia Lynn; Bean, Lana D; Willard, Emily P; Jacks, Susan R
Subject:	TSVM - A few more comments
Date:	Thursday, September 20, 2018 1:51:22 PM
Attachments:	stop tree cutting width of 150 ft.msg

Karen,

We have received four comments from the online commenting system (below) and one more by email (attached).

Anita

Name: Paula Hargis
[redacted]

Comments: We own TVA property where lines are located. I heard on the news you have ideas of what to do with the property but cannot find where those ideas are listed. Can we get that list? Also how do we find out what restrictions we have on building on those properties in reference to poximative of our home

Name: Ethan Halcomb
[redacted]

Comments: My home is located approximately 3 miles west of the Sequoyah nuclear plant and my property includes roughly 3 acres of land where TVA has ROW to control vegetation for 3 sets of 161 kv transmission lines. I have lived in my home for over 18 years and have witnessed various TVA vegetation control methods and am in favor of the most recent herbicide technique. From my personal observations, this technique has not had a negative impact on wildlife, brush & grass vegetation, or health issues within my family & friends. I would be in favor of adopting this technique for long term use. I would welcome environmental study of my property if it would benefit herbicide treatment in the future.

Name: Denise Cook
[redacted]

Comments: Goats. They eat everything and fit every terrain. If you were to get cashmere goats you could also sell their fur and make more than enough money to cover their upkeep. It’s a win win situation.

Name: Curtis Mccoy
[redacted]

Comments: We don't need to fix something thats not broke. There is not a problem except someone needs an explanation for their job so let the trees alone

From: Jerry Crossno
To: Masters, Anita E
Subject: NO 150 FT ROW
Date: Friday, September 14, 2018 3:26:52 PM

TVA External Message. Please use caution when opening.

We are totally opposed to increasing the width of the power line right of way to 150 feet! There is no reason to do so.

--
Blessings & Joys ---->

Jerry & Ellalyn Crossno
[redacted]

From: Mary Ann Crowe
To: Masters, Anita E
Subject: Change in vegetation management
Date: Monday, September 17, 2018 11:00:16 PM

TVA External Message. Please use caution when opening.

Dear Ms. Masters,

We respectfully request that TVA reject proposed changes in its vegetation management policy which would result in huge scars in the yards of Tennesseans and incur major costs in the process. It is our understanding that the Federal Electric Regulatory Commission did not demand that such clearing take place and that no one in the TVA has admitted to making such a decision, which suggests that whoever thought this was a good idea is not willing to face the ire of TVA's customers.

Please leave your earlier policy (managing vegetation directly under the power lines) in place rather than destroying vegetation that is unlikely to ever cause problems with the power lines.

If TVA really feels the need to spend nearly a fifth of a billion dollars, perhaps it should put the lines underground, which would seem a better option to protect them.

Thank you.

Nick and Mary Ann Crowe
[redacted]

From: Brian D.
To: Masters, Anita E
Subject: TVA and cutting trees
Date: Friday, September 14, 2018 3:29:28 PM

TVA External Message. Please use caution when opening.

Good afternoon, Ms. Masters,

I'm emailing you about an article recently published in the Knox News Sentinel.

I grew up in east Tennessee and still live in Nashville. I have hunted, hiked, and farmed in areas around high-power transmission lines. My dad is an electrician that has worked for TVA in the past. I'm familiar with some of TVAs approaches, but I'm very much opposed to changing the guidelines around trimming vegetation around power lines unless there are clear, compelling reasons to do so. So far, there has been nothing like that presented to justify a change.

Please consider the impact that a change would have on the state. Vegetation removes Co2 from the atmosphere and policy changes that may appear small on the face may have large, unintended side effects.

Please reconsider this policy change.

Thank you,
- Brian Dailey
Nashville, TN

From:	Ray Daniels
To:	Masters, Anita E
Subject:	Tree cutting
Date:	Friday, September 14, 2018 10:23:01 AM

TVA External Message. Please use caution when opening.

Read the opinion in the 9/14/19 Knoxnews Sentinel. Your tree cutting plan is absurd! To say you are the government and can doing anything you want makes me want to vomit. Like Trump, you will soon find out only the people have the power.

Raymond Daniels

From: Caprice DeLauder
To: Masters, Anita E
Subject: Tree Cutting Policy
Date: Sunday, September 16, 2018 1:01:05 PM

TVA External Message. Please use caution when opening.

Ms. Masters,
I do not agree with your new tree-cutting policy. I believe that the earlier policy is sufficient to keep power transmission possible.
Thank you,
Caprice DeLauder
[redacted]

Hi Ms. Masters,   Thanks for allowing me the opportunity to share information about our environmentally friendly service, utilizing goats and sheep, that provides TVA another option to help achieve their preferred Alternative C Plan. Goats are another tool available for Land Managers to mitigate vegetation in fragile ecosystems, preventing harm to the biota.

Utilizing sheep, in solar farms, eliminates panel damage from projectiles thrown by power equipment and also eliminate debris from accumulating on panels creating higher labor cost of cleaning panels.

We're here for Land Managers and Companies that want to make a commitment to the environment by utilizing sustainability practices using goats and sheep to mitigate their vegetational concerns. Also, utilizing animals compliments their environmental principles, creating positive Public Relations for their advertising efforts.

Logistics and difficultly of browse determines cost which widely varies up to $5000.00+ per acre.

Studies and reports will be forwarded in a following e-mail.

Regards,

Al Dilley
[redacted]

GOATS ARE THE GREENER WEED EATERS

Advantages: Goats provide a environmentally - friendly solution to vegetation management and are nutrient recyclers.

- Goats are cost effective in many situations, such as overgrown vegetation on steep slopes and uneven terrain
- They work where herbicides and machinery is prohibited, leaving only natural fertilizers and use no fossil fuels.

Goat Browsers [redacted] Al Dilley [redacted] www.goat[redacted]

Utilizing sheep is becoming the preferred practice for many solar farm operators mitigating their vegetation. Sheep provide an eco-friendly solution, are sustainable, and are nutrient recyclers. They work where herbicides and machinery is prohibited, using no fossil fuels creating a smaller carbon footprint.

Utilizing sheep eliminates the high cost of Workmen's Comp insurance and other labor concerns. It also eliminates panel damage from projectiles thrown by power equipment and also eliminates debris from accumulating on panels creating higher labor cost of cleaning panels.

We're here for companies that want to make a commitment to the environment by utilizing sustainability practices such as sheep to mitigate their vegetational concerns. Utilizing animals compliments their environmental principles, creating positive Public Relations for their advertising efforts.

Utilizing sheep as nutrient recyclers will;

- Restore and Preserve the Environment
- Reduces Waste and Pollutants
- Great Way to Educate the Public Regarding Environmental Conservation
- Reduce the Impact of Operations and the Final Product on the Environment

From:	al dilley
To:	Masters, Anita E
Subject:	having problems sending goat studies, send more later date
Date:	Wednesday, September 12, 2018 8:58:32 PM
Attachments:	2017_KYEXCELProjectReport_Goats vs Kudzu 2.pdf

TVA External Message. Please use caution when opening.

https://bugwoodcloud.org/mura/mipn/assets/File/ASITargetGrazingBook2006.pdf

KY EXCEL Project Report Form

Return this completed form and any attachments to:

KY EXCEL
Division of Compliance Assistance
300 Sower Blvd., 1st Floor
Frankfort, KY 40601
envhelp@ky.gov

(A separate form must be submitted for each project.)

Member and Project Information

Member Name: **Lexington-Fayette Urban County Government**

Contact Name: Cathy Mobley, LFUCG Division of Parks

Project: Kudzu vs. Billy the Kid (goat) at Idle Hour Park

Project Summary

This was a pilot project to test the effectiveness of using goats to clear thick brush and invasive plants. The goats were brought in primarily to eat the kudzu that was quite thick on the north end of the park. The kudzu was growing along a ravine and up a hillside which made it impossible to reach with machinery without damaging other desirable plants and trees. Plus, the combination of kudzu and honeysuckle made clearing the area by hand far too labor intensive.

The goats arrived on May 14 and remained on site until June 27th.They were quite voracious eaters and were able to clear the area of brush and vines from the ground to as far up as they could reach standing on their hind legs.

Mr. Diley, the goat owner and shepherd, set up a temporary electric fence (white mesh) to contain the goats as well as to keep out predators. He also set up an orange, plastic, mesh fence about five to six feet outside the electric fence to keep people away from the electrified one. Mr. Diley stayed on site, living in a camper trailer, for the duration of the project.

Mr. Diley states that in order to keep an area clear, the goats need to be utilized at least three times a year, otherwise the plants will grow back. Evidence of this can be seen in the regrowth of the honeysuckle a couple weeks after the goats were moved from one section to another. The area has been cleared enough, though, that people with hand-tools and a regular maintenance schedule could keep it cleared out.

Project Investment

- How much was spent (in dollars) to implement this project?

  $9,650

- How many hours did it take to plan and execute the project?

  10-12 hours

- How many people were involved in the project's planning and implementation?

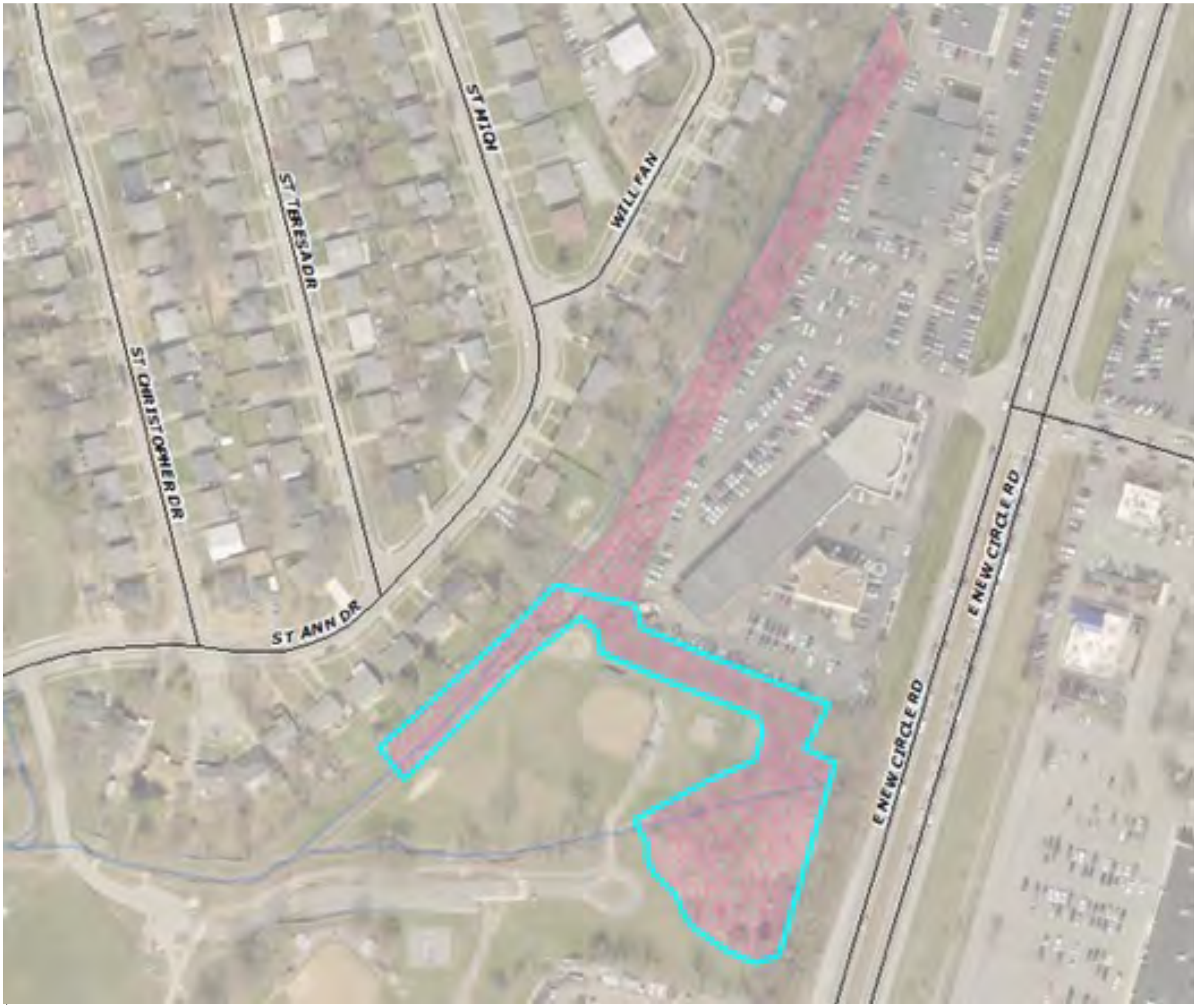
  2

- How much money did you save by completing this project?

  Uncertain at this time

Project Results

Goat farm – Goat Browsers, Glasgow, KY, http://www.goatbrowsers.com/
Owner – Al Diley
Quantity of goats – 17
Number of acres cleared – Phase 1 is 2.0 acres. (Phase 2 is a future project not yet contracted.)
Time required – 6 weeks
Benefits of using goats over machinery or herbicides – Goats do not burn fossil fuels nor compact the soil. Goats do convert the vegetation they eat into fertilizer. No chemical herbicides needed.
Disadvantage – Not a permanent solution.


ST MION
WILL FAN
ST TERESA DR
ST CHRISTOPHER DR
ST ANN DR
E NEW CIRCLE RD
E NEW CIRCLE RD


NO MOW ZONE
Goats

Masters, Anita E

From: al dilley [redacted]
Sent: Sunday, September 16, 2018 10:23 PM
To: Masters, Anita E
Subject: Universities mitigating vegetation utilizing goats
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Use of Meat Goats to Control Undesirable Plants in Hillside Pastures: Effect of GPS Collars on Time, Location and Activity.

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Summary

Pasture weed control is complicated by the steep hill side topography found in many areas of Kentucky and the surrounding region. Meat goats (*Capra hircus*) are considered a possible alternative to mechanical or chemical weed control in these pasture situations. A study using 120 boar-cross females averaging 44kg was conducted in Carter County Kentucky to determine the impact of meat goats on undesirable plant species. Additionally, some of them were fitted with GPS collars to determine animal location during the day and time spent foraging. Plant population and canopy density measurements were recorded at the start, middle, and end of the grazing season for two to three years. Goat periodic preference for particular plant species resulted in an increase in growth of other species for the same period or year. Bramble coverage in the upper canopy decreased during the study, particularly in the first year of grazing, but increased in the second year, as goat preference changed ($P < 0.05$). Overall, grass browsing in the middle and lower canopy increased during the grazing season in the study ($P < 0.05$). Distinct activity patterns were observed in goats during the 5 days of GPS measurements related to resting, foraging period and locations. The effectiveness of goats in eliminating undesirable plants species and the use of GPS as tool in determining behavior showed great potential for using meat goats in a vegetation management plan.

Keywords: GPS collars, Hillside pastures, Meat goats, Undesirable plant species.

Introduction

Hillside pastures grazed by cattle in Eastern Kentucky and much of the Appalachian region are dominated by herbaceous weeds and brush such as multiflora rose (*Rosa multiflora* Thunb) bushes, and other invasive species (Mays and Kok, 1988). These plants have become a growing problem for farmers in the last few decades; and in cases of heavy infestation, access by animals to pasture has been severely restricted. This problem is compounded by environmental concerns of chemical management, the dangers of mechanical control and increased costs of herbicides (Hart, 2001). The challenges posed by such undesirable plants offer new opportunities to use goats as low cost, low input and environmentally acceptable alternatives to chemical agents. Use of meat goats would therefore provide owners with alternatives to maintain their pastures in production and to integrate them into sustainable farming systems (Luginbuhl and Castagni, 2007).

The benefits of using meat goats to control undesirable and invasive vegetation in many different environmental situations are well documented. Goats have been reported to have unusual preferences for the leaves and twigs of woody plants, and have been exploited as an alternative to herbicides and mechanical cutting against encroaching herbaceous weed and brush species (Luginbuhl and Castagni, 2000). They possess a unique characteristic that separates them from other ruminants in that they eat more brush and weeds than grass. Goats can control brush and weeds without disturbing the existing grass and soil (Malecheck and Provenza, 1981). These animals have a larger liver mass relative to cattle or sheep, and tolerate higher levels of phenolic compounds such as tannins. In addition, goats are resistant to many plant toxins and anti-nutritive factors, and prefer to consume a large variety of plant species (Hart, 2001). Furthermore, because of their versatile grazing/browsing behavior, goats are able to successfully control encroaching vegetation while at the same time selecting a diet that meet their nutritional requirements (Child et al., 1985). The propensity of goats to stretch upward on their hind legs allow them to commonly browse up to a height of 2 meters in areas where trees and hanging vines are present (Lu, 1988). Goats can even climb trees, and have been used to reduce or eliminate many shrubs and browse species such as bramble, vines and forbs from grassland (Garcia and Gall, 1981).

While the use of goats to manage the growth of specific weed species is known and has been practiced, this approach is underutilized (Luginbuhl and Castagni, 2007). Optimizing use of goats would require behavior monitoring to increase knowledge of animal location, movement and activity patterns for better control and pasture utilization. Advances in global positioning system (GPS) technology have given rise to the development of GPS collar receivers that can monitor animal position leading to better assessment of behavior, evaluation of animal utilization of different forage and grazing patterns (Turner et al. 2000). Goetch et al. (2010) conducted a review of research on grazing behavior and found that the use of GPS systems can be effective in determining grazing behavior in goats, in terms of location, distances travelled and movement within the grazing area. Based on this information, a study was conducted in Carter County Kentucky to determine the impact of meat goats on undesirable plant species on hillside pastures, and the location and time spent by goats on foraging and other activities during the day.

MATERIALS AND METHODS

Experiments were conducted to evaluate the elimination of undesirable plants species and to gather GPS location data with meat goats. This study was conducted in Carter County KY on a privately-owned farm with a rugged hillside topography. The project only involved standard husbandry practices and was reviewed and approved by the Institutional Animal Care and Use Committee (IACUC). Goats were owned and managed by the cooperating producer who was responsible for all care and maintenance of the animals on the project.

Animals and Plants

A total of 120 multiparous Boer-cross females averaging 44kg were grazed on a single 40 hectares mountainous, unimproved pasture for three consecutive years for the purpose of reducing numbers of target weeds: bramble (blackberry, raspberry), forbs, vines, multiflora rose and various other weeds consisting of Japanese honey suckle, sumac, wild grapes, crown beard, greenbrier and smilax. Five areas representative of the property were identified and marked with "T" post to measure plant population and canopy density. The stocking density was low at 3 goats/hectre and access was limited to four 12 week browsing periods. Plant species data was measured at the upper, middle, and lower plant canopies every 13 cm for a distance of 240 m. Plant growth measurements were also taken at the beginning, middle, and end of the grazing season for two of the three years the study was conducted, in order to identify trends in growth or reduction of plant species. Measured readings of plant species in the upper, middle and lower canopies and also at the beginning, middle and end of the grazing season were recorded, and analyzed using the ANOVA procedure in SAS (SAS Institute, Inc.).

GPS Collars

Kenwood™ TH-K2 GPS collar receivers with coordinates every 15 min were placed on 15 goats on a Monday and removed on Friday during August of 2011. GPS data collected included time, animal location and movement, and forage consumption patterns. All data was pre-processed at Langston University. The data was downloaded from the GPS collars, post processed with N-4™ software and stored as dbase files to increase accuracy of the collar information. These were later opened in Excel and the date field converted from a universal time stamp field to a field format readable by ArcGIS™ (YYYYMMDDhhmmss). Thereafter, the data was imported into ArcGIS ArcMAP software using the Add XY tool, exported as ArcGIS Shapefiles and then merged later into one ArcGIS Feature Class. The next step was to visualize the goat movements by enabling time in the feature class and creating an animation from the data. Based on the animation, goat movement was manually aggregated by accessing the Feature Class attribute table with Excel and aggregating them using the Date/Time field.

Results

This study used goats to eliminate undesirable plants and to collect GPS data on goat behavior patterns. The bar graphs show the impact the goats had on the forage mix in the upper, middle, and lower canopies for 3 years, while the line graphs show trends in plant reduction and growth at the start, middle and end of the grazing season over 2 years of data collection.

Figure 1 shows that bramble and vine populations decreased in the upper canopy, while that of forb increased significantly in the middle and end of the grazing season ($P < 0.05$). There was no significant difference in the bramble population in the middle canopy (Figure 2). The slight increase in vines was not significant, but the population of forb increased significantly by the middle and end of the grazing season in the middle canopy ($P < 0.05$). Grass population that could barely be seen or measured from the upper and middle canopies grew rapidly as brambles and vines were consumed by the goats. Figure 3 indicates that grass increased significantly in the lower canopy during the grazing season, while forb showed an increase in the middle, but significantly decreased in the end. There was no significant difference in the growth rate of bramble and vine (P <0.05).

When broad measurements were taken of plant species specifically at the beginning, middle and the end of each grazing season, the following results were obtained: In 2010, bramble decreased significantly by the middle and end of the grazing season as compared to the beginning of the season. The slight increases in forb and vine were not significant throughout the season (P<0.05 – Figure 4). Figure 5 shows that the bramble population in 2011 increased significantly by the middle of the grazing season, and by the end of the grazing season, it had decreased to about its height at the start of the season. Vines decreased significantly to almost zero level by the middle of the season and remained unchanged at the end, while there was no significant difference in forb from the start to the end of the grazing season (P <0.05).

Animal movement and activity as indicated by information from the GPS collars shows that the goats spent the majority of their time in overnight locations (53.5%) and 9.6% of the day time in resting or rumination locations. They spent 32.1% of their time grazing during the 5 days of GPS collar use. Of the time spent grazing, 19.9% was spent on western exposure slopes and 12.2% on eastern exposure locations. Location selection for bedding and ruminating were different and may be associated with the heat during the day for rumination and security during the night. Overgrazing of these specific areas was observed by the second year, even though the size of the pastures were large. Figure 6 and 7 highlights some of the behavior patterns exhibited by goats in this study. The time spent by the goats as indicated by distance between collars is illustrated in Figure 6. Between 12PM to 2PM daily, the goats settled down to <1 to 3 meters apart, unlike at night or the rest of the day (P <0.05). Figure 7a shows an overview of the whole field as goat collars were being put on prior to release, while the grazing pattern for the first two days and a late afternoon spread are indicated in Figure 6b and Figure 6c, respectively. A difference in the grazing pattern between day one and day three is seen in Figure 6d, while Figure 6e shows the goats bedding down in the evening – a consistent pattern for all five nights. Meanwhile an additional diversity in the grazing pattern is illustrated by Figure 6f – goats are concentrated near the barn where feeding started during the day before recapture to remove the collars.

Discussion

Goats have a unique ability to consume forage resources that cannot be utilized effectively by other livestock species. Because of its versatility the goat lends itself to conservation grazing better than any other domestic livestock species when utilized in a sustainable manner, and at a predetermined stocking rate for optimum management (Hart, 2001). Results indicated that goats consumed shrub and browse species before grass. The bramble population was reduced first before vines and forbs, and lastly grass. This is in agreement with studies by Wilson et al. 1975 and Bryant et al. 1979), who in comparing the diets of ruminants under woodland or range conditions, reported that goats will choose the most nutritious parts of plants and prefer high shrub diets over grass. Depending on availability, Rector (1983) observed that goats consumed browse (70%), grass (20%) and forbs (10%), as compared to cattle whose consumption is 70% grass, 24% browse and 5% forbs. Similarly goats were reported to select 60% shrub, 10% broadleaf weeds and 30% grass, as compared to 20% shrub, 30% broadleaf weeds and 50% grass by sheep (Malecheck and Provenza, 1981).

The trend in plant species reduction and growth reflected the preference of goats for vegetative browse species (bramble, vines and forbs) before grass. In the present study, when goats concentrated on consuming bramble, the population of vines and forbs increased and as bramble became less available and attention was turned to vine, bramble increased in population, only to be reduced again before the end of the grazing season. This preference for broadleaf species allowed grass to grow and become prominent in the lower canopy by the end of the grazing season. In a study to evaluate the effectiveness of goats alone or goats with cows in reclaiming an overgrown orchard, the cover of grass species increased from 16 to 63%, as opposed to an average of 10% in the control pasture (Luginbuhl et al. 1999). In the present study, the increase in the amount of grass due to reduction in browse and bramble was achieved with a low stocking rate.

Distinct grazing patterns were observed with the use of GPS. The most remarkable was that the goats spent the majority of their time (53.5%) in the overnight bedding location, a consistent pattern for all five nights, while they rested at close distance between noon and 2PM during the day, most probably resting under a shade in response to high temperatures. This information could be used in developing methods to alter grazing patterns. Work with cattle has shown that grazing behavior can be altered through different management practices resulting in better utilization of specific target areas (Bailey 2004 and Bailey et.al. 2008).

Conclusion

The results of this study clearly demonstrate the effectiveness of goats in eliminating undesirable plant species in rugged terrain and other areas that may not be adaptable to mechanical control, and as a method of reducing the use of chemicals that may be detrimental to the environment. Using a low stocking rate, goats were added to cattle pastures to remove undesirable browse and brambles. The presence of the goats improved the availability of grass. Manipulating goat numbers to strike a balance between grazing livestock and the plant community would merit further research. Woody species would provide a continuing source of palatable and nutritious browse for goats, but could be controlled to minimize the loss of more favorable forage species preferred by other livestock species. The study also affirms the use of GPS technology in determining the behavior of the goat for effective vegetation management. More research is needed to determine effective methods of changing grazing patterns in goats.

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Using Goats to Control Invasive Plants

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Southwest Badger Whole Farm Planning Workshop for Landowners
Feb 7, 2015

Brush and invasive species management is challenging. Chemical, Mechanical, Fire and Biological control tools are used, with goats serving as a biological control tool. Timing, intensity, frequency, duration and targeting of goat application to brush/invasives are key to controlling them, just as with other control tools. Goats are a feasible alternative to chemical or physical control of invasive vegetation (Distel and Provenza, 1991). Livestock for prescriptive grazing was first published in the USA in the 1930s (Mosley, 1996).

Time of year, stage of plant maturity, and region affects consumption of browse by goats (Mitchell, 1996). According to Perryman et al. (1995) plant damage by livestock occurs primarily through duration and intensity, rather than timing of grazing applications. Repeated brush defoliation depletes stored energy reserves, weakening/killing brush (Gipson, 2005). Stripping of bark by goats will kill the tops of woody vegetation >7 feet tall (Mitchell, 1996), but repeated defoliations within each season and over 3-5 years is required to kill some brush (Hart, 2006).

Dietary Preferences in WI

Previous research (Lyons et al., 1996): Goat diets = 43% browse, 45% grass, 12% forbs in Western rangelands.
In Wisconsin research, goats significantly prefer brush/woody vegetation (82-88% of diet) over forbs (9-15%), and consume very little grass (3%) (Nolden et al., unpublished data from M.Sc. research). Scottish highland cattle prefer 36% woody, 35% forbs, 29% grass in their diet, and they are a breed of cattle that consumes high amounts of brush (Harrington and Kathol, 2009). Goats eat nearly all woody vegetation and most herbaceous species. They avoid fuzzy leaves (common mullein) but relish plants with thorns and secondary plant compounds.

Time to clear brush with goats: 1 goat/ac per % brush cover season-long in OK for control (Mitchell, 1996). 1.5 goats/ac with 43% brush on 32 acres cleared all browse in under 2 seasons. 1.5 goats/ac with 62% brush on 24 acres took >2 seasons to clear all browse. 0.5 goats/ac for maintenance. Rotating goats is more effective than set-stocking for brush control (Mitchell, 1996). Mob mentality vs. searching favored foods: more uniform brush removal: 1) Browse is diverse in each paddock: healthier goats, 2) Goats can be moved when desired impact is obtained, 3) % of brush that recovers is reduced with each browsing event.

Multiflora rose was a problem in 1986 in West Virginia (Bryan, 1994)

- Goats reduced brush from 45% to 15% in one season
- Sheep required 3 seasons to do the same
  - Mowing/herbiciding improved sheep effectiveness
- Actual goat kill of brush occurred in:
  - Early season defoliations
  - 5 years, killed 98%
- Management recommendations
  - Use goats for brush control
  - Use sheep for invasive forb control
  - Use cattle for toppling dead brush

Goat Behavior

Goats are herd-oriented, smart, curious. They have a strong social hierarchy and show jealousy for what other goats are eating. This can result in injuries, but also learning. Goats need to be trained to Electric fences, Bucket, Come to call, Trailering, Medical treatments, and need to be handled with respect. Goats can be very impatient when setting up new paddocks and when insufficient forage is available. They like to eat high off the ground.

Fencing: Keeping Goats In

Fence training involves setting up electric inside a permanent fence at >4 kV for 1 week. Preventing escapes is accomplished by:

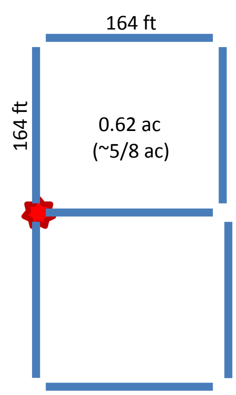
- Keep fence HOT, all the time
- Lead goat must respect fence Remove escape artists immediately, retrain/sell/eat
- Socialize goats to humans Introduce new goats in permanent fence
- Keep goats on one side of the fence only
- Keep bucks and does well separated
- Don't lay/lift fence for goat passage, open the gates to let them through

Portable e-Net Fencing

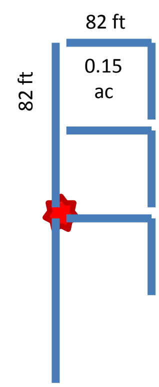
Hot Fence: 1.5 kV min; 3 kV good; 7 kV great
Grounding
Battery
Energizer
Uneven Terrain
Lush Vegetation
Rock/Ice
Sand

Fence Set-Up

7 Fence System
40-50 goats/paddock
2-5 days to defoliate
1-2 hours set-up



5 Fence System
10-12 goats/paddock
2-5 days to defoliate
0.5-1 hour set-up



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Rotational Browsing

Intended for management of vegetation, not just feeding of goats. Involves more labor in terms of moving goats faster and keeping them in higher-density groups. Goats are moved once they consume the desired amount of brush, not just when the best forage has been consumed for putting weight on the kids. The paddocks are re-browsed at least 2x/season; 3-5x is better. This extra labor/management/intentionality provides justification for contractor fees for goat browsing.

Water

In dense brush during July of 2013, 110 of my goats consumed 18 gal/d total (6.4 AUEs). The vegetation provided most of their water needs. Goats drink more when it is hotter and drier or the vegetation is low in moisture content. The nursing does drink more water than other classes, and supplements containing a lot of salt (>20%) will cause your goats to consume more water. Goats will not drink brackish water. I've successfully used apple cider vinegar, wood ashes and barley straw to control slime in the water tank.

Supplements

I provide salt mixed with the mineral (min 1200-1800 ppm copper in the mix). I don't provide an energy supplement (no grain) to my goats. Following the ideas of Pat Coleby, I give free-choice copper sulfate (blue powder from feed coop) year-round and have a free-choice hopper of dolomitic limestone paired with it (calcium counteracts any copper overdose). I provide epsom salts (Mg) free choice during the high potassium spring grass growth. Research at Utah State indicates that livestock can learn to consume a supplement or food for self-medication purposes (Provenza group, many publications).

Shelter

Goats need shelter from wet, windy conditions below 40 degrees F. Brush can provide the needed shelter from mid-April through November in most years. I'm conducting research on shelter density preferences of goats, testing the Animal Welfare Approved guideline for 16 ft^2 per adult doe. The research results will be available in fall of 2015.

Guardians

The primary predators in southern Wisconsin are domestic dogs and coyotes. I like using dogs and donkeys for guarding my goats, sheep and chickens. I breed, raise and train guardian dogs for Wisconsin farms. Appropriate early-life bonding conditions and the right temperament are critical for producing a functional guardian. Proper training is key. This topic is a whole lecture itself. Llamas and cows can serve as guardians also. Dogs are the only guardians that protect against aerial predators in addition to ground predators, and when kids are born on pasture/brush, or you raise pastured poultry, aerial predators are a problem. Two good books on the topic are included in the Reference section. If you move your fences more frequently than once every 2 weeks, coyotes will mostly avoid your goats due to their adjustment period to the new fence location. This does not work for wolves or domestic dogs.

Health

All of the typical goat health problems occur in browsing situations. Additional health problems are rare, but occur and need to be watched for among the herd: deer worm and liver fluke, getting caught in electric fences, torn udders on does with poor udder structure, getting hung up in trees, trees falling on goats and fences in storms.

Pasture Parasite Levels

Rotational browsing and grazing is not sufficient to protect goats from parasites. Browse and graze as high as possible (not closer than 2-4" from ground), select/breed for parasite resistant and resilient goats, only deworm those goats that need it (anemic, losing body condition, not growing, diarrhea) to prevent further anthelmintic resistance among parasites

Pastures will retain parasite contamination from the previous year, but those parasites will die off by early-summer if goats/sheep are not re-contaminating the pasture. Does will add parasites to the pasture, as will kids when they start grazing/browsing, which continues the cycle. Normal moisture years see a spike of parasites in June, whereas dry summers will keep parasite numbers low. Wet falls promote an increase in parasite larvae in pastures/browsing land.

Supplies

<u>Necessary</u> $1,700.00
Energizer, 3 Joule
Ground rods
Marine batteries
Battery recharger
Fences
Hand saw
Wiring harnesses
Fence tester
Battery tester
Extra posts
Water tank & jugs
Mineral feeder
Anemia chart
Treats & bucket

<u>Nice to Have</u>
Guard animal
Trailer
Water hauling tank
Water pump & hoses
Solar panel
Catch pen panels
Handling equipment
Portable vet supply kit
Cordless drill
Chainsaw
Weed whip

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Stocking Rate/Density, AUE

Stocking Rate is the # goats/area/whole season

Location	#Goats/Acre	Acres Cleared
YLWA, 2011, 2012	6.8	12.34 (normal size meat goats)
YLWA, 2013	8.9	12.34 (smaller meat goats)
BAAP, 2012	4.6	29
WV 1986 (Bryan, 1994)	8-10	unreported
OK 1996 (Mitchell et al., 1996)	1 goat/ac/% brush cover	unreported

Stocking Density is the Instantaneous # goats/area/time

Location	# Goats/Acre	Time spent in 1 location
YLWA, 2011, 2012	70	3.3 days (normal size meat goats)
YLWA, 2013	91.7	3.3 days (smaller meat goats)
BAAP, 2012a	24.2	10 days
BAAP, 2012b	48	5 days

Animal Unit Equivalents (AUE)
Standardizes grazing pressure across goat sizes and classes
AUE = # goats metabolically equivalent to 1 Animal Unit (AU)
1 AU = a 1000 lb cow @ 2.6% daily DMI

DMI by goat class: (adapted from Nut. Req. Sm. Ruminants, 2007)
Open Does = 1.95%
Lactating Does = 3.19%
Bucks = 1.6%
Kids = 3.63%

Fast AUE Calculation:
Sum the lbs of goat
Divide by 1000
NOTE: 70 goats = 5.18 AUE = 5.18 cows, but 91.7goats also = 5.18 AUE (smaller goats; not all goats are created equally)

Most breeds of goats work for browsing. Short goats can't reach as high into brush and tend to escape under fences more than bigger goats. High-strung goats are more likely to jump fences. Electric netting is needed for non-myotonic goats. Myotonic goats can be run with cattle with 2 strands of electric fencing since this "breed" cannot climb, jump or crawl under/over/through fences. The "pet-type" Myotonics that are prevalent in Wisconsin are too small, but those that are bred to be a standard goat size work well. Myotonia is a recessive trait that can easily be bred into any goat, so it is not specific to a breed. Goats cost from $.06-$4.00/lb live weight at auction, to $90-350/head from commercial breeders, to $150-$7,000/goat from purebred breeders.

WI Contract Browsing Fees

Some goat producers provide contractor services to private landowners with brush control problems. They work their herd through brush-invaded landscapes from April-November each year, charging hourly rates of $25-60 for personnel, $100-200/trip to deliver the goats to the site, and $2-3.00/head/day for the goats. Rates vary by company. They typically provide the goats, fences, energizer, batteries, water tank, mineral feeder and mineral, and labor. With a herd of 200 goats, a contract browser can fully defoliate 15 acres in one week with 3 paddock moves. It would take about 5 hours to set up each paddock, and 8 deliveries of goats to/from the site. This totals to around $4,000/wk charged to the landowner. The service is in high demand. Businesses that provide this service include:

23. Environmental Benefits

Brush cover and density are reduced by goats. Sun-loving herbaceous species increased with goat browsing, but invasives did not increase at this research site. Litter depth decreased from 15.7-11.6 cm, significant statistically, but sufficient to cover ground yet. Soil compaction measurements indicated no significant differences in 2011, 2012, or 2013.

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From:	al dilley
To:	Masters, Anita E
Subject:	University web links for goats mitigating kudzu and utilizing sheep in solar farms - thanks for viewing
Date:	Monday, September 17, 2018 2:10:03 PM

TVA External Message. Please use caution when opening.

http://www.webpages.uidaho.edu/rx-grazing/forbs/kudzu.htm

https://www.clemson.edu/cafls/research/hunnicutt/invasive/goats.html

http://news.ca.uky.edu/article/king-kentucky-weeds-kudzu-offers-goats-gourmet-meal-0

https://www.nrel.gov/technical-assistance/blog/posts/solar-sheep-and-voltaic-veggies-uniting-solar-power-and-agriculture.html

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From: DONALD DODSON
To: Masters, Anita E
Subject: Tree cutting policy
Date: Tuesday, September 18, 2018 9:07:36 AM

TVA External Message. Please use caution when opening.

TVA needs to keep their earlier policy and does NOT need a new more destructive policy!

Thanks,
Don Dodson
Sent from my iPhone

Edison Electric
INSTITUTE

Quinlan J. Shea, III
Vice President, Environment & Natural Resources

October 1, 2018

Ms. Anita E. Masters
Tennessee Valley Authority
1101 Market Street, BRC 4A
Chattanooga, TN 37402

Tennessee Valley Authority Transmission System Vegetation Management Draft Programmatic Environmental Impact Statement

[Submitted Electronically via www.tva.com/nepa]

Dear Ms. Masters:

The Edison Electric Institute (EEI) appreciates the opportunity to submit comments on the above-referenced Tennessee Valley Authority (TVA) Draft Programmatic Environmental Impact Statement (Draft PEIS) to address potential environmental, social and economic impacts associated with the proposed management of vegetation within its existing active transmission rights-of-way (ROWs). The Draft PEIS evaluates four alternatives that could be used to guide the management of vegetation across TVA's transmission system. EEI supports TVA's Alternative C, as it would allow strategic and flexible management of TVA's existing transmission line ROWs while providing reliable and affordable energy to customers and protecting environmental resources.

EEI is the association that represents all U.S. investor-owned electric companies. Our members provide electricity for 220 million Americans and operate in all 50 states and the District of Columbia. In addition to our U.S. members, EEI has more than 60 international electric companies, with operations in more than 90 countries, as International Members, and hundreds of industry suppliers and related organizations as Associate Members. Organized in 1933, EEI provides public policy leadership, strategic business intelligence, and essential conferences and forums. TVA is a long-time, valued strategic partner to EEI.

Driven by a number of factors—including customer demands, technology developments, and federal and state regulatory obligations—the electric sector is undergoing a transition of its generating fleet. Concurrent with this transition, the electric power industry is investing significant amounts of capital—estimated at more than 100 billion dollars in 2017 alone— to make the energy grid smarter, cleaner, more dynamic, more flexible, and more secure to integrate and deliver a balanced mix of resources from both central and distributed energy resources to customers. Safe, reliable, affordable and clean energy powers the economy, promotes national energy independence, and enhances the lives of all Americans.

The industry's infrastructure investments provide domestic job opportunities. As a whole, the electric power industry supports more than 7 million jobs in communities across the United States. That is 1 in 20 jobs—or 5 percent of all jobs in America. And, we are creating long-term solutions to address the ongoing need for a highly skilled and diverse workforce in the future. The industry also contributes 5 percent to our nation's GDP. We call this the first 5 percent of the American economy because virtually every other sector of the economy depends, to a significant degree, on the safe, reliable, affordable, and increasingly clean energy delivered by the men and women of the electric power industry.

Having a reliable supply of electricity is more than just a convenience. It's a necessity. The electric power sector often is described as the most critical of the critical infrastructure sectors. The energy grid efficiently delivers safe and reliable energy customers need. Protecting the grid is one of our top priorities, and every day EEI's member companies are working to improve grid security, reliability, and resiliency.

Managing vegetation on electric transmission and distribution ROWs is a key part of electric company efforts to protect the security and reliability of the energy grid. Vegetation management is necessary to reduce the risk of downed lines, outages, and wildfire and to ensure crew access to facilities. Failure to properly manage vegetation can cause wildfires, lead to power outages, and jeopardize the physical integrity of energy infrastructure. For example, the August 2003 Northeast blackout was initially triggered by contact between a power line and a tree. As a result of this blackout, Congress to enacted legislation in 2005 that established our current regime of mandatory and enforceable reliability standards—including vegetation management standards—for the electric power industry. Utilities are subject to significant fines for violations of the North American Electric Reliability Corporation (NERC) FAC-003-3 mandatory reliability standard for vegetation management. Likewise, courts have found utilities to be liable for wildfire damages caused by power line contact with vegetation.

Vegetation management is one of the largest single maintenance expense items for electric utilities. Timely access to public and private lands is necessary to plan and implement utility vegetation management operations in a cost-effective manner.

Moreover, transmission lines taken out of service due to vegetation management issues can result in an electric utility losing access to low-cost power and having to buy higher cost power from other sources.

Increased wildfire risk has elevated the need for companies to proactively address vegetation management on transmission line ROWs. Wildfire risk is increasing due to a confluence of factors, such as extreme heat, prolonged drought, and insect and disease infestations. Additionally, development continues to encroach into the wildland-urban interface where people and structures co-exist with fire prone vegetation. Wildfires will continue to be a challenge for electric companies into the future.

EEI advocates allowing electric utility companies adequate authority to utilize Integrated Vegetation Management (IVM) on and adjacent to ROWs as needed to meet applicable reliability standards, enhance grid safety and provide positive ecosystem benefits. IVM is the practice of promoting desirable, stable, low-growing plant communities within transmission ROWs that will resist invasion by tall growing tree species through the use of appropriate, environmentally-sound, and cost-effective control methods. These methods can include a combination of chemical, biological, cultural, mechanical, and/or manual treatments. IVM allows electric companies to select the most appropriate of these methods to maintain appropriate clearances between facilities and vegetation in keeping with applicable reliability, fire, and safety standards and practices. Vegetation management approaches that limit the range of tools available unnecessarily reduces the ability of an energy company to manage vegetation on a site-specific basis, potentially resulting in less than optimized environmental and cost-effective outcomes.

While vegetation management on ROWs is essential for providing safe and reliable electric power, these ROWs also provide important wildlife habitats. As wildlife habitats in the United States are lost to development, these ROWs become increasingly important. While poor vegetation management on ROWs can result in the loss of these critical habitats, the IVM approach can create natural, diverse, and sustaining ecosystems, such as a meadow transition habitat. These transition landscapes, in turn, reduce wildlife habitat fragmentation and allow species to be geographically diverse, remaining in areas from which they might otherwise be excluded. A variety of wildlife species (including threatened and endangered species) consider these habitats home, including species such as butterflies, songbirds, small mammals, and deer. These habitats also encourage the growth of native plant species and can increase plant diversity. Invasive and exotic species are often a problem on ROWs, and, consequently, the surrounding land. IVM techniques (such as selective herbicide application) can minimize this problem, while ensuring native and endangered species are not affected.

The Draft PEIS details TVA's comprehensive approach to determine the policy and direction for managing vegetation along its transmission line ROWs throughout an 82,000 square mile area serving approximately 9 million customers. As stated in the draft PEIS, the need for the proposed action is to:

- Improve the efficiency and effectiveness of TVA's vegetation management program by eliminating vegetation that interferes with the safe, efficient and reliable operation of the existing transmission system so as that TVA can continue to provide the public safe and reliable electric power in a cost-effective and environmentally sound manner.

- Comply with all current and future NERC Reliability Standards to maintain transmission lines in a safe and reliable operating condition, thereby minimizing TVA's potential for costly fines for NERC noncompliance.

- Enhance public safety through controlled vegetation management of TVA's transmission lines.

IVM is central to TVA's vegetation management strategy and allows the application of a wide range of methods to specifically address a wide variety of vegetation types. The PEIS considers the following four alternatives for managing transmission line ROWs vegetation management:

- Alternative A: No Action.
- Alternative B: Cyclical-Based Control Strategy.
- Alternative C: Condition-Based Control Strategy (End State: Meadow-Like).
- Alternative D: Condition-Based Control Strategy (End State: Variable by Zone).

The four alternatives provide a proper range of actions to consider. EEI supports Alternative C as the preferred alternative. Implementation of Alternative C is based on IVM principles. It would enhance the reliability of TVA's transmission system, reduce the potential for wildfire damage, and would increase the ability of TVA to comply with the reliability standards required by the NERC FAC-003. Further, vegetation management under Alternative C would enable the establishment of habitat for pollinators and other desirable plant and animal species.

In closing, the pace of change in the electric utility industry is accelerating. The industry is committed to meeting customers' needs by building and using smarter electric infrastructure, by providing even cleaner energy, and by creating the energy solutions they want. The electric transmission system is essential to meeting this commitment and must maintained to ensure reliability and safety. TVA's 16,000 miles of electric transmission lines are an integral part of the nation's electric grid. Allowing TVA to implement a vegetation management strategy to select the most appropriate method to maintain appropriate clearances between facilities and vegetation in keeping with applicable reliability, fire, and safety standards and practices, is most appropriate, therefore EEI supports TVA's proposed Alterative C.

Please contact Sarah Ball ([redacted] or Rick Loughery ([redacted] if you have any questions about EEI's comments.

Sincerely,

Quinlan J. Shea, III

From:	Len and Donna
To:	Masters, Anita E
Cc:	eklunddonna328@gmail.com
Subject:	New vegetation management
Date:	Friday, September 14, 2018 8:54:41 PM

TVA External Message. Please use caution when opening.

Keep the old rules and do not enact the new vegetation management proposal.
Sent from my iPad

From:	gg
To:	Masters, Anita E
Subject:	TVA and Trees
Date:	Tuesday, September 11, 2018 2:27:14 PM

TVA External Message. Please use caution when opening.

Ms. Masters:

I am writing to give TVA my feelings about what I understand is on the drawing board: TVA has plans to cut more trees from around its powerlines.

It is my understanding that for 80 years the old TVA and tree cutting policy took care of the powerlines and also left most trees standing. I fail to see why TVA has to now be so much more vicious with its chain saws, especially in a time of global warming.

Please register me as one citizen who opposes changing the 80 year old "let trees live" policy.

Thank you for your consideration.

John Eldridge

John E. Eldridge
[redacted]

From: [redacted]
To: Masters, Anita E
Subject: Reasonable tree cutting
Date: Friday, September 14, 2018 6:51:12 AM

TVA External Message. Please use caution when opening.

I think everyone wants to keep utility lines protected, but there are reasonable methods and draconian methods. Clear cutting everything within 50 ft radius is ridiculous. We cannot get rids if all trees that " might potentially grow tall enough to blow over and damage a line". That's ridiculous!!
We need trees as much as we need power lines!
Do NOT allow this destructive clear cutting to be approved.
Use reason in protecting power lines.
We can not EVER 100% protect against every risk. That's called life. There will always be some degree of risk in living. Please use reason in the way you inflict your opinion in other people's property.

Sent from my iPad

From: Tate Eskew
To: Masters, Anita E
Subject: RE: TVA Clearing of Transmission lines
Date: Friday, September 14, 2018 10:32:08 AM

TVA External Message. Please use caution when opening.

Hello Anita,
I am sending you a missive pertaining to the recent article published on the Knox News website.(1)
It appears to me that the policy that has been in tact historically is the best situation for not only the TVA transmission lines, but for the local ecology, neighbors, and fauna. It would also save our co-op and tax payers a tremendous amount of money. It would be a terrible policy to cut such a wide swath for such a long range of carbon sequestering forest. If the numbers are presented correctly in the article (150' x 16,000 miles) that would be equitable of 290,909 acres. These forests are vital to our local ecosystem and planetary health. That amount of a 50 year old forest sequesters 8,730,000,000 pounds of carbon dioxide and would emit 6,402,000,000 pounds of oxygen per calendar year. This would have a very broad effect on our biome. To compound the problem even further by spraying poisons such as glyphosate on the affected regions would be catastrophic to vital habitat and animals.

I would hope that you would please reconsider this new policy.

Best,
Tate A. Eskew
[redacted]

1. https://www.knoxnews.com/story/opinion/columnists/2018/09/14/tva-wants-hack-down-16-000-miles-trees-you-can-help-stop-opinion/1222444002/

From:	William D Evans
To:	Masters, Anita E
Subject:	TVA Tree cutting policy
Date:	Monday, September 17, 2018 11:15:03 AM

TVA External Message. Please use caution when opening.

We want to be on record as believing that TVA should NOT adopt a new policy in regard to tree trimming but should remain using the policy that saves our natural resource, our trees. There is NO need to clear cut to such an extent under the power lines as has been done in the last few years.
Cornelia and William Evans

c www.tva-gov/nepa

TVA

Public Meeting Comment Form

Transmission System Vegetation Management Programmatic Environmental Impact Statement (PEIS)

We want your comments! If you have any issues, concerns, or questions related to the Transmission System Vegetation Management Programmatic Environmental Impact Statement (PEIS), please complete and submit this comment sheet at the public meeting to ensure your input is considered. You can also drop the comment sheet in the mail to the address on the reverse side of this sheet. Fold the comment sheet on the lines with the return address showing, tape it closed, affix a stamp, and mail. You may attach additional pages. Please submit your comments by ***October 1, 2018***.
You may also submit comments by e-mail to Anita E. Masters, aemasters@tva.gov

For your comments to be the most effective, TVA suggests the following guidelines:

- Keep your comments focused on the proposed project;
- Submit your comments on potential impacts and project alternatives; and
- Submit your comments within the timeframes announced.

If you have no comments or questions, but would like to be on our mailing list and receive notification of the Final PEIS release, please complete the contact information below.

The proposed solutions focus on the reliability of the grid through well functioning of the Transmission Lines (TL). Reducing vegetation to meadow-like conditions (the agency's preferred maintenance plan) would significantly reduce the functioning of the targeted trees whose maintenance of water supply, flood control, and networks of multiple communities of life - soil organisms and small animals - which have no focus in the plans - would be adversely affected

Kentucky as a state has been reduced to a meadow over centuries of clearing for human purposes. However, I recognize the issue for the power companies. Therefore, I recommend a plan somewhere in the middle - least harm to nature while assuring reasonable functioning of TL and human safety. And, let's use the harvested wood for something good.

Please provide your contact information. If you would like to receive notification of the Final PEIS release, please fill in the box on the reverse side and submit this form.

Before including your address, phone number, e-mail address or any other personally identifying information in your comment, you should be aware that your entire comment – including personal identifying information - may be made publicly available at any time. While you may ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

Name: Susan Feathers Title: Exec Dir. Feathers Associates
Organization: Sierra Club
Mailing address: [redacted]
City, State, Zipcode: [redacted]
E-mail: [redacted] Phone: [redacted]

Thank you for your interest and participation!

From:	CAROL FORMAN
To:	Masters, Anita E
Subject:	Clear cutting transmission lines
Date:	Friday, September 14, 2018 6:17:47 AM

TVA External Message. Please use caution when opening.

I am opposed to changing the management policy for transmission lines and the use of toxic chemicals to kill all vegetation under those lines. I would need to see valid data to address this change from a program long in use in order to remove my opposition.

Thank you for addressing my concerns.

Carol Forman
LaFollette, TN

From:	Kathryn Fraser
To:	Masters, Anita E
Subject:	TVA vegetation management policy
Date:	Tuesday, September 11, 2018 7:50:23 AM

Ms. Masters,

I am writing to express my views regarding TVA's vegetation management plan. I understand that currently, as a result of a court order, TVA manages vegetation directly under its lines while leaving to the property owner the responsibility of maintaining what grows off to the side of those lines. I understand TVA is considering a change to that policy.

I write to express my opinion that I favor TVA keeping its current court-ordered plan, which I understand to have been TVA's plan for decades (at least until 2012). While I'm not an expert, I believe there could be a negative environmental impact from a change in TVA's vegetation management plan that includes cutting down possibly a million trees in a time of global warming. The policy currently in place has worked well for 80 years, and there is no need to change that policy.

Thank you for the opportunity to express my concerns.

Sincerely,

Kathryn Fraser
Knoxville, Tennessee

From: [redacted]
To: Masters, Anita E
Subject: TVA"s change of policy to clear-cut trees
Date: Friday, September 21, 2018 6:34:30 PM

TVA External Message. Please use caution when opening.

Ms. Masters:

As a citizen very concerned for the health and beauty of our state, as well as the global environment, I am writing to strongly oppose
TVA’s potential change of the court-ordered policy that was also TVA’s own policy for nearly 80 years. Clear-cutting 150 feet along power lines needlessly destroys trees and bushes which provide forage for valuable insects, habitat for native animals, and protection from some of the negative effects of global warming and pollution - as well as contributing to our state’s natural beauty.

In addition to the negative environmental and esthetic impact of TVA’s proposed change in this policy, there would be an enormous expense involved in clear-cutting trees along thousands of miles of power lines across multiple states. Rate payers will surely be negatively impacted as this cost is inevitably passed on, increasing the economic strain on vulnerable citizens who may already be struggling to pay utility bills.

For all these reasons I am deeply opposed to any change from the current court-ordered policy for TVA's management of vegetation under its power lines - the same policy which TVA itself had explained and defended in two of its prior publications. The destructive environmental and economic impact of this proposed change dictates that the current court-ordered policy should not be altered or ignored.

Beverly C. Gibbons, PhD
[redacted]

From: [redacted]
To: Masters, Anita E
Subject: Maintain earlier tree cutting policy
Date: Saturday, September 15, 2018 9:06:40 PM

TVA External Message. Please use caution when opening.

I am in favor of maintaining the earlier policy on tree cutting and we do not need a new policy. It is cost effective to maintain the earlier policy and it protects our trees
Alice Greene

Sent from my iPad

From: Mark
To: Masters, Anita E
Subject: tree cutting
Date: Friday, September 14, 2018 7:11:44 PM

TVA External Message. Please use caution when opening.

Anita,

Please no not waste nearly $200,000,000 of ratepayer's money cutting 16,000 miles of tress that have the misfortune of being located near a TVA transmission line AND then poisoning the ground. This is an absurd plan that only a large government agency could conceive.

Mark

Oak Ridge, TN

From: [redacted]
To: Masters, Anita E
Subject: Tree removal policy
Date: Tuesday, September 18, 2018 8:53:22 AM

TVA External Message. Please use caution when opening.

Ms. Masters,

My name is Brian Gregory. In 2010 TVA came to my aunts house (or they were possibly contractors working on TVAs behalf) demanding to cut down two trees in her yard saying they were too close to the power lines. However, these trees were all planted in an even row and were not a threat to the power lines. Cutting one was no more necessary than cutting all of them. They stated they had to cut down at least one or two trees and they would give her some new saplings in return. All of this was confusing to her and she reluctantly agreed. I called TVA myself and asked about this and was still not clear as to what was going on or why. My grandfather (who passed in 2002) planted these trees when he built the house and I hated to see them go. I thought this whole thing was very unnecessary. At this point after reading about the policy changes and the plans to cut 16,000 miles of trees, I am stating I would like for the TVA to go back to its original policy concerning trees near the side of transmission lines and not waste the time or money needed for this project.

Thank you

Brian Gregory
Columbia TN

Sent from my iPhone

From:	Masters, Anita E
To:	"Boulware, Karen"; "Elzinga, William J"
Cc:	Roelofs, Tricia Lynn; Bean, Lana D; Willard, Emily P; Jacks, Susan R
Subject:	TSVM - A few more comments
Date:	Thursday, September 20, 2018 1:51:22 PM
Attachments:	stop tree cutting width of 150 ft.msg

Karen,

We have received four comments from the online commenting system (below) and one more by email (attached).

Anita

Name: Paula Hargis
[redacted]

Comments: We own TVA property where lines are located. I heard on the news you have ideas of what to do with the property but cannot find where those ideas are listed. Can we get that list? Also how do we find out what restrictions we have on building on those properties in reference to poximative of our home

Name: Ethan Halcomb
[redacted]

Comments: My home is located approximately 3 miles west of the Sequoyah nuclear plant and my property includes roughly 3 acres of land where TVA has ROW to control vegetation for 3 sets of 161 kv transmission lines. I have lived in my home for over 18 years and have witnessed various TVA vegetation control methods and am in favor of the most recent herbicide technique. From my personal observations, this technique has not had a negative impact on wildlife, brush & grass vegetation, or health issues within my family & friends. I would be in favor of adopting this technique for long term use. I would welcome environmental study of my property if it would benefit herbicide treatment in the future.

Name: Denise Cook
[redacted]

Comments: Goats. They eat everything and fit every terrain. If you were to get cashmere goats you could also sell their fur and make more than enough money to cover their upkeep. It's a win win situation.

Name: Curtis Mccoy
[redacted]

Comments: We don't need to fix something thats not broke. There is not a problem except someone needs an explanation for their job so let the trees alone

From: [redacted]
To: Masters, Anita E
Subject: tree cutting policy
Date: Sunday, September 16, 2018 4:08:20 PM

TVA External Message. Please use caution when opening.

Ms. Masters:

I oppose changing the tree cutting policy to cut essentially 150-foot span of trees under, along the power lines. I support using the earlier policy and do not see any need to change. The change would be ridiculously expensive, thus leading to raising rates and there is no need to cut 75 feet on either side of the lines----you do not need a new policy-----stick with the policy managing directly under the lines which worked quite well for more than 75 years.

Thank you,

Julie Hembree, TVA customer and RATE PAYER

[redacted]

From: Don Hillon
To: Masters, Anita E
Subject: Right-Of-Way Clearing
Date: Saturday, September 15, 2018 1:13:59 PM

TVA External Message. Please use caution when opening.

Please convey that I feel it makes no sense to spend money that doesn't need to be spent on a perceived problem.

Please revert to your previous policy concerning right-of-way clearing. Thank you.

Regards,

Don Hillon
[redacted]

From:	Leonard Hobson
To:	Masters, Anita E
Subject:	tree removal
Date:	Friday, September 14, 2018 1:32:13 PM

TVA External Message. Please use caution when opening.

TVA's clear cut policy under power line right's away has overstepped it's authority. I am in complete agreement with the need to keep potential risks from interference with these high lines, but it seems as though TVA has gone far beyond the footprint needed to keep the lines free of obstructions.

From: Holland, Richard
To: Masters, Anita E
Subject: Public Meeting Comment
Date: Thursday, September 13, 2018 10:46:13 PM

TVA External Message. Please use caution when opening.

I attended the TVA Public Meeting on the Vegetation Management EIS in Memphis today. After reviewing the alternatives, I recommend TVA proceed with Alternative C.

Richard Holland
External Affairs Manager
[redacted]

From: Nancy Hulley
To: Masters, Anita E
Subject: Tree removal
Date: Saturday, September 15, 2018 2:50:17 PM

TVA External Message. Please use caution when opening.

I was disturbed to read about the policy of removing trees on private property outlines by Vance Sherwood in The Knoxville News Sentinel. Please let's have some consideration of our environment and not consider changing this policy to allow this sort of wanton destruction of our trees and greenery. Respectful yours
Nancy Hulley

Sent from my iPhone

c www.tva-gov/nepa

TVA

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Programmatic Environmental Impact Statement (PEIS)

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If you have no comments or questions, but would like to be on our mailing list and receive notification of the Final PEIS release, please complete the contact information below.

We purchased our 13.5 Acre piece of land Three years ago and have been Reacclimating it due to Poor logging Practices for The purpose of Forest Farming and Homesteading. The "edges", where powerlines run, Are A Sizeable portion of OUR Focus due to Collection of WAlnuts, Acorns, Elderberry etc. Due to what I've witnessed thus FAR, I would like to suggest That if trees must be taken, That they Are replaced by low growing, Shrublike trees such as Elderberry, Hazelnut, Willows, CAttAil and etc. These Are example of trees that don't reach above 10'-30' and like to be cut back and are good for Holding the soil, honey-bee pollination, purifying run off Water and etc. These Can be purchased for \$30-\$45 A tree from MO st. University Nursery. Many options such as Elderberry Can often be seeded for Nearly No Cost and grow in Nearly Every soil and weather Condition and Keep other Things from growing There (like big trees) and won't Need reseeded or planted again!! Plus it helps The land, ecology, and provides Food!!
I would be open to discussion about This proposal as well as others including individual property agreements, NRCS/USDA Conservation working programs, and transition to Renewable energy if Contacted. (cutting power line costs, trails, and capitalizing on Renewable energy) Thank You!

Please provide your contact information. If you would like to receive notification of the Final PEIS release, please fill in the box on the reverse side and submit this form.

Before including your address, phone number, e-mail address or any other personally identifying information in your comment, you should be aware that your entire comment – including personal identifying information - may be made publicly available at any time. While you may ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

Name: Wille Huston Title:

Organization: [redacted]

E-mail: Phone:

Thank you for your interest and participation!

From: Josie Hylton
To: Masters, Anita E
Subject: Cutting trees
Date: Friday, September 14, 2018 6:23:10 PM

TVA External Message. Please use caution when opening.

Dear Anita Masters,
There was policy in which trees were not cut. Somehow this policy was stopped and much money is to be spent to cut many, many trees. This a major mistake. We need as many trees as possible for health reasons as well as beauty. This current policy of tree cutting must be stopped immediately and permanently.
Sincerely,
Josie K. Hylton
[redacted]

Sent from my iPad

From: LaQuita Ingle
To: Masters, Anita E
Subject: Clear cutting transmission lines
Date: Monday, September 17, 2018 6:36:54 AM

TVA External Message. Please use caution when opening.

I am opposed to changing the management policy for transmission lines and the use of toxic chemicals to kill all vegetation under those lines. I would need to see valid data to address this change from a program long in use in order to remove my opposition.
Thank you for addressing my concerns and concerns of others.

LaQuita Ingle

From:	Carey or Joette Jones
To:	Masters, Anita E
Subject:	leave the tree cutting policy alone
Date:	Friday, September 14, 2018 10:22:41 PM

TVA External Message. Please use caution when opening.

As a National Park Ranger for 22 years, I know something about the need to preserve trees.

Leave the policy of clearing for power lines the way it has been, and do not widen the swath to 150 feet.

Allow responsible homeowners to take care of their property.

TVA can advise when necessary to protect power lines.

Carey Jones

[redacted]

From: Alan Larrabee
To: Masters, Anita E
Subject: Clear cutting trees and vegetation 150 feet to the side of transmission lines
Date: Wednesday, September 19, 2018 10:28:25 AM

TVA External Message. Please use caution when opening.

TVA's previous policy of only cutting trees and vegetation directly under transmission wires worked well and an expensive and expansive change to 150 feet is not necessary and is detrimental to the well being of people and the environment.
For your consideration, some facts about the importance of trees:
Trees provide something called "attention restoration." There is a lot of research published through several studies from William Sullivan, professor of landscape architecture at the University of Illinois at Urbana - Champaign that document the beneficial effects of trees on the health of humans. Let me quote from an article that appeared in a Lions Club publication:
"All of us have a limited capacity to pay attention during any period of time. . . As our attention runs out, we're more likely to be irritable, and abilities to solve and to plan ahead decrease. If you think that means a parent in this state is more likely to strike out in frustration, or a student is more likely to blow off an exam, you're right.
when that happens, being near trees and other vegetation can help restore our ability to pay attention. . . . a view of a green space . . . is a micro-resting spot for the mind . . . People function more effectively when they have a green view. . . In the 1990s, Sullivan and his colleague Frances Kuo, director of the University of Illinois at Urbana-Champaign's Landscape and Human Health Laboratory, found that residents of Chicago's public housing who had trees outside were less likely to threaten violence against their children, as compared with residents of the same housing project who did not have trees nearby. The more green space, the less mentally fatigued people were and the less they engaged in domestic violence..."
This article goes on to document other critical benefits of trees: They produce oxygen, correctly placed - reduce air-conditioning costs, cool the air in a process called evapotranspiration, reduce street repaving costs because a tree shaded street needs only to be repaved 2.5 times in 30 years; whereas, an unshaded street needs to be repaved 6 times in 30 years.
Any policy that removes trees unnecessarily is a bad policy and should be corrected. All people engaged in any project that involves tree removal should carefully consider the benefits of trees and should never remove trees that do not need to be removed. People are beginning to recognize the benefits of trees and vegetation and correctly insist that tree removal be as limited as possible.

From: [redacted]
To: Masters, Anita E
Subject: Clear-cutting
Date: Sunday, September 16, 2018 5:39:02 PM

TVA External Message. Please use caution when opening.

Dear Ms. Masters

We wish to register our opposition to any change in your tree-cutting policy that would result in clear-cutting.

The present trimming policy is a sound way to maintain electrical service and safety without the additional cost of clear-cutting and its destruction of the natural beauty in our region.

Please place our opinion before the group reviewing this policy.

Thank you.

Michael A. Lofaro

Nancy D. Lofaro

[redacted]

From:	Lousep
To:	Masters, Anita E
Subject:	line clearing
Date:	Monday, September 10, 2018 1:20:55 PM

TVA External Message. Please use caution when opening.

I would have gone to the meeting in Bowling Green had I known about it before but saw it in the paper the night after. Your group had sprayed my garden tomatoes, orka, and squash plus part of my grass the week before. I don't think you have the right to destroy my property because there is no way that it was going to interfere with the lines. Now I have no garden and a bare spot that washes every time it rains. You are over stepping when you destroy property that will not hurt anything.

I can understand you cutting trees that are tall enough to get in the lines but leave everything else alone.

Thanks

From:	Bill MacGillivray MacGillivray
To:	Masters, Anita E
Subject:	TVA policy on destroying the environment
Date:	Wednesday, September 19, 2018 4:52:09 PM

TVA External Message. Please use caution when opening.

I am concerned that TVA is attempting to resurrect a tree-cutting policy that has been blocked in the court in the past, and represents a radical and destructive change in TVA's own conservation policies for many years. I fail to understand the benefit to TVA to wreak such wide destruction upon our environment. It certainly does not and cannot benefit the public. I believe TVA, as a government entity (it's right there in your email address) has the obligation to respond to the wider public's concerns for this environmentally destructive policy. I have written my senators and congress men about this as well.This policy must be reversed. Return to a policy that protected power lines and trees for 80 years. Bill MacGillivray

From: [redacted]
To: Masters, Anita E
Subject: Tree cutting
Date: Friday, September 14, 2018 5:00:07 AM

TVA External Message. Please use caution when opening.

Like many across the state, I oppose what I understand is TVA's desire to change its policy re:tree cutting near power lines. TVA does many things well but it's leaders have a duty to balance the region's engergy needs with the beauty and liveablty of our wonderful area. I have no power lines on or near my property but oppose any change due to our common interest which we hope comes to be shared by you and others at TVA. Thank you. Lynn Massingale, [redacted]

Lynn Massingale

From:	Amanda May
To:	Masters, Anita E
Subject:	Proposed TVA tree clearing
Date:	Monday, September 24, 2018 8:39:59 AM

TVA External Message. Please use caution when opening.

Ms. Masters,
I am writing this letter on behave of my neighbors whom TVA is about to spend a ridiculous amount of tax-payers money.
In spring of 2012 TVA showed up in our backyard in the form of a bunch of guys with chainsaws who said they would soon be cutting down all our trees. Had to be done, they assured us, because very soon those trees (which had long since reached their full height) might grow into TVA's transmission lines 75 feet away. If this happened, we were told, power might be knocked out, and our neighbors electrocuted.
This was a change. For more than 75 years TVA had managed vegetation directly under its lines but left it to property owners to tend what grew off to the side. The new policy was to clear-cut everything underneath and also off to the side creating a 150-foot swath of destruction. And they would add poison when it was all done to make sure nothing came back.
Why change? After all this meant: 1) spending nearly a fifth of a billion dollars to clear-cut a 150-foot-wide path through 16,000 miles (that's right, 16,000 miles) of transmission lines across seven states and 2) cutting down trees that had been there since TVA was first established without causing blackouts and electrocutions. No matter, TVA told us. They had to come down.
Why? The official story line was that a tree in Alabama had touched a high voltage line, made power go out for a few hours locally, caused the Federal government to fine TVA, and–this is the good part–led the Federal Electric Regulatory Commission (FERC) to demand that TVA clear-cut everything. Hence, here they were in our back yard. And maybe yours too.
Except this was mostly made up. Yes, a misbehaving tree did cut out power for a little while in Alabama, but, no, FERC did not then demand that TVA clear-cut millions of trees. In fact, FERC forced TVA to admit as much publicly. So why did TVA change their largely successful 80-year-old policy and suddenly want to spend lots of money to come into our yards and cut down everything they could lay their hands on?
No one knows. A group of us sued TVA to find out, and though we made them stop this nonsense for a while, we still do not know why they changed a policy that had worked for 80 years. In fact, TVA repeatedly said during the suit it couldn't find any record of who made the decision to change or why. In any event, after two losses on appeal, TVA was ordered to stop.
A TVA attorney sat in my kitchen in 2012 drinking my coffee and told me, "We are the Federal government, and we can do whatever we want." And maybe so, because now they are back. TVA is currently asking your opinion on officially changing their previously successful 80-year-old policy. If you agree to the

change, they have your permission to wander into your back yards with chain saws and bull dozers and create an Agent Orange-like strip half a football field wide and 16,000 miles long across seven states . . . and to do it for reasons they cannot state.
This is one of those rare occasions when you can do something to stop big government silliness in its tracks. If you think, as I do, it makes no sense to spend an awful lot of money to solve a problem that doesn't exist and do it while raising rates, you can contact TVA, say you liked their earlier policy, and do not believe they need a new one.

Thank you for your time- Amanda May

Public Meeting Comment Form
Transmission System Vegetation Management
Programmatic Environmental Impact Statement (PEIS)

We want your comments! If you have any issues, concerns, or questions related to the Transmission System Vegetation Management Programmatic Environmental Impact Statement (PEIS), please complete and submit this comment sheet at the public meeting to ensure your input is considered. You can also drop the comment sheet in the mail to the address on the reverse side of this sheet. Fold the comment sheet on the lines with the return address showing, tape it closed, affix a stamp, and mail. You may attach additional pages. Please submit your comments by ***October 1, 2018***.
You may also submit comments by e-mail to Anita E. Masters, aemasters@tva.gov

For your comments to be the most effective, TVA suggests the following guidelines:

- Keep your comments focused on the proposed project;
- Submit your comments on potential impacts and project alternatives; and
- Submit your comments within the timeframes announced.

If you have no comments or questions, but would like to be on our mailing list and receive notification of the Final PEIS release, please complete the contact information below.

Thank you for the information I was given and the opertunity to comment.
I tend to agree with the TVA opp. C as the best way to maintain the vegtation, wildlife, and land oweners.

Please provide your contact information. If you would like to receive notification of the Final PEIS release, please fill in the box on the reverse side and submit this form.

Before including your address, phone number, e-mail address or any other personally identifying information in your comment, you should be aware that your entire comment – including personal identifying information - may be made publicly available at any time. While you may ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

Name: Kevin McDonald Title:

Organization:

Mailing address: [redacted]

City, State, Zipcod[redacted]

E-mail: [redacted] Phone: [redacted]

Thank you for your interest and participation!

From: [redacted]
To: Masters, Anita E
Subject: vegetation policy change
Date: Friday, September 14, 2018 4:22:57 AM

TVA External Message. Please use caution when opening.

I am writing you to register my register my opposition to proposed changes to the TVA vegetation policy. Clear cutting and poisoning such a wide strip is extreme. There must be some more sensible middle ground taking into account the environmental impacts and property owners issues.

James W. McMekin

From: Mary Ann McPeters
To: Masters, Anita E
Subject: tree cutting policy
Date: Monday, September 17, 2018 2:04:48 PM

TVA External Message. Please use caution when opening.

Please do not change the tree cutting policy. 150 feet is way more space than is needed. It's also too costly. Surely TVA can find something more useful to do with the money - maybe a bit longer before a rate increase.

Mary Ann McPeters
[redacted]

From: Marilyn McVeigh
To: Masters, Anita E
Subject: Please do NOT cut 16,000 miles of trees
Date: Wednesday, September 19, 2018 10:36:55 AM

TVA External Message. Please use caution when opening.

Re: article in Commercial Appeal Page 10A September 19, 2018

Your plan you’ve had for 80 years has worked. Please do not change. Trees are good for our environment.

Marilyn McVeigh

From:	Sarah Rimer
To:	Masters, Anita E
Subject:	Vegetation Management Policy
Date:	Wednesday, September 19, 2018 10:20:26 AM

TVA External Message. Please use caution when opening.

To Whom it May Concern:

I am writing to express my concerns about the plans to cut vegetation within and under 75 feet of TVA's power lines, both because of the negative environmental impact of cutting an estimated one million trees, and the cost of such an undertaking. Please adhere to the court ordered policy!

Thanks for your attention to this matter,
Sarah Rimer Moss

Sent from Outlook

From:	MARY OGLE
To:	Masters, Anita E
Subject:	TVA vegetation clearing policy - you don"t need 150 feet!
Date:	Thursday, September 20, 2018 12:02:27 AM

TVA External Message. Please use caution when opening.

There is no reason that vegetation needs to be cleared from an area of 75 feet from each side of a transmission line. Don't change your previous policy regarding clearing underneath the lines.

Mary Ogle

[redacted]

[redacted]

From:	Pat Penn
To:	Masters, Anita E
Subject:	NOT change successful 80 year old tree policy
Date:	Friday, September 21, 2018 12:51:44 PM

TVA External Message. Please use caution when opening.

Dear Ms. Masters,

In the "Environment" section of TVA's website there are two specific statements which would make the practice to "slash and burn" areas under the power lines totally unacceptable and incongruous with TVA's stated commitment. In one section it says, "We are committed to clean air and a clean water supply for our region, as well as historical, cultural and **environmental protection**. " In the following section…"promote proactive environmental sustainability in a balanced and **ecologically sound manner**."

It is understandable that trees which could touch transmission lines have to be removed, but removing all trees is totally unnecessary, and certainly not "ecologically sound." It destroys wildlife, as well as its habitat. To poison massive areas with toxic herbicide is unacceptable. The herbicide used is potent enough to destroy and keep the vegetation from coming back. This is potentially very harmful to wildlife AND to humans. The makers of "Roundup" are currently involved in a major lawsuit alleging that it can cause cancer. Herbicide not only kills grass and weeds, but can unintentionally kill or harm numerous other living things – including people.

TVA's previous policy was used successfully for many years. Do not change it to something that would cost more money – and cause more destruction.

Sincerely,

Pat Pennebaker

Sent from Mail for Windows 10

From: Thea Peterson
To: Masters, Anita E
Subject: Tree Cutting
Date: Friday, September 14, 2018 8:53:02 AM

TVA External Message. Please use caution when opening.

Dear Ms Masters,

I am totally opposed to the 150' clear cut on power transmission lines. This is far too wide a path. A much more prudent and cost effective method would be to cut down only those trees tall enough to cause a problem. It is pretty obvious that this issue has seldom been a problem in the past.
The amount of tax payer dollars that would be used to cut out a 150' swath of 16,000 miles of trees is unwise and careless use of our money.
Please change this policy - it is not a sound one.
Thank You,
Thea Peterson
Knoxville, TN

From:	Jane Ray
To:	Masters, Anita E
Subject:	Cutting of trees by TVA - change in policy
Date:	Sunday, September 23, 2018 1:48:29 PM

TVA External Message. Please use caution when opening.

No. I do not believe that TVA should cut trees that are not any where near power lines. I think that this is wasteful of TVA money and time. Why change the policy and not be able to tell the public why - to not really be able to justify the cutting down of trees that would never fall on any power line and disrupt service. Crazy and wasteful. Jane Ray, [redacted]

From:	Me
To:	Masters, Anita E
Subject:	TVA tree cutting policy
Date:	Friday, September 14, 2018 1:47:32 PM

TVA External Message. Please use caution when opening.

Ms Masters:

I do not understand TVA's extreme tree cutting policy as described in the Knox News-Sentinel on 9/14/18.

The earlier policy seemed adequate and did not require TVA to lie about why it needs a new one …… so, I also believe there is no need for a new one.

Carolyn Renier
[redacted]

Sierra Club
Tennessee Chapter
3712 Ringgold Road, #156,
Chattanooga, TN 37412-1638

October 1, 2018

Comments delivered via email

Anita E. Masters
NEPA Project Manager
1101 Market Street, BR 4A
Chattanooga, TN 37402

Dear Ms. Masters:

The Tennessee Chapter Sierra Club appreciates the opportunity to provide comments on behalf of our more than 9,000 members and more than 100,000 supporters on TVA's draft Programmatic Environmental Impact Statement programmatically addressing the impacts of system-wide vegetation management practices along its rights-of-way ("ROW").

For more than 75 years TVA managed vegetation on its right-of-ways (ROW) by keeping vegetation in the "wire zone" or "floor" in early successional habitat limited to herbaceous and grass species, with some selected low-growing trees allowed in cooperation with partnering landowners. Likewise, TVA kept a portion of what they label the "border zone" under the same management regime. However, TVA allowed trees to remain in the "buffer" zone as long as they did pose a hazard or danger to the transmission lines. The guiding principle was to keep vegetation further than, or potentially further than, 10 feet from the lines. This was considered to be the minimum distance required to prevent flashover. During all that time, TVA did not experience any instances of trees interfering with or falling on transmission lines and causing power outages.

However, following an incident in Ohio in August 2003, in which a tree fell onto a transmission line and initiated a cascade of events resulting in blackouts over most of northeastern North America, the Federal Energy Regulatory Commission issued rules designed to prevent a re-occurrence of such an event. TVA has interpreted the FERC policy as a mandate to clear the full extent of their deeded ROW's from all woody vegetation. TVA justified this new scorched earth policy by promoting the public perception that any transmission line incident would result in fines of millions of dollars. Fortunately, following the Sherwood vs. TVA litigation, TVA agreed to go back to their historic vegetation management practices and develop a PEIS to reach a decision on how to manage their ROW's in the future.

The Sierra Club opposes the preferred alternative C identified in the PEIS. We do not believe the history of TVA vegetation management, nor the rules set forth by NERC or the guidance set forth in ANSI A300 (Part 7) *Integrated Vegetation Management* Draft 4 Version 1 warrant or justify such a draconian vegetation management policy.

We recommend instead the adoption of alternative D, with the modification that the buffer zone not be initially cleared, but that only "incompatible", i.e., trees actually capable of coming within the minimum required distance to transmission lines be removed. We note that NERC FAC-003-4 *Transmission Vegetation Management* states that, contrary to TVA's assertion that a minimum distance of 10 feet is necessary to prevent flashovers, a varying distance from vegetation is required depending on the voltage of the line. For example, for a 161 kV line the distance is only approximately 3 feet. Using the 161 kV line example again with a 150 foot ROW and a buffer zone of 25 feet, there would be a distance of at least 50 feet from the center line of the ROW to the nearest tree. There are few tree species in TVA's service area that exceed 50 feet in height at maturity that could potentially fall onto the transmission line, and those exceptions could be easily identified and controlled without destroying what is a ecologically, environmentally, and culturally significant ecosystem.

We disagree with TVA's assertion that the loss of forested land over 16,000 miles of ROW in the buffer zones, totaling almost 100,000 acres, is insignificant. For the flora and fauna that inhabit that land, it is highly significant. Furthermore, the loss of carbon sequestration resulting from TVA's adoption of alternative C is also significant.

We do agree with and approve TVA's selection of IVM, or integrated vegetation management practices, as a best management practice for managing the vegetation within their ROWs, with the caveat that the selection of herbicides used be governed by their toxicity, teratogenicity, and compatibility with the use of the land by the landowner.

In conclusion, again, we recommend the adoption of a modified alternative D, as detailed in the above paragraph.

Sincerely,

Signed

Axel C. Ringe
Conservation Chair
Tennessee Chapter Sierra Club
onyxfarm@bellsouth.net

From: William Rogers
To: Masters, Anita E
Subject: TVA tree cutting policy
Date: Friday, September 14, 2018 11:28:33 AM

TVA External Message. Please use caution when opening.

Dear Ms. Masters,
I just want to be on record as opposing any change to TVA's tree cutting policy. FERC's demand to clear-cut a swath of all vegetation by 150 feet under and beside TVA transmission lines seems just way over the top. As I understand it, TVA's in-place 80-year old policy for vegetation clearance has been working just fine for most folks. Why change when most folks are happy with the status quo? The great majority of power outages are from distributors power lines, not TVA's.
Thanks for the opportunity to express my feelings about this matter.
Sincerely,
William Henry Rogers
[redacted]

From: Tom Runyan
To: Masters, Anita E
Subject: Vance Edwards Editorial
Date: Friday, September 14, 2018 4:00:48 PM

TVA External Message. Please use caution when opening.

If true, TVA is repugnant, repulsive, arrogant, and no longer trustworthy. Perhaps it should be sold after all.
Would like to see TVA respond to this.
Tom Runyan

Sent from my iPhone

From: Michael Sanders
To: Masters, Anita E
Subject: Unnecessary cutting trees
Date: Friday, September 14, 2018 11:14:21 AM

TVA External Message. Please use caution when opening.

Dear Ms. Masters,

This email is in response to Dr. Vance Sherwood's letter in today's News Sentinel newspaper. I was deeply disturbed learning that TVA may be changing their tree cutting policy. My wife and I live in the Holston Hills section of Knoxville because of our appreciation of the old trees here. Preserving our area's trees is extremely important to us. I want to encourage TVA to take a conservative approach to preserving our natural habitat. TVA needs to return to their old policy of respecting our environment and not cutting trees unnecessarily. Unnecessary cutting of trees adversely affects our environment by contributing to global warming. In addition, it destroys the beauty of our country.

I welcome hearing back from you regarding how you plan to advise TVA. I hope you do the right thing for all our sake.

Sincerely,

Michael W. Sanders, PhD
[redacted]

From:	Frank Shaffer
To:	Masters, Anita E
Subject:	Tree cutting-waste of money!
Date:	Wednesday, September 19, 2018 8:37:32 AM

TVA External Message. Please use caution when opening.

Dear Ms. Masters,

Once again, TVA is planning to spend a lot of money on a problem that does not exist and raising our rates as you do it. This plan to have a 150 ft. clear path around TVA power lines is both wasteful and unnecessary. Your earlier policy in place for 80 years was just fine. Keep it and stop this wasteful spending that makes us pay more for power. Thanks very much.

Frank Shaffer,
Cordova, Tenness

From:	Dr. R Jeff Slavin
To:	Masters, Anita E
Subject:	Vegetation control under TVA power lines.
Date:	Sunday, September 9, 2018 4:23:44 PM

TVA External Message. Please use caution when opening.

Dear Ms Masters:

I am a long time TVA customer and resident of Knoxville. I strongly am in favor of the current court ordered option regarding vegetation control under TVA power lines. It is my understanding that this had been TVA's own policy until 2012 as explained in TVA's 1997 and 2005 publications. In addition, the scientific evidence for global warming is indisputable. Felling large number of trees under TVA power lines further contributes to this global threat.

Sincerely,

Robert Jeff Slavin

From:	Harold Sloves
To:	Masters, Anita E
Subject:	Response to TVA"s Draft EIS
Date:	Monday, September 24, 2018 9:29:13 AM

TVA External Message. Please use caution when opening.

This correspondence is in response to TVA's draft EIS and TVA's expressed preference for Alternative C. Let me be clear: Not only is this unacceptable, but TVA's semantic dance is abhorrent.

TVA references its adoption of an Integrated Vegetation Management (IVM) approach... If this is really true, then where is TVA's expressed commitment to a site-specific assessment as part of Alternative C as stipulated in IVM practices. TVA says "Trust us," which has never been a good idea.

In fact, TVA's approach is simply a return to its policy of clear-cutting, with no respect for site-specific implications, soil erosion, the indefinite displacement of wildlife, homeowners' lifestyles, enjoyment of their property, nor the impact on property values.

Indeed, TVA is cavalier about the environmental impacts of its preferred approach, actually stating that moderate long-term impacts were acceptable. With specific reference to Alternative C, TVA writes, "The effects of Alternative C include both short-term and long-term impacts"; (Chapter 4 page 246).

Let me be clear: Only Alternative A is acceptable. Buried in this mammoth document is TVA's own admission that as a result of Alternative A, "impacts from this alternative on the natural environment are minor"; (Chapter 4, page 241).

Harold & Felicitas Sloves
Memphis, TN

From:	Kim Smith
To:	Masters, Anita E
Subject:	TVA Vegetation Management Plan
Date:	Tuesday, September 11, 2018 8:53:07 AM

TVA External Message. Please use caution when opening.

I am writing regarding TVA's vegetation management plan. I understand that as of now TVA manages vegetation directly under it's lines while leaving to the property owner the responsibility of maintaining what grows off to the side of those lines. Apparently TVA is considering a change to that policy.

I am writing to say that I think TVA should keep the present court-ordered plan that they have been doing for the past 80 years. I absolutely believe there could be a negative environmental impact from a change in TVA's vegetation management plan that includes cutting down possibly a million trees in a time of global warming.

Thank you.

Kim Smith

--
Kim Smith
[redacted]

From: Carolyn
To: Masters, Anita E
Subject: Policy of clear cutting millions of trees
Date: Wednesday, September 19, 2018 4:01:15 PM

TVA External Message. Please use caution when opening.

It makes no sense to spend a ton of money to solve a problem that does not exist.
Your earlier policy was fine and a new one is not needed.

Carolyn Spratley
[redacted]

From: Mark Stephens
To: Masters, Anita E
Subject: TVA"s Vegetation Management Plan
Date: Tuesday, September 11, 2018 6:31:49 AM

TVA External Message. Please use caution when opening.

Ms. Masters:

I am writing as a concerned citizen to express my views regarding TVA's vegetation management plan. I understand that currently - as a result of a court order - TVA manages vegetation directly under it's lines while leaving to the property owner the responsibility of maintaining what grows off to the side of those lines. I understand TVA is considering a change to that policy.

In light of the contemplated change, I write to express my opinion that I favor TVA keeping the present - court-ordered plan - which I understand to have been TVA's plan for decades (at least until 2012). Further, while I'm not an expert, I believe there could be a negative environmental impact from a change in TVA's vegetation management plan that includes cutting down possibly a million trees in a time of global warming.

Thank you for the opportunity to express my concerns.
--
Mark

____

Mark Stephens
[redacted]

____

From: Kay Stone
To: Masters, Anita E
Subject: Stop new vegetation policy
Date: Tuesday, September 18, 2018 9:03:03 AM

TVA External Message. Please use caution when opening.

I believe your old vegetation policy is sufficient. We do not need a new one.

Kay Stone

From: Richard Stouder
To: Masters, Anita E
Subject: TVA Clear Cut Policy
Date: Friday, September 14, 2018 7:55:25 AM

TVA External Message. Please use caution when opening.

I oppose government stupidity. And I oppose the TVA clear cutting a swath for 16k miles. The old policy worked - if it ain't broke...especially since TVA can give no sane rationale.

From Rich's iPhone 7

From: Trenta Swann
To: Masters, Anita E
Subject: Comments on TVA Tree Policy
Date: Friday, September 14, 2018 8:47:11 PM

TVA External Message. Please use caution when opening.

To whom it may concern:
We are concerned with the recent news regarding the agent orange type chemical which we understand is in the recent proposal for your vegetation management policy update. The main TVA line goes through our property at [redacted]. Our house is literally along the right of way. We have 100 acres and we are definitely opposed to any changes in the current policy as it would affect us and our livestock. You reach me at [redacted]

Thank you
Trenta and Roy Swann

From: [redacted]
To: Masters, Anita E
Subject: TVA Vegetation Management Plan
Date: Tuesday, September 11, 2018 8:45:09 AM

TVA External Message. Please use caution when opening.

Ms. Masters,

I am writing to register my concern over proposed changes to TVA's vegetation management plan. I support the current plan in which TVA manages vegetation directly under it's lines while leaving to the property owner the responsibility of maintaining what grows off to the side of those lines. I believe a change to this policy, which I understand has been successful for approximately 80 years, will be detrimental to the environment. While less concerning, I expect a change in TVA's policy will also result in damage done to property values and homeowners' right to enjoy the natural beauty of their property. Such outcomes seem unnecessary considering TVA has been so successful in maintaining vegetation up to this point without the need to clear cut many trees. I oppose any change to TVA's current policy, and I appreciate your willingness to take public opinion into account on a change that will have wide-ranging negative effects on the community.

Thanks,

Michael Tabler

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Michael Tabler
[redacted]

From:	Fredda Tipton
To:	Masters, Anita E
Subject:	Opinion on Change in TVA Policy Regarding Clear Cutting Around Transmission LInes
Date:	Friday, September 14, 2018 11:44:15 AM

Dear Ms. Masters:

It has recently come to my attention that TVA is reviewing their previously successful 80 year policy regarding maintenance around transmission lines which could result in clear cutting of millions of trees across seven states and wanted to express my opinion on this matter which is that I am STRONGLY opposed to it. In the present day of global warming and a blatant disregard for the environment by politicians, I feel that clear cutting of trees would only add insult to injury. Further, loss of natural beauty and animal habitats provided by trees would be a real tragedy for those of us who enjoy spending time outdoors.

I respectfully request that TVA maintain its current policy of managing vegetation directly under its lines and leaving all other vegetation alone for all living creatures, both human and animal, to enjoy. We need to protect Mother Nature, not destroy her.

Thank you for your time.
Fredda Tipton

From: Ruth Vanelli
To: Masters, Anita E
Subject: Trees
Date: Wednesday, September 19, 2018 8:51:57 AM

TVA External Message. Please use caution when opening.

Please do not change your earlier policy on tree cutting. This policy has worked just fine and the idea to change it, spend tons of money, and destroy trees that have taken years to grow, is absolutely criminal.
Thank you for your consideration.
Ruth Vanelli
Memphis, TN

Sent from my iPhone

From:	Don Vowell
To:	Masters, Anita E
Subject:	Comment on draft environmental impact statement
Date:	Sunday, September 30, 2018 6:23:44 PM
Attachments:	2017-03-18 Comment on scope of EIS.pdf 2017-03-22 Supplemental Comment on scope of EIS.pdf

TVA External Message. Please use caution when opening.

Ms. McMasters, I submitted a Comment and Supplemental Comment on the scope of the environmental impact statement on behalf of the plaintiffs in Sherwood v. TVA. The draft environmental impact statement did not address or did not adequately address the points made in the Comment and Supplemental Comment, so I am re-submitting (by attachment to this email) the very same Comment and Supplemental Comment in response to the draft environmental impact statement. Thank you for your consideration.

Don Vowell

Plaintiffs' Comment on Proposed Scope of Environmental Impact Statement

Transmission System Vegetation Management Policy

Federal Register, Vol. 82, No. 13, Monday, Jan 23, 2017

This comment is made by the Plaintiffs in *Sherwood, et al, v. TVA*, and submitted by their attorney, Donald K. Vowell

1. The EIS should acknowledge that TVA was not intended to operate solely on the basis of maximizing profit as an ordinary power company might do. Instead the EIS should acknowledge that the TVA Act states that TVA was formed to provide for "reforestation and the proper use of marginal lands in the Tennessee Valley" with the stated intention of being a "national leader in...environmental stewardship...." and with a view towards promoting the "economic, environmental, social, [and] physical well-being of the people of the service area." Therefore, the EIS, produced in anticipation of a major federal action with significant environmental impact, should be written to examine exactly how such an action will:

   a. Minimize damage to all aspects of the environment as it pertains to the right-of-way properties and surrounding region, the streams and lakes in the surrounding region, and the underlying water table.

   b. Minimize destruction to private or public property not owned by or utilized by TVA, including any private property, national forests, parks or other natural areas that the right-of-way passes through.

   c. Protect the health and safety of those people who own or use the affected property.

   d. Protect the health and habitat of any animals, birds, or fish inhabiting the affected areas and other areas in the surrounding region.

2. The EIS acknowledge that that TVA is making the EIS because of, and to comply with, rulings made by the United States District Court and Sixth Circuit Court of Appeals (2014 and 2016), in the lawsuit *Sherwood v. TVA*, filed in United States District Court in 2012, filed on behalf of a group of landowners from all parts of Tennessee, seeking to stop TVA from further implementing a new tree-clearing policy that TVA called the 15-foot rule. The EIS should state the date that TVA began implementing the 15-foot rule, and should acknowledge that TVA continued implementing the 15-foot rule in violation of NEPA for approximately five years, before the District Court enjoined it from further implementing the policy in early 2017. A copy of the substantive orders of the District Court and Court of Appeals should be attached to the EIS.

3. The EIS should state the true and correct history of the EIS, including the fact that in approximately 2011 or 2012 TVA implemented the 15-foot rule, a new practice that was intended to eliminate virtually all of the trees in the right-of-way, including eliminating the historic buffer zones at the edges of the right-of-way, including vast numbers of 50-100-year-old trees that had been left standing when TVA initially installed its transmission lines, beginning in the 1930s. (The EIS should include the dates that TVA made the decision to implement the new policy, and who made the decision, and the date that it was implemented.)

4. The EIS should acknowledge that TVA publicly estimated that the cost of this new policy would be $10,000-$12,000/mile or at least $170,000,000 for the entire 17,000-mile right-of-way. The EIS should state how much money TVA has actually spent implementing the new policy from its inception to the time that it was ordered to stop by the United States District Court, should the number of miles of right-of-way that it has illegally clear-cut during that time period, and should state the number of trees that it has improperly destroyed during that time period.

5. The EIS should also acknowledge that the 15-foot rule was a major federal action with significant environmental impact, and that TVA implemented it illegally and improperly, without making an environmental impact statement, as was required by the National Environmental Policy Act. The EIS should acknowledge that it ultimately suspended the 15-foot rule, and reverted to its prior practices as a result of and to comply with rulings made by the United States District Court and the Sixth Circuit Court of Appeals in the lawsuit *Sherwood v. TVA*.

6. The EIS should accurately and correctly describe the 17,000 mile right-of-way, including the quantity of trees and wildlife found in the right-of-way, including the historic buffer zones on both sides of the right-of-way, the extent and character of the buffer zones, that is, the estimated mileage or right-of-way that has buffer zones, and the fact that the buffer zones are replete with millions of trees, vast numbers being huge trees 50-100 years old, trees that had been left standing when TVA initially installed the lines beginning in the 1930s. The EIS should also correctly and accurately describe the quantity number of trees found in the wire zone, and the character of these trees, including the fact that vast numbers of these trees are likewise 50-100 years old. The EIS should also acknowledge that when TVA initially installed the transmission lines, beginning in the 1930s, that it did not clear-cut the right-of-way, but just cleared enough to install the lines

7. The above statement describing the right-of-way, and stating the mileage of right-of-way that has buffer zones, should identify and specify the date the clear-cutting started (the date the 15-foot rule was first implemented), and should identify and specify the segments of right-of-way, including buffer zones, that were illegally clear-cut during TVA's implementation of the 15-foot rule, specifically including the mileage that was clear-cut and the mileage of buffer zones that were

eliminated by the illegally implemented 15-foot rule, from the time that it was put into effect until the Court stopped it. TVA should not attempt to minimize the extent of its current buffer zones, or the number of trees that would be destroyed or the number of properties that would be ruined without taking into account the fact that it has already illegally implemented the new policy on thousands of miles of property, with thousands of miles of buffer zones and other trees already being destroyed.

8. The EIS should avoid blatant falsehoods such as the statement in the Notice of Intent that the transmission lines are installed "in ROWs that are cleared of buildings and tall vegetation." In truth, the right-of-way is replete with vast amounts of buildings and tall vegetation, including millions of trees in the buffer zones and the wire zone, as stated above and any number of buildings and other man-made structures. The EIS should specifically state that the above-referenced statement that the lines are installed "in ROWs that are cleared of buildings and tall vegetation" is simply not true.

9. The EIS should similarly not contain incorrect statements such as the statement found in the Notice of Intent that the easements give TVA the legal right to manage adjacent vegetation if it is "tall enough to pass within ten feet of a conductor..." This commenter recognizes that the easements generally give TVA the right to manage danger trees and it may be that some easements give TVA the right to remove danger trees "tall enough to pass within ten feet of a conductor," but this commenter does not believe that the easements generally spell out the distance of ten feet.

10. Rather than the misleading statement of TVA's "current practices" contained in the Statement of Intent, the EIS should accurately describe TVA's current tree-clearing practices, that is, the practices that it followed before it illegally implemented the 15-foot rule. These practices include the following:

a. Trimming or removing any trees in the right-of-way that pose an immediate danger to the transmission lines, and trimming or removing danger trees located beyond the limits of the right-of-way that pose an immediate danger to the transmission lines.

b. Leaving the border or buffer zones on the edges of the right-of-way as described in TVA's 2008 Line Maintenance Manual (including 10/21/1986 Memorandum of Ralph B. Ferguson referenced therein) [Doc. 18-1 and 50-1], TVA's 1997 Line Maintenance Manual [Doc. 18-2] (e.g. 25-foot buffer zone on each side of 500-kV lines on 200-foot wide right-of-way and 12.5-foot buffer zone on each side of 500-kV lines on 175-foot right-of-way). [Copies of said documents attached hereto as Ex. 1 and 2 to this Comment.]

c. Allowing landowners to trim their own trees when requested by the landowners, as described in the 10/21/1986 Memorandum of Ralph B. Ferguson, attached hereto in Ex. 1 to this Comment. The said Memorandum states, among other things, as follows:

TVA must assume a leadership role in allowing and encouraging the maximum use of the region's land while at the same time ensuring that reliable electric service to the region is not impaired. This can only be accomplished by a concerted and conscientious effort by each of us in exercising a good commonsense approach in carrying out our right-of-way reclearing responsibilities.

...While the primary objective of our right-of-way reclearing program should continue to be the removal of all trees that present a hazard to the operation or maintenance of our lines, compromises <u>must</u> be made to allow consideration of property owners' requests to trim trees where trimming will not result in the trees being in a direct hazard to the operation and maintenance of the transmission line. The increased administrative and maintenance cost

s associated with these compromises should be partially, if not completely, offset by improved public relations. [Emphasis in original]

d. Trimming of trees by TVA where possible, rather than removing them.

e. Operating with a tree-cutting budget similar to the tree-cutting budget that was used in the years before the 15-foot rule was put into effect, adjusted for changes in the cost of living, inflation, and the like.

11. The EIS should detail what, if anything, was wrong with the pre-15-foot rule practices, including but not limited to a detailed statement of what is wrong with assuming a "*leadership role in allowing and encouraging the maximum use of the region's land while at the same time ensuring that reliable electric service to the region is not impaired*," what, if anything, is wrong with leaving the buffer zones, as they have been left since TVA came into being, and what, if anything, is wrong with making a "*conscientious effort*" to exercise a "*good commonsense approach*" and making "*compromises*" to allow consideration of property owners' requests to trim trees where trimming will not result in the trees being in a direct hazard to the lines, and what, if anything, is wrong with "*improved public relations*."

12. The EIS should state the amount of CO2 and other greenhouse gases that TVA discharges into the atmosphere on an annual basis, as a result of burning coal or other fuels, and the amount of CO2 and other greenhouse gases that the trees in its right-of-way absorb on an annual basis, and the increase in greenhouse gases that would result if TVA removes all of the trees in its right-of-way.

13. The EIS should state that TVA acknowledges and recognizes that trees absorb CO_2 and produce oxygen and that this is a significant environmental consideration.

14. The EIS should acknowledge that burning coal and other fuels puts CO_2 and other greenhouse gases into the atmosphere, and that TVA recognizes that greenhouse gases are contributing to man-made climate change or global warming, and should state whether current TVA management believes that they have any responsibility to reduce greenhouse gases in the atmosphere. If they do not recognize this, the EIS should state what steps management is taking to eductate themselves on the issue.

15. The "TVA Statement on Climate Change Adaptation" states that over the past decade TVA has "reduced, avoided, or sequestered million tons of CO_2 under the DOE "Climate Challenge Program." The EIS should state how many tons of CO_2 the trees in its right-of-way have sequestered or otherwise captured on an annual basis for the previous ten years, taking into account that TVA has wiped out many of these trees pursuant to the 15-foot rule, and should state how many tons of CO_2 that the buffer zones and other trees that it has illegally wiped out while it was illegally implementing the 15-foot rule would have sequestered or otherwise captured.

16. The "TVA Statement on Climate Change Adaptation" requires TVA to "Develop, prioritize, implement and evaluate adaptation planning actions, as practicable, to moderate climate change risks..." The EIS should describe the effect that the elimination of the buffer zones and other trees in the right-of-way would have on TVA's effort to "moderate climate change risks."

17. The EIS should attach a copy of the relevant portion of the "TVA Statement on Climate Change Adaptation," and should generally describe how the various alternatives would affect the objectives stated in the "TVA Statement on Climate Change Adaptation."

18. The EIS should acknowledge that "Climate Change Mitigation" is stated to be one of the principal objectives of the "TVA Environmental Policy." See chart below, taken from the "TVA Environmental Policy." The EIS should describe how the elimination of the buffer zones and other trees in the right-of-way would affect this principal objective of the "TVA Environmental Policy." As for the third alternative course of action, that TVA is now calling the "border to border" or BTB approach, the EIS should explain the irony of how TVA, one of the leading burners of coal in the world, responsible for putting a vast amount of CO_2 into the atmosphere, would elect to destroy a vast forest of trees that would otherwise remove CO_2 from the atmosphere. (The relevant portions of the "TVA Environmental Policy.)

EXHIBIT 1
Overall Environmental Policy Alignment With TVA's Mission

2 TVA Environmental Policy

19. One of the "Guiding Principles" of the TVA Environmental Policy is that "TVA plans to actively reduce its carbon emissions through cleaner energy options and energy efficient initiatives." The EIS should describe how eliminating the buffer zones and other trees in the right-of-way would help it observe this "Guiding Principle."

20. The EIS should describe how the various alternatives would affect the objectives stated in the Executive Order entitled "Preparing the United States for the Impacts of Climate Change" issued by President Barack Obama on or about Nov. 1, 2013, in particular addressing the question of how the destruction of the buffer zones and other trees in the right-of-way would make the nation's watersheds, natural resources, and ecosystems, and the communities and economies that depend on them, "more resilient in the face of a changing climate" and how the destruction of the buffer zones and other trees in the right-of-way would promote

the "dual goals of greater climate resilience and carbon sequestration, or other reductions to the sources of climate change."

21. The EIS should state whether anyone in the executive branch of the United States is putting pressure on TVA to deny that burning coal and other fuels is causing global warming, and, if so, the EIS should identify the correspondence or other communications.

22. The EIS should estimate both the initial cost of implementing each of the alternative approaches that it considers, and the ongoing cost of each alternative, and comparing that to past costs, including the cost, if any, of simply allowing trees to remain in the buffer zones, compared with the cost of first removing all of the trees, and then mowing or otherwise keeping the entire width of the right-of-way clear, in the Border to Border approach. The EIS should also estimate the cost of replanting and remediation, whether done by TVA or whether thrown on the backs of the landowners.

23. The EIS should itemize TVA's tree-clearing expenditures at least for the years 2008-2016, as a means of verifying TVA's cost estimates for the Border to Border Alternative versus the No Action Alternative.

24. The EIS should estimate and quantify the perceived cost and cost savings for each of the Alternatives, both short and long-term, taking all factors into account, including the cost of removal of the trees and maintaining the right-of-way in a cleared condition, and a comparison of the cost of vegetation-related outages, if any, under the current practices, versus the anticipated future cost of vegetation caused outages under any other alternative.

25. The EIS should identify and quantify the government-owned land that its right-of-way crosses, and should indicate whether the cost of remediation and replanting will be thrown onto the government.

26. The EIS should identify the TVA decision makers who decided to implement the 15-foot rule (generally similar to the present Border to Border Approach), and should identify the TVA decision makers who will be deciding which alternative will be selected from the present EIS, to ensure the public that the present decision makers are not simply rubber-stamping a decision that they themselves made in the first place. In other words, the public needs the assurance that the original wrong-doers who decided to illegally implement the 15-foot rule, do not simply re-make the same decision by implementing the Border to Border alternative after the EIS is published. This would be an impermissible conflict of interest.

27. The preparers of the EIS should be identified in the EIS, specifically including whether any preparer or person who had any input or contribution was not involved in making the original decision to illegally implement the 15-foot rule. The preparers of the EIS should not be the same people who decided to illegally

implement the 15-foot rule in the first place, to avoid conflict of interest. The EIS should make it clear that the various alternatives posed by the EIS will get real consideration by open-minded decision makers who were not involved in making the decision to illegally implement the 15-foot rule in the first place.

28. The EIS should objectively state the rationale that led TVA to utilize buffer zones in the first place, and to allow trees in the wire zone.

29. The EIS should indicate whether electricity is any more dangerous today than it ever has been, and in particular whether it is any more dangerous today than it was during all the years that it utilized the Buffer Zone Approach.

30. The EIS should detail TVA's institutional experience with trees coming into contact with the transmission lines, and/or vegetation caused outages, detailing each incident or vegetation caused outage in such a way that it can be verified, including date, location, result and extent of the outage, and the cause of the outage, that is, did TVA allow the tree to grow into the lines and did TVA violate its existing procedures, and was TVA at fault in not recognizing that the offending vegetation should have been addressed before.

31. The EIS should state TVA's reliability percentage, which has always been described by TVA in terms such as 99.9% reliability. This will serve as a guide as to whether it is reasonable to believe that reliability will be improved by any of the contemplated alternatives.

32. The EIS should state where TVA got the idea to implement the 15-foot rule, or to implement the Border to Border Approach, that is, whether the idea originated at another utility or within the industry or from an industry group, and in particular should address whether any marketing representatives from tree cutting companies or manufacturers of tree cutting equipment had any role in the decision, and should identify the individual or individuals who came up with the idea.

33. The EIS should state whether TVA has ever been fined or disciplined by any regulatory body for vegetation caused problems, and if so to provide the details with documentation, in such a way that it can be verified, including date, description of the event including what TVA did wrong, and whether TVA violated its existing procedures, the regulatory body, and the amount of the fine.

34. The EIS should similarly state whether or to what extent other utility companies have been fined or disciplined for vegetation caused problems, if TVA contends that this is an industry-wide problem.

35. The EIS should state whether TVA will replant the trees that it cuts down under the Integrated Vegetation Management or Border to Border alternative, or other Alternative, or remediate in any way, or whether it will simply attempt to throw the cost of replanting and remediating on the affected landowners. The EIS

should also estimate the cost of replanting or remediation. If saving costs is a claimed rationale for any Alternative, the EIS should estimate the cost that it will throw onto the backs of the affected landowners. In other words, the EIS should indicate the amount of money that an Alternative will supposedly save TVA, but should also indicate the amount of money that it will cost the affected landowners, and the other environmental damage that removing the buffer zones and other trees will do, specifically including the total decrease in value of the properties across the region brought about because of the implementation of any rule that is adopted.

36. The EIS should state the number of landowners whose property will be affected by the Alternatives, specifically the number of landowners whose property will be adversely affected by the Border to Border Approach.

37. The EIS should explain and describe the "integrated vegetation management" (IVM) Approach in such a way that it is comprehensible. The description of the "integrated vegetation management" Approach in the Notice of Intent it is simply vague and meaningless mumbo jumbo.

38. The EIS should detail the effects of soil erosion, increased sediment and nutrient loads, runoff problems, degradation of stream habitat, that the various Alternatives will cause, including the soil erosion that would be caused by the Border to Border approach, which would clear-cut the entire 17,000-mile right-of-way, taking into account whether TVA will or will not replant or remediate, and taking into account the costs that would be thrown on the affected landowners. The EIS should specify the depth of topsoil that is present in the right-of-way, including the depth of topsoil on mountains or slopes, and should specify the erosion that would be caused by clear-cutting mountains, hillsides, and slopes, including mass wasting events.

39. The EIS should detail the effects of soil erosion, etc., as stated just above, on the thousands of miles or right-of-way that TVA has already clear-cut while the 15-foot rule was in effect.

40. The EIS should indicate what herbicides that TVA will use, and the amount of herbicide that TVA will use in the various Alternatives, and should explain what happens to these herbicides after they have been used, that is, whether they will find their way into the Tennessee Valley water table, and whether they will remain there in perpetuity, and whether it can assure the public that it is a good idea to use massive quantities of herbicide for vegetation removal with permanent adverse effect on the water table, including how long it is expected that it will take for the herbicides to decompose, and what scientific backing TVA has for this information.

41. The EIS should indicate how TVA is going to disseminate or spread the herbicide, that is, by aerial bombardment, by spraying on the ground or otherwise.

42. The EIS should indicate whether TVA has obtained all necessary permits necessary to carry out the various alternatives, including the permits necessary to discharge this huge volume of herbicide into the environment and the water table and what steps they will take to comply with the Clean Water Act.

43. The EIS should state how TVA proposes to comply with the Resource Conservation and Recovery Act in implementing each any of the stated alternatives.

44. The EIS should disclose any and all studies or other information as to the environmental effects of the herbicides that it will use, and as to the environmental effects of releasing this volume of herbicide into the water table or into the environment in general.

45. The EIS should include any assurances that TVA can give to the public to guarantee that the release of this volume of herbicide is in the best interest of the public and that it will not be damaging to the water table or to the environment in general.

46. The EIS should assess the damage that the various alternatives will do to crops, gardens, orchards, or other fruit and nut trees in the right-of-way.

47. The EIS should state whether and to what extent TVA plans to implement the Border to Border or other alternative during nesting season, and if so to address the quantity of active nests of birds and other animals will be destroyed in doing so, and whether TVA believes that this is a matter of any significance, whether it believes that this will violate any law including the Federal Migratory Bird Treaty Act and T.C.A. 70-4-114 or similar law in other states (unlawful to disturb or destroy the home, nest or den of any protected wild animals or birds, whether it will consult with the U.S. Fish and Wildlife Agency, or the Tennessee Wildlife Resources Agency, or other federal or state wildlife related agency, prior to clear-cutting right-of-way during nesting season, and whether it will heed the directions given or suggestions made by these agencies.

48. As a measure of the consideration stated in the previous paragraph, the EIS should candidly state how many thousands of miles of right-of-way that TVA clear-cut during nesting season during its approximately five years of illegally implementing the 15-foot, and should state or estimate the number of active nests of birds and other animal species that it destroyed and the number of baby birds and other animals that it killed in the process.

49. The EIS should state TVA's rationale and justification for implementing the 15-foot rule during nesting season, and state whether that rationale and justification would be brought forward in the Border to Border or other alternative.

50. The EIS should survey and quantify the wildlife population of the 17,000 mile right-of-way, including birds, species by species, including bald eagles, golden

eagles, red-tail hawks and other hawks, great horned owls and other owls, and other animals, including but not limited to bears, deer, elk, otter, bats, Indiana and otherwise, and squirrel, specifically indicating the number of each species who live in or occupy the 17,000 mile right-of-way, including whether the said birds and other animals nest in the right-of-way or otherwise occupy or use the right-of-way, and how the clear-cutting of the right-of-way would affect these populations. The EIS should identify any survey or other study that it utilizes to reach these conclusions.

51. The EIS should state whether TVA's biologists or environmental department were consulted about the idea of implementing the 15-foot rule during nesting season, and if so what their opinion was and specifically whether they approved it, with documentation.

52. The EIS should state whether TVA believes that habitat destruction is a significant threat to wildlife in the United States and a significant cause of threatened or endangered species.

53. The EIS should analyze the effect of the Border to Border or other approach, including the erosion that it would cause, on the Tennessee Valley watershed and groundwater ecosystem, including steps to be taken to avoid impacting or affecting the buffer zones on the sides of streams or rivers. The cost of such efforts should be separately set forth in the EIS.

54. The EIS should avoid using untrue and propaganda-like statements such as this statement in the Notice of Intent that in the Border to Border approach (clear-cutting of the right-of-way likely with no replanting or remediation) the right-of-way "would take on the appearance and characteristics of natural meadows..." The EIS should identify the persons originating this propaganda-like terminology. Instead of using this type of language, the EIS should accurately describe the devastation of clear-cutting a forest.

55. The EIS should state and acknowledge that TVA has been in compliance with the regulation known as FAC-003 and similar regulations at all times since it has been in operation, or detail any instances when it was not in compliance, and enumerate any fines that TVA has paid for any infractions, including the individual and total amount of any such fines.

56. The EIS should state and acknowledge that NERC has specifically stated that it would be an "imprudent use of resources" to apply the FAC-003-2 standard to all sub-200 kV lines. (Proposed Transmission Vegetation Management NERC Standard FAC-003-2 Technical Reference states that "Given the very limited exposure and unlikelihood of a major event related to these lower-voltage lines, it would be an imprudent use of resources to apply the Standard to all sub-200kV

lines." http://www.nerc.com/docs/standards/sar/FAC-003-2_White_Paper_2009Sept9.pdf)

57. The EIS should identify any previous memoranda, studies or background materials concerning the advisability of implementing the 15-foot rule (generally the same as the current Border to Border Approach.)

58. The EIS should indicate whether TVA utilizes any outside consultants or studies in making the EIS.

59. The EIS should indicate whether TVA has already decided to implement the Border to Border Alternative, and whether the EIS process is a mere charade, and if it is not a mere charade, what steps TVA will take to ensure that the selection of alternatives is given objective consideration by persons other than the same personnel who conceived of and/or approved of the 15-foot rule.

60. The EIS should indicate whether TVA will be attentive to input from other governments or governmental agencies, such as the Knox County Commission and Knoxville City Council, and similar bodies in other communities, in selecting the alternative that will be utilized.

61. The Notice of Intent is deficient in that it does not state that TVA plans to request other Federal, State, or local agencies to participate in the preparation of the EIS. Numerous other agencies should participate in the preparation of the EIS including but not limited to the U.S. Fish and Wildlife Service, the National Forest Service, the Tennessee Wildlife Resources Agency, the Tennessee State Ornithologist, and the governments of all cities, towns or counties where the policy will be implemented.

62. The Notice of Intent is deficient in that it does not identify the "initiating office," does not identify the members of the scoping committee, or who appointed them, does not indicate who prepared the Notice of Intent, other than the signatory, M. Susan Smelley, and does not indicate a schedule for EIS preparation.

63. The EIS should state whether M. Susan Smelley, the signatory on the Notice of Intent, or any member of the scoping committee, had any role in implementing the 15-foot rule or in deciding to implement the 15-foot rule without making an environmental impact statement, it should state the role of any such person, and should state whether any of these individuals will have any role in selecting the alternative that will ultimately be employed.

64. The EIS should describe the effect that the elimination of the buffer zones and other trees in the right-of-way will have in fragmentation of the natural areas that the right-of-way runs through.

65. The EIS should include a reasonable estimate of the number of trees to be cut down and the number of miles that would be clear-cut and the number of miles of buffer zone that would be destroyed under the various alternatives, while identifying the number of trees that have already been destroyed and the number of miles that have already been clear-cut and the number of miles of buffer zones that have already been destroyed.

66. The EIS should include a discussion of the soil erosion effects of the new practice or policy, including an estimate of how much top-soil will be lost throughout the TVA right of way as a result of the new practice or policy.

67. The EIS should include a discussion of the impact that the new practice or policy will have on wildlife, including a reasonable estimate of the number of nests of eagles, hawks, and owls and other species that will be destroyed.

68. The EIS should include any rationale that would support implementing the various alternatives during nesting season.

69. The EIS should include a reasonable species specific estimate of the number of baby birds that will be killed by the various alternatives if they are implemented during nesting season.

70. The EIS should include consideration of the Federal Migratory Bird Act and Tenn. Code. Ann. §70-4-114, which makes it unlawful to disturb or destroy the home, nest or den of any protected wild animals or birds.

71. The EIS should include a listing and description of the natural barriers or buffers that will be destroyed by the various alternatives.

72. The EIS should include reasonable estimate of the cost of each of the alternatives, including all direct and indirect costs, not only to TVA but also to the landowners and the public, which is the owner of a substantial amount of the right-of-way property.

73. The EIS should include a comparison of the estimated cost with the claimed savings that would supposedly result from the various alternatives and the costs that would be thrown onto the owners of the underlying fee simple.

74. The EIS should include a reasonable estimate of any costs that TVA contends will supposedly be saved by the various alternatives, and how these costs will supposedly be saved.

75. The EIS should include a discussion of whether TVA plans to replant and remediate and an analysis of whether it should do so or is required by law to do so.

76. The EIS should include a discussion of how the new practice or policy will affect the owners of the land where the transmission lines are located, including the cost of replanting and remediation.

77. The EIS should include a discussion of the increased energy costs resulting from lack of shade.

78. The EIS should include a discussion of the effects of noise pollution that will result from lack of natural buffers provided by the border or buffer zones.

Date: March 18, 2017

Donald K. Vowell
TN BPR # 6190
6718 Albunda Drive
Knoxville, TN 37919
865/292-0000
865/292-0002 fax
don@vowell-law.com
Attorney for the Plaintiffs in Sherwood, et al v. TVA
Case No. 3:12-CV-00156
United States District Court of the Eastern District of Tennessee

Plaintiffs' *Supplemental* Comment on Proposed Scope of Environmental Impact Statement

Transmission System Vegetation Management Policy

Federal Register, Vol. 82, No. 13, Monday, Jan 23, 2017

This comment is made by the Plaintiffs in *Sherwood, et al, v. TVA*, and submitted by their attorney, Donald K. Vowell

1. With the TVA system already 99.999% reliable, according to TVA's own internal and public relations statements, how could TVA possibly justify supposedly improving that reliability percentage by spending $170,000,000 or any other vast amount of money to clear the buffer zones and all of the other trees in the right-of-way? Stated another way, how could TVA possibly justify spending that much money to improve reliability by .001%?

2. TVA records indicate that TVA has only been fined by Federal regulators for a vegetation management violation one time in its history, with the fine being $175,000. That being the case, how could TVA possibly justify clearing its entire right-of-way of trees, at a cost of $170,000,000 or any other vast amount of money, to avoid similar fines. Stated another way, how could TVA possibly justify spending that much money to supposedly reduce the risk of a similar fine, when the likelihood of such a fine is extremely remote in the first place. (The event leading up to the fine was caused by avoidable employee error or negligence and/or ineffective practices which have now been replaced.)

Date: March 22, 2017

Donald K. Vowell
TN BPR # 6190
6718 Albunda Drive
Knoxville, TN 37919
865/292-0000
865/292-0002 fax
don@vowell-law.com
Attorney for the Plaintiffs in Sherwood, et al v. TVA
Case No. 3:12-CV-00156
United States District Court of the Eastern District of Tennessee

From:	Melinda Weber
To:	Masters, Anita E
Subject:	CLEAR-CUTTING POLICY
Date:	Friday, September 14, 2018 9:40:45 AM

TVA External Message. Please use caution when opening.

Please do not change the long-standing policy regarding trees near TVA power lines! This seems non-sensical and unnecessary.

-- Melinda G. Weber

From:	Sarah Weeks
To:	Masters, Anita E
Subject:	TVA Vegetation Management Policy and Procedures
Date:	Friday, September 14, 2018 1:42:20 PM

TVA External Message. Please use caution when opening.

Dear Anita Masters,
I understand that TVA is considering changing the procedures for managing vegetation under and near TVA powerlines. I also understand that you are currently accepting input from the public regarding this change.

I am emailing you today to let you know that I do not agree with a change in the procedure to expand the clearance of vegetation to a 150' wide pathway. I believe that the procedures that are currently in place are adequate to protect both the powerlines and the public.

Thank you,
Sarah Weeks
Knoxville, TN

From:	Westbrook, John E Jr
To:	Masters, Anita E
Subject:	Vegetation Management
Date:	Monday, August 13, 2018 10:16:21 AM

I know we have a requirement to manage the vegetation, but please do not use herbicides. I own a cabin in the Murphy, NC area and Blue Ridge Mountain EMC used Roundup to control the vegetation and it ended up in my well water. I could not use the water for months and it cost me money to have the water tested. With the recent lawsuit verdict in CA, I would recommend no herbicides.
John Westbrook

From: Wetzel_Christopher
To: Masters, Anita E
Subject: stop tree cutting width of 150 ft
Date: Thursday, September 20, 2018 1:42:29 PM

TVA External Message. Please use caution when opening.

Instead use the old policy of cutting under the power lines.
Thank you
Chris Wetzel

From: Gerry Mae
To: Masters, Anita E
Subject: Vegetation management policy
Date: Wednesday, September 26, 2018 1:09:55 PM

TVA External Message. Please use caution when opening.

Dear Ms. Masters, I am happy with TVA's earlier policy and do not think we need a new one. We have been maintaining our trees for 28 years and are happy to continue that maintenance. Thank you for your attention to this matter. Very truly yours, Gerry M. Williams

Sent from my iPad

From:	mark williams
To:	Masters, Anita E
Subject:	new vegetation management policy
Date:	Tuesday, September 18, 2018 9:46:45 AM

TVA External Message. Please use caution when opening.

Dear Ms Masters,

Please acknowledge that this is my request that TVA retain its earlier vegetation management policy, and does not need a new one.

Best regards,

Mark W. Williams

From: Gerry Mae
To: Masters, Anita E
Subject: TVA vegetation management policy
Date: Wednesday, September 26, 2018 1:14:18 PM

TVA External Message. Please use caution when opening.

Dear Anita Masters; This is a request that TVA continue it's earlier policy on vegetation management. We do not feel there is a need for a new policy. Thank you. Sincerely, Richard E. Williams

Sent from my iPad

From: Margaret Wooten
To: Masters, Anita E
Subject: I"m against TVA"s proposed changes
Date: Monday, September 10, 2018 10:10:03 AM

TVA External Message. Please use caution when opening.

Hi Anita,
Wanted to send an email regarding the recent proposed changes to TVA's vegetation management policies. I believe that TVA should stick to current court-ordered policy and allow property owners to manage their own land on the sides of TVA's lines. I don't understand why you've changed the policy to begin with-it doesn't make any sense to spend so much money and create a 150-ft wide swath of destruction without even being able to state the reasons for doing so.

I support keeping the current policy and don't think that you need a new one.

Thanks so much,
Margaret Wooten

From: Wright, Avery Taylor
To: Masters, Anita E
Subject: Vegetation Mgmt Input
Date: Tuesday, August 14, 2018 12:01:16 PM
Attachments: image001.png
image002.png
image003.png
image004.png
image005.png
image006.png
image007.png
image008.png

I've read the four options, but I'm not overly familiar with the specifics. I'd just like to suggest that whatever plan TVA goes with, we work in conjunction with the TN's Dept of Environment & Conservation's "Natural Heritage Program" to help promote the proliferation of vulnerable, rare, and threatened natural plantlife.
With the sheer scale of this project, I also think there could be a good opportunity to partner with a local university in establishing test sites to help with future environmental mgmt.
Last, I think TVA should set clearly defined goals of what success would look like. Such metrics could be erosion, short-term impact to local vegetation and wildlife, long-term impact to vegetation and wildlife, proliferation of endangered natural species, % reduction in invasive non-native species.
Thank you for the opportunity to provide feedback!

Avery Wright, **PMP**
[redacted]

Tennessee Valley Authority
1101 Market Street, MR2A-C
Chattanooga, TN 37402

[redacted]

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Appendix D – Relevant Programmatic Agreements and Consultations

Preserving America's Heritage

May 19, 2016

Mr. William D. Johnson
President and CEO
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville TN 37902

Dear Mr. Johnson:

In response to a notification by the Tennessee Valley Authority (TVA), the Advisory Council on Historic Preservation (ACHP) will participate in consultation to develop a Programmatic Agreement to set forth tailored procedures and criteria for review of undertakings within TVA's reservoir and power service system that are similar and repetitive in nature. Our decision to participate in this consultation is based on the *Criteria for Council Involvement in Reviewing Individual Section 106 Cases*, contained within our regulations. The criteria are met for this proposed undertaking because it has the potential for presenting procedural problems.

Section 800.6(a)(1)(iii) of our regulations requires that we notify you, as the head of the agency, of our decision to participate in consultation. By copy of this letter, we are also notifying Ms. Michealyn Harle, Archaeologist, of this decision.

Our participation in this consultation will be handled by Ms. Najah Gabriel who can be reached at (202) 517-0210 or via e-mail at ngabriel@achp.gov. We look forward to working with your agency and other consulting parties to develop an agreement document that governs implementation of this process in a manner that avoids, minimizes or mitigates effects to historic properties in the reservoir and power service system.

Sincerely,

John M. Fowler

John M. Fowler
Executive Director

ADVISORY COUNCIL ON HISTORIC PRESERVATION

401 F Street NW, Suite 308 • Washington, DC 20001-2637
Phone: 202-517-0200 • Fax: 202-517-6381 • achp@achp.gov • www.achp.gov

USDA Department of Agriculture Service

Atlanta, GA 30309

Fax: 404-347-4448

File Code: 1950; 2720
Date: MAR 2 0 2018

M. Susan Smelly
Director-TVA Environmental Compliance and Operations
400 West Summit Hill Drive
Knoxville, Tennessee 37902-1499

Dear Director Smelley:

Thank you for your letter dated December 19, 2017, inviting the Forest Service to participate as a cooperating agency on the Tennessee Valley Authority (TVA) proposed environmental impact statement (EIS) for the Transmission System Vegetation Management Program. I greatly appreciate your efforts to work more cooperatively to more effectively achieve the mission of both of our agencies. Per 40 CFR 1501.6, the Forest Service accepts your invitation and will be a cooperating agency for your proposed EIS.

Based on our understanding of your proposed action, there will be no Forest Service decision to be made as no new TVA special use permits are proposed on National Forest System (NFS) lands and no existing TVA special use permits will need to be amended. Therefore, the Forest Service will participate in the environmental analysis in the following way:

- Provide TVA with shape files and information related to any Trail of Tears National Historic Trail segments that are within the vicinity of TVA transmissions lines on NFS lands; and, Forest Service Regional Forester Sensitive Species and/or Species of Concern list(s) that are relevant to the analysis.

- Review and provide comments on draft best management practices, mitigation, and instructions that would be relevant to NFS lands; and, review and provide comments on the draft, preliminary management (level) alternatives.

- Review and provide timely comments on the draft EIS, the draft final EIS, and if requested, the draft Record of Decision. The focus of Forest Service comments would be to ensure appropriate consideration of Forest Service resources and consistency with respective Forest Plans.

Participating to the extent described above will allow the Forest Service to use its our own funds for the effort. Should TVA request major activities or analyses of the Forest Service, we would ask TVA consider including funding support to the Forest Service in their budget requests for the project. (see 40 CFR 1501.6(a)(5).

As the lead Federal agency, it is our expectation that TVA will be responsible for all aspects of the environmental analysis including the required consultations with the United States Fish and Wildlife Service, State Historical Preservation Offices, and Tribes.

Your primary contact for this project will be Christina Henderson, Assistant Special Uses Program Manager for the Southern Region. You can contact her at 404-347-1754 or christinachenderson@fs.fed.us.

Sincerely,

for

KEN ARNEY
Acting Regional Forester

cc: Miriam Mazel, Tim Abing, Peter Gaulke

Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, Tennessee 37902

March 30, 2018

Mr. Stan Austin, Regional Director
Southeast Regional Office
National Park Service
Atlanta Federal Center
1924 Building
100 Alabama Street, SW
Atlanta, Georgia 30303

LETTER AGREEMENT BETWEEN THE TENNESSEE VALLEY AUTHORITY AND NATIONAL PARK SERVICE FOR PREPARATION OF AN ENVIRONMENTAL IMPACT STATEMENT TO ADDRESS THE VEGETATION MANAGEMENT ON TVA TRANSMISSION RIGHTS OF WAY

On January 23, 2017, the Tennessee Valley Authority (TVA) published a Notice of Intent [82 FR 7913] to prepare an Environmental Impact Statement (EIS) to address the management of vegetation on its transmission system. In order to ensure that electric service to the public is not disrupted by outages on its transmission lines, TVA must control the vegetation on approximately 260,000 acres of the rights of way (ROW) for those lines. The purpose of this EIS is to examine at a programmatic level the potential environmental impacts of vegetation management practices along the approximately 17,000 miles of TVA's transmission line within TVA's seven-state power service area. The EIS will evaluate several alternative management approaches.

TVA is a federal agency of the United States (member of the executive branch) created by and existing pursuant to the TVA Act of 1933. Its broad mission is to foster the social and economic welfare of the people of the Tennessee Valley region and to promote the proper use and conservation of the region's natural resources. One component of this mission is the generation, transmission, and sale of reliable and affordable electric energy. TVA operates the nation's largest public power system, producing approximately four percent of all of the electricity in the nation. The TVA Act requires the TVA power system to be self-supporting and operated on a nonprofit basis and directs TVA to sell electricity at rates as low as are feasible. TVA receives no taxpayer funding, deriving virtually all of its revenues from sales of electricity.

The National Park Service (NPS) is responsible for managing nearly 84 million acres with over 400 units in the National Park System. The mission of the NPS is to preserve unimpaired the natural and cultural resources and values of the National Park System for the enjoyment, education, and inspiration of current and future generations. The NPS also has management responsibilities over other areas, including parts of the National Wild and Scenic Rivers System, National Trails System, National Heritage Areas, National Historic Landmarks, and NPS Affiliated Areas.

In response to TVA's Notice Of Intent, and to ensure that the interests of the NPS are addressed in the study process, the NPS requested participation in March, 2017, as a cooperating agency in development of the EIS under 40 CFR Part 1501.6 TVA accepted this request on December 19, 2017. Coordination and cooperation among Federal agencies before and during maintenance of ROWs on Federal lands are important to enhance electric transmission reliability, increase maintenance efficiencies, reduce management costs, prevent the spread of invasive plants, reduce fuel loads, and minimize potential natural and cultural resources impacts and human safety risks.

To facilitate the continued cooperation of TVA and NPS in the conduct of TVA's ROW Vegetation Management EIS, the agencies agree on the following roles and responsibilities.

TVA will:

- Assume primary responsibility as the lead agency under 40 CFR 1501.5 for implementing the NEPA process.
- Meet as needed with the NPS and maintain open communication about all phases of the NEPA process to ensure adequate opportunity for timely input to review of preliminary and final draft material.
- Assume primary responsibility for conducting technical studies in support of the EIS.
- Assemble and edit the DEIS and FEIS documents.
- Provide for timely intergovernmental review as provided under TVA's regulations, Executive Orders, and other pertinent laws and regulations.
- Share all relevant data, analyses, maps and other information necessary to allow for full understanding of the resource issues associated with the EIS and to ensure full participation of the NPS in the review process.
- Develop a project mailing list and provide for public input as required in the NEPA process.
- Coordinate the response to comments on the DEIS.
- Keep confidential, to the extent permitted under the Freedom of Information Act (FOIA) and other applicable laws, all pre-decisional or other privileged documents shared with TVA by the NPS.
- Fulfill other roles and responsibilities as agreed upon by mutual consent and documented in meeting notes and correspondence.
- Use the environmental analyses and recommendations of the cooperating agencies to the maximum extent possible, consistent with its own responsibilities as lead agency. In the event that the NPS has its own preferred alternative, the varying preferences may be identified in the EIS, as described in the response to Question 14b of the Council on Environmental Quality's 40 Most Asked Questions (46 FR 18026).
- Assume the financial responsibility for all lead agency duties.

The NPS will:

- Assure that the laws and regulations governing the operation of the NPS are appropriately considered as applicable to TVA, in the EIS.

- Attend scheduled EIS coordination meetings, and respond to requests for existing information and review of written material within the mutually agreed upon timeframe.
- Provide TVA copies of pertinent planning documents, data, and resource information in their possession relating to the management of resources in the study area.
- Provide technical expertise and input on matters relating to their primary areas of responsibility, including analysis as mutually agreed upon.
- Assist in the development of mitigation measures and monitoring plans.
- Conduct appropriate technical and or administrative reviews of the preliminary draft and preliminary final EISs and provide written comments to the lead agency for use in subsequent revisions.
- Coordinate the activities of the various NPS offices concerning their interest and involvement with the EIS process, so that the NPS speaks with one voice to TVA.
- Provide mailing lists of any agencies or organizations potentially interested in, and any individuals who have requested information about the management of resources that could potentially be affected by TVA's proposed action for inclusion, as needed, in the master mailing list for the EIS.
- Assist in responding to public comments on the DEIS pertaining to the NPS.
- Keep confidential, as permitted under the Freedom of Information Act (FOIA) and other applicable state and Federal law, all pre-decisional and other privileged TVA documents shared in the course of preparing this EIS and coordinate responses to all requests for release of such documents or information with TVA. Further, ensure that all contacts, correspondences, e-mails, telephone records, etc., directly relating to the EIS are channeled through TVA, excepting requests for routine information. In regard to questions about the NPS's role in the EIS process or other agency-specific inquiries, notify TVA about the question and agency response.
- Fulfill other roles and responsibilities as agreed upon by mutual consent and documented in meeting notes and correspondence.
- Provide adequate staff personnel and other resources necessary to meet their commitments outlined in this agreement.
- Assume the financial responsibility for NPS duties under this agreement.

The NPS' cooperating agency status and level of involvement would not preclude independent review and comment responsibilities under Section 102(2)(C) of NEPA. Similarly, it would not imply that the NPS would necessarily concur with all aspects of TVA's findings.

TVA and NPS will cooperate in the development of an EIS that assesses the impacts of various alternatives for the management of vegetation on TVA transmission line ROW in TVA's Power Service Area. In signing this document, TVA and NPS recognize that cooperation in the

The NPS' cooperating agency status and level of involvement would not preclude independent review and comment responsibilities under Section 102(2)(C) of NEPA. Similarly, it would not imply that the NPS would necessarily concur with all aspects of TVA's findings.

TVA and NPS will cooperate in the development of an EIS that assesses the impacts of various alternatives for the management of vegetation on TVA transmission line ROW in TVA's Power Service Area. In signing this document, TVA and NPS recognize that cooperation in the preparation of the EIS would not only be mutually beneficial but also critical to the successful completion of this environmental review.

Sincerely,

M. Susan Smelley

M. Susan Smelley

APPROVALS:

M. Susan Smelley

M. Susan Smelley, Director
Environmental Compliance & Operations
Tennessee Valley Authority

4/2/2018
Date

for Stan Austin, Regional Director
Southeast Regional Office
National Park Service

4/11/18
Date

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Tennessee ES Office
446 Neal Street
Cookeville, Tennessee 38501

April 12, 2018

Ms. Holly LeGrand
Program Manager, Endangered Species Policy
Tennessee Valley Authority
400 West Summit Hill Drive, WTK11-C
Knoxville, TN 37902-1499

Subject: Biological Opinion - Evaluation of impacts of Tennessee Valley Authority's Routine Actions on Four Federally Listed Bats, FWS Log #: 04ET1000-2018-F-0017.

Dear Ms. LeGrand:

This letter transmits the enclosed biological opinion (BO) of the U.S. Fish and Wildlife Service (Service) for the Evaluation of the Impacts of Tennessee Valley Authority's (TVA) Routine Actions on Four Federally Listed Bats (the Action). The TVA proposes to implement ten overarching actions and 96 routine activities in 1.015-million acres throughout its 82.8-million acre service area. On October 2, 2017, we received your letter requesting formal consultation for the Action, and associated Biological Assessment. You determined that the Action is likely to adversely affect the federally endangered Indiana bat (*Myotis sodalis*) and federally threatened northern long-eared bat (*Myotis septentrionalis*).

You also determined that the Action is not likely to adversely affect the gray bay (*Myotis grisescens*), Virginia big-eared bat (*Corynorhinus townsendii virginianus*), and designated critical habitats for the Indiana bat. The Service previously concurred with these determinations by letter dated March 8, 2018.

The enclosed BO answers your request for formal consultation, and concludes that the Action is not likely to jeopardize the continued existence of the species listed above. This finding fulfills the requirements applicable to the Action for completing consultation under §7(a)(2) of the Endangered Species Act (ESA) of 1973, as amended.

The BO includes an Incidental Take Statement that requires the TVA to implement reasonable and prudent measures that the Service considers necessary or appropriate to minimize the impacts of anticipated taking on the listed wildlife species. Incidental taking of listed wildlife species that is compliance with the terms and conditions of this statement is exempted from the prohibitions against taking under the ESA.

Reinitiating consultation is required if the TVA retains discretionary involvement or control over the Action (or is authorized by law) when:

a. the amount or extent of incidental take is exceeded;
b. new information reveals that the Action may affect listed species or designated critical habitat in a manner or to an extent not considered in this BO;
c. the Action is modified in a manner that causes effects to listed species or designated critical habitat not considered in this BO; or
d. a new species is listed or critical habitat designated that the Action may affect.

A complete administrative record of this consultation is on file at the Tennessee Field Office. If you have any questions about the BO, please contact Todd Shaw by phone at 931/525-4985 or via email at *ross_shaw@fws.gov*.

Sincerely,

Robert W. Tawes
Acting Field Supervisor

Enclosure: Biological Opinion - Evaluation of the Impacts of Tennessee Valley Authority's Routine Actions on Four Federally Listed Bats

Biological Opinion

Programmatic Strategy for Routine Actions that May Affect Endangered or Threatened Bats

FWS Log #: 04ET1000-2018-F-0017

Prepared by:

U.S. Fish and Wildlife Service
Tennessee Ecological Services Office
446 Neal Street
Cookeville, Tennessee 38501

4/12/18

Robert Tawes, Acting Field Supervisor   Date

TABLE OF CONTENTS

CONSULTATION HISTORY

This section lists key meetings and correspondence (events) during the course of this consultation. A complete administrative record of this consultation is on file in the Service's Tennessee Ecological Services Field Office (TNFO).

Date	Event	Participants	Discussion Topic
Sept. 23, 2014	TVA Office, Knoxville, TN/Conference call	Staff from TVA, Service SE Region Office (RO), and TN FO	Discussion on development of a region-wide programmatic consultation (*e.g.*, pros/cons, components, limitations, time frame).
Jan. 23, 2015	TVA office, Knoxville, TN	Staff from TVA and TN FO	Initiation of informal programmatic consultation
Feb. 10, 2015	Conference call	TVA staff; Service SE and Midwest ROs and TN FO staff	Framework and aspects in development of modeling approach to determine potential presence of Indiana bat and northern long-eared bat within TVA's Action Area.
Apr. 22, 2015	Conference call	Staff from TVA and TN, NC, KY, AL, MS, GA, and VA FOs	TVA shared focus and framework, discussion on what to focus on moving forward.
July 22, 2015	TN FO, Cookeville, TN/Conference call	Staff from TVA, Service SE RO, and TN, AL, KY, and MS FOs	Status Meeting (discussed routine actions, acreage estimates, data/modeling, avoidance and minimization measures).
Aug. 20, 2015	TVA Office, Knoxville, TN	TVA staff; Geographic information system (GIS) staff from TN and NC FOs	GIS Modeling and Analysis.
Dec. 16, 2015	GA FO, Athens, GA	TVA staff; staff from GA FO	Overview, status, and questions and answers regarding consultation with GA FO staff.
Jan. 6, 2015	TN FO, Cookeville, TN	TVA staff; TN FO staff	Checkpoint.
Jan. 14, 2016	Service SE RO, Atlanta, GA	TVA staff; staff from Service SE RO and TN FO	Overview and status.
Jan. 22, 2016	E-mail correspondence	TVA staff; TN FO staff	Provided BA Chapters 1-2 for Service review.
Feb. 1, 2016	TVA Office, Chattanooga, TN	TVA staff; AL FO staff	Overview, status, and questions and answers regarding consultation with AL FO staff.

Date	Event	Participants	Discussion Topic
Feb. 16, 2016	MS FO, Jackson, MS / Conference call	TVA staff; MS FO staff	Overview, status, and questions and answers of consultation with MS FO staff.
Feb. 22, 2016	KY FO, Frankfort, KY / Conference call	TVA staff; KY FO staff	Overview, status, and questions and answers of consultation with KY FO staff.
June 18, 2017	E-mail correspondence	TVA staff; staff in Service SE RO, AL, GA, TN, MS, KY, NC, and VA FOs	TVA provided draft BA for final review and comments to the Service SE RO and AL, GA, TN, MS, KY, NC, and VA FOs.
June 30, 2017	E-mail correspondence	TVA staff; staff in Service SE RO, and AL, GA, MS, KY, NC, TN, and VA FOs	TN FO forwarded request to staff in Service SE RO, and AL, GA, MS, KY, NC, and VA FOs by July 19, 2017.
July 17, 2017	E-mail correspondence	TN FO staff; TVA staff	TN FO sent e-mail to TVA indicating that additional time was needed for Service SE RO, and AL, GA, MS, KY, NC, TN and VA FOs review and comments of draft BA; the RO and FOs agreed to provide comments to the TN FO by August 4, 2017. The TN FO indicated to TVA that comments would be provided to TVA by August 21, 2017.
Aug. 11, 2017	E-mail correspondence	TVA staff; staff in Service SE RO, and AL, GA, MS, KY, NC, TN, and VA FOs	TVA sent e-mail to SE RO, and AL, GA, MS, KY, NC, TN, and VA FOs indicating that they would hold a conference call from the TN FO on September 15, 2017, to address comments submitted on draft BA.
Sept. 7, 2017	TN FO, Cookeville	TVA staff, TN FO staff	TVA held meeting with TN FO staff to discuss comments provided by KY, NC, TN, and VA FOs review of draft BA.
Sept. 15, 2017	Conference call	TVA staff, staff in Service SE RO, AL, GA, TN, MS, KY, NC, and VA FOs	TVA addressed comments submitted by FOs regarding the draft BA.
Sept. 15 – Oct. 1, 2017	E-mail correspondence, Phone calls	TVA staff, staff in KY, NC, and VA FOs	TVA continued coordinating with KY, NC, and VA FOs to further address their questions and comments on the draft BA.

Date	Event	Participants	Discussion Topic
Oct. 2, 2017	Mail	TVA staff, TN FO staff	TVA provided hard copy of final BA to TN FO.
Oct. 13, 2017	E-mail correspondence	TVA staff, TN FO staff	TVA provided electronic copy of final BA to TN FO.
Oct. 13, 2017	Mail	TN FO staff, TVA staff	The TN FO initiated formal consultation and indicated that the final subject programmatic biological opinion would be provided to TVA no later than Feb. 28, 2018.

BIOLOGICAL OPINION

1. INTRODUCTION

A Biological opinion (BO) is the document that states the opinion of the U.S. Fish and Wildlife Service (Service) under the Endangered Species Act (ESA) of 1973, as amended, as to whether a Federal action is likely to:

- jeopardize the continued existence of species listed as endangered or threatened; or
- result in the destruction or adverse modification of designated critical habitat.

The Federal action addressed in this BO is the Tennessee Valley Authority's (TVA) proposed programmatic strategy for routine actions that may affect endangered and threatened bats (the Action). TVA provided a Biological Assessment (BA) for the Action, which described how 10 overarching actions and 96 routine activities that TVA authorizes, funds, or carries out, may affect ESA-listed bats and their designated critical habitat during the next 20 years. The BA does not address the effects of the 96 routine activities on other listed species and critical habitats, and these activities are subject to the consultation requirements of ESA §7(a)(2). As necessary, TVA must consider the effects of these activities on other listed species and critical habitats through additional programmatic or project-level consultations.

The TVA determined that 21 of the 96 routine activities have no effect on the listed bat species or their critical habitat. Unless these activities may affect other listed species and critical habitat, consultation is not required. The TVA determined that the other 75 routine activities may affect, but are not likely to adversely affect, the gray bat, Virginia big-eared bat, and designated critical habitat for the Indiana bat (Ibat). Of these 75 activities, TVA determined that 72 (all but 3) may affect, but are not likely to adversely affect, the Ibat and northern long-eared bat (NLEB). By letter dated March 8, 2018, the Service concurred with TVA's "not likely to adversely affect" determinations, which concluded the consultation relative to these species, critical habitats, and activities. Until new information warrants a reinitiation of the consultation that supported these activity-specific findings, projects that are fully consistent with the activity description in the BA do not require further consultation with the Service regarding the species and critical habitats for which the Service provided programmatic concurrence. TVA proposes to report annually all project-level activities that complied with ESA §7(a)(2) by relying on the programmatic consultation.

Accordingly, this BO is limited in scope to evaluating the effects of the three proposed routine activities that TVA determined are likely to adversely affect the Ibat and the NLEB. The Action does not affect, or is not likely to adversely affect, any designated critical habitat for listed bat species; therefore, this BO does not further address critical habitat.

A BO evaluates the effects of a Federal action along with those resulting from interrelated and interdependent actions, and from non-Federal actions unrelated to the proposed Action (cumulative effects), relative to the status of listed species and the status of designated critical habitat. A Service opinion that concludes a proposed Federal action is *not* likely to jeopardize species and is *not* likely to destroy or adversely modify critical habitat fulfills the Federal agency's responsibilities under §7(a)(2) of the ESA. "*Jeopardize the continued existence*" means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR §402.02).

2. PROPOSED ACTION

TVA proposes a Bat Programmatic Strategy (the Action) to streamline the manner in which the agency fulfills its responsibilities under ESA §7 relative to ESA-listed bat species. TVA's BA for the Action describes various routine activities that may affect listed bat species and the conservation measures that TVA will apply to avoid and minimize adverse effects. The BA also describes various ongoing activities, such as monitoring, habitat enhancement, and public education, that promote the recovery of one or more listed bat species. Addressing these activities programmatically is intended to promote consistency, predictability, and efficiency of project-level consultations, and to more effectively address the conservation needs of listed bats at local and landscape scales.

The Action is comprised of 96 routine activities under the following 10 general action categories that TVA authorizes, funds, or carries out:

1) manage for biodiversity and public use;
2) protect cultural resources;
3) manage land use and disposal;
4) manage permitting under section 26a of the TVA Act;
5) operate, maintain, retire, construct, and expand power plants;
6) maintain existing transmission line assets;
7) convey electric transmission property;
8) expand or construct new transmission assets;
9) promote economic development; and
10) promote solar sites.

The Action does *not* include activities associated with:

- construction of, or purchase of power from, a wind farm;
- utility-scale solar projects (*i.e.,* projects that generate and feed solar power directly into the grid, supplying a utility with energy);
- TVA's ownership of mineral reserves; and
- nuclear power plant relicensing (the Nuclear Regulatory Commission typically serves as lead agency).

Of the 96 routine activities that occur under the 10 general action categories listed above, TVA determined that 75 may affect listed bats or their designated critical habitats. Of these 75 activities, only three are likely to adversely affect the Ibat or NLEB:

1) removal of hazardous trees or tree branches (Activity #33);
2) mechanical vegetation removal that includes trees or tree branches 3 inches or greater in diameter (Activity #34); and
3) prescribed burns (Activity #23);

In this BO, we do not further address the 93 activities described for the Action that TVA determined have no effect on, or are not likely to adversely affect, listed bats or their critical habitat. The scope of the BO is limited to the three activities listed above that are likely to adversely affect the Ibat and NLEB, and to the proposed conservation actions that are relevant to these species. Because the effects of hazardous tree removal and other tree removal on bats are similar, we combine these two activities in our description of the proposed action in section 2.2 and in our effects analyses.

The BA estimates the spatial extent of tree removal and prescribed burning activity during a calendar year and cumulatively over the next 20 years (2018–2037), but does not identify the location or timing of such activity at the project level. In the context of consultation under ESA §7(a)(2), the Action is consistent with the regulatory definition at 50 CFR §402.02 of a "framework programmatic action," which is a Federal action that approves a framework for the development of future actions that are authorized, funded, or carried out at a later time, and are subject to further consultation.

2.1. Action Area

For purposes of consultation under ESA §7, the action area is defined as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action" (50 CFR §402.02). The 96 activities of the programmatic Action will occur on lands associated with the 10 general action categories listed in the previous section. Table 2-1 reports the ownership, approximate total acreage, and estimated annual acreage affected by project activity on these lands.

Table 2-1. Ownership, total acreage, and annual affected acreage of the 96 activities described for the Action (source: BA Table 3-1).

Ownership	Acres	Annual Affected Acres
TVA Retained Land: *Reservoir Land*	293,000	12,782
TVA Retained Land: *Power Property*	38,000	1,089
TVA Transmission Easements: *Existing ROW*[a] *& Maintenance Buffer*	545,201	79,186–80,935
TVA Transmission Easements: *New ROW*	23,800	1,190
Public Land: *Economic Development Sites*	75,220	3,761
Private Land: *Solar Sites*	40,000	2,000
Total	**1,015,221**	**100,008–101,757**

[a] Right-of-Way

The 1.015-million acres reported in Table 2-1 are distributed throughout the 82.8-million acre TVA Region (Figure 2-1) in Tennessee, northern Alabama, northern Georgia, southern Kentucky, eastern Mississippi, western North Carolina, and southwestern Virginia. The BA does not provide maps delineating Action lands within the TVA Region, because some are not yet identified (*e.g.*, future solar sites on private land, new transmission substations), and many are difficult to display effectively at a regional scale (*e.g.*, the existing transmission ROW network). Although the Action Area is large, it represents only 1.23 percent of the total area within the TVA Region.

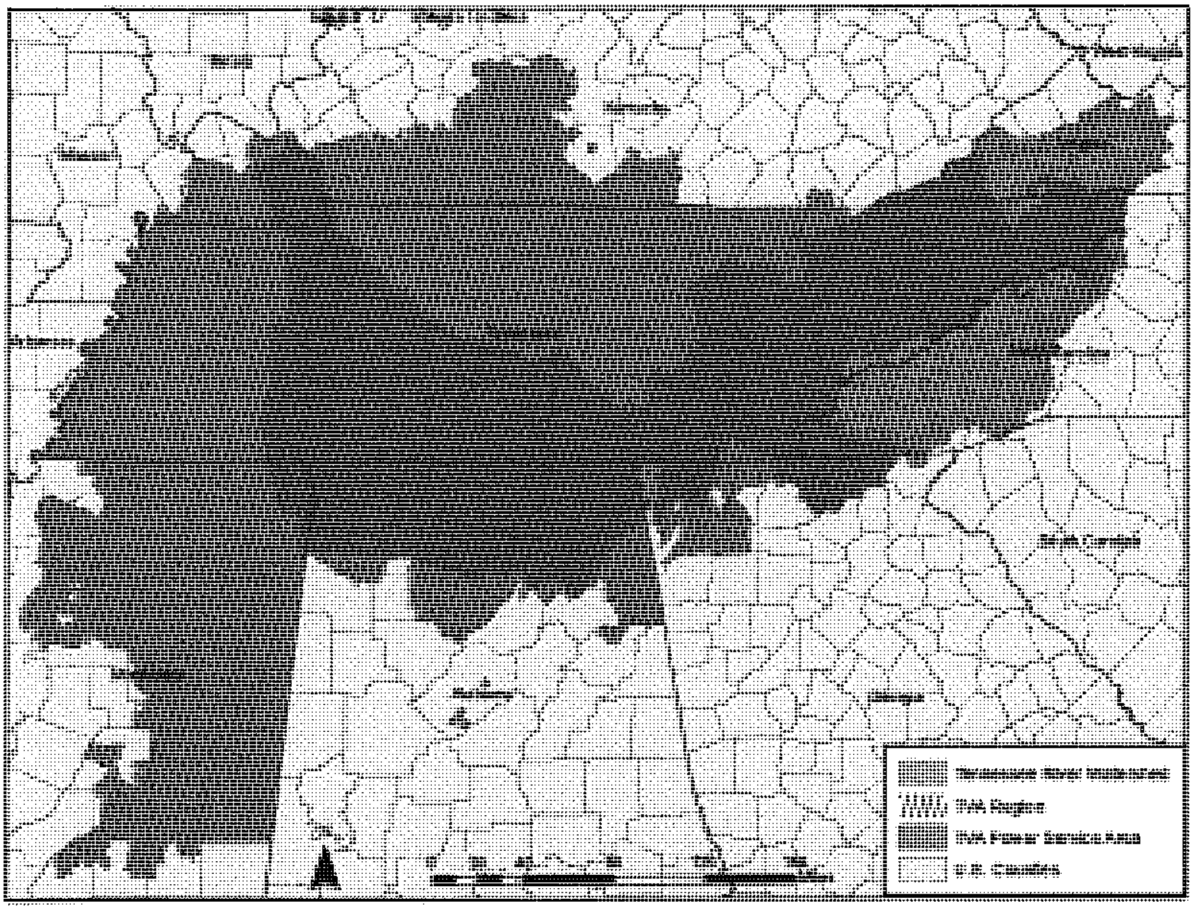

Figure 2-1. The 1.015-million acre Action Area is distributed throughout the 82.8-million acre TVA Region, which is comprised of the Tennessee River Watershed and the TVA Power Service Area (source: BA Figure 2-1).

The BA does not provide a project-specific schedule or map of activities over the 20-year Action duration. Annually, TVA estimates that about one-tenth (100,008–101,757 acres) of the lands for which the programmatic Action is formulated will receive direct and indirect effects from project activity. Cumulatively over 20 years, TVA estimates that the routine activities described for the Action will affect about 45.5 percent of the Action lands; therefore, more than half of the 1.015-millon acres will receive no effects. Some lands may receive project activity on multiple occasions (*e.g.*, prescribed burning, ROW vegetation management). Recognizing the variable and uncertain distribution of the routine activities, TVA describes the 1.015-million acres of lands that may receive effects of project activity at any time during the next 20 years as the "Action Area" for this consultation. Although it includes areas that the Action will not affect, the Service adopts the TVA definition of the Action Area for the purposes of this programmatic consultation.

Chapter 2 of the BA, "Description of the Action Area," provides data about land cover and other characteristics of the 82-million-acre TVA Region, which contains the 1-million-acre Action

Area distributed in patches (e.g., TVA reservoirs, power plants) and linear corridors (e.g., transmission ROWs) throughout the region. About 36 million acres (44 percent) of the Region has forest cover that is potentially suitable habitat for tree-roosting bats (BA pg. 24). The Action Area is proportionally less forested than the Region as a whole, with 240,103 acres (23.65 percent) of forest cover (H. LeGrand, pers. comm., 2017).

2.2. Tree Removal Activities

Eight of the ten of the general TVA action categories identified in section 2 routinely involve a need to remove trees, either to eliminate a hazard to human life or property (Activity #33) or to manage the structure and composition of the plant community on a site (Activity #34). Action category #2, "protect cultural resources," and category #7, "convey electric transmission property," do not involve tree removal.

The BA described three general sideboards for TVA's anticipated routine tree removal activity. First, TVA estimated the total acreage of routine tree removal annually and cumulatively over the next 20 years (2018–2037). Second, TVA estimated the proportion of tree removal that would result in a permanent alteration of local habitat conditions, *i.e.*, the percentage of the acreage in which trees are not planted or allowed to regenerate following tree removal. Third, TVA estimated the temporal distribution of tree removal acreage (either permanent or temporary) relative to three functional seasons of the bat life cycle:

- Inactive season, hibernation (mid-November to mid-March or April)
- Active season, all bats are volant (able to fly).
- Active season, bat pups are non-volant (June and July).

Table 2-2 summarizes these estimates of tree removal activity by action category.

The 20-year cumulative estimates in Table 2-2 are exactly or approximately 20 times a single annual acreage estimate reported for each action category except #6, "maintain existing transmission line assets," for which TVA provided two annual estimates. TVA anticipates a substantial reduction in tree removal from 1,835 to 86 acres per year beginning in the year 2022, when TVA expects it will have removed taller trees from the border zones along the majority of existing ROWs. Thereafter, TVA plans to maintain its ROWs in an early-successional state on a 3-year maintenance rotation. Removing trees from 1,835 acres per year for 4 years and from 86 acres per year for 16 years results in a 20-year cumulative estimate of 8,716 acres for existing transmission line maintenance. The cumulative acreage of tree removal for all action categories is 47,204 acres, of which 92 percent is permanent removal.

2.2.1. Tree Removal Settings and Methods

Section 3.2 of the BA describes two of the 96 activities included under the programmatic Action as tree removal:

Activity #33, "Removal of hazardous trees or tree branches," occurs as necessary throughout the year to address immanent threats to public safety, facilities, or private property. Settings for hazardous tree removal include, but are not limited to, campgrounds, day use areas, access

Table 2-2. Extent (acres) of TVA tree removal activity (annual, permanent, seasonal, and cumulative) for 2018–2037 (data source: BA Table 3-2). Percentages are relative to values in the same row under "Annual Total Tree Removal," except in the last row, where the percentages are relative to 47,204 acres ("Total Cumulative Tree Removal").

Action Category		Annual Total Tree Removal	Permanent Tree Removal	Seasonal Distribution: Inactive Season	Seasonal Distribution: Active Season; All Bats Volant	Seasonal Distribution: Active Season; Pups Non-Volant	Cumulative Total Tree Removal 2018-2037
1. Manage for Bio-diversity, Public Use		59	35 (60%)	12 (20%)	30 (50%)	18 (30%)	1,186
3. Manage Land Use, Disposal		630	504 (80%)	315 (50%)	189 (30%)	126 (20%)	12,600
4. Manage 26a Permitting (Shoreline)		104	73 (70%)	83 (80%)	10 (10%)	10 (10%)	2,080
5a. Operate and Maintain Plants		35	35 (100%)	28 (80%)	5 (15%)	2 (5%)	700
5b. Retire, Construct, Expand Plants		75	75 (100%)	60 (80%)	11 (15%)	4 (5%)	1,500
6. Maintain Existing TL[a] Assets:	2018–2021	1,835	1,835 (100%)	734 (40%)	459 (25%)	642 (35%)	8,716
	2022–2037	86	86 (100%)	34 (40%)	22 (25%)	30 (35%)	
8. Expand or Construct New TL Assets		595	595 (100%)	357 (60%)	119 (20%)	119 (20%)	11,900
9. Promote Economic Development		376	376 (100%)	338 (90%)	38 (10%)	0 (0%)	7,522
10. Promote Solar Generation		50	50 (100%)	40 (80%)	10 (20%)	0 (0%)	1,000
Annual Total	2018–2021	3,759	3,578 (95%)	1,967 (52%)	871 (23%)	921 (25%)	N/A[b]
	2022–2037	2,010	1,829 (91%)	1,267 (63%)	434 (22%)	309 (15%)	
Cumulative Total 2018–2037		N/A	43,576 (92%)	28,140 (60%)	10,428 (22%)	8,628 (18%)	47,204

[a] TL = transmission line
[b] N/A = not applicable

corridors between private property and TVA reservoirs, and transmission line ROWs. Hazardous tree removal may involve the use of a feller buncher, bulldozer, bush-hog, chainsaw, and other hand tools.

Activity #34, "Mechanical vegetation removal, includes trees or tree branches three inches or greater in diameter," serves a variety of purposes and occurs during daylight hours throughout the year, with a possible duration of days to weeks at a particular location. The physical settings for non-hazardous tree removal include, but are not limited to, public/recreational use areas, natural areas (*e.g.,* to create openings for wildlife habitat enhancement), lawn maintenance, and areas for the construction of new buildings, roads, transmission lines, or substations. TVA removes trees along existing ROWs and access roads to ensure the integrity of operations and reduce risks to human safety. The equipment employed may include a feller buncher, bulldozer, track or bucket hoe, scrapper, bush-hog, mower, logging and boom trucks, chainsaw, and hand tools.

2.2.2. Conservation Measures for Tree Removal

To avoid or reduce adverse effects to bats resulting from tree removal, TVA proposes to apply several conservation measures when conducting Activities #33 and #34. Generally, these measures are intended to reduce the intensity of, or the probability of exposure to, stressors caused by tree removal that may affect bats or their habitat resources, including the elimination of roost trees (while currently occupied or not), and the introduction of sediment or other pollutants to waters that bats drink or that support bat prey resources.

The BA also identifies noise as a stressor caused by tree removal activity. The "noise/vibration" conservation measure that TVA assigns to tree removal (labeled as NV1; BA pg. 114) states:

> NV1 = Noise is expected to be short-term, transient, and not significantly different from urban interface or natural events (*i.e.,* thunderstorms) that bats are frequently exposed to when present on the landscape; bats thus are unlikely to be disturbed.

This statement suggests that the noise associated with tree removal activity is unlikely to disturb bats due to its brief duration and similarity to ambient noise. However, TVA indicates that Activity #34 may include the use of various large or loud equipment (*e.g.,* bulldozer, chainsaw) "with [a] possible duration of days to weeks" (BA pg. 44). Because this measure does not specify actions or conditions that will have any effect on when, where, or how noise associated with tree removal will occur, it is not relevant to the analysis in this BO.

<u>General Measures</u>

TVA proposes nine conservation measures (TR1–TR9; BA section 5.2.4) for tree removal activity. Some deal with the timing and location of tree removal activity relative to the seasonal life cycle and known occurrences of the listed bats. The proposed measures are (copied from the BA):

- TR1 = Removal of potentially suitable summer roosting habitat during time of potential occupancy has been quantified and minimized programmatically. TVA will track and document alignment of activities that include tree removal (*i.e.,* hazard trees, mechanical vegetation removal) with the programmatic quantitative cumulative estimate of seasonal removal of potentially suitable summer roost trees for Indiana bat and northern long-eared bat.

- TR2 = Removal of suitable summer roosting habitat within 0.5 mile of Priority 1/Priority 2 Indiana bat hibernacula, or 0.25 mile of Priority 3/Priority 4 Indiana bat hibernacula or any northern long-eared bat hibernacula will be prohibited, regardless of season, with very few exceptions (*e.g.*, vegetation maintenance of TL ROW immediately adjacent to Norris Dam Cave, Campbell County, TN).
- TR3 = Removal of suitable summer roosting habitat within documented habitat (*i.e.*, within 10 miles of documented Indiana bat hibernacula, within 5 miles of documented northern long-eared bat hibernacula, within 2.5 miles of documented Indiana bat summer roost trees, within five miles of Indiana bat capture sites, within one mile of documented northern long-eared bat summer roost trees, within three miles of northern long-eared bat capture sites) will be tracked, documented, and included in annual reporting.
- TR4 = Removal of suitable summer roosting habitat within potential habitat for Indiana bat or northern long-eared bat hibernacula will be tracked, documented, and included in annual reporting.
- TR5 = Removal of any trees within 150 ft of a documented Indiana bat or northern long-eared bat maternity summer roost tree during non-winter season, range-wide pup season or swarming season (if site is within known swarming habitat), will first require a site-specific review and assessment. If pups are present in trees to be removed (determined either by mist netting and assessment of adult females, or by visual assessment of trees following evening emergence counts), TVA will coordinate with the USFWS to determine how to minimize impacts to pups to the extent possible. This may include establishment of artificial roosts before loss of roost tree(s).
- TR6 = Removal of a documented Indiana bat or northern long-eared bat roost tree that is still suitable and that needs to occur during non-winter season, range-wide pup season, or swarming season (if site is within known swarming habitat) will first require a site-specific review and assessment. If pups are present in trees to be removed (determined either by mist netting and assessment of adult females, or by visual assessment of trees following evening emergence counts), TVA will coordinate with the USFWS to determine how to minimize impacts to pups to the extent possible. This may include establishment of artificial roosts before loss of roost tree(s).
- TR7 = Tree removal within 100 ft of existing transmission ROWs will be limited to hazard trees as defined in Section 3-2.
- TR8 = Requests for removal of hazard trees on or adjacent to TVA reservoir land are inspected by staff knowledgeable in identifying hazard trees per International Society of Arboriculture and TVA's checklist for hazard trees. Approval is limited to trees with a defined target.
- TR9 = Internal controls will be in place to further reduce potential for site-specific direct adverse effects to Indiana bat and northern long-eared bat associated with tree removal. This includes promoting presence/absence surveys (mist netting or emergence counts) that allows for positive detections but without resulting in increased constraints in cost and project schedule. Internal controls are intended to facilitate willingness and financial feasibility to conduct surveys amidst increasing budget constraints without the risk for increased financial penalty if Indiana bat or northern long-eared bat individuals are caught. This enables TVA to

contribute to increased knowledge of bat presence on the landscape while continuing to carry out TVA's broad mission and responsibilities.

Sedimentation, Spills, Pollutants, and Contaminants (SSPC)

Six conservation measures (SSPC1–5, and SSPC7) deal with protecting water quality while conducting tree removal activities, which are described in section 5.2.6 of the BA. These measures are standard TVA best management practices (BMPs) that avoid or minimize inputs of sediment and other pollutants into waterways and cave/cave-like entrances. Although TVA determined that tree removal activity under the programmatic Action is likely to adversely affect the Ibat and NLEB, TVA concluded that the stressors causing such adverse effects do not include sediments and contaminants (BA pg. 123). The Service agrees that implementing SSPC1–5 and SSPC7 during tree removal activities will limit any adverse effects to bats via changes in water quality to an insignificant scale or discountable probability. Therefore, we do not further address the SSPC conservation measures in this BO.

2.3. Prescribed Burning

Of the ten general TVA action categories listed in the introduction to section 2 of this BO, only "manage for biodiversity and public use" involves prescribed burning (Activity #23). This activity is limited to portions of TVA Reservoir Lands. TVA uses fire to maintain and establish high quality wildlife habitat, reduce the risk of wildfires, stimulate growth of targeted vegetation, and recycle nutrients back into the soil.

During the last 5 years, TVA has burned about 750 to 1,000 acres each year, of which 60 percent was on open lands and 40 percent on forested lands. The annual extent of burning will rarely exceed 1,500 acres. TVA estimates that 26,247 acres of its reservoir lands could use prescribed fire over the next 20 years. Of this total, 17,677 acres (86 parcels that range in size from 2–4,649 acres) are identified for prescribed burning (potential burn sites), but are not currently included in a burn plan due to budget and staff limitations. The remaining 8,570 acres (66 parcels that range in size from 2–1,659 acres) are currently managed with fire (active burn sites) or are slated for fire management within the next 5 years (planned burn sites).

2.3.1. Prescribed Burning Methods

TVA intends to conduct most burns in early winter to early spring (approximately November–April). Weather conditions that are not conducive to controlled burning generally preclude burns during September and October. Burn season and frequency on a parcel ranges from 1–5 years, depending on site-specific objectives. Table 2-3 provides examples of the objectives associated with burns conducted at various times of year.

Table 2-3. Seasonality and example objectives of prescribed burning on TVA lands (source: BA Table 3-3).

SEASON	OBJECTIVES
Fall-Winter-Spring; Spring	Invasive control - conversion to native early successional - maintain early successional (in partnership with state agency at some locations)
Fall-Winter; Winter-Spring; Spring	Maintain early successional seral stage (*e.g.,* dam safety level protection; hay/row crop production; Native warm season grass production; research partnership with local university, state agency or non-profit organization; reduce encroaching canopy - expanding barrens habitat; reduction of density coverage; understory maintenance- shortleaf pine initiative)
Fall-Winter	Maintain Pine-savannah - early successional seral stage
Winter-Spring	Mix upland hardwood selective thinning and understory control-Partnership research with Mississippi State University
Fall-Winter-Spring	Mixed hardwood-pine local wildfire suppression-understory maintenance-Shortleaf Initiative
Spring	Pine-Cedar local wildlife suppression-invasive and woody suppression-revert to early succession
Fall-Winter-Spring	Pine-hardwood local wildfire suppression-understory maintenance-hardwood regeneration
Fall-Winter-Spring; Fall-Winter	Pine-Oak local wildfire suppression (invasive understory control; early succession maintenance; shortleaf initiative; afforestation preparation)
Fall-Winter-Spring	Planted shortleaf (understory maintenance; maintain early successional seral stage
Winter-Spring	Site prep (conversion to native, early successional stage; maintain early successional seral stage
Fall-Winter-Spring	Undesirable woody suppression - desirable woody regeneration maintenance; early-successional conversion and maintenance)
Fall-Winter; Spring	Upland hardwood local wildfire suppression (undesirable woody control; understory maintenance; invasive control)

TVA has previously established BMPs for conducting prescribed burns, which are appended to the BA as Appendix C ("BMPs for Silviculture Activities on TVA Lands"), and which apply to this Action. The description of Activity #23 in section 3-2 of the BA lists the following guidance (conditions and considerations) for prescribed burning that specifically deal with caves and bats (paraphrased from BA pg. 40):

1) Caves are smoke-sensitive environments. TVA assumes that federally listed bats use a cave until surveys show otherwise.
2) Considering relevant site-specific conditions, prescribed burn managers must ensure that smoke does not enter caves or cave-like structures when bats are present.

3) Where feasible, burn larger acreages in smaller units at a time to reduce the risk of smoke entering sensitive sites.
4) Tractor-constructed fire breaks, mechanical site preparation, vegetation cutting, and construction of new roads (including temporary roads) are prohibited within 200 feet of cave portals, cave collapse areas, mines and sinkholes. Use site-specific data to determine whether wider buffers are necessary to protect water and air quality in caves and mines.
5) Use existing barriers (*e.g.,* streams, lakes, wetlands, roads, and trails) as fire lines whenever possible.
6) Prescribed burning in known and potential maternity roosting habitat is prohibited from June 1–July 31, except where site-specific data indicate that Ibats and NLEBs are not likely present.

TVA has provided a seasonal breakdown of the 20-year cumulative extent of prescribed burning relative to the three bat life-cycle seasons: inactive season (winter), non-volant pups (June and July), and the remainder of the active season (H. LeGrand, pers. comm., 2018a). Although not listed as an avoidance and minimization measure applicable to burning, this breakdown specifies no burning during June and July, 90 percent during the inactive season, and 10 percent in the remainder of the active season.

2.3.2. Conservation Measures for Prescribed Burning

In addition to the burning BMPs and the methods described in section 2.3.1, TVA proposes nine conservation measures to avoid and minimize the adverse effects of smoke and heat from prescribed burning on bats. Some of these measures, listed below (copied from BA section 5.2.3), overlap with the proposed methods.

- SHF1 = Fire breaks are used to define and limit burn scope.
- SHF2 = Site-specific conditions (*e.g.,* acres burned, transport wind speed, mixing heights) are considered to ensure smoke is limited and adequately dispersed away from caves so that smoke does not enter cave or cave-like structures.
- SHF3 = Acreage is divided into smaller units to keep the amount of smoke at any one time or location to a minimum and reduce risk for smoke to enter caves.
- SHF4 = Planned timing for prescribed burns minimally overlaps with time of potential occupancy by bats (See BA Table 3-3). If burns need to be conducted during April and May, when there is some potential for bats to present on the landscape and more likely to enter torpor due to colder temperatures, burns will only be conducted if the air temperature is 55° or greater, and preferably 60° or greater.
- SHF5 = Fire breaks are plowed immediately prior to burning, are plowed as shallow as possible and are kept to minimum to minimize sediment.
- SHF6 = Tractor-constructed fire lines are established greater than 200 ft from cave entrances. Existing logging roads and skid trails are used where feasible to minimize ground disturbance and generation of loose sediment.
- SHF7 = Burning will only occur if site specific conditions (e.g. acres burned, transport wind speed, mixing heights) can be modified to ensure that smoke is adequately dispersed away from caves or cave-like structures. This applies to prescribed burns and burn piles of woody vegetation.

- SHF8 = Brush piles will be burned a minimum of 0.25 mile from documented, known, or obvious caves or cave entrances and otherwise in the center of newly established ROW when proximity to caves on private land is unknown.
- SHF9 = A 0.25-mile buffer of undisturbed forest will be maintained around documented or known gray bat maternity and hibernation colony sites, documented or known Virginia big-eared bat maternity, bachelor, or winter colony sites, Indiana bat hibernation sites, and northern long-eared bat hibernation sites. Undisturbed forest is important for gray bats to regulate temperatures at the mouth of the cave, and provide cover for bats as they emerge from the cave. Prohibited activities within this buffer include cutting of over-story vegetation, construction of roads, trails or wildlife openings, and prescribed burning. Exceptions may be made for maintenance of existing roads and existing ROW, or where it is determined that the activity is compatible with species conservation and recovery (*e.g.*, removal of invasive species).

The BA (pg. 39) reports that 74 caves occur within 1 mile of the active, planned, and potential burn sites on TVA reservoir lands. Of these, 11 have documented bat occupancy (current or historic), 25 are within 500 feet of active burn sites, and 15 are within the boundaries of potential burn sites (3 of the 15 have documented bat occurrence). TVA determined that prescribed burning conducted in a manner consistent with the proposed Action, which includes the BMPs and the conservation measures listed above, is not likely to adversely affect listed bats while they inhabit caves.

The Service previously concurred with this TVA determination relative to the gray bat and Virginia big-eared bat (see Consultation History), which roost in caves year-round. We agree also that the BMPs and proposed conservation measures will limit any adverse effects of burning on Ibats and NLEBs while they inhabit caves to an insignificant scale or discountable probability. Therefore, we do not further address in this BO the effects of burning on these two species while they inhabit caves, which is during their inactive winter (hibernation) season. Further analysis of the effects of prescribed fire is limited to burns conducted during the active season of these two bat species.

2.4. Additional Conservation Measures

In addition to the impact avoidance and minimization measures specified for each of the 96 activities, section 5.3 of the BA describes various ongoing TVA efforts that promote the recovery of listed bats in the TVA Region. These efforts include:

- monitor gray bat caves on TVA-managed lands;
- collaborate with partners to survey bridges and potential summer use (e.g., maternity colonies) areas;
- support bat ecology research (*e.g.*, spring migration radio tagging and tracking, location and assessment of roost trees);
- monitor bat use following habitat enhancement and artificial roost projects on TVA lands;
- install, monitor, and maintain gates and signage at bat caves on TVA lands;
- serve on State white-nose syndrome planning committees (*e.g.*, AL, TN);

- maintain a database of listed bat occurrences within the TVA Region (*i.e.*, mist net captures, cave, bridge, and tree roosts, *etc.*) to inform project-specific environmental reviews and BAs;
- manage invasive plants that threaten rare species habitats (*e.g.*, cave entrances); and
- conduct bat habitat identification workshops for TVA staff.

TVA also addresses listed bat conservation needs to some extent in the following plans and policies:

- 2015 Integrated Resource Plan (IRP), which guides TVA's electricity generation planning;
- 2011 Natural Resource Plan (NRP), which guides management and stewardship activities on TVA lands;
- 2006 Land Policy, which guides management of the reservoir system and surrounding reservoir lands; and
- 1999 Shoreline Management Policy (SMP), which guides the protection of shoreline and aquatic resources while allowing reasonable access to the water by adjacent property owners.

Lastly, the BA expresses TVA's commitment to a rigorous environmental review process at multiple levels to ensure compliance with the National Environmental Policy Act, ESA, and other environmental laws. The Action of this consultation is an example of such review at a regional programmatic level for ESA compliance purposes with respect to listed bats. The programmatic Action addresses multiple routine activities that are common components of actions funded, authorized, or carried out with additional project-level environmental review as necessary and appropriate.

The BA does not provide data about the various additional conservation measures listed above that would inform an analysis of their beneficial effects on listed bat numbers, reproduction, or distribution. The Service recognizes the inherent value of these efforts to the recovery of listed bats. Several provide information that is critical to formulating effective conservation actions, but do not improve directly the status of listed bats. Therefore, lacking data that would allow us to determine the scale of their beneficial effects relative to those of the proposed activities that are likely to adversely affect the Ibat and NLEB, we do not further address the "additional conservation measures" in this BO.

2.5. Project-Level Process

Chapter 6 of the BA describes the procedures TVA proposes for activities funded, authorized, or carried out under the programmatic Action to rely on this programmatic consultation for ESA compliance with respect to the listed bats that such activities may affect. These procedures specify a sequence of TVA project-specific determinations using best available data, and the documentation, notification, and reporting processes that are associated with these determinations. Table 2-4 reiterates these procedures.

Table 2-4. Proposed steps to document and report alignment of TVA activities with the bat programmatic consultation (source: BA Table 6-1).

#	Step
1.	Site-specific project will be screened via TVA's environmental review process.
2.	Project will be reviewed to determine if associated activities are within the scope of TVA's bat programmatic consultation (BPC).
3a.	Projects with activities that are outside BPC scope will be subject to project-specific consultation if warranted. ***END***
3b.	Projects with activities that are within BPC scope will be reviewed for potential to impact covered species. ***Go to 4.***
4a.	Project-specific activities that are determined in the BPC to have No Effect will be documented as aligning with the BPC and documented in TVA's environmental management system. ***END***
4b.	Project-specific activities determined in the BPC to have potential to NLAA[a] covered species will be reviewed further to determine if project exposes covered species to stressors. If so, conservation measures identified in the BPC will be implemented and documented. If no exposure to stressors will occur as part of the project, activity will be documented as having no effect on covered species. In either case, TVA will notify the appropriate USFWS FO (via email or letter) of proposed project, alignment with BPC, and project-specific determination. This notification will serve as documentation in the TVA's administrative record. All projects with effects determinations of these types will be summarized in annual reporting associated with the BPC. ***END***
4c.	Project-specific activities determined in the BPC to have potential to LAA[b] covered species will be reviewed further to determine if project exposes covered species to stressors. ***Go to 5.***
5a.	If no exposure to stressors will occur as part of this project-specific activity, activity will be documented as aligning with the BPC, having no effect on covered species, and will be included in annual reporting associated with the BPC. ***END***
5b.	If project-specific activity aligns with LAA determination, project conducts presence/ absence surveys, and detections are negative, TVA will document a NLAA determination and alignment with BPC. TVA will notify the appropriate USFWS FO (via email or letter) of the proposed project, alignment with BPC, survey outcome, and determination. This notification will serve as documentation in TVA's administrative record. All projects with effects determinations of these types will be summarized in BPC annual reporting. ***END***
5c.	If project-specific activity aligns with LAA determination, project assumes presence, or project conducts presence/absence surveys and detections are positive, TVA will document a LAA determination and alignment with BPC. TVA will notify the appropriate USFWS FO (via email or letter) of the proposed project, alignment with BPC, survey outcome (if surveys conducted), and determination. This notification will serve as documentation in TVA's administrative record. All projects with effects determinations of these types will be summarized in annual reporting associated with the BPC. ***END***

[a] NLAA = may affect; not likely to adversely affect.
[b] LAA = may affect; likely to adversely affect.

2.6. Interrelated and Interdependent Actions

A BO evaluates the effects of a proposed Federal action. For purposes of consultation under ESA §7, the effects of a Federal action on listed species or critical habitat include the direct and indirect effects of the action, plus the effects of interrelated or interdependent actions.

> "Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration" (50 CFR §402.02).

The 96 activities addressed in this programmatic Action are routine components of projects that serve one or more of the 10 general action categories listed in section 2 of this BO. Projects authorized, funded, or carried out under these 10 action categories may or may not involve interrelated or interdependent actions. Section 5.1 of the BA indicates that TVA will consider in project-level environmental review whether interrelated or interdependent activities associated with one or more of the activities covered under this programmatic Action may affect listed bats and other listed species, and if so, enter a project-specific consultation with the Service. We agree with TVA that any assessment of interrelated and interdependent activities at the program level of this Action would be speculative, given its activity-level focus. Therefore, we do not further address the topic of interrelated or interdependent actions in this BO.

3. STATUS OF THE SPECIES

This section summarizes best available data about the biology and current condition of the Indiana bat (*Myotis sodalis*) (Ibat) and the northern long-eared bat (*Myotis septentrionalis*) (NLEB) throughout their range that are relevant to formulating an opinion about the Action.

The Ibat was among several animals identified in 1967 (32 FR 4001) as threatened with extinction under the Endangered Species Preservation Act of 1966, and subsequently classified as endangered when the ESA of 1973 superseded the earlier statute. The Service approved a recovery plan for the Ibat on October 14, 1983 (USFWS 1983), and issued a draft first revision, on April 13, 2007 (USFWS 2007). Critical habitat is designated for the Ibat, but is not relevant to this consultation.

The Service has issued the following decisions regarding ESA protections for the NLEB:

Date	Federal Register	Decision
04/02/2015	80 FR 17973–18033	Threatened species status with interim 4(d) rule
01/14/2016	81 FR 1900–1922	Final 4(d) rule
04/27/2016	81 FR 24707–24714	Determination that designation of critical habitat is not prudent

The Service has not yet approved a recovery plan for the NLEB.

3.1. Species Description

The Ibat is a medium-sized bat that closely resembles the little brown bat (*Myotis lucifugus*), but has a darker brown to black pelage. Adults weigh about one-quarter of an ounce (the weight of three pennies), and have a wingspan of 9 to 11 inches.

The NLEB is also a medium-sized bat, also weighing about one-quarter of an ounce. As indicated by its common name, the NLEB is distinguished from other *Myotis* species by its large ears, which extend beyond the nose when laid forward.

3.2. Life History

The Ibat and NLEB are both insectivorous migratory species that hibernate in caves and mines during winter and forage in wooded areas during summer. Foraging activity and travel is mostly nocturnal. Ibat average life span is 5–10 years, but recapture of banded individuals has documented Ibats up to 15 years old (Humphrey and Cope 1977). NLEB longevity is up to 18.5 years (Hall *et al.* 1957). Prior to the arrival of white-nose syndrome, Caceres and Pybus (1997) attributed the highest age-specific annual mortality rates for the NLEB and many other species of bats to the juvenile stage. Hall (1962), Myers (1964), and LaVal and LaVal (1980) report sex ratios of 1:1 for the Ibat. NLEB sex ratios at the population level are not reported in the literature, but as a species similar to the Ibat in many other respects, a 1:1 ratio is likely.

The key phases in the Ibat and NLEB annual life cycle are:

- hibernation;
- spring staging and migration;
- pregnancy and lactation;
- pup volancy (able to fly); and
- fall migration and mating (swarming).

Although the timing varies with latitude and weather conditions, both bat species generally hibernate from mid-fall to mid-spring each year. Upon emerging from hibernation, bats forage for a few days or weeks near their hibernaculum (spring staging). Spring migration occurs from mid-March to mid-May. Females depart shortly after emerging from hibernation and are pregnant when they reach summer areas. Males tend to stay closer to hibernacula during summer. Adult females give birth to a single pup in late May to early June. Pups are weaned from nursing shortly after becoming volant in mid- to late-July. Fall migration occurs from mid-August to mid-October. Upon arriving at hibernacula, both species exhibit the "swarming" behavior. Large numbers of bats fly in and out of hibernacula entrances from dusk to dawn, roosting during the day in trees, but occasionally within the hibernacula. Swarming continues for several weeks and mating occurs during the latter part of the period. After mating, females enter hibernation, but not necessarily at the same hibernaculum where mating occurred. Most individuals of both sexes are hibernating by the end of November (by mid-October in northern areas).

The following subsections discuss in greater detail the aspects of the Ibat and NLEB life history that are most relevant to this consultation. We do not further discuss hibernation or hibernacula, because the Action is not likely to affect this life stage or habitat.

3.2.1. Summer Habitat and Ecology

Summer habitats for Ibat and NLEB bat consists of a wide variety of forested areas where they roost, forage, and travel. These habitats may include portions of adjacent and interspersed non-forested areas such as wetlands, the edges of agricultural fields, old fields, and pastures. Areas containing potential roosts include forests and woodlots, as well as linear features such as fencerows, riparian forests, and other wooded corridors. Tree density and canopy cover in areas used for roosting or foraging is variable. NLEBs are typically associated with upland forests with generally greater cover than Ibats, and appear to favor mature upland forests (Caceres and Pybus 1997), but occasionally forage over forest clearings, water, and along roads. However, most NLEB hunting occurs on forested hillsides and ridges, rather than along riparian areas preferred by the Ibat (Brack and Whitaker 2001; LaVal *et al.* 1977).

Wing morphology of both species suggests they are adapted to moving in cluttered habitats. Many species of bats, including the Ibat and NLEB, consistently avoid crossing or foraging in large open areas, choosing instead to use tree-lined pathways or small openings (Patriquin and Barclay 2003; Yates and Muzika 2006). Therefore, small patches of trees are unlikely to provide suitable foraging or roosting habitat unless connected to other patches by a wooded corridor.

Many male Ibats appear to remain at or near the hibernacula in summer with some fanning out in a broad band around the hibernacula (Whitaker and Brack 2002). Because males typically roost individually or in small groups, the average size of their roost trees is generally smaller than the roost trees used by female maternity colonies, which we discuss in the following subsection. Males may occasionally roost in caves. Males exhibit summer site fidelity and have been recaptured in foraging areas from prior years (USFWS 2007).

<u>Maternity Colonies and Roosts</u>

Following a variable-length period of foraging near hibernacula in the spring, females seek suitable habitat for maternity colonies, which appear essential for reproductive success. The size of NLEB maternity colonies is variable, but most are comprised of 30-60 females (USFWS 2014). Ibat maternity colonies are generally larger, but most contain fewer than 100 adult females (USFWS 2007). The mean maximum emergence count from Ibat maternity roosts after young began to fly (measured in 12 studies) was 119 bats (Kurta 2005), suggesting a colony size of 60–70 adult females (assuming that most adult females successfully raise one pup to volancy).

For purposes of this programmatic BO, we use 60 adult Ibat females per colony as the basis for estimating the number of Ibat colonies on the summer landscape. For each colony, we assume the local Ibat population is comprised of 60 adult females, 60 sympatric adult males, and 60 juveniles following parturition. Similarly, we use 45 adult NLEB females (the mid-point of the 30–60 range), and assume that the local population is comprised of 45 adult females, 45 sympatric adult males, and 45 juveniles following parturition.

Both species exhibit a degree of inter-annual fidelity to particular roost trees and/or maternity areas (Ibat: Humphrey *et al.* 1977; Gardner *et al.* 1991a, 1991b; Gardner *et al.* 1996; Callahan *et al.* 1997) (NLEB: Perry 2011; Johnson *et al.* 2009; Jackson 2004; Foster and Kurta 1999). Males are occasionally found with females in NLEB maternity colonies, but only rarely in Ibat maternity colonies. Maternity colonies of both species use networks of roost trees often centered around one or more primary (Ibat) or central-node (NLEB) roost trees. Ibat maternity colonies use a minimum of 8–25 roost trees per season (Callahan *et al.* 1997; Kurta *et al.* 2002). NLEB roost networks also include multiple alternate roost trees. Male and non-reproductive female NLEBs may also roost in caves and mines (Barbour and Davis 1969; Amelon and Burhans 2006).

Roost tree preferences vary between the two species. Ibats are known to use a wide variety of tree species ≥ 5 inches diameter at breast height (dbh) that have cracks, crevices, or peeling bark. A typical Ibat primary roost is located under the exfoliating bark of a dead ash, elm, hickory, maple, oak, or poplar, but any tree that retains large, thick slabs of peeling bark is potentially suitable. Primary Ibat roosts are usually in trees that are in early-to-mid stages of decay. NLEBs use a wider variety of trees for roosts. NLEBs roost in cavities, underneath bark, crevices, or hollows of both live and dead trees and/or snags that are ≥ 3 inches dbh. Ibats and NLEBs (more frequently) occasionally roost in barns and sheds, particularly when suitable tree roosts are unavailable.

3.2.2. Migration

Males and non-reproductive females may remain near hibernacula, or migrate to summer habitat some distance from their hibernaculum. Female Ibats commonly migrate hundreds of miles from their hibernacula (USFWS 2007), whereas NLEBs typically migrate 40-50 miles (USFWS 2014). Long-distance migration is energetically demanding. Fall migration occurs following months of summer foraging and building fat reserves. Spring migration occurs when fat reserves are depleted from hibernation, prey abundance is low, and females are pregnant; therefore, spring migration is possibly the most stressful period in the Ibat and NLEB life cycle.

3.2.3. Fall Swarming/Spring Emergence Habitat

The area around a winter hibernaculum necessarily serves as the location for the spring emergence from hibernation and the fall return from summer habitats. During spring staging and fall swarming, Ibat and NLEB roost in trees and forage in habitats that are similar to their summer habitats (see section 3.2.1), typically within 5 miles of their hibernaculum. Fall swarming activity lasts for several weeks. The duration of spring staging is more variable. Individual bats may spend a few days or a few hours around their hibernacula following emergence, or may migrate immediately to summer habitat.

3.2.4. Home Range

Ibats and NLEBs are migratory species that establish seasonal residency within a distinct home range. Summer home range includes roosting, foraging, and drinking areas, and the travel pathways between those habitats for a duration of several months. Fall home range includes the hibernaculum entrance for swarming behavior, but must also include roosting, foraging, and drinking areas for a duration of several weeks. For individuals (most females) that migrate to more distant summer habitats, spring home range is likely a subset of the areas used in the fall, but only for a few hours or days.

Studies using radio telemetry tagging and various analysis methods (e.g., mean convex polygons, 95% adaptive kernel, 95% fixed kernel) have estimated average individual Ibat summer home range sizes of 205–917 acres (Jachowski *et al.* 2014; Kniowski and Gehrt 2014; Menzel *et al.* 2005; Sparks *et al.* 2005; Watrous *et al.* 2006). One study near a hibernaculum during spring and fall (Rommé *et al.* 2002), and two during fall (Brack 2006; Kiser and Elliot 1996), estimated average home range sizes of 156–3,825 acres. Average individual NLEB summer home range size appears smaller than Ibat, with estimates of 161 and 179 acres (Owen *et al.* 2003, Lacki *et al.* 2009, respectively). No published studies have examined spring or fall home range sizes of NLEB. The average home range sizes reported in the studies cited above are each associated with substantial variability among the sample of individuals tracked in a particular study area. The sample size ranges from 3–32 bats. None reported the collective spatial extent of bat activity of all individuals tracked, and none attempted to track all members of a maternity colony or all bats engaged in fall swarming at a hibernaculum.

Depending on local habitat conditions, the home ranges of members of a maternity colony may or may not overlap substantially outside of the immediate area around shared roost trees. Some studies have documented summer habitat movements exceeding 1 mile (e.g., NLEB travel between roost tree and foraging area of 5,640 feet, Sasse and Pekins 1996), which imply a home range larger than a few hundred acres. For these reasons, the Service conservatively advises using a radius of 2.5 miles (Ibat) and 1.5 miles (NLEB) around a summer survey detection to delineate the area in which foraging and roosting activity of a maternity colony may occur. The area of a circle with a 2.5-mile radius is 12,566 acres, which is about 14 times larger than the largest Ibat individual summer home range reported in the literature. Similarly, a 1.5-mile circle (4,524 acres) is 25 times larger than the largest NLEB individual summer home range reported in the literature. A radius of 2.5 and 1.5 miles is likely to encompass all the roosts and foraging areas associated with a summer Ibat and NLEB detection, which is the purpose of this guidance, but likely exceeds the area on the landscape that a maternity colony actually uses regularly, which is not its purpose.

Likewise, the home ranges of very large numbers of individuals swarming at a hibernaculum probably do not overlap substantially much beyond the hibernaculum entrance, unless suitable habitat in the vicinity is very limited. To delineate potential foraging and roosting activity around known Ibat hibernacula, the Service uses a 10-mile radius for Priority 1 and 2 hibernacula, and a 5-mile radius for Priority 3 and 4 hibernacula. This recognizes the importance of these areas in bat conservation, and the variability associated with larger (P1 and P2) and smaller (P3 and P4) numbers of bats. For all known NLEB hibernacula, the radius is 5-miles, because NLEB winter aggregations are comparable to or less than Ibat numbers at P3 and P4 hibernacula.

Ibat males and females generally roost separately in the summer, but NLEB males are known to roost with females in maternity colonies to some extent. Some of the studies cited above suggest differences in summer home range size between males and females, both Ibat and NLEB. Despite some differences, male and female NLEB may share a large fraction of their foraging habitat within the occupied forested landscape. An analysis of mist net survey data in Kentucky (USFWS 2015a) shows that most NLEB males and non-reproductive females are captured in the same locations as reproductively active females (1,712 of 1,825 capture records, or 94 percent), suggesting substantial overlap in the summer home range of reproductive females and other individuals.

3.3. Numbers, Reproduction, and Distribution

3.3.1. Indiana Bat

Ibats are concentrated in relatively few hibernacula during the winter. Biennial winter surveys in 2017 estimated a total of 530,705 Ibats in 229 hibernacula in 17 states (USFWS 2017). Four states accounted for 96 percent of the total population estimate: Missouri (41.1%), Indiana (34%), Kentucky (11%), and Illinois (9.9%).

Emerging from hibernation, female Ibats disperse across a broad range in 19 States (Figure 3-1). Males are found during the summer throughout the range of the species, but most commonly in areas near known hibernacula (Gardner and Cook 2002). Males typically roost alone in the summer, but occasionally with maternity colonies. The Recovery Plan (USFWS 2007) reports 269 known extant maternity colonies in 16 states. Of these, 54 percent were discovered between 1997 and 2007, mostly using mist-netting surveys. Surveys continue to discover maternity colonies, but the Service has not compiled a range-wide tally since 2007. Using a 1:1 female/male sex ratio and an average maternity colony size of 60 adult females (see section 3.2.1), the 2017 winter survey population estimate yields an estimate of $530{,}705 \div (2 \times 60) = 4{,}423$ extant maternity colonies. The 269 Ibat maternity colonies known as of 2007 represents only 6 percent of this possible total.

The 2017 range-wide population estimate of 530,705 Ibats is a 3.5 percent decrease from the 2015 estimate of 550,224 bats (Figure 3-2). The biennial population estimates had been increasing from 2001 to 2007, suggesting that the species' long-term decline had been reversed (USFWS 2017). The decline since 2007 is likely attributable to WNS (see section 3.4 under "Threats"), especially in the Northeast Recovery Unit.

3.3.2. Northern long-eared bat

The range of the NLEB extends across much of the eastern and north central US (37 states), and all Canadian provinces west to the southern Yukon Territory and eastern British Columbia (Figure 3-3). Before the onset of WNS, the species was most frequently observed in the northeastern US and the Canadian Provinces of Quebec and Ontario. The species was less common in the southern and western portions of the range. The NLEB still occurs across much of the historical range, but with many gaps where the species is apparently extirpated or sparse due to WNS.

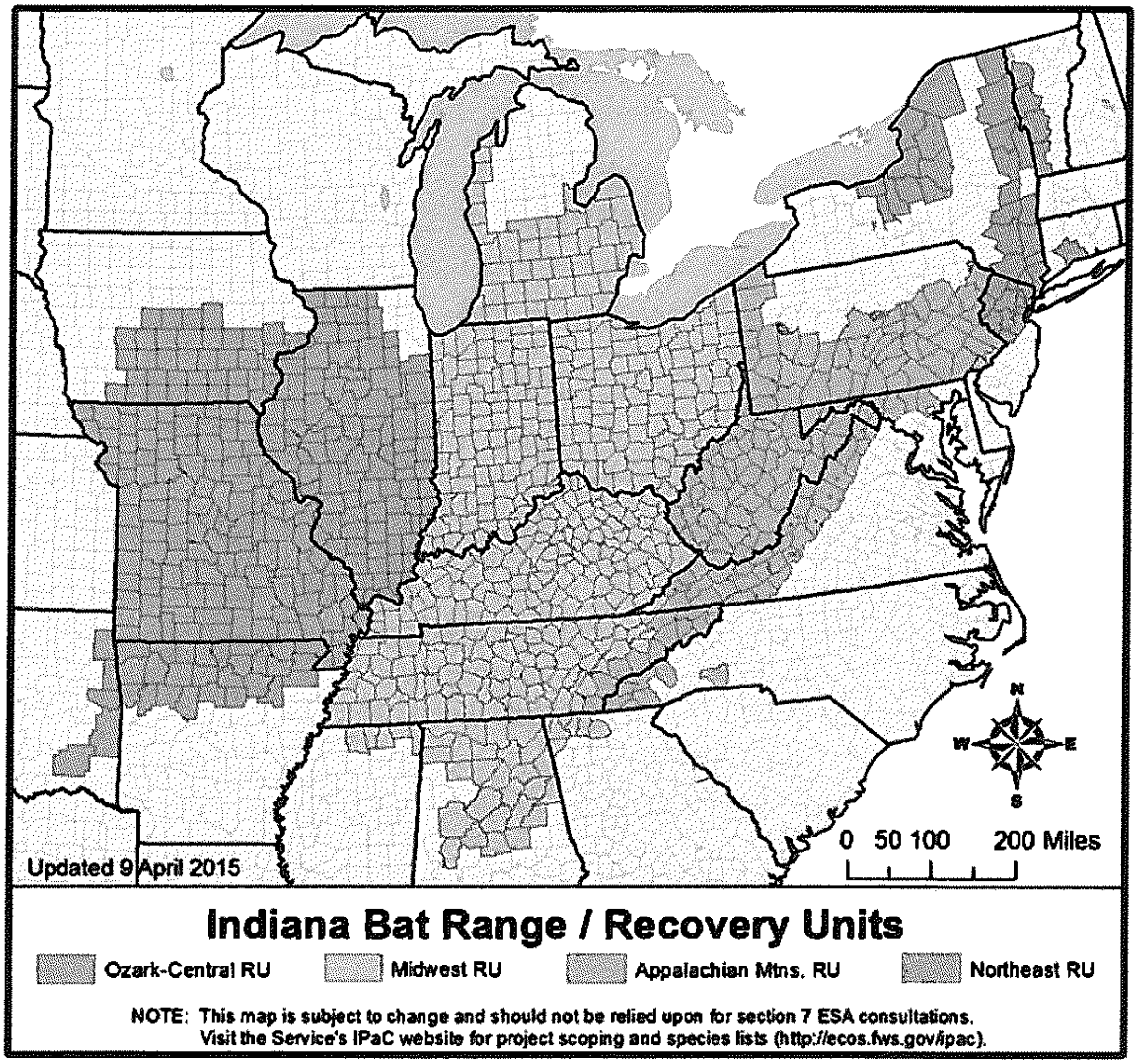

Figure 3-1. Range of, and Recovery Units for, the Indiana bat.

Most historical records of NLEBs are from winter hibernacula surveys (Caceres and Pybus 1997). The Service's "Programmatic Biological Opinion on Final 4(d) Rule for the Northern Long-Eared Bat and Activities Excepted from Take Prohibitions" (USFWS 2016) reported 1,508 known hibernacula in the United States, most in the eastern and mid-western portions of the US range. Even prior to WNS, surveys of many these hibernacula detected only a few individuals (Whitaker and Hamilton 1998). There are likely many more unknown hibernacula. The 2016 Biological Opinion also reported 1,744 known NLEB maternity roost trees in 19 US states. Prior to the introduction of WNS, the NLEB was considered common in the northern portion of its range, uncommon in the south, and rare in the west. Recent surveys in upland areas have revealed that this species is more common in Arkansas, Kentucky, Missouri, and Tennessee than indicated by previous work, which was focused primarily on detecting Ibats, and also more common in the Piedmont and Coastal Plain of North Carolina (NatureServe Explorer 2017).

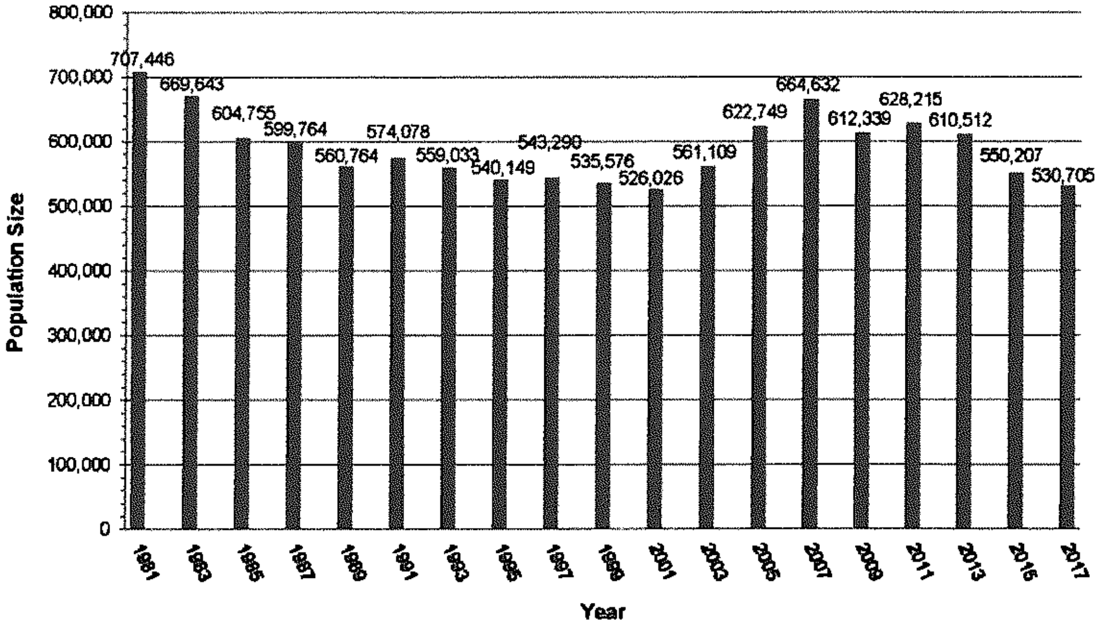

Figure 3-2. Indiana bat range-wide population estimates from 1981–2017 (source: USFWS 2017)

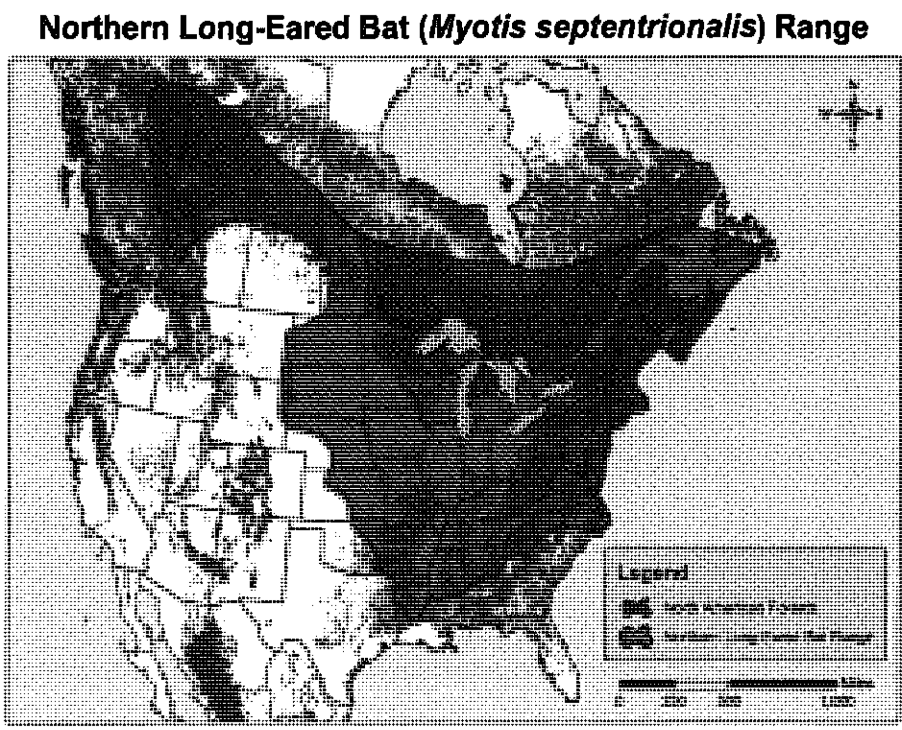

Figure 3-3. Range of the NLEB (Source: 80 FR 17976).

Hibernacula counts are the preferred census method for bats that hibernate. However, the NLEB uses many hibernacula, rarely in numbers greater than 300, is difficult to detect in hibernacula, moves between hibernacula during the winter, and most of its hibernacula are likely not known. Therefore, hibernacula counts are unlikely to provide a reliable metric for the species' range-wide abundance.

The 2015 final listing rule for the NLEB (80 FR 17979) summarized the limited abundance data available for each major region within the range, and noted that a range-wide population estimate for the species was not available at that time. The Service calculated a rough range-wide population estimate of about 6.5 million NLEB in the intra-Service BO for the final 4(d) rule that excepted various activities from take prohibitions (USFWS 2016). The Service based this estimate on the extent of forested habitat in the species range, observed detection rates in summer surveys, and the characteristics of summer NLEB colonies (e.g., home range size, number of individuals per colony). Although WNS continues to kill and weaken individuals in most of the species' range, NLEB populations may still number in the millions.

3.4. Conservation Needs and Threats

The conservation needs of and threats to the Ibat are discussed in detail in the 2007 Draft Recovery Plan (USFWS 2007) and the most recent 5-Year Review (USFWS 2009). These documents describe habitat loss and degradation, forest fragmentation, hibernacula disturbance and alteration, and environmental contaminants as the greatest threats to Ibats. The Draft Recovery Plan also identified collisions with wind turbines as an emerging threat. The Service has not yet approved a recovery plan for the NLEB.

In recent years, no other threat is more severe and immediate for the both the Ibat and NLEB than the disease known as white-nose syndrome (WNS). It is unlikely that NLEB populations would be declining so dramatically without the impact of WNS. Since first observed in New York in 2006, WNS has spread rapidly in bat populations from the Northeast to the Midwest and Southeast. NLEB numbers have declined by 99 percent in the Northeast, which along with Canada, was considered the core of the species' range. WNS-related declines in Ibat populations are estimated at up to 75 percent, with the disease recently moving into the Midwest core of the species' range. It appears likely that WNS will spread throughout most of the range of both species, and addressing the threat of WNS is their first and foremost conservation need. Additional information on WNS, which is constantly evolving, is available at http://whitenosesyndrome.org/.

The coastal plain of North Carolina is a possible refuge from the WNS epidemic for the NLEB. Studies using radio telemetry are revealing seasonal behavior that is different from other portions of the species' range. These coastal plain bats are not migrating to hibernacula in the fall (caves do not occur in this part of North Carolina), are active during most of the winter, and do not yet show any symptoms of WNS.

WNS is the clear cause of significant NLEB population declines and the recent downturn in Ibat numbers. However, other stressors that had no discernable population-level impacts previously, combined with the impact of the disease, could become factors influencing Ibat and NLEB probability of persistence in particular areas or regions. In general, smaller populations are more vulnerable to extirpation resulting from direct impacts or adverse habitat changes than larger populations, especially those that rely on colonial behaviors for critical life history functions. A single bat maternity colony, for example, reduced in size by WNS-related mortality and with the remaining individuals weakened by the disease, is much less likely to adapt to the loss or reduction of suitable roosting trees and foraging habitat in its traditional home range than a larger and healthier colony. Repeating this scenario with multiple colonies across a landscape could accelerate the population-level declines caused by WNS alone.

The USDA Forest Service summary of forest trends (USFS 2014) reported a decline in forest acreage from 1850 to the early 1900s. Thereafter, the conversion from forest to other land cover types was balanced with the conversion of other land cover types (mostly cropland) to forest through tree planting or old-field succession until 2001. From 2001 to 2006, the U.S. lost 1.2 percent of its total forest acreage, mostly in the southeast and west. Interior forest (40-acre parcels comprised of at least 90% forest cover) experienced a net loss of 4.3 percent.

The construction and operation of wind turbines represent an emerging concern for bat conservation, as bats appear particularly vulnerable to mortality and injury associated with the rotating turbine blades, either by collision or barotrauma (pressure-change injury). Ibat and NLEB mortality has been documented at multiple wind turbines installations. The Service is working with the wind industry to develop and implement measures that avoid and minimize the take of bats incidental to turbine operations, and to assess the magnitude of this threat.

Bats are sensitive to changes in temperature, humidity and precipitation (Adams and Hayes 2008), especially in their hibernacula. Climate change may affect bats through changes in food availability, timing of hibernation and reproductive cycles, frequency and duration of torpor, rates of energy expenditure, and rates of juvenile bat development (Sherwin *et al.* 2013). Clawson (2002) suggested that climate change may shift Ibats from southern to northern hibernacula. At this time, however, the Service has no evidence linking climate change to any population-level changes for either Ibats or NLEB. The rapid spread of WNS across the range of both species is likely to mask any effects of climate change on their status.

4. ENVIRONMENTAL BASELINE

This section is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the Ibat and the NLEB, their habitats, and ecosystem within the Action Area. The environmental baseline is a "snapshot" of the species' health in the Action Area at the time of the consultation, and does not include the effects of the Action under review.

4.1. Action Area Numbers, Reproduction, and Distribution

4.1.1. Indiana Bat

Figure 4-1 shows the outline of the TVA Region on a map of the range of the Ibat. About 64 percent of the 82-million acre TVA Region (52,947,795 acres) is within the Ibat's range, and that portion represents about 17 percent of the Ibat range. The 1.015-million acre Action Area is

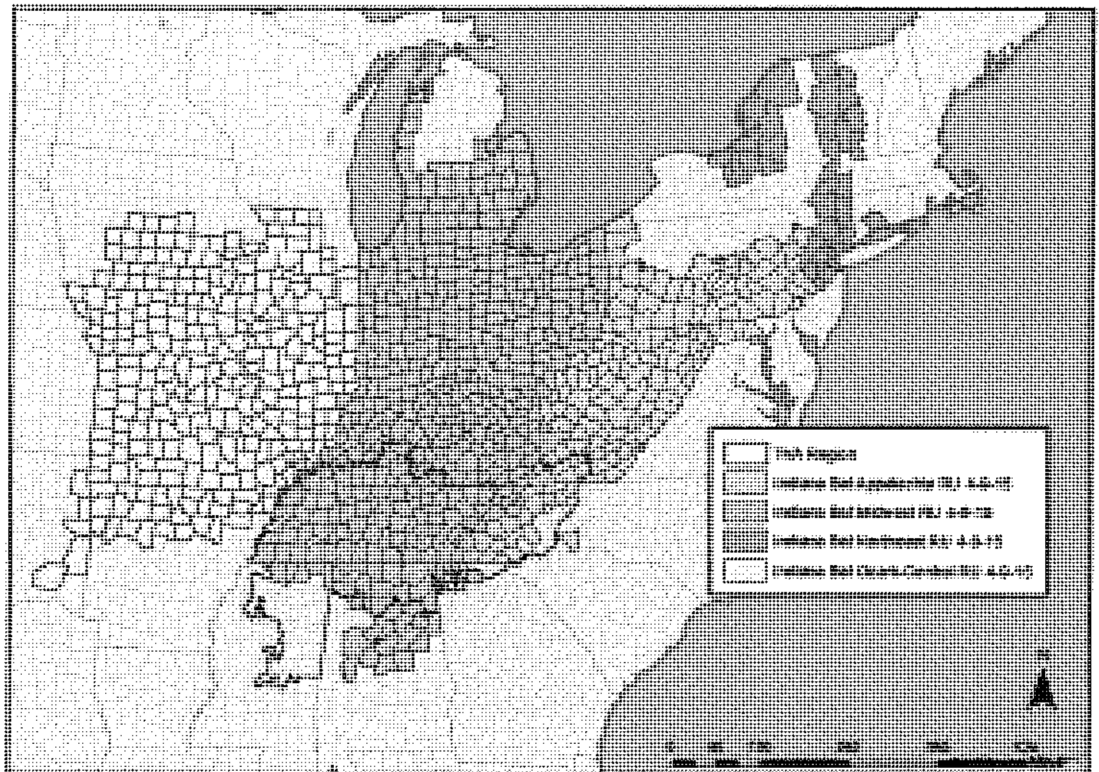

Figure 4-1. Range of the Indiana bat showing the TVA Region (source: BA Figure 4-1).

distributed throughout the TVA Region (see section 2.1); however, the BA does not partition the Action Area relative to the range of the Ibat. For purposes of describing the Ibat baseline and analyzing action-caused effects to Ibat in this BO, TVA proposes that we use the proportion of the TVA Region that is within the Ibat range (63.93 percent) as the proportion of the Action Area that is within the Ibat range (H. LeGrand, pers. comm., 2018b). We agree. This is a conservative approach that errs on the side of overestimating effects, because TVA anticipates that a disproportionate share of Action activity during the next 20 years will occur in portions of Mississippi that are outside the Ibat range.

TVA reports that 240,103 acres of the Action area are forested (see section 2.1). We assume that this forest cover is distributed uniformly or nearly so both within and outside the range of the Ibat; therefore, the distribution of forest cover within and outside the Ibat range is the same as the distribution of the Action Area as a whole within (63.93 percent) and outside the Ibat range. Forested acreage of the Action Area within the Ibat range is 0.6393 × 240,103 acres = 153,498 acres.

Figure 4-2 shows documented Ibat occurrence records within and near the TVA Region, including numerous hibernacula. Based on the 2013 winter surveys of hibernacula within the TVA Region, TVA reported (BA Table 4-2) that 25,434 Ibats (4.4 percent of the 2013 range-wide population) hibernated within the TVA region. Hibernacula counts provide the best census method for Ibat numbers (see section 3.3.1). Although adults disperse widely from hibernacula,

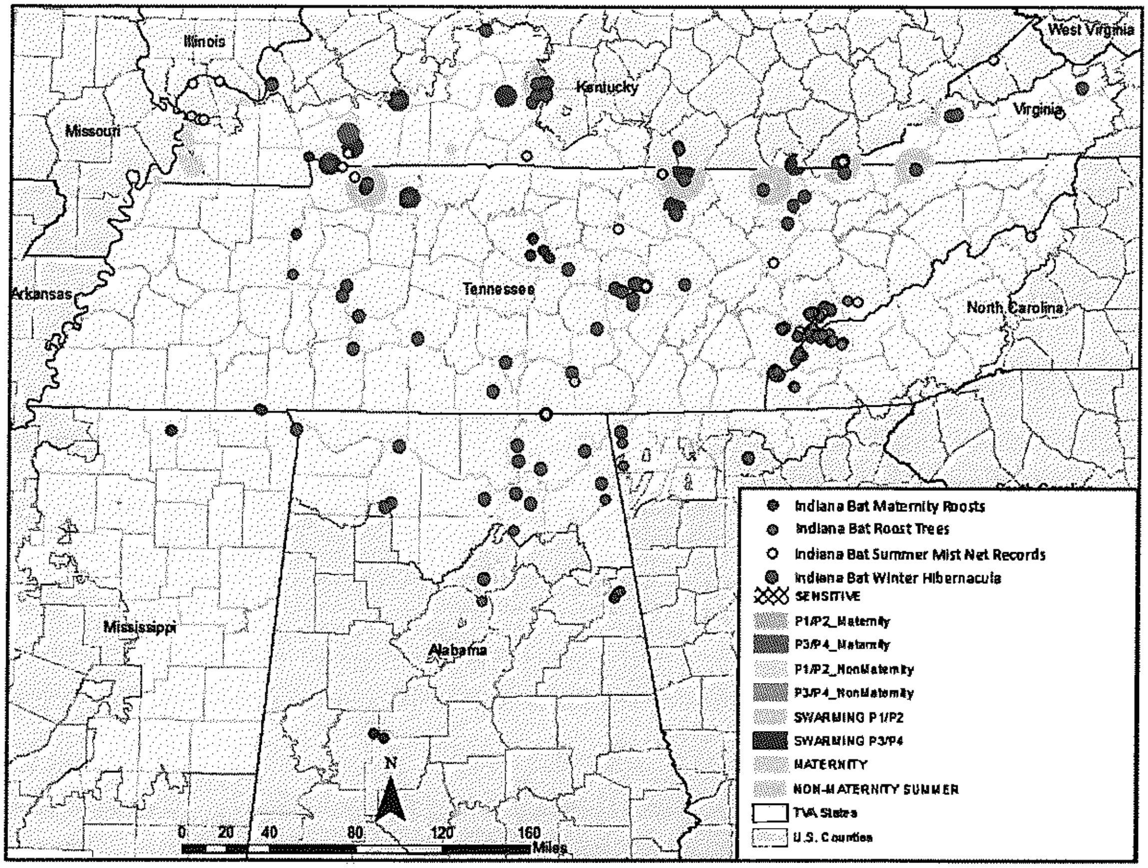

Figure 4-2. Documented occurrences of Indiana Bat in the TVA Region (source: BA Figure 4-2).

hibernacula counts are likely a reasonable approximation of Ibat numbers within the TVA Region. Ibat hibernacula are widely distributed in the portion of the Ibat range that is within the TVA Region and occur in every TVA state except Mississippi.

Hibernacula-specific counts from the 2015 or 2017 winter surveys, which each reflected a decline in range-wide total numbers relative to the previous biennial survey, are not yet compiled in a report that is available for use in this consultation. Therefore, for purposes of this consultation, we consider that the TVA region supports the same percentage observed for the 2013 range-wide census (4.4 percent) relative to the 2017 census total (530,705), or 23,244 adult Ibats. Assuming a 1:1 sex ratio, and 60 adult females per maternity colony (see section 3.2.1), the Ibats hibernating within the TVA Region would form about 194 maternity colonies ($23,244 \div (2 \times 60) = 194$).

As discussed in the first paragraph of this section, we assume that the Action Area and its forested acreage are uniformly distributed in the TVA Region. This means that the fraction of the Action Area that is within the range of the Ibat is same as the fraction of the Action Area in the TVA Region as a whole: 1.015 million acres in 82 million acres, or 1.226 percent. We do not assume that the Action Area supports a disproportional share (more or less) of the TVA Region's Ibat population. Therefore, the Action Area supports 1.226 percent of TVA Region's Ibat population, or 0.01226 × 23,244 = 285 adult Ibats. Assuming a 1:1 sex ratio, and 60 adult females per maternity colony, these bats would constitute about 2–3 colonies (285 ÷ (2 × 60) = 2.375), which we round up to 3 colonies.

The size of the area that all individuals belonging to an Ibat colony use for roosting and foraging is not reported in the literature. As we discussed in section 3.2.4, studies using radio telemetry tagging have estimated average *individual* Ibat summer home range sizes of 205–917 acres. Callahan (1993) reported a range of 0.81–1.48 km (0.5–0.9 mile) for minimum-radius circles that encompassed all roost trees of four Ibat colonies in MO, which corresponds to areas of 509–1,700 acres. The Service uses a radius of 2.5 miles around an Ibat summer survey detection to delineate the area in which the foraging and roosting activity of a maternity colony may occur. This corresponds to and area of 12,566 acres, which is several orders of magnitude greater than individual home range or the area encompassing documented roost trees reported in the literature. For purposes of this BO, we use 1,700 acres (the largest roost-tree area reported by Callahan 1993) as the area in which a single Ibat colony roosts and forages. Three non-sympatric Ibat colonies residing fully within the Action Area would occupy 3 × 1,700 = 5,100 acres. Forested habitat of the Action Area within the range the Ibat is about 153,498 acres (see second paragraph of this section). We expect that three Ibat colonies would occupy 5,100 ÷ 153,498 = 3.3 percent of the Action Area's forested habitat within the Ibat range.

Relatively narrow (75–200 feet) transmission line ROWs represent about 80 percent of the Action Area (see section 2.1), and the remainder is patchy and widely dispersed throughout the TVA Region (e.g., power plants, TVA reservoir lands). Therefore, it is unlikely that the home range of an Ibat maternity colony lies fully within the Action Area, except perhaps on TVA Reservoir lands. It is more likely that the Action Area overlaps a portion of the home range of several of the 194 Ibat colonies that we estimate may occur in the TVA Region based on hibernacula counts. However, it is still useful to treat the programmatic Action Area as a unit that we expect to support the equivalent of 3 whole Ibat maternity colonies.

4.1.2. Northern Long-Eared Bat

The TVA region lies at southern limits of, but entirely within, the broad range of the NLEB. Figure 4-3 (taken from the BA) shows documented NLEB hibernacula and summer detection records that are within and near the TVA Region. The BA states (pg. 104) that "occurrence data for maternity roost trees [are] not available for anywhere in the TVA Region." However, the Service reported a total of 387 known maternity roost trees for the six States that are partially within the TVA Region, and 50 for the State of Tennessee, which is wholly within the TVA Region (USFWS 2016, BO for the 4(d) rule; Table 2.1).

Hibernacula counts, such as those described previously for the Ibat, are not a reliable means of estimating NLEB population size, either range-wide or in the Action Area (see section 3.3.2). To estimate NLEB numbers, we must instead make inferences based on the extent of forested habitats, observed detection (occupancy) rates from summer surveys, and the characteristics of NLEB summer colonies. TVA reports that the 1.015-million acre Action Area contains 240,103

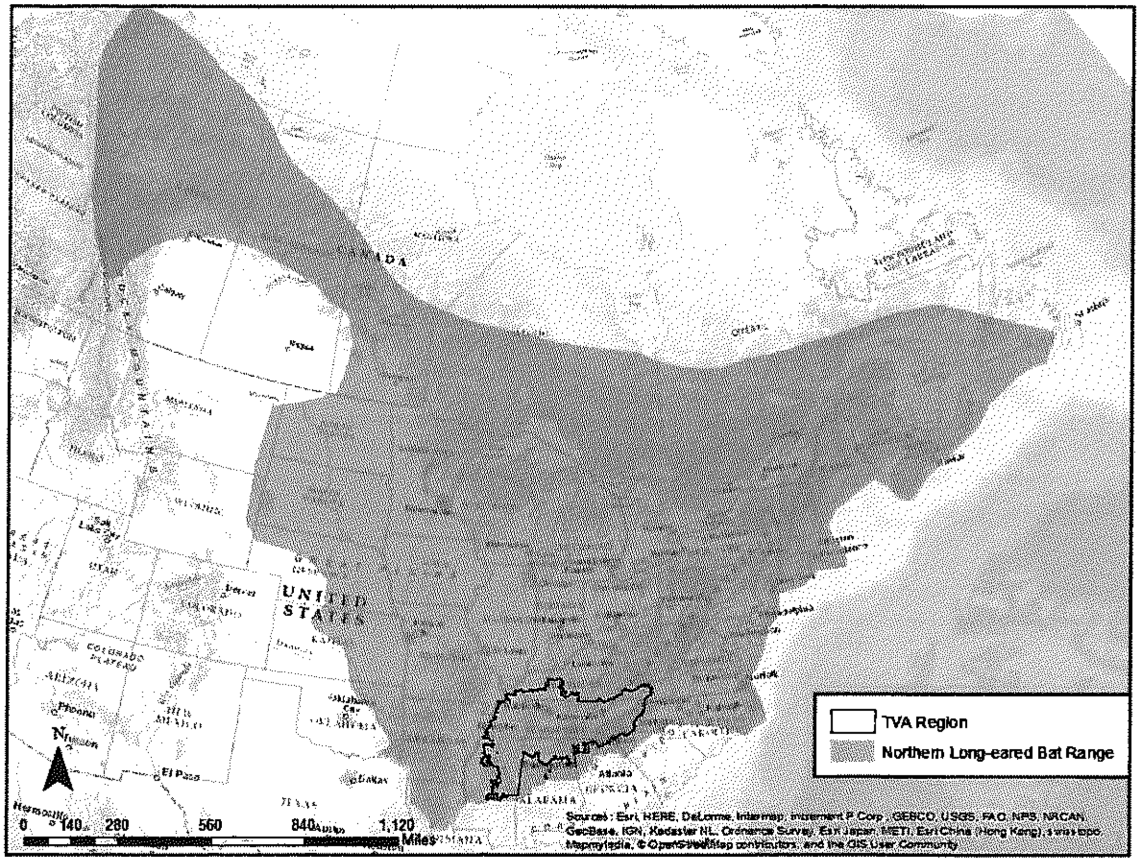

Figure 4-3. Range of the northern long-eared bat showing the TVA Region (source: BA Figure 4-3)

acres of forest cover (see section 2.1). The following paragraphs describe the occupancy rates and colony characteristics that we apply to this forest acreage to estimate NLEB numbers in the Action Area.

Occupancy Rates

The Service compiled data for post-WNS NLEB occupancy rates (percentage of survey sites in forested habitats that detected NLEB) in its 2016 BO for the 4(d) rule. Data for six of the seven TVA region states were either not available or available only from surveys on National Forests. Conditions on National Forests are not representative of the Action Area for this consultation, which is only 24 percent forested, and several of the Forests that provided data for the 2016 BO lie outside the TVA Region. Only Kentucky had occupancy data compiled from surveys conducted statewide, including the portion of the state within the TVA Region. The Service estimated the post-WNS NLEB occupancy rate from all 2013–2014 surveys in Kentucky as 14 percent (USFWS 2015a). The Service relied on this Kentucky occupancy estimate as best available data in evaluating the Tennessee Field Office's statewide bat conservation strategy (USFWS 2015b). Tennessee constitutes about half of the area of the TVA Region. Therefore, for purposes of this consultation, we also rely on the Kentucky-based estimate of 14 percent as the occupancy rate in the Action Area. We expect that the NLEB occupies 14 percent of the 240,103 forested acres of the Action Area, or 33,614 acres.

Estimated Number of NLEB Colonies

Summer home range includes both roosting and foraging areas, and range size may vary by sex. Studies of maternity roosting areas have reported sizes that vary from a mean of 21–179 acres (Owen *et al.* 2003; Broders *et al.* 2006; Lacki *et al.* 2009) to a maximum of 425 acres (Lacki *et al.* 2009). Foraging areas are six or more times larger (Broders *et al.* 2006; Henderson and Broders 2008). The distance traveled between consecutive roosts varies widely from 20 ft (Foster and Kurta 1999) to 2.4 miles (Timpone *et al.* 2010). Likewise, the distance traveled between roost trees and foraging areas in telemetry studies varies widely, e.g., a mean of 1,975 ft (Sasse and Perkins 1996) and a mean of 3,609 ft (Henderson and Broders 2008). Circles with a radius of these distances have an area of 281 and 939 acres.

Based on reported maximum individual home range (425 acres) and travel distances between roosts and foraging areas described above (corresponding to circular areas up to 939 acres), we use 1,000 acres for purposes of this BO as the area a NLEB colony uses. Within this 1,000-acre area, one or more members of a maternity colony and sympatric adult males/non-reproductive females would likely appear in mist net or acoustic surveys. Such appearance is the basis for the 14 percent occupancy rate we use to estimate the acreage of available forested habitat that we expect NLEB to use during the active season in the Action Area (33,614 acres).

The literature we have reviewed reports no information about the degree of spatial overlap between NLEB maternity colonies. We believe a 14 percent occupancy rate for the Action Area is appropriate; therefore, it is unlikely that limited habitat availability would contribute to substantial colony-range overlap in the Action Area. However, mist net survey data in Kentucky indicate that there is substantial overlap in the summer home range of reproductive females and that of males and non-reproductive females (J. Garland, pers. comm., 2015). Of 909 capture locations for males and non-reproductive females, only 87 (9.57 percent) did not have reproductively active females and were more than 3 miles away from captures of reproductive females. These data suggest a $100 - 9.57 = 90.43$ percent overlap between the home range of individuals belonging to maternity colonies and other individuals, which we adopt for use in this BO. Because the 14 percent occupancy rate includes detections of males and non-reproductive females, we multiply the occupied forest acres of the Action Area by 0.9043, and then divide by 1,000 acres to compute the number of probable maternity colonies in the Action Area:

33,614 occupied (both sexes) acres $\times$ 0.9043 = 30,397 acres; which supports
30,397 $\div$ 1000 = 31 maternity colonies (rounding up the fractional remainder).

Estimated Number of Individuals

For each 1,000 occupied acres of the Action Area, we assume the NLEB population associated with the single maternity colony that these acres support is comprised of 45 adult females, 45 adult males, and 45 juveniles following parturition (see section 3.2.1). Therefore, the active-season population associated with 31 colonies within the Action Area include $45 \times 31 = 1{,}395$

adult females, the same number of adult males, and the same number of juveniles after July 31 each year.

Relatively narrow transmission line ROWs represent about 80 percent of the Action Area (see section 2.1), and the remainder is patchy and widely dispersed throughout the TVA Region (e.g., power plants, TVA reservoir lands). As we discussed in the last paragraph of section 4.1.1 regarding Ibat colonies that we expect to occur in the Action Area, it is unlikely that the home range of 31 or more NLEB maternity colonies lie fully within the Action Area. It is more likely that the Action Area overlaps a portion of the home range of a larger number of colonies that occur in adjacent portions of the TVA Region. However, it is still useful to treat the programmatic Action Area as a unit that we expect to support the equivalent of 31 whole NLEB maternity colonies.

4.2. Action Area Conservation Needs and Threats

The conservation needs of and threats to the Ibat and NLEB in the Action Area are a regional subset of the range-wide needs and threats discussed in section 3.4. WNS is their greatest threat in the Action Area and eliminating this threat is their greatest conservation need. All seven states within the TVA Region have reported detecting the disease and fungus in hibernacula that are within the TVA region (https://www.fws.gov/midwest/endangered/mammals/nleb/pdf/WNSZone.pdf). The BA reports that TVA monitors caves on TVA-managed lands and cooperates with other agencies to monitor caves elsewhere in the TVA region. This monitoring tracks bat populations and the spread of WNS.

Sections 4.1.4 and 4.2.4 of the BA describe several ongoing TVA activities that support Ibat and NLEB conservation, including various studies, habitat management, artificial roosting structures, and installing bat-friendly cave gates.

5. EFFECTS OF THE ACTION

This section analyzes the direct and indirect effects of the Action on the Ibat and NLEB. Direct effects are caused by the Action and occur at the same time and place. Indirect effects are caused by the Action, but are later in time and reasonably certain to occur. Our analyses are organized according to the description of the Action in section 2, which lists tree removal (section 2.2) and prescribed burning (section 2.3) as the components of the Action that may affect the Ibat and NLEB that require this BO for ESA compliance purposes. For the reasons we discussed in section 2.4, we are unable to assess meaningfully the beneficial effects to bats resulting from the "additional conservation measures" that TVA describes as part of the programmatic Action. However, we acknowledge that these measures to some degree offset the adverse effects of tree removal and prescribed burning.

5.1. Effects Analysis Methods

In the two following activity-specific sections (5.2 Tree Removal, and 5.3 Prescribed Burning), we identify the stressors (alteration of the environment that is relevant to the two species) that each activity will cause based on the description of the proposed Action. We then review the best available science and commercial information about how individual Ibats and NLEBs are likely to respond to each stressor. Lastly, we identify the circumstances for an individual bat's exposure to each stressor (overlap in time and space between the stressor and an Ibat or NLEB, considering the proposed conservation measures), and estimate the amount or extent of individual responses at the Action Area scale. This section explains the methods we apply to the last step under each activity-specific analysis.

Estimating the Spatial Extent of Bat Exposure

TVA projects will affect about 100,000 acres annually within a 1.015-million acre Action Area that is not delineated in the BA, and this Action Area is distributed throughout the 82-million acre TVA Region (see section 2.1). The BA provides the maximum annual acreage, and the 20-year cumulative acreage, of various activities that may occur during seasons that are relevant to the bats' life history (see sections 2.2 and 2.3). Ibat and NLEB are not ubiquitous in the Action Area, and we do not assume that all Action activity will occur in occupied habitats. Instead, our effects analyses compute the expected degree of spatial overlap between activities and occupied areas as the product of two independent event probabilities within the same space. We multiply a total area by the percentage of the area that will receive an activity and by the percentage of the area that a species occupies. The resulting acreage is the expected overlap (intersection) between the activity and the species' occupied habitat.

The area for the NLEB analyses is the forested acreage of the entire Action Area, which is 240,103 acres, and the NLEB occupancy rate within this area is 14 percent (see section 4.1.2). The area for the Ibat analyses is the forested acreage of the Action Area within the Ibat range, which is 153,498 acres (63.93 percent of the full Action Area), and the Ibat occupancy rate within this area is 3.3 percent (see section 4.1.1). For the Ibat analyses, we prorate the acreage of activities according to the percentage of the Action Area that is within the Ibat range (63.93 percent). Table 5-1 shows these calculations for tree removal activity. Such proration of the acreage of activities is not necessary for the NLEB analyses, because the range of the species encompasses the entire Action Area.

Table 5-1. Estimated acreage of seasonal tree removal activity that is within the range of the Ibat (63.93 percent of the total Action Area acreage from Table 2-1).

Years	Inactive Season[a]	Active Season; All Bats Volant[b]	Active Season; Pups Non-Volant[c]	Total
Annual 2018-2021	1,258	557	589	2,403
Annual 2022-2037	810	277	198	1,285
Cumulative 2018-2037	17,990	6,667	5,516	30,172

[a] Mid-November to mid-March

[b] Mid-March to April 30, and August 1 to mid-November

[c] June and July

Table 5-2 shows the amount of seasonal tree removal activity that will occur in the Action Area expressed as a percentage of the total amount of forested acreage (240,104 acres) in the Action Area. These percentages apply to both the Ibat and NLEB analyses, because we have prorated both the amount of tree removal activity and the amount of forested acreage within the range of the Ibat by the same fraction (63.93 percent).

Table 5-2. Seasonal tree removal activity expressed as a percentage of the total acreage of forest cover within the Action Area (240,103 acres within NLEB range, and 153,498 acres within Ibat range).

Years	Inactive Season[a]	Active Season; All Bats Volant[b]	Active Season; Pups Non-Volant[c]	Total
Annual 2018-2021	0.82%	0.36%	0.38%	1.57%
Annual 2022-2037	0.53%	0.18%	0.13%	0.84%
Cumulative 2018-2037	11.72%	4.34%	3.59%	19.66%

Estimating Numbers of Bats Exposed

Our analyses examine effects to Ibats and NLEBs while they are in their day-time roost trees, which constitute a tiny fraction of the total number of trees in the forested habitats they use for foraging and travel during the spring, summer, and fall. The broadly defined Action Area and programmatic nature of this consultation precludes any attempt to estimate effects at the scale of roost trees, or to partition the effects of Action activities between areas that contain roosts for pregnant females, solitary males, fall swarming, spring staging, etc. A substantial majority of the available data on Ibat and NLEB home range describes summer habitat and roost characteristics; therefore, we use summer home range and roost characteristics to represent the possible intersection between Action activities and the bats' active-season occupied habitats.

Although male Ibats generally remain closer to hibernacula during the active season than females (see section 3.2.1), we cannot attempt separate effects analyses for males and females without a partitioning of the Action Area relative to known Ibat hibernacula. NLEB migrate shorter distances from hibernacula than Ibats, and both sexes are frequently observed in the same summer habitats (see section 3.2.4). Therefore, we include both Ibat and NLEB adult males in an analysis based on maternity colony characteristics, recognizing that maternity colonies may occur in areas that are both close to and far from known hibernacula. Projects located closer to Ibat hibernacula would likely affect a higher percentage of Ibat males and cause fewer effects to pups, and vice versa for projects located farther from hibernacula.

We estimate numbers of bats affected in the expected area of overlap between Action activities and occupied habitats as the product of:

(a) the overlap area;
(b) the density of bats in a maternity colony home range, including sympatric males and non-reproductive females; and
(c) an expected response rate.

For adult Ibats, the density under (b) above is 60 females and 60 males in 1,700 acres, or 120 ÷ 1,700 = 0.0706 bats per acre (see section 4.1.1). Following the birth of up to 1 pup per adult female during the active season, this density increases to a maximum of 180 ÷ 1,700 = 0.1056 bats per acre. The density we use for NLEBs is 45 females and 45 males in 1,000 acres, or 90 ÷ 1,000 = 0.090 bats per acre (see section 4.1.2). Following the birth of up to 1 pup per adult female during the active season, this density increases to a maximum of 135 ÷ 1,000 = 0.135 bats per acre. The response rates we use under (c) above are stressor and life-stage specific. We explain the basis for the response rates we use in the discussion for each stressor caused by tree removal and by prescribed burning.

5.2. Tree Removal

In section 5.2 we examine the direct and indirect effects on Ibat and NLEB of the proposed tree removal associated with various routine activities over the next 20 years. Section 5.2.1 reviews best available data about stressors associated with tree removal and the responses of bats to these stressors. Section 5.2.2 provides our estimation of the amount or extent of bat exposure to these stressors caused by the Action. In this introduction to section 5.2, we first dismiss from further analysis potential stressors that are not likely to have measurable or detectable effect on bat numbers, reproduction, or distribution.

TVA determined that its BMPs and other conservation measures for protecting water quality during tree removal operations would reduce the introduction of sediments and contaminants to drinking water sources to levels that are not likely to adversely affect listed bats. The Service previously concurred with this determination relative to the gray bat, Virginia big-eared bat, and Ibat critical habitat (see section 1). We also concur with this determination relative to the Ibat and NLEB (see section 2.2.2; discussion under "Sedimentation, Spills, Pollutants, and Contaminants"). Therefore, we do not further address changes in water quality resulting from tree removal as a stressor to bats.

The removal of substantial amounts of forest cover may reduce the local availability and quality of foraging habitat for the Ibat and NLEB. However, analyzing such effects that projects implemented under this programmatic Action may cause is not feasible, because we have no data on the availability or quality of forest cover at the project scale. Further, we estimate that the Ibat and NLEB occupy only 3.3 and 14 percent, respectively, of all forest cover at both the Action Area and TVA Region scales; therefore, it is unlikely that foraging habitat is limiting for these species at these scales. In this BO, we assume that the individuals associated with Ibat and NLEB summer colonies forage and roost in an area of about 1,700 and 1,000 acres, respectively (see sections 4.1.1 and 4.1.2). Maximum annual tree removal under the Action is 3,759 acres (section 2.2.1). This tree removal will occur on multiple projects distributed throughout the 1.015-million acre Action Area. We consider the potential for a project under this Action to cause a measurable or detectable response by Ibat or NLEB individuals through reducing the availability or quality of foraging habitat as negligible. Therefore, we do not further address the effects of tree removal on bats via exposure to changes in foraging habitat availability or quality.

The conservation measures that TVA proposes to implement for tree removal activity (see section 2.2.2) include a general prohibition for tree removal near known Ibat and NLEB hibernacula. Specially, measure TR2 states:

> "Removal of suitable summer roosting habitat within 0.5 mile of Priority 1/Priority 2 Indiana bat hibernacula, or 0.25 mile of Priority 3/Priority 4 Indiana bat hibernacula or any northern long-eared bat hibernacula will be prohibited, regardless of season, with very few exceptions (*e.g.*, vegetation maintenance of TL ROW immediately adjacent to Norris Dam Cave, Campbell County, TN)."

We believe this measure limits the severity of any effects of tree removal on the microclimate of hibernacula, and on any bat individuals hibernating within, to insignificant levels. Therefore, we do not further address the direct or indirect effects of tree removal under this Action on bats in hibernacula.

Two of TVA's proposed conservation measures address the removal of trees that are documented as Ibat or NLEB roost trees (TR6) or are within 150 feet of documented roost trees (TR5) (see section 2.2.2). If documented roosts are present or within 150 feet of a tree-removal project area, these measures commit TVA to a site-specific review and assessment. If pups are present in trees planned for removal, these measures also commit TVA to coordination with the Service in determining how to "minimize impacts to pups to the extent possible" (BA pg. 117).

Although the Service supports these measures, we have no ability to assess their effectiveness at reducing impacts at the scale of this programmatic Action. The BA does not identify or tally the number of documented roost trees that are within the Action Area. Because the Action Area is not specifically delineated, we are unable to determine whether the Action may affect any particular documented roosts. Therefore, we acknowledge the potential benefits of these measures in project-level implementation of the Action, but do not attempt to estimate the extent to which they may avoid or minimize adverse effects of tree removal in the following analyses.

Six other proposed conservation measures for tree removal (TR1, 3–4, and 7–9) either relate to tracking and reporting tree removal activity or prescribe general conditions that may or may not reduce potential adverse effects (e.g., TR7, which limits tree removal within 100 feet of existing transmission ROWs to hazard trees). The tracking and reporting measures are appropriate components of this programmatic Action, but do not change the effects of the Action. For the remaining measures, we are unable to estimate the degree to which they may change the effects of the Action, and do not further consider them in the following analyses.

5.2.1. Stressors and Responses

The BA describes three primary stressors associated with the proposed tree removal activity: (1) noise and disturbance during removal operations; (2) loss of shelter (roost trees); and (3) introduction of sediments and contaminants to drinking water sources. We have dismissed #3 from further analysis (see section 5.2), but we agree that (1) and (2) are environmental changes caused by tree removal that are relevant to the Ibat and NLEB.

Noise/Disturbance

The people, chainsaws, and heavy equipment involved in tree removal generate noise and disturbance. During the active season for bats, this disturbance could cause volant bats to temporarily flee or permanently abandon roosts during the day, which is a disruption of normal behavior. Gardner *et al.* (1991b) reported that Ibats continued to roost and forage in an area with an active timber harvest. Callahan (1993) monitored the location of a primary roost by evening exit counts, which Ibats abandoned at some point during an 18-day gap between successive counts. Also at some point during that 18-day gap, a bulldozer started clearing brush adjacent to the tree, which Callahan noted as the likely, but not confirmed, cause of the roost abandonment.

Adult females that permanently abandon a roost with non-volant nursing pups would cause the death or injury of these pups. Although Ibats are known to carry pups between roosts, such movement increases the likelihood of injury. Regardless whether pups are present, the additional energy expenditure that flight away from disturbance causes is an adverse effect, and day-time flight is an alteration of normal nocturnal behavior.

Mikula *et al.* (2016) reviewed about 1,500 reports from 109 countries of attacks by 143 species of diurnal birds on 124 species of bats. The review compiled cases involving species from several bat taxonomic families. The family Vespertilionidae, to which the genus *Myotis* belongs, represented 22.8 and 58.8 percent of the cases of bats taken by raptors of the hawk and falcon families, respectively, and 77 percent of the bats taken by non-raptors (e.g., gulls, crows). Citing data from other studies, the authors surmised that the diurnal predation rate on bats is likely 100–1,000 times higher than the nocturnal predation rate when standardized relative to the duration of day versus night bat activity. The authors concluded that the reports and studies they reviewed strongly suggest that predation by birds restricts daytime activity in bats and is likely a major factor that contributed to the evolution of their generally nocturnal behavioral patterns.

About half of the forecast 20-year cumulative tree removal activity under this Action will occur within the narrow ROWs of power lines (see Table 2-1). Noise and disturbance will move with these operations along the length of the ROW, such that the duration of high sound and activity levels at any one location is brief. We believe it is unlikely that brief periods of noise and disturbance during daylight hours would cause females to permanently abandon roosts containing their non-volant pups, but noise, vibration, and machinery exhaust sufficiently close to roosts it may temporarily flush a percentage of volant bats. Despite the evidence of no such response in Gardner *et al.* (1991b) cited above, we conservatively estimate in this BO that 10 percent of volant bats exposed to daytime tree removal disturbance will fly to an alternate roost located away from the disturbance. The results of Mikula *et al.* (2016) summarized above support a finding that such disruption of diurnal sheltering behavior increases the likelihood of injury through predation by diurnal predators, which is consistent with the definition of incidental take in the form of harassment.

Roost Tree Loss – Direct Effects

Ibats and NLEBs use a network of multiple roost trees within their home range, and show fidelity to roosts used in previous years (see section 3.2.1). However, trees are an ephemeral resource, especially the trees preferred for roosting, which are typically dead or dying, with cavities, crevices, exfoliating bark, and other characteristics of senescence or poor health. Despite the observed use of the same roosts between years, both species must seek new roosts as necessary when traditional roost trees inevitably fall. Potential bat responses to roost loss, caused by natural factors or felling by humans, depends on when the loss occurs during the annual life cycle: (a) when non-volant pups (or adults in torpor) are present in the tree; (b) other times during the active season; or (c) during the inactive (hibernation) season. Removal of an occupied roost tree during the spring, summer, or fall has direct and immediate effects. Removal of an unoccupied roost tree has indirect (later in time) effects, which we discuss in the following sub-section.

Due to their small size, it is extremely unlikely to detect an Ibat or NLEB killed or injured by tree felling in a forested setting. The literature we have reviewed contains no reports of NLEB mortality resulting from roost tree removal. In the biological opinion for the NLEB 4(d) rule (USFWS 2016: pg. 38), the Service summarized three accounts of Ibat injury and mortality resulting from tree removal, which we quote here.

> "Cope *et al.* (1974) reported the first felling of an occupied Indiana bat maternity roost tree in Wayne County, Indiana. The landowner observed bats exiting the tree when it was bulldozed down. The original account stated that eight bats (2 adult females and 6 juveniles) were "captured and identified as Indiana bats," and that about 50 bats flew from the tree. Although the original account did not specify how the eight bats were captured, J. Whitaker (Indiana State University, pers. comm., 2005) recounted that those bats were killed or disabled, retrieved by the landowner, and subsequently identified by a biologist. In another case, Belwood (2002) reported on the felling of a dead maple in a residential lawn in Ohio. One dead adult female and 33 non-volant young were retrieved by the researcher. Three of the young bats were already dead when they were picked up, and two more died subsequently. The rest were apparently retrieved by adult bats that had survived. In a third case, 11 dead adult female Indiana bats were retrieved (by people) when their roost was felled in Knox County, Indiana (J. Whitaker, pers. comm., 2005)."

All three of these accounts document adult bat mortality. Two document juvenile mortality, two document adult survival, and one documents juvenile survival. Of the two documenting adult survival, apparently far more adults survived than were killed, and more juveniles survived than were killed in the Belwood case. The juvenile survival rate in the Belwood case was apparently high (5 died out of 33 retrieved, and the rest were apparently carried away by adults). This case from a residential lawn is the only available data on juvenile bat survival/mortality rates following roost tree removal. However, we believe it is not representative of tree felling in forested settings, where the ability to detect, retrieve, and place pups where adult bats may find them and carry them away is likely negligible.

For purposes of this consultation, we conservatively assume that removal of an occupied roost will harm (kill or injure) all non-volant pups present. We also assume that roost removal will either harm or harass all volant bats present. Cutting an occupied roost tree may cause some to fly away before the tree falls and crush some when the tree falls, but will cause all volant survivors to seek an alternate roost after the tree falls. Expelled from their roost, survivors are exposed to diurnal predators and other hazards until finding alternate shelter. For simplicity, and to avoid underestimating lethal effects, we treat these two responses to tree removal (immediate death/injury *vs.* displacement that creates the likelihood of injury) as a single effects pathway, to which we attribute a 100 percent harm response.

Roost Tree Loss – Indirect Effects

The effects of removing a roost tree while it is unoccupied depend on how individual Ibats and NLEBs use that tree at other times, whether as a maternity roost, an alternate summer roost, or a roost during spring staging or fall swarming. Removal of a primary maternity roost likely has the greatest impact, but the loss of any previously established roost causes bats to spend time and energy seeking a new roost that meets their requirements in that area.

Ibats and NLEBs form summer maternity colonies that exhibit "fission-fusion" behavior (Barclay and Kurta 2007; Garroway and Broders 2007). Members coalesce to form a group (fusion), but the composition of the main unit is dynamic. Individuals exit the main unit for solitary roosting or to form smaller roosting groups (fission), and later return to the main unit, which may sometimes move to another roost. Ibats and NLEBs switch roosts often, typically every 2–3 days (Kurta *et al.* 2002; Kurta 2005; Foster and Kurta 1999; Owen *et al.* 2002; Carter and Feldhamer 2005; Timpone *et al.* 2010). Several researchers interpret these behaviors as a an adaption to the ephemeral nature of tree roosts, whereby bats proactively seek and test the suitability of new roost trees in preparation for the eventual loss of the primary and secondary roosts they previously and currently use (Kurta *et al.* 2002, Carter and Feldhamer 2005, Timpone *et al.* 2010).

Because Ibats and NLEBs rely on previously established roosts, roost tree loss, regardless whether it occurs during the active or inactive (winter) seasons, may affect the fission-fusion dynamics of their maternity colonies. Kurta (2005) suggested that loss of a single alternate roost at any time of year probably has little impact on Ibats, because Ibat colonies use at least 8–25 alternate summer roosts, but that loss of a primary roost could disrupt colony social structure. Sparks *et al.* (2003) found that the natural loss of a single primary maternity roost led to the fragmentation of the colony (bats used more roosts and congregated less) following the roost loss. Because colonial behavior contributes to reproductive success (see section 3.2.1), colony fragmentation could reduce the colony recruitment rate (survival of offspring to sexual maturity).

Silvis *et al.* (2014a) studied the social dynamics of an Ibat colony located in central Ohio for two years using telemetry methods. These investigators represented the observed roosting networks in a mathematical model and then simulated the effects of roost removal. Results varied between the models of each year's networks. The probability of colony fragmentation exceeded 50 percent with the simulated removal of only 5 percent of the roosts using the 2009 network data, but with the simulated removal of 30 percent of the roosts using the 2010 network data. In both years, simulated removal of the primary roost resulted in fragmentation. The advantages of colonial behavior are reduced or lost when a colony fragments. However, colony fragmentation is probably also a necessary dispersal adaptation to the inevitable loss of ephemeral roosts. The authors of this study concluded: "As the ephemerality of roost trees likely cause Indiana bat maternity colonies to experience frequent roost loss, including that of primary roosts, fission-fusion dynamics may provide a mechanism for the formation of new maternity colonies by presenting opportunities for the colony to split."

At Fort Knox in Kentucky, Silvis *et al.* (2014b) tracked three maternity colonies of NLEB to evaluate their social and resource networks, *i.e.,* roost trees. Roost and social network structure differed between maternity colonies, and roost availability was not strongly related to network characteristics or space use. In model simulations based on the tracking data, removal of more than 20 percent of roosts initiated social network fragmentation, with greater loss causing greater fragmentation. The authors suggested that flexible social dynamics and tolerance of roost loss are adaptive strategies for coping with ephemeral conditions in dynamic forest habitats.

In the same Fort Knox study area with the same three NLEB maternity colonies, Silvis *et al.* (2015) removed (during winter) a primary maternity roost tree from one colony, 24 percent of the secondary roosts from another colony, and none from the third. Neither removal treatment altered the number of roosts used by individual bats the following active season, but secondary roost removal doubled the distances moved between sequentially used roosts. The overall location and spatial size of colonies was similar pre- and post-treatment. Patterns of roost use before and after removal treatments also were similar. Roost height, diameter at breast height, percent canopy openness, and roost species composition were similar pre- and post-treatment. The study did not investigate pre- and post-treatment reproductive success. NLEB use a wide range of tree species and sizes as roosts, and potential roosts were not limited in the treatment areas.

The studies summarized above suggest that colony fragmentation is a likely later-in-time Ibat response to the loss of a primary roost tree and to the loss of a sufficient percentage of alternate roost trees. Colony fragmentation, or delayed colony formation upon returning from hibernation to an altered colony home range, could reduce recruitment rates. Such reduction is consistent with the definition of incidental take in the form of harm, but no studies have yet investigated this indirect effect on either Ibats or NLEBs. Experimental results of roost tree removal during winter from two NLEB colonies did not document fragmentation, but loss of secondary roosts doubled the distances individuals travelled between roosts, and effects on reproductive success were not investigated. Therefore, available evidence indicates that, at minimum, the later-in-time Ibat and NELB response to roost tree loss is an increased energy expenditure to establish a new roost network, and that this increase is likely proportional to the fraction of home range roost trees removed. Although studies have focused on summer maternity habitats, it is reasonable to assume that loss of roosts in spring staging and fall swarming habitats also causes an increased energy expenditure. Whether this response to habitat modification actually reduces survival or reproductive success is uncertain.

Service policy regarding significant gaps in the best available data is to either:

- "extend the due date of the biological opinion until sufficient information is developed for a more complete analysis" (if the action agency agrees); or
- "develop the biological opinion with the available information giving the benefit of the doubt to the species" (USFWS and NMFS 1998: pg 1-6).

The need to determine whether, and to what degree, roost tree removal reduces survival or reproductive success is not unique to this consultation. Further, studies that could address this data gap are not feasible within a time frame that would serve TVA's ESA compliance obligations for the activities included under this programmatic Action. Therefore, in this BO we give the "benefit of the doubt" to the listed species by treating the removal of unoccupied roost trees as a habitat modification that may injure Ibats and NLEBs by significantly impairing their essential breeding or sheltering behaviors, *i.e.,* incidental take in the form of harm.

The increased energy expenditure caused by the removal of unoccupied roosts is likely proportional to the number of roosts an individual bat lost, the type of roost (a primary maternity roost, an alternate social roost, or a solitary roost), and other factors. Whether the time and energy spent seeking replacement roosts actually injures a bat (e.g., causes reproductive failure) likely depends on the availability of suitable roosts, the individual's condition (e.g., fat reserves depleted by hibernation and migration, suffering from WNS, etc.), and other factors. These factors are variable and will not always combine in a manner that causes injury. For this BO, we limit the injury caused by unoccupied roost removal, regardless of season, to adult females, and we use an injury rate of 10 percent to estimate numbers of bats responding to this stressor in this manner.

5.2.2. Estimation of Exposure and Numbers of Bats Affected

Section 5.2.1 identified noise/disturbance, direct physical trauma, and the loss/reduction of shelter (roost trees) as stressors caused by tree removal that are relevant to Ibat and NLEB individuals. We identified the bat responses to these stressors as: (1) fleeing noise/disturbance; (2) death or injury (removing occupied roost trees); and (3) reduced survival or reproductive success (removing unoccupied roost trees). We identified the response to disturbance as a disruption of diurnal roosting behavior that creates the likelihood of injury thorough predation (harassment), with an expected 10 percent response rate upon exposure (*i.e.*, 10 percent will flee; 90 percent will not). We identified the response to unoccupied roost tree removal as a reduction in reproductive success (harm), with expected 10 percent response rate upon exposure (*i.e.*, 10 percent will fail to raise a pup to volancy). Although some bat pups and volant bats may survive the felling of an occupied roost tree, we assume a 100 percent lethal/injurious (harm) response rate to such exposure. Ibat and NLEB exposure to the three stressors depends on the timing and location of tree removal relative to their home ranges within the Action Area.

TVA does not specify the locations for tree removal activity under this programmatic Action. Instead, the BA provides annual and 20-year cumulative acreages for tree removal that will occur in the 1.015-million acre Action Area, and specifies the seasonal timing for these acreages (see Table 2-2). Conducting 60 percent of the 20-year cumulative tree removal during the inactive season limits the direct impacts of noise and physical trauma to 40 percent of the acreage affected by this activity. Proposed conservation measures that may further limit the extent of exposure to the stressors caused by tree removal include (paraphrased):

- TR2 – With few exceptions, prohibiting the removal of suitable summer roosting habitat within 0.5 mile of P1/P2 Ibat hibernacula, and within 0.25 mile of P3/P4 Ibat hibernacula or any NLEB hibernacula.
- TR5 and TR6 – Requiring a site-specific review and assessment before removing a known Ibat or NLEB maternity roost tree, or any trees within 150 feet of a known Ibat or NLEB maternity roost tree, during the active season. If pups are present in trees planned

for removal, TVA will coordinate with the USFWS to determine how to minimize impacts to pups.

Table 5.3 provides our estimates of the numbers of Ibats and NLEBs that we expect tree removal activity to affect. For each stressor and corresponding life-stage-specific response, the table provides data for the expected spatial overlap between seasonal tree removal activity and occupied areas, bat densities in occupied areas, and the expected bat response rate, to calculate bat numbers affected, and the corresponding percentage of the Action Area total population affected. Three sets of seasonal tree removal activity are used in these calculations: (1) Annual 2018–2021; (2) Annual 2022–2037; and (3) Cumulative 2018–2037. These sets correspond to the description of the Action, which estimates a higher acreage of tree removal during the first 3 years than in the remaining 17 years, and the 20-year total acreage.

5.3. Prescribed Burning

In section 5.3, we examine the direct and indirect effects on Ibat and NLEB of the proposed prescribed burning on TVA lands over the next 20 years. Section 5.3.1 reviews best available data about stressors associated with prescribed burning and the responses of bats to these stressors. Section 5.3.2 provides our estimation of the amount or extent of bat exposure to these stressors caused by the Action. In this introduction to section 5.3, we first dismiss from further analysis potential stressors that are not likely to have measurable or detectable effect on bat numbers, reproduction, or distribution.

TVA determined that prescribed fire under this Action is not likely to adversely affect listed bats when they are within caves and mines documented as hibernacula or as active-season roosts. The TVA burning program prohibits prescribed fire within 0.25 mile of the entrances to such sites and other measures that limit the potential for smoke entering caves and mines that bats occupy (see section 2.3.2). The Service previously concurred with this determination relative to the gray bat, Virginia big-eared bat, and Ibat critical habitat (see section 1). We also concur with this determination relative to the Ibat and NLEB. Therefore, we do not further address in this BO the effects of prescribed burning on bats via exposure to smoke in hibernacula.

Prescribed fire may have both beneficial and adverse effects on the availability of suitable tree roosts and prey resources, which some of the literature we reviewed for the following section describes. However, we believe the scale of the TVA prescribed burning program, which will rarely exceed 1,500 acres annually (see section 2.3) on 26,247 acres of TVA Reservoir Lands (5.7 percent), is unlikely to have a measurable or detectable effect on the availability of roost tree or prey resources for the Ibat or NLEB colonies that may occupy these lands. Further, several of the TVA burning objectives listed in Table 2-3 are to maintain an early-successional seral stage, which is not Ibat and NLEB habitat.

Table 5-3. Estimated numbers of bats affected by tree removal.

Stressors -->	Noise/ disturbance	Physical trauma		Reduction of shelter resource
Stressor type	Direct	Direct	Direct	Indirect
Exposure period	Entire active season	Pup season	Entire active season	Year round
Life stage affected	Volant bats	Pups	Volant bats	Adult females
Individual Response	Flight to alternate roost (harassment)	Death or injury (harm)	Death or injury (harm)	Reduced reproduction (harm)
A. Response rate (section 5.2.2)	10%	100%	100%	10%
B. Percent of forest cover affected (from Table 5-2)				
Annual 2018-2021	0.75%	0.38%	0.75%	1.57%
Annual 2022-2037	0.31%	0.13%	0.31%	0.84%
[redacted]				
D. Total Action Area Forested Acres (section 2.1)				
Ibat		153,498		
[redacted]				
F. Bat density in occupied areas (section 5.1)				
# Ibat/acre	0.0706	0.0353	0.0706	0.0353
[redacted]				
H. Percentage of Action Area bats affected (G/H)				
Ibat (H=360 adults, or 180 pups, as applicable)				
Annual 2018-2021	0.28%	0.56%	0.83%	0.28%
Annual 2022-2037	0.28%	0.56%	0.56%	0.28%
Cumulative 2018-2037	0.83%	3.89%	8.06%	1.11%
NLEB (H=2,790 adults, or 1,395 pups, as applicable)				
Annual 2018-2021	0.11%	0.43%	0.82%	0.11%
Annual 2022-2037	0.04%	0.14%	0.36%	0.07%
Cumulative 2018-2037	0.90%	3.94%	8.64%	1.08%

In this BO, we use occupancy rates in the Action Area of 3.3 and 14 percent for Ibat and NLEB, respectively. Assuming that all 26,247 acres of Reservoir Lands that could use prescribed fire are forested, burning 5.7 percent of these lands annually yields an expected overlap between burning and bats of 49 and 210 acres for Ibat and NLEB, respectively. While we do not discount this overlap, assessing the indirect effects (later in time changes in roost and prey availability) of burning at this small scale in a programmatic context without site-specific data is not feasible. Therefore, we limit our analysis of prescribed burning to its direct effects on bats in forested habitats.

5.3.1. Stressors and Responses

Smoke and heat are stressors that are relevant to all species within or near the path of a fire, including the Ibat and NLEB, whether it is a wildfire or a prescribed burn. Three of the proposed avoidance and minimization measures listed in section 2.3.2 should limit the severity of smoke and heat as stressors in forested settings that bats occupy. TVA will use fire breaks to burn larger areas in smaller units (SHF1 and SHF3). Burns in April and May will occur when temperatures exceed 55°F to avoid affecting adult bats in torpor, who are unable to rouse quickly and fly to a roost beyond the smoke (SHF4).

Perry (2012) provided a review of fire effects on bats in the eastern oak region of the U.S., and Carter *et al.* (2002) provided a similar review for bats in the southeastern and mid-Atlantic states. Forest-dwelling bats, including the Ibat and NLEB, were presumably adapted to the fire regime that preceded European settlement and subsequent fire suppression in many parts of the eastern U.S. These reviews summarized how fire may affect individual bats directly (negatively) through exposure to heat, smoke, and carbon monoxide, and indirectly (both positively and negatively) through habitat modifications and resulting changes in their food base and tree roosts (Dickinson *et al.* 2009).

Direct Effects in Tree Roosts

Few studies have examined bat escape behaviors, direct mortality, or potential reductions in survival associated with fire. Dickinson *et al.* (2009) monitored two NLEB (one male and one female) in roosts during a controlled summer burn. Within 10 minutes of ignition near their roosts, both bats flew to areas that were not burning. All four bats they tracked before and after burning switched roosts during the fire, with no observed mortality. Rodrigue *et al.* (2001) reported flushing a *Myotis* bat from an ignited snag during an April controlled burn in West Virginia. Although these studies did not document injury or mortality resulting from daytime flights away from prescribed fire, this disruption of normal sheltering behavior creates the likelihood of injury by exposure to diurnal avian predators (see discussion in section 5.2.1 under "Noise/Disturbance").

Carter *et al.* (2002) suggested that the risk of direct injury and mortality to southeastern forest-dwelling bats resulting from summer prescribed fire is generally low. During warm temperatures, bats are able to arouse from short-term torpor quickly. Most adult bats are quick, flying at speeds > 30 km/hour (> 18 miles/hour) (Patterson and Hardin 1969), enabling escape to unburned areas. Ibats and NLEBs use multiple roosts, switching roost trees often (see section 3.2.1), and could likely use alternative roosts in unburned areas, should smoke make the current roost uninhabitable or fire destroy it. Non-volant pups are likely the most vulnerable to death and injury from fire. Although most eastern bat species are able to carry their young for some time after they are born (Davis 1970), the degree to which this behavior would allow females to relocate their young if fire threatens the nursery roost is unknown.

Dickinson *et al.* (2010) used a fire plume model, field measurements, and models of carbon monoxide and heat effects on mammals to explore the risk to the Ibat and other tree- roosting bats during prescribed fires in mixed-oak forests of southeastern Ohio and eastern Kentucky. Carbon monoxide levels did not reach critical thresholds that could harm bats in low- intensity burns at typical roosting heights for the Ibat (8.6 m) (28.2 ft). NLEB roost height selection is more variable, but on average lower (6.9 m) (22.8 ft) than the Ibat (Lacki *et al.* 2009). In this range of heights, direct heat could cause injury to the thin tissue of bat ears. Such injury would occur at roughly the same height as tree foliage necrosis (death), or where temperatures reach 60 °C (140 °F). Generally, forest managers plan prescribed fires to avoid significant tree scorch.

5.3.2. Estimation of Exposure and Numbers of Bats Affected

Prescribed burning is proposed for a well-defined portion of the larger Action Area for this consultation. This portion is comprised of 26,247 acres of TVA Reservoir lands on which TVA believes fire is an appropriate habitat management tool during the next 20 years (see section 2.3.1). These lands are entirely within the range of both the Ibat and NLEB; therefore, no partitioning of the proposed prescribed burning activity by species is necessary for this analysis.

Due to funding and staff limitations, TVA indicates that its burn activity is unlikely to exceed 1,500 acres annually, and that burn frequency on parcels presently treated with fire ranges from 1–5 years. Burning 1,500 different acres only once every year for the next 20 years would cover 30,000 acres, slightly more than the 26,247 acres that could benefit from prescribed fire. Maintaining a fire frequency of 1–5 years on some parcels and burning less than 1,500 acres annually will necessarily fall short of covering all the lands TVA would like to burn.

TVA proposes to conduct 10 percent of its prescribed burning during the active season outside of the pup season, none during the pup season (June and July), and the remainder (90 percent) during the inactive (winter) season (see section 2.3.1). Burning under the proposed Action will have no direct effects on non-volant pups. As we discussed in the introduction to section 5.3, we have dismissed from further analysis the direct effects of smoke on bats in hibernacula, due to the proposed conservation measures that limit such effects to insignificant levels. We have also dismissed from further analysis the indirect effects of burning on bats through changes in their forested habitat resources, such as roost tree availability and prey abundance. Winter burning has no direct effects on bats in forested habitats (bats are not present); therefore, our analysis in this section is limited to the direct effects of active season burning, which is limited to the months in which all bats are volant.

The 20-year cumulative acreage proposed for burning during the bat active season outside the pup season is 10 percent of 26,247 acres, or 2,624 acres. Lacking more specific data, we assume that the seasonal breakdown for the 20-year cumulative acreage applies to annual burning activity, which TVA indicates will rarely exceed 1,500 acres. Therefore, 150 acres is the expected annual amount of burning that may directly affect Ibats and NLEBs in their forested habitats, which is 0.571 percent of the TVA Reservoir Lands that may receive prescribed fire.

In this BO, we use occupancy rates in forested portions of the Action Area of 3.3 and 14 percent for Ibat and NLEB, respectively (see sections 4.1.1 and 4.1.2). Assuming that all 26,247 acres of Reservoir Lands that could use prescribed fire are forested, burning 0.571 percent of these lands annually yields an expected overlap between burning and occupied areas of 4.9 and 21.0 acres for Ibat and NLEB, respectively ($0.00571 \times 0.033 \times 26{,}247 = 4.9$, and $0.00571 \times 0.14 \times 26{,}247 = 21.0$).

In this BO, we use a density of 120 adult bats per 1,700 acres for Ibat (0.0706 bats/acre), and 90 adults per 1,000 acres for NLEB (0.09 bats/acre). On 4.9 and 21.0 occupied acres burned annually, the expected number of Ibats and NLEBs affected is 0.35 and 1.89, respectively, which we round up to 1 and 2. Without rounding up, burning 0.571 percent of the eligible Reservoir Lands annually for 20 years with constant bat occupancy rates and densities, we would expect fire to affect about 7 Ibats and and 38 NLEBs over the full duration of the Action (20×0.35 and 20×1.89).

Based on our literature review of the effects of fire on bats in section 5.3.1, we expect that all adult Ibats and NLEBs exposed to smoke or heat from prescribed fire would fly to alternate roosts, and that most would do so without injury. However, daytime flight away from such annoyance exposes bats to diurnal avian predators (see discussion in section 5.2.1 under "Noise/Disturbance"), which is consistent with the definition of incidental take in the form of harassment.

5.4. Summary of Effects

In section 5.2, we identified four unique pathways by which we expect stressors caused by tree removal under this Action to affect bats: noise and disturbance, physical trauma to non-volant pups, physical trauma to volant bats, and loss of shelter indirectly causing reduced reproduction. Bat responses upon exposure to the latter three pathways are consistent with the definition of incidental take in the form of harm, and responses to disturbance are consistent with the definition of take in the form of harassment.

However, the scale of this harm and harassment is small relative to the size of the Action Area and the numbers of bats we estimate it supports. We expect that noise from tree removal will each year cause a few individuals (1 Ibat and 3 NLEB) to flee their roosts, exposing them to diurnal predators. These numbers are low because we believe that Ibats and NLEBs are more likely (90 percent) to remain in a roost during tree removal operations that do not actually remove the roost tree.

For the Ibat, we expect the three pathways leading to harm to affect up to 5 individuals annually (1 pup, 3 volant bats, and 1 adult female). The 20-year cumulative estimates of harm are 7 pups and 29 volant bats killed or injured by felling an occupied tree, and 4 adult females injured (reproductive failure that year) by removal of unoccupied roost trees from the individual's roost network. Harming up to 4 volant bats annually represents 1.11 percent of the Ibat adult population that we believe the Action Area is likely to support (3 maternity colonies; 360 adults).

For the NLEB, the scale of harm caused by tree removal is greater than for the Ibat, but also small relative to the Action Area population. Two factors explain the different results for NLEB and Ibat: (a) the range of the NLEB encompasses the entire Action Area, whereas the range of the Ibat covers only 64 percent; and (b) we use an occupancy rate of 14 percent for the NLEB, and only 3.3 percent for the Ibat. The same three pathways leading to Ibat harm lead to NLEB harm. We expect tree removal to annually harm up to 6 NLEB pups, 23 volant bats, and 3 adult females. The 20-year cumulative estimates of harm are 55 pups, 241 volant bats, and 30 adult females. Harming up to 26 volant bats annually represents 0.93 percent of the NLEB adult population that we believe the Action Area is likely to support (31 maternity colonies; 2,790 adults).

In section 5.3, we determined that only the direct effects of prescribed burning during the bat-volant season (portion of the active season outside the pup season) are relevant to our analysis. Only 10 percent of the proposed burning will occur in this seasonal period. We expect that up to one (1) Ibat and two (2) NLEB annually will experience heat and smoke in their roosts and fly to an alternate roost, which will expose them to diurnal avian predators. This disruption of normal sheltering behavior, which creates the likelihood of injury, is consistent with the definition of incidental take in the form of harassment.

6. CUMULATIVE EFFECTS

For purposes of consultation under ESA §7, cumulative effects are those caused by future state, tribal, local, or private actions that are reasonably certain to occur in the Action Area. Future Federal actions that are unrelated to the proposed action are not considered, because they require separate consultation under §7 of the ESA.

The BA suggests that many types of non-federal actions may occur within the 1.015-million-acre Action Area during the next 20 years that may affect environmental resources. As examples, TVA lists state highway maintenance and improvement projects, airport operations and expansions, rail development projects, and others. However, the BA does not provide an assessment of how these actions may affect the Ibat or NLEB.

Most of the lands (about 89 percent) included in the Action Area are under a large or substantial degree of TVA control:

- 331,000 acres of TVA-retained lands (33 percent); and
- 569,001 acres of transmission line easements (56 percent) (source: BA Table 2-1).

Although non-federal actions may occur within transmission line easements, we believe it reasonable to assume that all actions on TVA-retained lands and many on TVA easements will involve managing and maintaining conditions for TVA purposes. Such actions are federal actions that we do not consider under cumulative effects in a consultation. The BA does not assess the effects of other non-federal actions that are reasonably certain to occur on these lands.

The remaining 11 percent of the Action Area lands are other non-TVA public lands associated with an anticipated level of TVA economic development support (7 percent), and an anticipated acreage of private lands identified for distributed solar energy generation (4 percent). These areas not under TVA ownership or easement, but are not specifically identified in the BA, because many of the sites that may support such activity in the next 20 years are not yet determined.

TVA expects that activities under the Action will affect only about 462,000 acres (45 percent) of the 1.015-million-acre Action Area. Therefore, it is not necessary to consider cumulative effects on about 55 percent of the Action Area. We lack a spatial delineation of the area that the Action may affect and any data about non-federal actions that are reasonably certain to occur in that area; therefore, the Service is unable to assess meaningfully the cumulative effects that may be relevant to this consultation.

7. CONCLUSION

In this section, we summarize and interpret the findings of the previous sections for the Ibat and NLEB (status, baseline, effects, and cumulative effects) relative to the purpose of a BO under §7(a)(2) of the ESA, which is to determine whether a Federal action is likely to:

a) jeopardize the continued existence of species listed as endangered or threatened; or
b) result in the destruction or adverse modification of designated critical habitat.

"Jeopardize the continued existence" means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR §402.02).

Status – Biennial Ibat population estimates were increasing from 2001 to 2007, suggesting a reversal in a long-term decline. The decline thereafter is largely attributable to WNS, especially in the Northeast Recovery Unit. The NLEB was common in many areas of its broad range until the onset of WNS in 2006, but has declined rapidly since. We expect further declines in both species as WNS continues to spread. The most recent Ibat census (2017) estimated a total of 530,705 Ibats in 229 hibernacula in 17 states. The Service calculated a rough range-wide population estimate of about 6.5 million NLEB in the intra-Service BO for the species' final 4(d) rule. Although WNS continues to kill and weaken individuals in most of the species' range, NLEB populations may still number in the millions, but its status is highly uncertain.

Baseline – Based on the Ibat hibernacula census data, we estimate that the 82-million-acre TVA Region supports about 23,000 adult Ibats. Of this regional population, we estimate that the 1.015-million-acre Action Area supports three (3) Ibat maternity colonies, each comprised of 60 adult females and associated with the same number of sympatric adult males. Estimates of NLEB numbers cannot rely on hibernacula census data. Instead, we make inferences based on an observed occupancy rate of 14 percent in the TVA Region and colony characteristics from the literature. We estimate that the Action Area supports about 31 NLEB maternity colonies, each comprised of 45 adult females and associated with the same number of sympatric adult males. Ibat and NLEB conservation needs and threats in the Action Area are largely the same as the range-wide needs and threats. WNS is detected in all 7 states of the TVA Region, and is the primary threat to their survival and recovery.

Effects – We expect that noise and disturbance caused by tree removal activity under the proposed Action will harass small numbers (up to 1 Ibat and 3 NLEB) each year by flushing individuals from tree roosts. We expect tree removal to harm relatively small numbers of Ibats and NLEBs each year.

For the Ibat, our estimates of harm are up to 1 pup and 3 volant bats killed or injured by felling occupied roost trees, and up to one 1 adult female injured (reproductive failure that year) by removing roost trees from the individual's roost network. Harming up to 5 bats in a year represents about 1 percent of the Ibat population that we believe the Action Area is likely to support before pups are born (3 maternity colonies; 360 adults).

For the NLEB, our estimates are higher than for the Ibat, but not large. Our estimates of harm are up to 6 pups and 23 volant bats killed or injured by felling occupied roost trees, and up to 3 adult females injured (reproductive failure that year) by removing roost trees from their roost networks. Harming up to 32 bats in a year represents about 1 percent of the NLEB population that we believe the Action Area is likely to support before pups are born (31 maternity colonies; 2,790 adults).

The extent of prescribed burning on TVA lands that may affect bats is about 150 acres per year. This burning will not affect bat pups. We expect that up to 1 Ibat and 2 NLEB annually will experience heat and smoke in their roosts and fly to an alternate roost, which will expose them to diurnal predators.

Harming up to 5 Ibats per year of the current range-wide population of about 530,000 Ibats will not appreciably reduce the likelihood of the species' survival and recovery in the wild. Ibat numbers have declined due to WNS by about 10,000–60,000 adults between successive biennial winter census counts in recent years. The effects of this Action will not alter that trend by an amount that is biologically meaningful at either the recovery unit or range-wide scales.

Harming up to 32 NLEBs per year from a wide-wide population that may still number in the millions will not appreciably reduce the likelihood of the species' survival and recovery in the wild. The Service determined previously that an average annual timber harvest rate of about 3.7 million acres per year throughout the range of the NLEB was not likely to appreciably reduce the likelihood of the species' survival and recovery in the wild (USWFW 2016). Tree removal under this Action, up to 3,759 acres per year, is a tiny subset of this range-wide average annual activity. Although NLEB numbers continue to decline due to WNS, the effects of this Action will not alter this trend by an amount that is biologically meaningful at the scale of either regional populations overlapping the Action Area or the species' range.

Cumulative Effects – TVA expects that various activities under the Action will affect about 462,000 acres (45 percent) of the 1.015-million-acre Action Area. Therefore, it is not necessary to consider cumulative effects on about 55 percent of the Action Area. We lack a spatial delineation of the 462,000 acres that the Action may affect and any data about non-federal actions that are reasonably certain to occur in that area; therefore, the Service is unable to assess meaningfully the cumulative effects that may be relevant to this consultation.

Conclusion – After reviewing the species' current status, the environmental baseline for the Action Area, the effects of the Action, and the cumulative effects, it is the Service's biological opinion that the Action is not likely to jeopardize the continued existence of the Ibat or the NLEB.

8. INCIDENTAL TAKE STATEMENT

ESA §9(a)(1) and regulations issued under §4(d) prohibit the take of endangered and threatened fish and wildlife species without special exemption. The term "take" in the ESA means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct" (ESA §3). In regulations at 50 CFR §17.3, the Service further defines:

- "harass" as "an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering;"
- "harm" as "an act which actually kills or injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering;" and
- "incidental take" as "any taking otherwise prohibited, if such taking is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity."

Under the terms of ESA §7(b)(4) and §7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered prohibited, provided that such taking is in compliance with the terms and conditions of an incidental take statement (ITS).

Regulations issued under ESA §4(d) prohibit the taking of the northern long-eared bat (NLEB) under specific conditions and circumstances, which are more limited than under the definitions quoted above. These prohibitions include incidental take resulting from tree-removal activity that "cuts or destroys known occupied maternity roost trees, or any other trees within a 150-foot (45-meter) radius from the maternity roost tree, during the pup season (June 1 through July 31)" (50 CFR §17.40). In this BO, we anticipate that projects under the programmatic Action will cause the taking of NLEB incidental to the removal of undocumented roost trees. Such taking is not prohibited under the NLEB 4(d) rule, and, therefore, does not require special exemption through compliance with the terms and conditions of an ITS. None are included for the NLEB in this ITS.

The programmatic Action evaluated in this BO does not authorize, fund, or carry out any of the future project-level activities that it describes, and these future Federal activities are subject to the requirements in ESA §7(a)(2). The TVA must determine on a project-level basis whether a proposed activity is consistent with the description of activities included in the programmatic Action and addressed in this BO, and if so, may rely upon the findings of this BO to document its compliance with §7(a)(2) with respect to the Indiana bat (Ibat) and NLEB. Such compliance does not relieve TVA of the requirements in §7(a)(2) for activities that may affect designated critical habitat or endangered and threatened species other than the Ibat and NLEB.

For the exemption in ESA §7(o)(2) to apply to the incidental taking of Ibats caused by project-level activities that are consistent with the programmatic Action addressed in this BO, TVA must undertake the non-discretionary measures described in this ITS, and these measures must become binding conditions of any permit, contract, or grant issued for implementing the Action. TVA has a continuing duty to regulate the activity covered by this ITS. The protective coverage of §7(o)(2) may lapse if the TVA fails to:

- assume and implement the terms and conditions; or
- require a permittee, contractor, or grantee to adhere to the terms and conditions of the ITS through enforceable terms that are added to the permit, contract, or grant document.

In order to monitor the impact of prohibited incidental take, TVA must report the progress of the Action and its impact on the species to the Service as specified in this ITS.

8.1. Amount or Extent of Take

This section specifies the amount or extent of take of Ibats that the Action is reasonably certain to cause, which we estimated in the "Effects of the Action" section of this BO. We reference, but do not repeat, these analyses here. We do not specify the anticipated amount or extent of take of NLEBs, because we do not expect the proposed Action to cause take of NLEB that is prohibited under the applicable regulations at 50 CFR §17.40.

The Service anticipates that the Action is reasonably certain to cause incidental take of individual Ibats consistent with the definition of harm resulting from tree removal activities (see section 5.2). We expect that the amount of take will not exceed five (5) individuals per calendar year and will not exceed 40 individuals over the 20-year duration (2018–2037) of the programmatic Action (see Table 5-3).

The Service anticipates that the Action is reasonably certain to cause incidental take of individual Ibats consistent with the definition of harass resulting from tree removal activities (see section 5.2) and from prescribed burning (see section 5.3). We expect that the amount of harassment caused by tree removal will not exceed one (1) individual per calendar year and will not exceed three (3) individuals over the 20-year duration (2018–2037) of the programmatic Action (see Table 5-3). We expect that the amount of harassment caused by prescribed burning will not exceed one (1) individual per calendar year and will not exceed seven (7) individuals over the 20-year duration (2018–2037) of the programmatic Action (see section 5.3.2).

The Service expects that incidental take of Ibats caused by the Action will be difficult to detect for the following reasons:

- individuals are small, mostly nocturnal, and when not hibernating, occupy forested habitats where they are difficult to observe;
- the species forms maternity colonies of about 60 adult females under loose bark or in the cavities of trees, and males and non-reproductive females may roost individually, which makes finding roost trees difficult;
- finding dead or injured individuals during or following tree removal in forested habitats is unlikely;
- observing individuals flying away from trees that are not known to contain a bat roost during tree removal operations or prescribed burning is unlikely; and

- some of the anticipated incidental take is in the form of reproductive failure that is not directly observable.

Due to the difficulty of detecting take of Ibats, TVA will monitor the extent of taking using the annual and 20-year cumulative acreages of tree removal and prescribed burning under the programmatic Action as a surrogate measure, because these activities will cause the taking. The amount of anticipated taking depends upon the seasonal timing of these activities. Therefore, TVA will monitor the annual and cumulative acreages according to the three seasonal periods defined for these activities in the description of the proposed Action. Taking of Ibats is expected in the Counties of the Action Area that are within the range of the Ibat (as shown in Figure 4-1), which represent about 64 percent of the total Action Area. Taking of Ibats will not exceed the levels we estimate in this BO resulting from tree removal and prescribed burning on an acreage within the range of the Ibat that is less than or equal to the following amounts:

Years	Tree Removal Acreage			
	Inactive Season; Bats Hibernating; November 15 – March 15	Active Season; All Bats Volant; March 16 – April 30, and August 1 – November 14	Active Season; Pups Non-Volant; June 1 – July 30	Total
Annual 2018-2021	1,258	557	589	2,403
Annual 2022-2037	810	277	198	1,285
Cumulative 2018-2037	17,990	6,667	5,516	30,172
	Prescribed Burning Acreage			
Annual	1,350	150	0	1,500
Cumulative 2018-2037	23,622	2,625	0	26,247

8.2. Reasonable and Prudent Measures

The proposed programmatic Action includes conservation measures to avoid and minimize impacts to the Ibat (see sections 2.2.2, 2.3.2) and to promote its recovery (see section 2.4). The analysis of effects of the Action in this BO considers that TVA will authorize, fund, or carry out all activities under the Action in a manner that is consistent with the description of activities in the BA, including all applicable conservation measures.

TVA also proposes procedures to document and report the alignment of TVA activities with the proposed programmatic Action (see section 2.5). These procedures include advance notification of the appropriate Service Field Office regarding project-specific effects determinations, alignment with the programmatic Action, bat survey results (if conducted), and coordination with Service Field Offices in the event that tree removal activity may directly affect Ibat or NLEB non-volant pups.

Based on our review of the proposed Action, its conservation measures, and its project-level review and notification procedures, the Service believes that no reasonable and prudent measures are necessary or appropriate to minimize the impacts of incidental take on the Ibat caused by the Action. Minor changes that do not alter the basic design, location, scope, duration, or timing of the Action will not reduce incidental take below the amount or extent anticipated for the Action as proposed. Therefore, this ITS does not provide reasonable and prudent measures.

8.3. Terms and Conditions

No reasonable and prudent measures to minimize the impacts of incidental take caused by the Action are provided in this ITS; therefore, no terms and conditions for carrying out such measures are necessary.

8.4. Monitoring and Reporting Requirements

In order to monitor the impacts of incidental take, the TVA "must report the progress of the Action and its impact on the species to the Service as specified in the incidental take statement" (50 CFR §402.14(i)(3)). This section provides the specific instructions for such monitoring and reporting (M&R). As necessary and appropriate to fulfill this responsibility, the TVA must require any permittee, contractor, or grantee to accomplish the monitoring and reporting through enforceable terms that are added to the permit, contract, or grant document. Such enforceable terms must include a requirement to immediately notify the TVA and the Service if the amount or extent of incidental take specified in this ITS is exceeded during Action implementation.

M&R1. Annual Reporting. Each year from 2019–2037, TVA will file a report not later than March 31 covering the preceding calendar year ending December 31. The report will:

- (a) identify all tree-removal and prescribed burning projects, and report the seasonal timing and total acreage for each project;
- (b) provide the results of any bat surveys associated with such projects;
- (c) provide the effects determination for each project according to the procedures specified under Chapter 6 of the BA;
- (d) summarize the outcome of any coordination with Service Field Offices as specified under tree removal conservation measures TR5 and TR6 in Chapter 5.2.4 of the BA.
- (e) provide the results of any TVA-sponsored bat monitoring and research in the TVA Region.

TVA will provide these annual reports to the U.S. Fish and Wildlife Service, Tennessee Field Office, at 446 Neal Street, Cookeville, Tennessee 38501.

M&R2. Annual Coordination. TVA will convene a meeting with the Tennessee Field Office at least once each calendar year on a mutually agreeable date between May 1 and December 31 to:

- (a) discuss the annual report under M&R1;
- (b) review the progress of the Action; and
- (c) review any new information relevant to the Action and its effects on the bat species considered in this consultation.

M&R3. Handling and Reporting Dead or Injured Listed Species. All personnel involved in activities under this TVA programmatic Action must take care when handling dead or injured Ibats, NLEBs, and any other endangered or threatened species that are found in a project area to preserve biological material in the best possible state, and to protect the handler from exposure to diseases, such as rabies. Project personnel are responsible for ensuring that evidence for determining the cause of death or injury is not disturbed unnecessarily. Reporting the discovery of dead or injured listed species is required in all cases to enable the Service to determine whether the level of incidental take exempted by this ITS is exceeded. Personnel finding a dead, injured, or sick specimen of any endangered or threatened species, must promptly notify the Service's Division of Law Enforcement at 1875 Century Blvd., Suite 380, Atlanta, Georgia 30345 (Telephone: 404/679-7057), and then the Service's Ecological Services Field Office of applicable jurisdiction.

9. CONSERVATION RECOMMENDATIONS

§7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by conducting conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary activities that an action agency may undertake to avoid or minimize the adverse effects of a proposed action, implement recovery plans, or develop information that is useful for the conservation of listed species. The Service offers the following recommendations that are relevant to the listed species addressed in this BO and that we believe are consistent with the authorities of the TVA. In general, our recommendations are to continue and expand the various programs that TVA already undertakes to contribute to bat conservation.

1. Continue the TVA collaboration with partners to survey bridges that may support maternity colonies.
2. Continue the TVA collaboration with partners to learn more about how bats are using habitats within the TVA region (*e.g.*, spring migration radio tagging and tracking, location and assessment of roost trees).
3. Conduct bat monitoring following bat habitat enhancement and artificial roost projects on TVA-managed lands to assess project benefits.
4. Monitor and maintain gates and signage at caves that listed bats use, and determine the need for new gates, fences, or signage at other caves on TVA lands that listed bats use.
5. Continue to serve as a member of state WNS planning committees.
6. Continue to update and maintain a database of listed bat occurrence records (*i.e.*, mist net captures, cave, bridge, and tree roosts, *etc.*), and use this database to inform project-specific environmental reviews and BAs.
7. Continue to offer workshops to TVA staff interested in assisting with conducting bat habitat assessments.

10. REINITIATION NOTICE

Formal consultation for the Action considered in this BO is concluded. Reinitiating consultation is required if the TVA retains discretionary involvement or control over the Action (or is authorized by law) when:

a. the amount or extent of incidental take is exceeded;
b. new information reveals that the Action may affect listed species or designated critical habitat in a manner or to an extent not considered in this BO;
c. the Action is modified in a manner that causes effects to listed species or designated

critical habitat not considered in this BO; or

d. a new species is listed or critical habitat designated that the Action may affect.

In instances where the amount or extent of incidental take is exceeded, the TVA is required to immediately request a reinitiation of formal consultation.

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Tennessee ES Office
446 Neal Street
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December 18, 2018

Mr. John T. Baxter
Manager, Biological Compliance
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, TN 37902

Re: FWS #2018-F-0958; Programmatic Consultation for Right-of-Way Vegetation Management that May Affect Endangered or Threatened Plants in the Tennessee Valley Authority Service Area

Dear Mr. Baxter:

This letter acknowledges the U.S. Fish and Wildlife Service's (Service) November 21, 2018, receipt of your November 19, 2015, letter requesting initiation of formal section 7 consultation under the Endangered Species Act (Act). The consultation concerns the possible effects of your proposed Programmatic Strategy for Right-of-Way Vegetation Management that May Affect Endangered or Threatened Plants in the Tennessee Valley Authority Service Area (TVA) (the Proposed Action) on 18 federally listed plants, including:

- Price's potato-bean (*Apios priceana*)
- Braun's rock-cress (*Arabis perstellata*)
- Pyne's ground plum (*Astragalus bibullatus*)
- Morefield's leather-flower (*Clematis morefieldii*)
- Alabama leather flower (*Clematis socialis*)
- leafy prairie-clover (*Dalea foliosa*)
- whorled sunflower (*Helianthus verticillatus*)
- small whorled pogonia (*Isotria medeoloides*)
- fleshy-fruit gladecress (*Leavenworthia crassa*)
- lyre-leaf bladderpod (*Lesquerella lyrata*)
- Spring Creek bladderpod (*Lesquerella perforata*)
- Mohr's Barbara's buttons (*Marshallia mohrii*)
- Cumberland sandwort (*Minuartia cumberlandensis*)
- Short's bladderpod (*Physaria globosa*)
- white fringeless orchid (*Platanthera integrilabia*)
- green pitcher plant (*Sarracenia oreophila*)
- large-flowered skullcap (*Scutellaria montana*)
- Tennessee yellow-eyed grass (*Xyris tennesseensis*)

All information required of you to initiate consultation was either included with your letter or is otherwise accessible for our consideration and reference. We have assigned log number FWS 2018-F-0958 to this consultation. Please refer to that number in future correspondence on this consultation.

Based on the information provided, the Service agrees that the Proposed Action may affect and is likely to adversely affect the 18 plant species listed above and that initiation of formal consultation is appropriate for the Proposed Action. Section 7 allows the Service up to 90 calendar days to conclude formal consultation with your agency and an additional 45 calendar days to prepare a biological opinion (unless we mutually agree to an extension). Therefore, we expect to provide you with a final biological opinion no later than April 5, 2019. As has been previously discussed, we also agree to provide TVA a draft biological opinion for review by March 5, 2019.

As a reminder, the Act requires that after initiation of formal consultation, the federal action agency may not make any irreversible or irretrievable commitment of resources that limits future options. This practice insures agency actions do not preclude the formulation or implementation of reasonable and prudent alternatives that avoid jeopardizing the continued existence of endangered or threatened species or destroying or modifying their critical habitats.

In your letter, TVA also determined that the proposed Action is not likely to adversely affect the listed species and designated critical habitats on the attached list. The Service has reviewed the data and rationale for these determinations that was provided in the BA. We agree that the proposed best management practices, standard operating procedures, and appropriate avoidance measures associated with the activities that may affect these species and critical habitats will limit any adverse effects to an insignificant scale or discountable probability. Therefore, we concur with TVA's determinations for the listed species and designated critical habitats in the attached list, and this letter concludes consultation for the Action relative to those listed species and designated critical habitats. However, reinitiating consultation relative to the species and critical habitats in the attached list is required if TVA retains discretionary involvement or control over the Action (or is authorized by law) when:

- new information reveals that the Action may affect listed species or designated critical habitat in a manner or to an extent not considered in this BA;
- the Action is modified in a manner that causes effects to listed species or designated critical habitat not considered in this BA; or
- a new species is listed or critical habitat designated that the Action may affect.

If you have any questions or concerns about this consultation or the consultation process in general, please feel free to contact myself or Todd Shaw of this office at 931/525-4985, or at *ross_shaw@fws.gov*.

Sincerely,

Virgil Lee Andrews, Jr.
Acting Field Supervisor

xc: Christine Willis, USFWS, Region 4
attachment – NLAA Species and Critical Habitats List

Listed species (LE=listed as endangered; LT=listed as threatened) and designated critical habitats (DCH) that TVA has determined the proposed Action is not likely to adversely affect (NLAA).

Scientific Name	Common Name	Federal Status	DCH (Y=Yes)	TVA Species Determination	TVA DCH Determination
Mammals					
Glaucomys sabrinus coloratus	Carolina Northern Flying Squirrel	LE	-	NLAA	-
Birds					
Charadrius melodus	Piping Plover	LT	-	NLAA	-
Grus americana	Whooping Crane	LE	-	NLAA	-
Mycteria americana	Wood Stork	LT	-	NLAA	-
Picoides borealis	Red-cockaded Woodpecker	LE	-	NLAA	-
Sterna antillarum athalassos	Interior Least Tern	LE	-	NLAA	-
Reptiles					
Graptemys oculifera	Ringed Map Turtle	LT	-	NLAA	-
Sternotherus depressus	Flattened Musk Turtle	LT	-	NLAA	-
Amphibians					
Gyrinophilus gulolineatus	Berry Cave Salamander	C	-	NLAA	-
Necturus alabamensis	Black Warrior Waterdog	LE	Y	NLAA	NLAA
Fishes					
Acipenser oxyrinchus desotoi	Gulf Sturgeon	LT	-	NLAA	-
Chrosomus saylori	Laurel Dace	LE	Y	NLAA	NLAA
Cottus paulus (pygmaeus)	Pygmy Sculpin	LT	Proposed	NLAA	NE*
Crystallaria cincotta	Diamond Darter	LE	Y	NLAA	NLAA
Cyprinella caerulea	Blue Shiner	LT	-	NLAA	-
Elassoma alabamae	Spring Pygmy Sunfish	LT	Proposed	NLAA	NLAA
Erimonax monachus	Spotfin Chub	LT	Y	NLAA	NLAA
Erimystax cahni	Slender Chub	LT	Y	NLAA	NLAA
Etheostoma akatulo	Bluemask Darter	LE	-	NLAA	-
Etheostoma boschungi	Slackwater Darter	LT	Y	NLAA	NLAA
Etheostoma chermocki	Vermilion Darter	LE	Y	NLAA	NE*
Etheostoma chienense	Relict Darter	LE	-	NLAA	-
Etheostoma nuchale	Watercress darter	LE	-	NLAA	-
Etheostoma percnurum	Duskytail Darter	LE	-	NLAA	-
Etheostoma phytophilum	Rush Darter	LE	Y	NLAA	NE*
Etheostoma rubrum	Bayou Darter	LT	-	NLAA	-
Etheostoma spilotum	Kentucky Arrow Darter	LT	-	NLAA	-
Etheostoma susanae	Cumberland Darter	LE	Y	NLAA	NLAA
Etheostoma trisella	Trispot Darter	PT	-	NLAA	-
Etheostoma wapiti	Boulder Darter	LE	-	NLAA	-
Moxostoma sp. 2	Sicklefin Redhorse	Under Review	-	NLAA	-
Notropis albizonatus	Palezone Shiner	LE	-	NLAA	-
Notropis cahabae	Cahaba Shiner	LE	Proposed	NLAA	NE*

Scientific Name	Common Name	Federal Status	DCH (Y=Yes)	TVA Species Determination	TVA DCH Determination
Noturus baileyi	Smoky Madtom	LE	Y	NLAA	NE*
Noturus crypticus	Chucky Madtom	LE	Y	NLAA	NE*
Noturus flavipinnis	Yellowfin Madtom	LT	Y	NLAA	NE*
Noturus stanauli	Pygmy Madtom	LE	-	NLAA	-
Percina antesella	Amber Darter	LE	Y	NLAA	NLAA
Percina aurolineata	Goldline Darter	LT	Proposed	NLAA	NE*
Percina aurora	Pearl Darter	LT	-	NLAA	-
Percina jenkinsi	Conasauga Logperch	LE	Y	NLAA	NLAA
Percina tanasi	Snail Darter	LT	-	NLAA	-
Phoxinus cumberlandensis	Blackside Dace	LT	-	NLAA	-
Scaphirhynchus albus	Pallid Sturgeon	LE	-	NLAA	NLAA
Scaphirhynchus suttkusi	Alabama Sturgeon	LE	-	NLAA	-
Speoplatyrhinus poulsoni	Alabama Cavefish	LE	Y	NLAA	NE*
Freshwater mussels					
Alasmidonta atropurpurea	Cumberland Elktoe	LE	Y	NLAA	NLAA
Alasmidonta raveneliana	Appalachian Elktoe	LE	Y	NLAA	NE*
Cumberlandia monodonta	Spectaclecase	LE	-	NLAA	-
Cyprogenia stegaria	Fanshell	LE	-	NLAA	-
Dromus dromas	Dromedary Pearlymussel	LE	-	NLAA	-
Epioblasma brevidens	Cumberlandian Combshell	LE	Y	NLAA	NLAA
Epioblasma capsaeformis	Oyster Mussel	LE	Y	NLAA	NLAA
Epioblasma florentina florentina	Yellow-blossom Pearlymussel	LE	-	NLAA	-
Epioblasma florentina walkeri	Tan Riffleshell	LE	-	NLAA	-
Epioblasma metastriata	Upland Combshell	LE	Y	NLAA	NLAA
Epioblasma obliquata obliquata	Purple Catspaw	LE	-	NLAA	-
Epioblasma othcaloogensis	Southern Acornshell	LE	Y	NLAA	NLAA
Epioblasma penita	Southern Combshell	LE	-	NLAA	-
Epioblasma torulosa gubernaculum	Green Blossom Pearlymussel	LE	-	NLAA	-
Epioblasma torulosa rangiana	Northern Riffleshell	LE	-	NLAA	-
Epioblasma torulosa torulosa	Tuberculed Blossom Pearlymussel	LE	-	NLAA	-
Epioblasma triquetra	Snuffbox	LE	-	NLAA	-
Epioblasma turgidula	Turgid Blossom Pearlymussel	LE	-	NLAA	-
Fusconaia cor	Shiny Pigtoe Pearlymussel	LE	-	NLAA	-

Scientific Name	Common Name	Federal Status	DCH (Y=Yes)	TVA Species Determination	TVA DCH Determination
Fusconaia cuneolus	Fine-rayed Pigtoe	LE	-	NLAA	-
Hemistena lata	Cracking Pearlymussel	LE	-	NLAA	-
Lampsilis abrupta	Pink Mucket	LE	-	NLAA	-
Lampsilis altilis	Fine-lined Pocketbook	LT	Y	NLAA	NLAA
Lampsilis perovalis	Orange-nacre Mucket	LT	Y	NLAA	NLAA
Lampsilis virescens	Alabama Lampmussel	LE	-	NLAA	-
Lemiox rimosus	Birdwing Pearlymussel	LE	-	NLAA	-
Leptodea leptodon	Scaleshell	LE	-	NLAA	-
Medionidus acutissimus	Alabama Moccasinshell	LT	Y	NLAA	NLAA
Medionidus parvulus	Coosa Moccasinshell	LE	Y	NLAA	NLAA
Obovaria retusa	Ring Pink	LE	-	NLAA	-
Pegias fabula	Little-wing Pearlymussel	LE	-	NLAA	-
Plethobasus cicatricosus	White Wartyback	LE	-	NLAA	-
Plethobasus cooperianus	Orange-foot Pimpleback	LE	-	NLAA	-
Plethobasus cyphyus	Sheepnose	LE	-	NLAA	-
Pleurobema clava	Clubshell	LE	-	NLAA	-
Pleurobema curtum	Black Clubshell	LE	-	NLAA	-
Pleurobema decisum	Southern Clubshell	LE	Y	NLAA	NLAA
Pleurobema furvum	Dark Pigtoe	LE	Y	NLAA	NLAA
Pleurobema georgianum	Southern Pigtoe	LE	-	NLAA	-
Pleurobema gibberum	Cumberland Pigtoe	LE	-	NLAA	-
Pleurobema hanleyianum	Georgia Pigtoe	LE	-	NLAA	-
Pleurobema marshalli	Flat Pigtoe	LE	-	NLAA	-
Pleurobema perovatum	Ovate Clubshell	LE	Y	NLAA	NLAA
Pleurobema plenum	Rough Pigtoe	LE	-	NLAA	-
Pleurobema taitianum	Heavy Pigtoe	LE	-	NLAA	-
Pleuronaia dolabelloides	Slabside Pearlymussel	LE	Y	NLAA	NLAA
Potamilus capax	Fat Pocketbook	LE	-	NLAA	-
Potamilus inflatus	Alamababama (inflated) Heelsplitter	LT	-	NLAA	-
Ptychobranchus greenii	Triangular Kidneyshell	LE	Y	NLAA	NLAA
Ptychobranchus subtentum	Fluted Kidneyshell	LE	Y	NLAA	NLAA
Quadrula cylindrica	Rabbitsfoot	LT	Y	NLAA	NLAA
Quadrula cylindrica strigillata	Rough Rabbitsfoot	LE	Y	NLAA	NLAA
Quadrula fragosa	Winged Mapleleaf	LE	-	NLAA	-
Quadrula intermedia	Cumberland Monkeyface	LE	-	NLAA	-
Quadrula sparsa	Appalachian Monkeyface	LE	-	NLAA	-
Quadrula stapes	Stirrupshell	LE	-	NLAA	-
Toxolasma cylindrellus	Pale Lilliput	LE	-	NLAA	-
Villosa fabalis	Rayed Bean	LE	-	NLAA	-
Villosa perpurpurea	Purple Bean	LE	Y	NLAA	NLAA
Villosa trabalis	Cumberland Bean	LE	-	NLAA	-
Snails					

Scientific Name	Common Name	Federal Status	DCH (Y=Yes)	TVA Species Determination	TVA DCH Determination
Anguispira picta	Painted Snake Coiled Forest Snail	LT	-	NLAA	-
Athearnia anthonyi	Anthony's River Snail	LE	-	NLAA	-
Campeloma decampi	Slender Campeloma	LE	-	NLAA	-
Leptoxis ampla	Round Rocksnail	LT	-	NLAA	-
Leptoxis foremani	Interrupted Rocksnail	LE	Y	NLAA	NLAA
Leptoxis plicata	Plicate Rocksnail	LE	-	NLAA	-
Leptoxis taeniata	Painted Rocksnail	LT	-	NLAA	-
Lioplax cyclostomaformis	Cylindrical Lioplax	LE	-	NLAA	-
Pleurocera foremani	Rough Hornsnail	LE	-	NLAA	-
Pyrgulopsis ogmorhaphe	Royal Marstonia	LE	-	NLAA	-
Pyrgulopsis pachyta	Armored Marstonia	LE	-	NLAA	-
Insects					
Neonympha mitchellii	Mitchell's Satyr	LE	-	NLAA	-
Crustaceans					
Orconectes shoupi	Nashville Crayfish	LE	-	NLAA	-
Flowering Plants					
Arabis georgiana	Georgia Rock-cress	LT	Y	NLAA	NE*
Conradina verticillata	Cumberland Rosemary	LT	-	NLAA	-
Liatris helleri	Heller's Blazing Star	LT	-	NLAA	-
Lindera melissifolia	Pondberry	LE	-	NLAA	-
Ptilimnium nodosum	Harperella	LE	-	NLAA	-
Sagittaria secundifolia	Kral’s Water-plantain	LT	-	NLAA	-
Spigelia gentianoides	Gentian Pinkroot	LE	-	NLAA	-
Spiraea virginiana	Virginia Spiraea	LT	-	NLAA	-

*NE = No Effect

Biological Opinion

Programmatic Strategy for Right-of-Way Vegetation Management that May Affect Endangered or Threatened Plants in the Tennessee Valley Authority Service Area

FWS Log #: 04ET1000-2018-F-0958

Prepared by:

U.S. Fish and Wildlife Service
Tennessee Ecological Services Field Office
446 Neal Street
Cookeville, Tennessee 38501

VIRGIL ANDREWS Digitally signed by VIRGIL ANDREWS
Date: 2019.05.08 15:38:58 -04'00'

Virgil Lee Andrews, Jr. Date
Acting Field Office Supervisor

TABLE OF CONTENTS

Abbreviations/Acronyms

ac	acre(s)
ADCNR	Alabama Department of Conservation and Natural Resources
ANHP	Alabama Natural Heritage Program
AMM	avoidance and minimization measure
ATV	all-terrain vehicle
BA	biological assessment
BISO	Big South Fork National Scenic River and Recreation Area
BMP	best management practices
BO	biological opinion
CFR	Code of Federal Regulations
CH	federally designated critical habitat
cm	centimeter(s)
COE	United States Army Corps of Engineers
CR/CAP	Condition Report/Corrective Action Plan
dc	decimeter(s)
DOD	United States Department of Defense
EO	element occurrence
EPA	United States Environmental Protection Agency
ESA	Endangered Species Act of 1973
FY	fiscal year
FO	field office (refers to a state U.S. Fish and Wildlife Ecological Services Office)
FR	Federal Register
Ft	Foot or Feet
GDNR	Georgia Department of Natural Resources
GIS	Geographic Information System
IDNR	Indiana Department of Natural Resources
in	inch(es)
KNHP	Kentucky Natural Heritage Program
KSNPC	Kentucky State Nature Preserves Commission (recently renamed as the Office of Kentucky Nature Preserves)
km	kilometer(s)
km^2	square kilometer(s)
LAA	may affect, and is likely to adversely affect
LBL	Land Between the Lakes National Recreation Area
LRCNP	Little River Canyon National Preserve
LTNA	Land Trust of North Alabama
m	meter(s)
m^2	square meter(s)
mi	mile(s)
mi^2	square mile(s)
mm	millimeter(s)
mph	miles per hour
NEPA	National Environmental Policy Act
NB	National Battlefield

NF	National Forest
NLAA	may affect, but not likely to adversely affect
NMLT	North Mississippi Land Trust
NRCS	Natural Resources Conservation Service
NP	Nature Preserve
NPS	National Park Service
O&M	operations and maintenance
ORV	off-road vehicle
O-SAR	Office Level Sensitive Area Review
PSA	Power Service Area
PSF	Pickett State Forest
PSP	Pickett State Park
QA/QC	quality assurance/quality control
RM	river mile(s)
RO	United States Fish and Wildlife Service, Southeast Regional Office
ROW	rights-of-way
SMZ	streamside management zone
SNA	State Natural Area
SNHP	State Natural Heritage Program
SOP	standard operating procedure
TDEC	Tennessee Department of Environment and Conservation
TL	transmission line
TDNA	Tennessee Division of Natural Areas
TNC	The Nature Conservancy
TNFO	Tennessee Ecological Services Field Office
TNHP	Tennessee Natural Heritage Program
TVA	Tennessee Valley Authority
TWRA	Tennessee Wildlife Resources Agency
USDA	United States Department of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
WMA	Wildlife Management Area
WWC	Wet Weather Conveyance

CONSULTATION HISTORY

This section lists key meetings and correspondence (events) during the course of this consultation. A complete administrative record of this consultation is on file in the U.S. Fish and Wildlife Service's (USFWS) Tennessee Ecological Services Field Office (TNFO).

Date	Event	Participants	Discussion Topic
Nov. 27, 2017	Telephone call	Tennessee Valley Authority (TVA) staff; USFWS TNFO staff	Scope of consultation and TVA interest in having a meeting with Field Offices (FOs) from all seven states intersected by the TVA power service area (PSA). TNFO is lead office.
Dec. 18, 2017	Video Conference hosted by TVA, Knoxville, TN	TVA Staff; USFWS TN, KY, GA, MS, and VA FO staff	Discussion of consultation scope, TVA right-of-way (ROW) vegetation management practices, and proposed project schedule.
Jan. 3, 2018	Postal correspondence	TVA to USWFS TNFO	Letter requesting early coordination, including draft species list and proposed schedule.
Feb. 28, 2018	Video Conference hosted by TVA, Knoxville, TN	TVA Staff; USFWS TN, AL, and GA FO staff	Presentation of TVA debris management techniques and rationale behind TVA preliminary species determinations.
Mar. 6, 2018	Conference call	Staff from TVA and USFWS Southeast Regional Office (RO)	Recent retirement of TNFO Field Supervisor and discussion of moving the consultation forward.
Mar. 14, 2018	Conference call	Staff from TVA and USFWS Southeast RO	USFWS Southeast RO clarified that it would function as a facilitator and provide a support role during the consultation, and the TNFO would retain responsibility for development and completion of the biological opinion (BO).
Mar. 14, 2018	E-mail correspondence	GIS staff from USFWS TNFO and TVA staff	Initiated coordination with TVA to acquire maps, illustrating locations of TVA transmission lines (TLs) to overlay listed species occurrences.
Mar. 20, 2018	Telephone call	Staff from TVA and USFWS Southeast RO	USFWS Southeast RO provided updates on recent USFWS

Date	Event	Participants	Discussion Topic
			activities and upcoming meetings.
Mar. 22, 2018	Postal correspondence	TVA to USFWS Southeast RO	TVA sent a non-disclosure agreement to USFWS for release of map data with TVA TL locations.
Apr. 4, 2018	E-mail correspondence	Staff from TVA, USFWS Southeast RO, and USFWS AL, GA, NC, MS, KY, TN, and VA FOs	TVA responded to USFWS questions from recent internal meeting.
Apr. 16, 2018	Telephone call	Staff from TVA, USFWS Southeast RO, and USFWS AL, GA, NC, MS, KY, TN, and VA FOs	Discussed what actions and species should be covered in the consultation and reviewed TVA's ROW Vegetation Management methods and tools and project scope.
June 13, 2018	Video Conference hosted by TVA, Knoxville, TN	Staff from TVA, Southeast RO and USFWS AL, GA, NC, MS, KY, TN, and VA FOs	Discussed species determinations for all listed species in the Action Area.
July 10, 2018	E-mail correspondence	Staff from USFWS ALFO and TVA	Discussed effect determinations for Black Warrior waterdog, flattened musk turtle, and whooping crane.
July 13, 2018	E-mail correspondence	Staff from USFWS GA and TNFOs, USFWS Southeast RO and TVA	Discussed effect determinations for species found in the Conasauga River in TN and GA.
July 18, 2018	Telephone call	Staff from MSFO and TVA	Discussed effect determinations for Mitchell's satyr and red-cockaded woodpecker.
July 24, 2018	Telephone call	Staff from VAFO and TVA	Discussed effect determinations for aquatic species, particularly those in the Clinch and Powell rivers.
July 24, 2018	E-mail correspondence	Staff from TVA, USFWS Southeast RO, and USFWS AL, GA, NC, MS, KY, TN, and VA FOs	TVA sent message with complete species list and all species determinations discussed by USFWS and TVA.

Date	Event	Participants	Discussion Topic
Aug. 13, 2018	Conference call	Staff from TVA, USFWS Southeast RO, and USFWS AL, GA, NC, MS, KY, TN, and VA FOs	TVA discussed rationale underlying determinations for designated critical habitats (CH). TVA provided the schedule for remainder of consultation.
Sept. 14, 2018	E-mail correspondence	Staff from TVA, USFWS Southeast and Northeast ROs, and USFWS AL, GA, NC, MS, KY, TN, and VA FOs	TVA submitted draft biological assessment (BA).
Oct. 2018	E-mail correspondence	Staff from TVA and USFWS GAFO	Discussion of the potential effects of mechanical tree clearing on aquatic species in the Conasauga River basin.
Nov. 19, 2018	E-mail and postal correspondence	TVA provided to USFWS Southeast RO and USFWS AL, GA, NC, MS, KY, TN, and VA FOs	TVA submitted the Final BA.
Dec. 18, 2018	E-mail correspondence, letter attached	USFWS TNFO provided to TVA	The TNFO initiated formal consultation and indicated that the subject draft BO would be provided to TVA no later than Mar. 5, 2019 and the final BO provided to TVA no later than Apr. 5, 2019.
Feb. 20, 2019	E-mail correspondence	USFWS TNFO provided to TVA	Based on a Feb. 8, 2019 conference call between the USFWS Southeast RO, USFWS TNFO and TVA, the TNFO provided revised due dates for the draft and final BO (due to a several week government shutdown, deliverable dates had to be extended). The revised draft BO due date was indicated as Apr. 9, 2019, and the revised final BO due date was indicated as May 10, 2019.
Apr. 9, 2019	E-mail correspondence	USFWS TNFO provided to TVA	The TNFO notified TVA that the draft BO would be forthcoming on April 10, 2019.

Date	Event	Participants	Discussion Topic
Apr. 10, 2019	E-mail correspondence	USFWS TNFO provided to TVA	The TNFO forwarded the draft BO to TVA for review and comment.
Apr. 11 – May 3, 2019	Telephone calls and E-mail correspondence	Staff from USFWS TNFO and TVA	The TNFO and TVA coordinated regarding reviews and necessary revisions to the draft BO.
Apr. 29, 2019	E-mail correspondence	TVA provided to USFWS TNFO	The TVA provided comments on the draft BO to the TNFO for consideration and incorporation into the document.
Apr. 30, 2019	E-mail correspondence	USFWS TNFO provided to TVA	The TNFO provided the final draft BO to TVA for review and comment.
May 3, 2019	E-mail correspondence	TVA provided to USFWS TNFO	The TVA provided comments on the final draft BO to the TNFO for consideration and incorporation into the document.
May 8, 2019	E-mail correspondence	USFWS TNFO provided to TVA	The TNFO provided the signed, final BO to TVA.

BIOLOGICAL OPINION

1. INTRODUCTION

A biological opinion (BO) is the document that states the opinion of the USFWS under section 7 of the Endangered Species Act of 1973, as amended (ESA), as to whether a Federal action is likely to:

- jeopardize the continued existence of species listed as endangered or threatened; or
- result in the destruction or adverse modification of designated critical habitat (CH).

The Federal action addressed in this BO is the TVA proposed programmatic strategy for ROW vegetation management that may affect 18 endangered or threatened plants in the TVA Power Service Area (PSA) (the Action). The TVA's request for formal consultation was received on November 21, 2018, and formal consultation was initiated on that date. With that correspondence, TVA enclosed a Biological Assessment (BA) for the Action, dated November 2018, which describes how three overarching categories and 13 methods of vegetation management, that TVA authorizes, funds, or carries out, would be carried out over the next 20 years. Four bat species, and all potential effects to bats from TVA ROW vegetation management activities were previously addressed in the recently finalized BO, *Programmatic Strategy for Routine Actions that May Affect Endangered or Threatened Bats* (signed April 12, 2018).

The BA addresses potential effects to all 163 plant and animal species, federally-listed as endangered or threatened at the date of the BA, that could occur in the 209 county area that intersects the TVA PSA and associated TLs. TVA also addresses how the proposed vegetation management methods and tools may affect CHs for a number of species. The TVA transmission system intersects CH for 35 species. Bat species are not analyzed here because the recent Biological Opinion *Programmatic Strategy for Routine Actions that May Affect Endangered or Threatened Bats* (signed April 12, 2018) accounts for all effects of TVA ROW vegetation management on those species.

The TVA determined that all 13 of methods of vegetation management have no effect on one arachnid, one snail, three crustaceans, and 13 plants or designated CH for 12 species (Appendix I). The TVA also determined that all 13 of methods of vegetation management are "may affect, but not likely to adversely affect" (NLAA) 127 species, including one mammal, five birds, two reptiles, two amphibians, 36 fish, 60 freshwater mussels, eleven snails, one insect, one crustacean, and eight flowering plants; TVA also made a NLAA determination for CH designated for one amphibian, 14 fish, 19 mussels, and one snail (Appendix I). By letter dated December 18, 2018, the USFWS concurred with TVA's NLAA determinations, which concluded the consultation relative to these species, CHs, and activities. Until new information warrants a reinitiation of the consultation that supported these activity-specific findings, projects that are fully consistent with the activity description in the BA do not require further consultation with the USFWS regarding the species and CHs for which the USFWS provided programmatic concurrence. TVA will annually report all project-level activities that complied with ESA §7(a)(2) by relying on the programmatic consultation (see Section 21 below).

Finally, the TVA determined in the BA that the Action "may affect, and is likely to adversely affect" (LAA) the eighteen plant species, listed below:

- Price's potato-bean (*Apios priceana*)
- Braun's rock-cress (*Arabis perstellata*)
- Pyne's ground plum (*Astragalus bibullatus*)
- Morefield's leather-flower (*Clematis morefieldii*)
- Alabama leather-flower (*Clematis socialis*)
- leafy prairie-clover (*Dalea foliosa*)
- whorled sunflower (*Helianthus verticillatus*)
- small whorled pogonia (*Isotria medeoloides*)
- fleshy-fruit gladecress (*Leavenworthia crassa*)
- lyrate (*a.k.a.*, lyreleaf) bladderpod (*Lesquerella lyrata*)
- Spring Creek bladderpod (*Lesquerella perforata*)
- Mohr's Barbara's buttons (*Marshallia mohrii*)
- Cumberland sandwort (*Minuartia cumberlandensis*)
- Short's bladderpod (*Physaria globosa*)
- white fringeless orchid (*Platanthera integrilabia*)
- green pitcher plant (*Sarracenia oreophila*)
- large-flowered skullcap (*Scutellaria montana*)
- Tennessee yellow-eyed grass (*Xyris tennesseensis*)

This BO is limited in scope to evaluating the effects of 12 of the 13 methods of ROW vegetation management that TVA determined would LAA the 18 plant species listed above. One method of vegetation management (Reseeding, Restoration) is considered further in the BO as explained later in Section 2.

ESA §9(a)(2) prohibits certain acts with respect to endangered plant species, including acts that:

(a) remove and reduce to possession from areas under Federal jurisdiction;
(b) maliciously damage or destroy on areas under Federal jurisdiction; and
(c) remove, cut, dig up, or damage or destroy on any other area in knowing violation of any law or regulation of any state or in the course of any violation of a state criminal trespass law.

Regulations issued under ESA §4(d) extend the prohibition under (a) above to threatened plant species (50 CFR §17.71). The damage or destruction of endangered and threatened plants that is incidental to (not the purpose of) an otherwise lawful activity is not prohibited. A Federal action that is likely to jeopardize the continued existence of listed plant species is not lawful; therefore, our BO evaluates the effects of the Action to the 18 listed plant species included under this consultation.

A Federal action that is likely to destroy or adversely modify designated CH is not lawful. Based on the information provided in the BA, the USFWS concurred with TVA's NLAA determinations for CH potentially affected by the Action. Since no CH for listed plant species will be destroyed or adversely modified, this BO does not further mention or address CH.

A BO evaluates the effects of a Federal action along with those resulting from interrelated and interdependent actions, and from non-federal actions unrelated to the proposed Action (cumulative effects), relative to the status of listed species and the status of CH. A USFWS opinion that concludes a proposed Federal action is *not* likely to jeopardize species and is *not* likely to destroy or adversely modify CH fulfills the Federal agency's responsibilities under §7(a)(2) of the ESA. "*Jeopardize the continued existence*" means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR §402.02).

2. PROPOSED ACTION

TVA proposes a Vegetation Management Programmatic Strategy (the Action) to streamline the manner in which the agency fulfills its responsibilities under ESA §7 relative to ESA-listed plant species. TVA's BA for the Action describes various methods that may affect listed plant species and conservation measures, including best management practices (BMPs), standard operating procedures (SOPs), and avoidance and minimization measures (AMMs), that TVA will apply to ameliorate adverse effects. Addressing these activities programmatically is intended to promote consistency, predictability, and efficiency of project-level consultations, and to more effectively address the conservation needs of listed plants at local and landscape scales.

The Action is comprised of 13 methods of vegetation management under the following three general action categories that TVA authorizes, funds, or carries out:

1) vegetation control;
2) debris management; and
3) ROW restoration.

The Action does *not* include activities associated with:

- Maintenance work on existing TL infrastructure (*e.g.*, pole/structure replacement, addition of grillage/surcharge, installation of lightning arrestors, overhead ground wire replacement, reconductoring, or any other work on TL assets).
- Intentional ground disturbance (excavation/fill, access road construction, *etc*.), work within a stream channel, and placing fill in wetland.
- Future ROW acquisitions and new TL construction.[1]

TVA determined that 12 of the 13 methods of vegetation management under two of the three general action categories, listed above, are LAA the 18 endangered and threatened plants discussed in Section 1:

[1] To address potential impacts of vegetation management along new TL ROW, TVA would tier from this programmatic ROW vegetation management consultation unless the environmental conditions projected to be present in the new ROW are not addressed in this document.

1) Manual Clearing – cutting or pulling using hand tools or chainsaws;
2) Mechanical Clearing – clearing of trees and shrubs where previous vegetation maintenance has been infrequent and woody plants have encroached into the ROW or removal of vegetation in areas where trees were never cleared. Mechanical clearing can also be used to safely remove off-ROW danger trees;
3) Mechanical Mowing – mowing of herbaceous plants and seedlings to maintain vegetation within the floor area of the ROW;
4) Mechanical, Side-Wall Trimming – tree trimming, from ground or air, on the ROW edge;
5) Herbicide, Spot Treatment – highly targeted herbicide application, such as stump treatment or hack and squirt;
6) Herbicide, Localized – low volume foliar application is most common, but basal treatment, localized granular application, and bareground treatments are also included;
7) Herbicide, Broadcast (ground) – non-selective herbicide application made from the ground;
8) Herbicide, Broadcast (aerial) – non-selective herbicide application made from the air using a fixed-wing airplane or helicopter equipped with a boom-type spray assembly;
9) Manual, Debris Management – cut and leave trees, but material may be cut into smaller pieces to facilitate decomposition;
10) Mechanical, Debris Management – chipping, mulching, and off-site hauling of debris;
11) Burning, Debris Management – burning in piles or containers; and
12) Landowner Use, Debris Management – debris can be provided to the landowner in the form of firewood or mulch.

In this BO, we do not further address the one method of vegetation management (Reseeding, Restoration) described for the Action that TVA determined is NLAA listed plants. The USFWS concurs with that determination based on the discountable nature of affects associated with that method. As a result, the scope of the BO is limited to the 12 methods of vegetation management included above that are LAA the 18 listed plants, and to the proposed conservation measures that are relevant to these species.

In the context of consultation under ESA §7(a)(2), the Action is consistent with the regulatory definition at 50 CFR §402.02 of a "framework programmatic action," which is a Federal action that approves a framework for the development of future actions that are authorized, funded, or carried out at a later time, and are subject to further consultation.

2.1. Action Area

For purposes of consultation under ESA §7, the action area is defined as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action" (50 CFR §402.02). The 13 vegetation management methods of the programmatic Action will occur on lands associated with the three general action categories listed in the previous section.

TVA's transmission system consists of a network of more than 16,000 miles (mi) of electric TLs and about 500 power substations, which are all contained within 238,196 acres (ac) of utility ROW. The ROW width for a single line varies from approximately 75 feet (ft) to 200 ft, increasing with the voltage of the line. ROWs containing multiple lines can be larger depending on the number of lines and voltage. As summarized in Table 2-1, TVA's transmission ROW can be classified into three broad categories based on the need for routine vegetation maintenance. TVA has management responsibility for the entirety of the 238,196 ac of transmission ROW; however, TVA actively maintains only approximately 47 percent or 110,752 ac. This is because approximately 52 percent of the transmission ROW is used as cropland, golf courses, orchards or similar uses that integrate compatible vegetation, which is primarily maintained by the respective landowners.

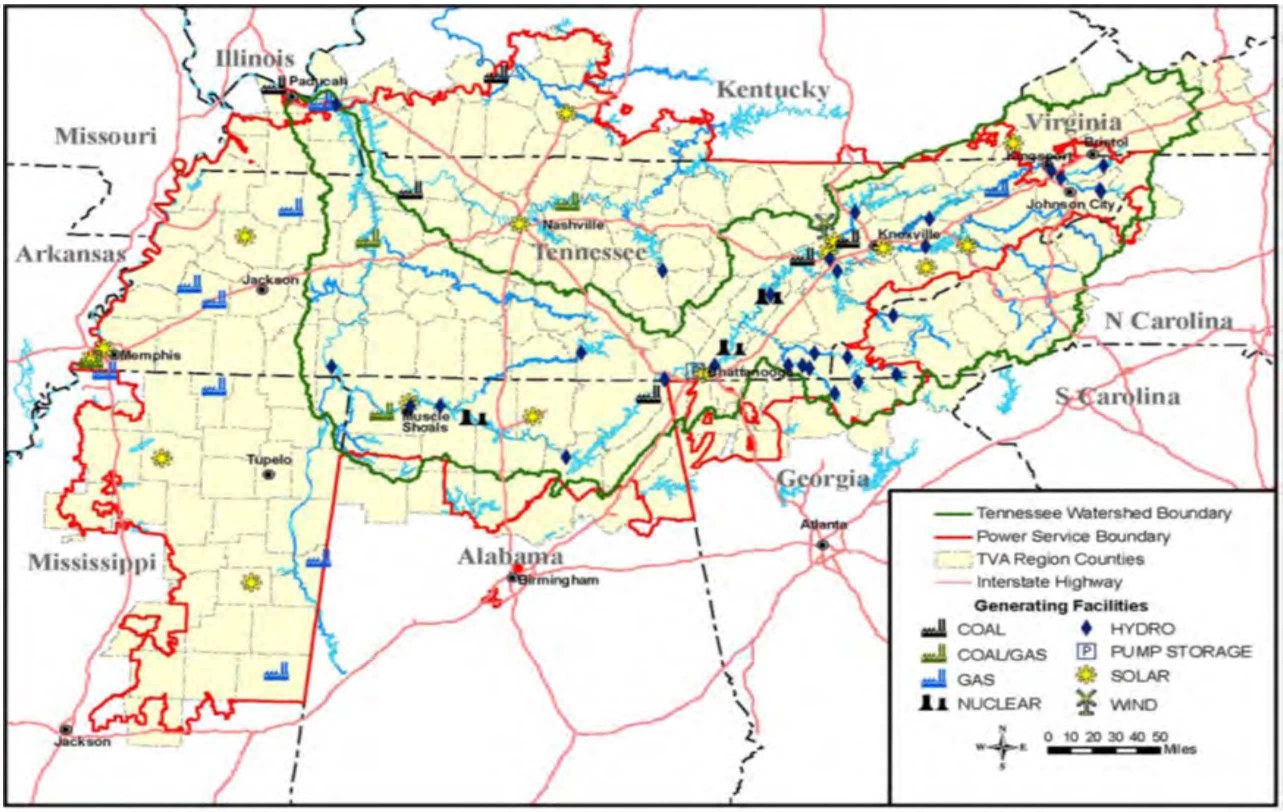
A relatively small amount of the TVA transmission system ROW (4,720 ac) does not require routine vegetation management by TVA or the landowner. These areas include transmission ROW that spans open water or deep valleys where vegetation growing at lower elevations does not threaten the TL.

Table 2-1. Summary of routine vegetation maintenance responsibility and extent within TVA transmission rights-of-way (source: BA Table 1-1).

Broad Land Management Category	ROW (ac)	Percent of ROW
Lands Primarily Maintained by Others	122,724	51.5%
Lands Not Subject to Management	4,720	2.0%
Lands Actively Managed by TVA	110,752	46.5%
Total	**238,196**	**100%**

The 238,196 ac reported in Table 2-1 are distributed throughout TVA's more than 82,000-square-mile (mi^2) (approximately 52.5-million ac) PSA (Figure 2-1) in Tennessee, northern Alabama, northern Georgia, southern Kentucky, eastern Mississippi, western North Carolina, and southwestern Virginia. TVA has described the total 238,196 ac of transmission ROW lands that may receive effects of project activity at any time during the next 20 years as the "Action Area" for this consultation. The BA does not provide maps delineating Action lands within the TVA PSA, because many are difficult to display effectively at a regional scale (*e.g.,* where various vegetation methods would be applied within the existing transmission ROW network). However, the BA does provide a map of six regions consisting of 12 sectors that TVA has designated for vegetation management purposes (Figure 2-2). The Action Area represents 0.5 percent of the entire 52.5-million acre PSA, within the 82.8 million acre TVA Region.

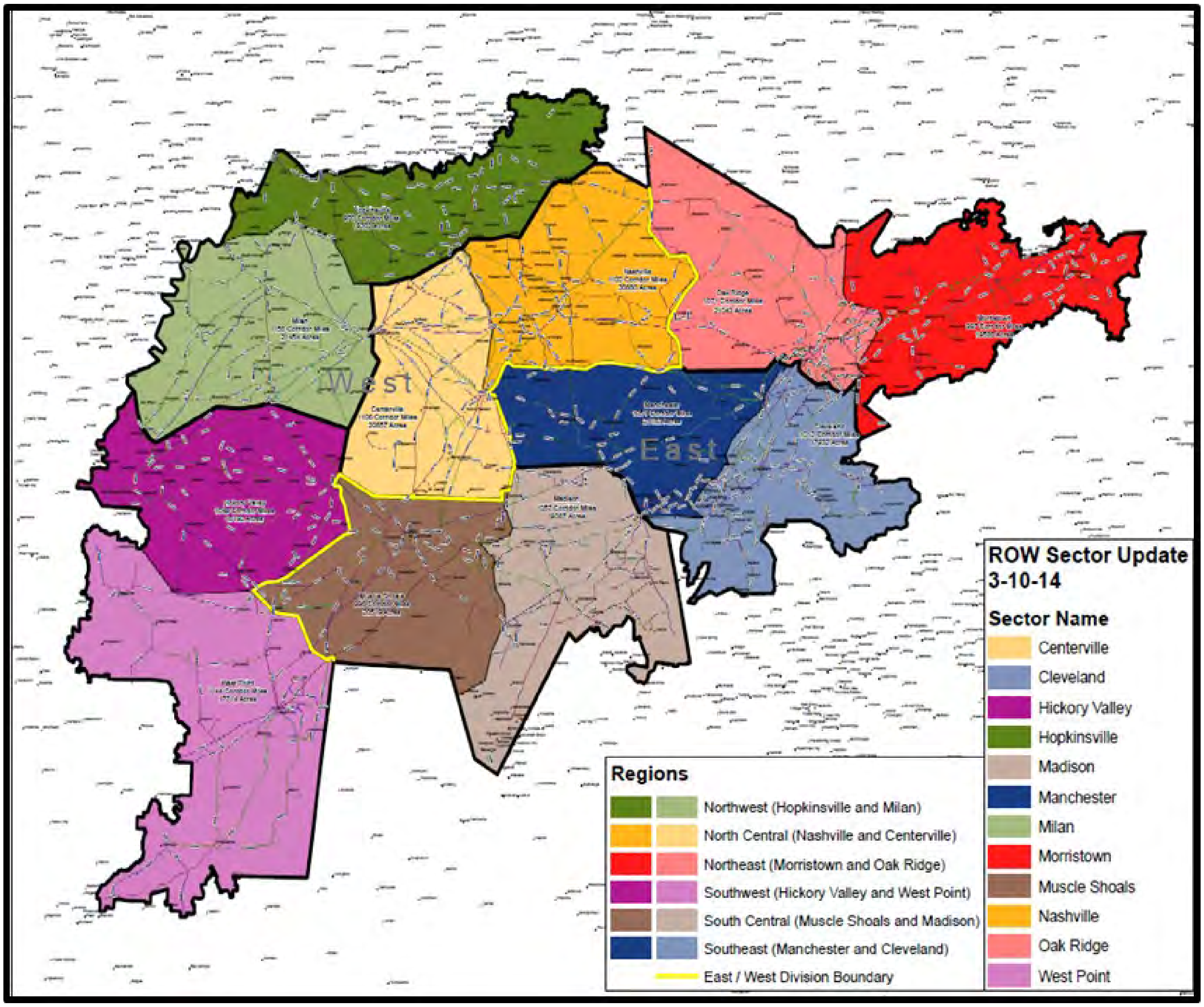
Figure 2-1. TVA Power Service Area (source: BA Figure 1-1).



TVA must continuously manage vegetation occurring on TL ROW in order to ensure reliability of the system. The BA does not provide a project-specific schedule or map of activities over the 20-year Action duration, but TVA does develop annual plans to maintain TL ROWs within each of the 12 vegetation management sectors (Figure 2-2). Routinely, TVA estimates that approximately 47 percent or about 110,752 ac of the 238,196 ac of the Action lands for which the programmatic Action is formulated will receive direct and indirect effects from project activity; therefore, the majority (approximately 52 percent) of the Action lands will receive no effects. Vegetation management activities will likely occur at irregular timeframes due to environmental and site-specific factors. This will mean that some areas may receive vegetation management activities infrequently or that some may be treated on multiple occasions over the 20-year term of the consultation. We have adopted TVA's definition of the Action Area for this programmatic consultation, but we recognize that application and distribution of the vegetation management activities likely will not be uniform; TVA will rely on its annual plan to determine where, when, and which activities are undertaken to meet its overall vegetation management objectives.

Chapter 2 of the BA, "Description of Action Area," provides data about terrestrial vegetation, terrestrial wildlife, and aquatic ecology of the 238,196 ac PSA (i.e., the Action Area), distributed in linear corridors (e.g., transmission ROWs) throughout the region.

Figure 2-2. TVA's vegetation management regions and sectors (source: BA Figure 1-2).



2.2. Vegetation Control

TVA is considering eight methods of vegetation control that can be used alone or in combination to manage vegetation within the TL ROW including:

- Manual clearing;
- Mechanical clearing;
- Mechanical mowing;
- Mechanical side-wall trimming;
- Herbicide, spot treatment;
- Herbicide, localized;
- Herbicide, broadcast (ground); and
- Herbicide, broadcast (aerial).

These vegetation control methods, and the advantages and disadvantages of each method (as perceived by TVA, are described in Table 2-2.

Table 2-2. Transmission Line Right-of-Way Vegetation Control Methods (Source: BA Table 3-1).

Description	Advantages	Disadvantages
Manual Clearing (Hand Work - Pulling or Cutting)		
Chainsaw, machete, brush hooks, axes, bush blades		
Hand clearing work is effective for selective vegetation removal and may be necessary in select areas where mechanical or chemical methods cannot be used. Hand clearing is likely most effective for minor projects or sensitive areas such as wetlands, steep slopes, or where restrictions are imposed on other viable methods.	Selective – Only targeted vegetation is removed. Lighter footprint – Causes less ground disturbance, which mitigates potential impacts to sensitive cultural or biological areas. Can be employed under most field conditions.	Prohibitively expensive for large areas. Labor intensive, less safe to workers, and more intrusive than some herbicide treatments. Typically, most effective for areas of low density vegetation. Can create an environment where resprouting occurs, which increases the woody stem count. Resprouting leads to increased safety concerns and higher costs due to the need for increased long-term vegetation management. Not effective for noxious weeds and can facilitate the expansion of invasive plant communities. Chainsaw use may be restricted at certain times in areas with protected animal species.
Mechanical Clearing (Cutting and Trimming)		
Bulldozer, track-hoe, skid steer, shears (*e.g.*, feller-buncher), mulcher/chipper, Hydro-ax including various other attachments, tracked equipment such as Compact Track Loader		
Clearing of trees and shrubs where previous vegetation maintenance has been infrequent and woody plants have encroached into ROW or removal of vegetation in areas where trees were never cleared. Can also be used to safely remove off-ROW danger trees.	Efficient and lowest cost methods of re-clearing, especially for areas of dense vegetation. The use of mechanized equipment can also be used to mitigate certain hazard exposures due to working near energized TLs. Can fell, lift, and stack trees; or mulch trees; or selectively cut trees depending on the machine and attachments. Mechanical equipment that can mulch or chip eliminates removal of large debris, hastens decomposition, adds organic matter to the soil (keeps nutrients in place), and reduces erosion potential.	Used on large, accessible areas. May not be appropriate for sensitive areas (*e.g.*, archeological sites). Cannot be used on steep slopes (>30%). Negative environmental impacts include non-selective removal of vegetation, ground agitation, noise, and possible oil leaks and spills. Not effective against noxious weeds, as the machines scatter seeds and leave roots. Shatters stumps and supporting near-surface root crowns. Resprouting from shattered stumps and root crowns can produce multi-stem dense stands, which can result in a monoculture (single species vegetation cover).

Description	Advantages	Disadvantages
		Potential seasonal restrictions for sensitive species (*e.g.*, federally listed bat species and ground-nesting birds).
Mechanical Mowing (Mower or brush hog)		
Involves mowing of herbaceous plants and seedlings to maintain vegetation within the floor area of the ROW. Typically performed on a short-term basis (cycle is 3 years or less). Removes and grinds brush and fells small trees.	Effective at grinding brush and felling small trees. Grinding and scattering improves aesthetics, facilitates debris decomposition, and reduces fire hazards. Mowing reduces debris size (creates mulch), hastens decomposition, and adds organic matter to the soil (keeps nutrients in place). Appropriate timing can affect plant community development by selecting for low-growing plants.	Disadvantages are typically the same as those for clearing.
Mechanical (Side-Wall Trimming)		
From air – Helicopter tree saw		
Trimming trees immediately adjacent to the ROW to prevent encroachment within the ROW.	Can prune trees quickly and efficiently.	Requires repeated treatments that may not keep up with fast growing species and leads to ongoing vegetation management cost.
From ground – Hydro-ax, Jarraff & Kershaw line trimmers, aerial lifts		
Trimming trees immediately adjacent to the ROW to prevent encroachment.	Efficient and safer than other trimming methods.	Same as side-wall trimming from air.
Herbicide, Spot Treatment		
Stump spray following cutting to control re-growth. Hack and squirt involves making small cuts in the trunk of target trees and squirting herbicide into the cut. Growth regulators are designed to reduce growth rates of some fast-growing species.	Stump spraying kills unwanted woody plants by preventing re-growth or sucker growth. Growth regulators are helpful to slow growth and avoid removal where tree removals or vegetation conversions are prohibited or impractical (*e.g.*, urban forests). Result in better erosion protection, more wildlife food and cover plants, and often yield an increase in flowering plants and shrubs which enhances available pollinator habitat. Select herbicides retain ground cover, which helps reduce erosion issues in the transmission ROW, and the ground cover provides habitat, which helps retain the biological communities associated with those habitats.	Effectiveness varies by season (works best when plants are taking up nutrients for the winter). Growth regulators are not economical on a large scale. Applicators must be trained, follow applicable state guidelines for licensure and charter requirements. Applicators must also follow manufacturer instructions and U.S. Environmental Protection Agency (EPA) guidelines. Application can require written permissions or permits. Multiple, specific restrictions on applications around waterbodies, agricultural areas, urban areas, federal and state parks and forests, and other sensitive areas. Herbicides must be prevented from reaching streams whether by direct

Description	Advantages	Disadvantages
		application or through runoff (unless labeled for aquatic use). Timing of application is seasonally dependent.
Herbicide, Localized		
Individually treats selected species or groups of species within a limited area using a variety of techniques including: Basal treatments – herbicides are applied by hand via squirt bottle or backpack to the base of the plant from the ground up to knee height. Low-volume foliar treatments – herbicides primarily are applied by workers using backpack sprayers and applicator. An all-terrain vehicle (ATV) or tractor with a spray-gun attachment also can be used. Herbicide is applied to the foliage of individual or clumps of plants according to the label directions during the growing season. Localized granular application – granular or pellet forms of herbicide are hand-applied to the soil surface beneath the drip lines of an individual plant or as close to a tree trunk or stem base as possible. Herbicide is applied when there is enough moisture to dissolve and carry the herbicide to the root zone. Bare-ground treatments – applications made via backpack sprayer, ATV, tractor with a spray-gun, or hand disbursed. This approach treats the ground to keep any vegetation from growing rather than treating the vegetation itself. The herbicide used can be in liquid or granular formulations. This technique commonly would be used in an electric yard (substation) and around wood transmission poles within the transmission ROW.	Species-specific, low-volume applications of herbicides using a variety of techniques and timing show definite improvement of ROW plant diversity. Work well in treating deciduous tree stumps to prevent resprout and regrowth in the transmission ROW. Selective treatment of vegetation at a distance allows for less ground disturbance, which minimizes inadvertent damage to sensitive areas or compatible (non-targeted) vegetation. Result in better erosion protection, more wildlife food and cover plants, and often yield an increase in flowering plants and shrubs which enhances available pollinator habitat. Select herbicides retain ground cover, which helps reduce erosion issues in the transmission ROW, and this ground cover provides habitat, which helps retain the biological communities associated with those habitats.	Applicators must be trained, follow applicable state guidelines for licensure and charter requirements. Applicators must also follow manufacturer instructions and U.S. EPA guidelines. Application can require written permissions or permits. Multiple, specific restrictions on applications around waterbodies, agricultural areas, urban areas, federal and state parks and forests, and other sensitive areas. Herbicides must be prevented from reaching streams whether by direct application or through runoff (unless labeled for aquatic use). Timing of application is seasonally dependent.
Herbicide, Broadcast (Ground)		
Non-selective, broadcast applications made from the ground (manual and mechanical) to treat an entire area, rather than individual	Herbicides can be liquid, granular, or powder and can be broadcast, giving this method some application flexibility. Involves less ground disturbance when applied at a distance, which minimizes	Applicators must be trained, follow applicable state guidelines for licensure and charter requirements. Applicators must also follow

Description	Advantages	Disadvantages
plants or small groupings of plants. Used to treat transmission ROWs that are heavily vegetated, and also are used to treat noxious weeds. Application techniques include: High-volume foliar treatments – herbicide is applied by truck, ATV, or tractor with a spray-gun, broadcast nozzle, or boom to spray foliage and stems of target vegetation. The herbicide mixture is pumped through hoses to either a hand-held nozzle or a boom. Cut-stubble treatment – herbicide is applied from a mobile boom over large swaths of freshly mechanically-cut areas to prevent resprout or regrowth of vegetation. This is the broadcast style of stump treatment. Broadcast granular treatment – granular forms of herbicide are dispersed by hand, belly grinder (a front-held container that disperses seeds by turning a hand crank), truck, or tractor. The herbicide is dispersed over a relatively large area, such as in an electric yard (substation) or around the tower legs of a transmission structure. Broadcast bare-ground treatments – herbicide is dispersed by ATV or tractor with a spray-gun by trucks with mounted booms, or can be hand disbursed. This application treats the ground to keep vegetation from growing, but covers a wider area than other broadcast application methods. Generally, this application technique is used in electric yards (substations) and other areas that need to be kept completely clear of vegetation for safety purposes (*i.e.*, prevention of worker electrocution due to vegetation creating a difference in the electrical potential).	damage to soils, archaeological resources, and nesting and tunneling wildlife.	manufacturer instructions and U.S. EPA guidelines. Application can require written permissions or permits. Multiple, specific restrictions on applications around waterbodies, agricultural areas, urban areas, federal and state parks and forests, and other sensitive areas. Herbicides must be prevented from reaching streams whether by direct application or through runoff (unless labeled for aquatic use). Timing of application is seasonally dependent.

Description	Advantages	Disadvantages
Herbicide, Broadcast (Aerial) - Aerial Sprayers		
Non-selective herbicide application made from a fixed wing or rotary aircraft.	Cost-effective because it can be used without disturbing the ROW. Can be cost effective and efficient for large, remote, or difficult-to-access sites. Herbicides can be liquid, granular, or powder and can be broadcast, giving this method some application flexibility. Involves less ground disturbance when applied at a distance, which minimizes damage to soils, archaeological resources, and nesting and tunneling wildlife.	Requires preflight walking or flying inspection 72 hours (hrs) prior to application (or as specific state statutes require). Aerial application of herbicides requires specific weather conditions (*e.g.*, wind speed, fog, temperatures) and involves risks associated with flying. Long-term decreases in diversity of native plants and degraded habitat for sensitive species. Aerial applications require buffers around sensitive resources. Threat to off-target vegetation from drift of herbicides. Applicators must be trained, follow applicable state guidelines for licensure and charter requirements. Applicators must also follow manufacturer instructions and U.S. EPA guidelines. Application can require written permissions or permits. Multiple, specific restrictions on applications around waterbodies, agricultural areas, urban areas, federal and state parks and forests, and other sensitive areas. Herbicides must be prevented from reaching streams whether by direct application or through runoff (unless labeled for aquatic use). Timing of application is seasonally dependent.

2.3. Debris Management

A second general TVA action category identified in section 2 routinely involves a need to manage debris. TVA is considering four methods of general debris management that can be used alone or in combination to manage debris within the TL ROW including:

- Manual, Debris Management;
- Mechanical, Debris Management;
- Burning, Debris Management;
- Landowner Use, Debris Management

These debris management methods, and the advantages and disadvantages of each method, are described in Table 2-3.

Table 2-3. Transmission Line Right-of-Way Debris Management Methods (source: BA Table 3-5).

Descriptions	Advantages	Disadvantages
Manual, Debris Management		
Cut and Leave (left in place) – chainsaws or other manual tools		
Trees may be cut and left in place in specified areas with approval from the appropriate regulatory agency. These areas may include sensitive areas where tree removal would cause excessive ground disturbance or very rugged terrain where windrowed trees are used as sediment barriers along the edge of the ROW. TVA prefers to leave vegetation in place in areas where removal is a significant risk to worker safety.	Eliminates off-site hauling costs. Can provide wildlife habitat under coarse-woody debris (depending on the species of interest). Can provide nutrient recycling (*i.e.*, organic soil matter). Can provide erosion control. Good for sensitive areas or very rugged terrain.	Requires prior approval from appropriate regulatory agency. Potential public backlash because of the initial aesthetics of felled logs and brush debris. Reduced access for subsequent vegetation maintenance activities. Cut vegetation might visually intrude on public or private landowner uses. Can create fuel for wildfires. Can harbor tree pests (e.g., emerald ash borer) and disease.
Cut & Leave (lopping and scattering) - ground crews, chainsaws, brush rakes, skidders		
Branches of trees are cut (lopped) and trunks are cut into 4 to 8 ft. lengths. Limbs and trunks are then scattered throughout the ROW, laid flat, and left to decompose. Debris can then be "crushed" by driving over with machinery (which can speed decomposition).	Eliminates off-site hauling costs. Some mechanical equipment also can mulch or lop and scatter vegetation debris as the equipment moves through an area. Can provide wildlife habitat (depending on the species of interest). Can provide erosion control and nutrient recycling.	Can be difficult, time consuming, and less safe. Cut vegetation might visually intrude in lands traditionally used by others. Can create more fuel for wildfires. Can harbor tree pests (*e.g.*, emerald ash borer), disease, and spread invasive species (*e.g.*, scatter seed). Limited use for certain tree species. For example, pine needles can reduce grass re-growth and there is a risk of poisoning to grazing livestock from pine needles and the wilted leaves of wild cherry. Not appropriate for sensitive areas.
Mechanical, Debris Management		
Chipping in Place – chippers, skidders, grapples, rakes		
Mechanical brush disposal cuts brush into chips (less than 4-inch diameter). Chips are then spread over the ROW. Trunks too large to chip are de-limbed then placed as windrows at the edge or scattered along the ROW, as the situation requires.	Eliminates off-site hauling costs. Can provide erosion control and nutrient recycling (*i.e.*, organic soil matter). Spread-out wood chips and mulch can create a visually appealing park-like look. Windrows can capture snow/precipitation and hold more moisture and provide some shade protection for seedling establishment. Potential benefits to wildlife and nutrient cycling.	Non-target plants can be damaged when debris is dispersed. Chipper machinery can have limited access. More labor intensive than mulching. Windrows allow tree saplings to sprout in places where mechanical equipment cannot reach during future vegetation control.
Mulching in Place – roller-choppers, mulchers, mowers		
Mulching falls between chip and lop-and-scatter methods.	Same as Chipping in Place	Not effective against noxious weeds (spread seed and leave roots).

Descriptions	Advantages	Disadvantages
Debris is cut into 4 inches to 2 ft lengths and scattered in the ROW to decompose and is best used when terrain or conditions do not allow use of mechanical chipping equipment.		Not appropriate for sensitive areas. Non-target plants can be damaged when mulching. Results in more coarse debris than chipping.
Offsite Debris Disposal (hauling) – loaders; truck and trailers		
Cut trees and brush are collected into piles and loaded onto trailers or debris trucks, regardless of debris size. Debris is then hauled by trucks to offsite locations.	Removing all debris can create a more visually appealing look. Creates safer conditions in the ROW for workers and the public. Reduces the fuel available for wildfires.	Trucks can have limited access. Rutting can damage non-target plants and compact soils from repeated truck-trips. May inadvertently spread invasive species by distributing seeds off the ROW. More labor intensive and expensive than Cut and Leave methods. Potential disposal costs at offsite locations.
Offsite Debris Disposal (chip and haul) – chippers; truck and trailers		
Brush is chipped and blown directly into a trailer. Trunks too large to chip are de-limbed then placed onto trailers. All debris is then hauled by trucks to offsite locations.	Removing all debris can create a more visually appealing look. Creates safer conditions in the ROW for workers and the public. Reduces the fuel available for wildfires. Chipping increases the amount of debris that can be loaded onto a single trailer, reducing number of truck-trips needed.	Same as above.
Burning, Debris Management		
Burning (pile) – ground crews, chainsaws, skidders, brush rakes, drip torches		
Debris is moved off the ROW and burned in small piles.	Reduces or eliminates hauling and debris processing costs. Reduces wildfire potential of remaining slash. Reduces transmission of insects and disease.	Reduces air quality, visibility, and public health due to the smoke created by burning woody biomass. Conditions can alter the effectiveness of this method and fire can spread if not managed properly. Workers conducting the burning can experience minor to severe burns, smoke irritation, and inhalation of toxic agents or particulates that can have acute effects. Burning is a hazard in the ROW and near substations where smoke can induce flashovers from electrified facilities. Will typically sterilize an area of the soil, making it susceptible to weeds. The soil in and around the burn should be stirred to re-inoculate the soil with beneficial micro-flora and fauna.

Descriptions	Advantages	Disadvantages
Burning (container) – air current incineration systems (*e.g.*, air current destructor, air curtain burner, trench burner)		
The main operating principle of air curtain incineration systems is high velocity air (curtain) that is blown across and into the upper portion of the combustion chamber. The high volume of air causes over-oxygenation of the fire, and secondly the high velocity airflow over the combustion chamber traps particulates (smoke). These types of burners can efficiently dispose of large quantities of forest waste products at very high temperatures with very little air emissions.	Produces lower smoke emissions compared to pile or broadcast burning. Burns a greater variety of materials (new and old) and turns 95 to 98% of debris into ash. Reduces fire risk and outbreak of insect problems. Operates with fewer restrictions on weather and burn conditions. Residents in urban interface areas are more willing to accept use and remove wood waste and slash fuel hazards around their homes if offered free disposal. The fire is contained and easily and quickly extinguished, if necessary.	Still produces smoke emissions and heat, which may make this option untenable in the ROW. May not be as cost competitive in areas where broadcast and pile burning are acceptable. Requires use of motors to add forced-air into the system which has risks (*e.g.*, fuel spills, emissions, noise). Requires purchase of the system which is an expensive upfront capital cost.
Landowner Use, Debris Management		
Landowner Use - feller-buncher, forwarders, skidders, chainsaws		
Wood that is large enough for firewood or sale by the owner can be cut to lengths upon request and left for the owner's use.	Benefits local landowners and can improve relations overall. Reduces need to remove large timber from the ROW.	Generally, only an option during initial ROW clearing and has limited application for existing ROW vegetation management. Requires prior communication and coordination with local landowners.

2.4. Avoidance and Minimization Measures (AMMs) to Protect Listed Plants

Information in this section was derived from Chapter 4 of the BA.

2.4.1. Office Level Sensitive Area Review (O-SAR)

The types of sensitive resources occurring in or near the transmission ROW vary widely and include threatened and endangered plant and animal species, caves, heron/osprey rookeries, natural areas, and wetlands. To protect sensitive resources on TL ROWs, TVA developed the Office Level Sensitive Area Review (O-SAR) process as an integral component of all of its vegetation management practices.

The O-SAR process is used to address routine vegetation maintenance activities. As part of the O-SAR process, qualified biologists perform reviews of the entire transmission system every three years. These desktop reviews use computer-based mapping programs and a wide array of digital data in lieu of field surveys to ascertain where sensitive resources may occur on TVA transmission ROWs. Field-verified data is added to the O-SAR data, if and when it becomes available. The common and widely available data sets used in office-level reviews include aerial photography, U.S. Geological Survey topographic maps, National Wetlands Inventory data, EPA Level 4 ecoregion maps, and Natural Resource Conservation Service (NRCS) soils maps.

Sensitive resources identified as part of the review process are grouped into five general categories: Plants, Aquatic Animals, Terrestrial Animals, Natural Areas, and Wetlands. Regarding plants, the data descriptions include documented or potential locations of federally or state-listed species or unique communities. Based on proposed vegetation management activities, and the requirements of sensitive resources present within areas to be managed, specific criteria are developed to guide project planning and work. These include limitations on the use of certain vegetation management practices (*e.g.*, broadcast herbicide application would be restricted around federally listed plant populations).

Each AMM is grouped into SAR "classes" for the respective categories. These classes define appropriate or inappropriate vegetation management practices, or impose additional review or coordination requirements prior to initiation of work.

TVA's approach is unique in that it uses specific data as part of the O-SAR review that includes both TL/structure locations coupled with TVA's extensive Regional Natural Heritage database. This is a "living" database that contains approximately 40,000 occurrence records for protected plants, animals, caves, heronries, eagle nests, and natural areas for the entire TVA operations area. TVA shares data with the USFWS, and most of the seven states within the TVA region to ensure the quality of data contained in the TVA Regional Natural Heritage database.

In the first phase of the O-SAR review process, data are added to the O-SAR database, primarily when TVA biologists conduct desktop reviews of portions of the transmission system. O-SAR reviews are conducted annually on approximately 1/3 of the transmission system in conjunction with planned vegetation maintenance activities. If during the review, data indicates a sensitive resource may be present, a polygon that defines the area of interest is created within the O-SAR database and overlaid on the segment of TL ROW under review. Each polygon is assigned an O-SAR class which identifies needed AMMs for the resource.

Sensitive areas may be defined based on information available on the various computer-based mapping sources described above. These also may be added to the O-SAR database because landscape features *(i.e.*, slope, soils, exposed bedrock) and proximity to previously documented resources could indicate that other sensitive resources may be present within or near the ROW easement.

In the second phase of the O-SAR review process, specific guidance governing transmission ROW vegetation management is appended to every identified sensitive resource polygon. This guidance results in the assignment of a "Class" level for each polygon, which is accompanied by specific guidance provided to TVA transmission ROW personnel to support further vegetation management planning efforts. The guidance may be informational or prescriptive and result in limitations of particular control measures, requirements for notification to TVA biologists, or the need for site-specific field surveys to be performed by TVA biologists prior to work activities. This guidance constitutes an important aspect of the implementation of BMPs to minimize environmental impact.

The guidance is particularly important to clearly define what vegetation maintenance activities are permissible within sensitive areas, taking into account the specific sensitive resources that occur or might occur on a given section of transmission ROW. The guidance also seeks to give certainty and flexibility to TVA transmission ROW personnel, who develop vegetation control activities over large areas under schedule and budget constraints.

Resources are assigned to various classes from those that need less special treatment to those that include more sensitive species, which require greater precautions. Resource categories include plants, aquatic and terrestrial animals, natural areas, and wetlands. Because this consultation only addresses listed plants, we only discuss the classes into which plants are categorized and O-SAR guidance, specific to plants, including how the guidance types are assigned, below.

Plants, Class 1

This Class allows for selective herbicide application to woody plants and mechanical/hand-clearing of all vegetation without site-specific coordination with the TVA botanist, regardless of season. Broadcast herbicides are not permitted. This level of guidance is applied to protect rare species and habitats and is applied when federally or state-listed plants, or uniquely diverse plant communities, are somewhat likely to occur within a given section of transmission ROW based on the professional judgment of the TVA botanist when performing desktop O-SAR reviews.

Broadcast herbicide use is prohibited under this guidance because it is considered to be the most detrimental vegetation maintenance tool to rare plants and diverse, herbaceous plant habitats dominated by native plant species. Also, selective application of herbicide to woody plant species often promotes herbaceous habitat and is considered an appropriate tool for the large portions of the TVA transmission system that have not been field surveyed and could contain federally or state-listed plant species.

Currently, broadcast and aerial herbicide is restricted from use on approximately 17 percent (about 41,000 ac) of TVA TL ROWs likely to contain important habitat.

Plants, Class 2

Management of sensitive plant areas assigned as Class 2 requires active coordination between TVA operations' personnel and the TVA botanist. The guidance provided does not prescribe or prohibit any specific tool because each Class 2 area is handled on a case by case basis depending on the site, plant species in question, and the timing/type of vegetation clearing proposed.

This guidance is applied to sensitive areas where federally or state-listed (rank of S1 or S2) species are known to (or are highly likely to) occur. Often, areas covered under this classification are areas of regional conservation significance and contain unique species and habitat that are better represented within the early successional habitats perpetuated within the transmission ROW. Before scheduled vegetation maintenance, particularly herbicide application, TVA botanists regularly perform field surveys to assess the site.

Slightly less than one percent (about 2,000 ac) of TVA transmission ROW is known to contain populations of rare plant species; these areas are designated as Class 2 sites in the O-SAR database. When work is scheduled to occur at these locations, TVA botanists and transmission

ROW operations staff coordinate to ensure habitats are protected. Sometimes the proposed work would not affect listed plants found in the transmission ROW, but sometimes operations staff augment the timing or method of proposed work to protect sensitive resources. The following are representative examples of how O-SAR is used to avoid negative impacts to rare plants.

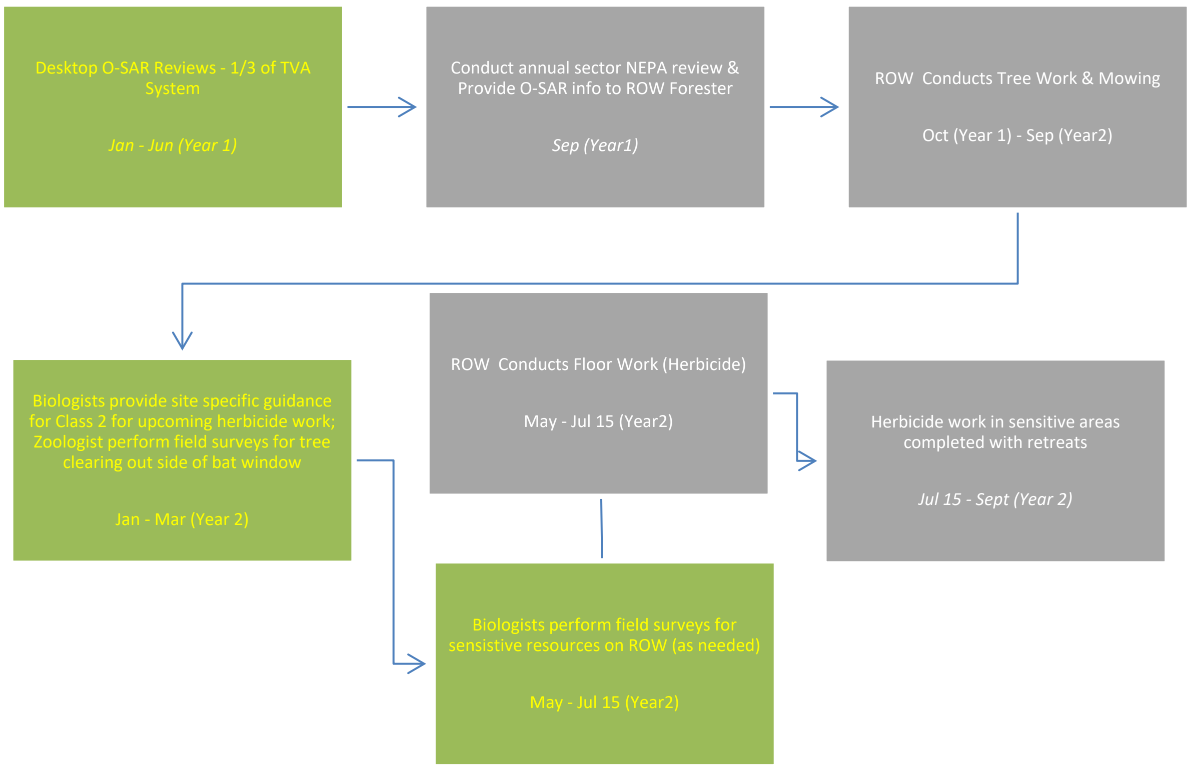
- *Timing* – TVA would avoid spraying herbicide in areas where federally listed plants may occur until after a species has completed its life cycle for the year (*i.e.*, after plants have bloomed and set seed).
- *Flagging* – Before localized herbicide application, typically low volume foliar application to woody plants, TVA botanists would perform field surveys to delineate specific areas where listed plants occur. Sites would be marked in the field with flagging tape and maps provided to the herbicide contractor, along with instructions on how work would be conducted in these areas. Typically, foliar herbicide would not be applied within flagged areas and any woody vegetation within those relatively small areas would be removed with machetes or spot application of herbicide.
- *Conservation Spray* – TVA documents sites where targeted, low-volume foliar application of herbicide to woody plants along the transmission ROW does not appear to negatively impact listed plant populations (*e.g.*, white fringeless orchid). This "conservation spray" differs from standard foliar application of herbicide because of extensive communication between TVA staff and herbicide applicators on the sensitive nature of the site. In addition, there is direct TVA oversight during the application, which leads to extra caution and large reductions in damage to non-target vegetation, such as the white fringeless orchid.
- *Natural Area Cooperation* – Where populations of listed plants occur on TVA TL ROW, TVA has worked with resource managers, who have coordinated with a third party to use herbicides to control woody plants in sensitive areas on ROW. Agreements with land management agencies are made on a case-by-case basis.

2.4.2. Implementation of O-SAR

The O-SAR process is fully integrated into the TVA vegetation management program. Figure 2-3 illustrates how the current iteration of this process fits in with other vegetation management activities and the National Environmental Policy Act (NEPA) reviews, which are conducted annually for each of the twelve ROW sectors that comprise the TVA transmission system. Specific attributes of O-SAR process may change over time, but integration of biology and ROW operations will continue into the future. In addition to ensuring NEPA compliance, these annual environmental reviews incorporate new O-SAR polygons and guidance, generated by TVA biologists, into the vegetation management planning process for the subsequent fiscal year (FY).

When all desktop O-SAR reviews have been completed for plants and all other disciplines (aquatic animals, terrestrial animals, natural areas, and wetlands), this data is then used for each sector specific NEPA review. The information is then passed on to the ROW Forester, who oversees vegetation management for each sector and uses it to inform on-the-ground vegetation management beginning the subsequent FY (i.e., beginning October 1 of each year).

Figure 2-3. Integration of O-SAR into the TVA Vegetation Management Program – Current Process (biologist actions are shown in green and ROW actions in gray) (source: BA Figure 4-3).



After providing updated O-SAR data via desktop review, there are several instances when biologists interact ROW operations staff. These include providing site specific guidance on Class 2 polygons (plants and aquatic animals) ahead of planned herbicide work (*i.e.*, low volume foliar treatment) and performing bat habitat surveys to support proposed tree work that must occur outside of the established clearing window. Botanists typically perform field surveys of Class 2 botany polygons during the growing season. These ROW are skipped during initial herbicide application. This allows botanists to perform field surveys at a seasonally appropriate time before application and prevents the surveys from holding up herbicide crews. The skipped Class 2 botany areas are then treated with other parts ROW in the TVA system that were inadvertently missed during the initial herbicide application (retreats). In these areas, AMMs, such as timing, flagging and conservation spray (See Plants, Class 1 and Class 2 under 2.4.1), are employed on a case-by-case basis according to the findings of the field survey.

2.5. Best Management Practices and Standard Operating Procedures

Information in this section was derived from Chapter 4 of the BA.

Several mechanisms govern how TVA performs ROW vegetation management activities on the ground. These range from formalized procedures and BMPs to indirect controls that serve to limit adverse effects of vegetation work. The formalized processes and procedures outlined in three TVA documents are as follows.

- Guideline for Vegetation Maintenance, Site Specific Environmental Reviews & Permitting (TVA 2015a) – Appendix A of BA.
- A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities, Revision 3 (TVA 2017a) – Appendix B of BA.[2]
- Transmission Environmental Protection Procedures, Right-Of-Way Vegetation Management Guidelines, Revision 8 (TVA 2017b) – Appendix C of BA.

Together, these practices, when paired with the planning and execution that takes place with O-SAR, allow TVA to avoid and minimize effects to listed plant species.

2.5.1. Streamside Management Zone Definition

Given the potential for herbicide application to negatively affect water quality and aquatic organisms, and the potential for soil disturbance to contribute to instream impacts, special restrictions are required when operating adjacent to intermittent or perennial waterbodies, including springs, streams, reservoirs, ponds, rivers, and other waterbodies. Measures are also taken to protect ephemeral streams (sometimes referred to as wet weather conveyances [WWCs]) even when they are not identified on project or topographic maps.

Streamside management zones (SMZs) are defined by TVA as, "an area or zone, covered with vegetation on both sides of perennial and intermittent streams and along the margins of bodies of open water, where extra precaution is used in carrying out activities (including vegetation management) to protect streambanks, instream aquatic habitat, and water quality". The width of SMZs may vary depending on the type of watercourse, primary use of the water resource, topography, existing features, land use, or the known or likely presence of listed animal species. A minimum 50-ft SMZ is established at ROW crossings. The width of the SMZ is increased as determined by conditions identified in Table 2-4.

Table 2-4. Recommended Minimum Width of Streamside Management Zones (source: BA Table 4-2).

Streamside Management Zone Category	Percent Slope of Adjacent Lands				
	1-10	11-20	21-30	31-40	41+
	Streamside Management Zone Width Each Side (Ft)				
A - Standard	50	70	90	110	130
B - Important	70	90	110	130	150
C - Unique	90	110	130	150	170

[2] Note - many techniques found in the BMP manual are designed for construction projects and do not apply to stand-alone vegetation clearing projects, however there are a number of practices that apply to both types of work.

A - Standard SMZ Protection
This is the standard (basic) level of protection for streams, springs, sinkholes, and the habitats around them.

B - Protection of Important Permanent Streams, Springs, and Sinkholes
This category will be used when there is one or more specific reason(s) why a permanent (always-flowing) stream, spring, or sinkhole requires protection beyond that provided by standard BMPs. Reasons for requiring this additional protection include high potential for occupancy by federally listed or significant state listed species, the presence of suitable habitat for federally listed or significant state listed species, CH, or areas designated as a special use classification (*e.g.*, trout waters). The purpose of these guidelines is to minimize the disturbance of the banks and water in the flowing stream(s) where this level of protection is required.

C - Protection of Unique Habitats
This category would be used when, for one or more specific reasons, a temporary or permanent aquatic habitat requires special protection. This relatively uncommon level of protection would be appropriate and required when a unique habitat requiring special protection is present (*e.g.*, the spawning area of a rare species), the stream is known to be occupied by a federally listed or significant state listed species, or when required as a special condition resulting from consultation with the USFWS to avoid project effects on a listed species or CH.

2.5.2. Site Specific Environmental Reviews

TVA uses prescriptive guidance within the O-SAR process to minimize and avoid effects to listed species. Most of this information is generated from desktop reviews. However, there are situations that would trigger a site-specific review by TVA environmental scientists should they arise during the course of vegetation management activities (TVA 2015a). Most of these situations rarely occur during vegetation management, but they include:

- O-SAR conditions and guidance cannot be met;
- Activities with the vicinity of large bird nests >2 ft in diameter;
- Activities in WWCs and SMZs including:
    - Culvert installations
    - Construction of stream crossing
    - Dredging/placing fill or riprap within a SMZ;
- Activities in wetlands including:
    - Equipment use cannot meet requirements laid out in TVA (2017a) for clearing in wetlands
    - Placing fill
    - Leaving brush, timber, tree limbs, debris, *etc*. in wetland area;
- Ground disturbing activities including:
    - Creating new access or clearing/regrading existing access
    - Leveling ground for equipment access
    - Other excavation/fill
    - Landowner requests (*e.g.*, repairing existing access, culvert repairs or installations, grading)

    - Use of bulldozer;
- Herbicide application cannot be applied in accordance with label use restrictions.

If these types of actions are needed during the course of ROW vegetation management, TVA would assess the potential impact of the work and enter into section 7 consultation if the proposed action may affect listed species.

2.5.3. Standard BMPs – Herbicide Use

Herbicides are an important tool in the integrated vegetation management approach utilized by TVA. While appropriate herbicide use benefits the ROW vegetation management program, there are some potential risks associated with their use. Some of these risks include contamination of waterways, over application that results in soil erosion, and unintended damage that could harm off-target plant and animal species. For these reasons, TVA employs a host of BMPs focused on avoiding and minimizing negative impacts of herbicide use. BMPs are reported comprehensively in TVA (2017a, 2017b) and summarized here.

- The sites to be treated are selected and application directed by the appropriate TVA official;
- Herbicide is only applied according to the label, by licensed applicators;
- Temperature, wind speed, and precipitation dictate application;
- Herbicides are not applied to surface water or wetlands unless specifically labeled for aquatic use. Generally, contractors are directed not to apply to waterbodies;
- Use of aerial or broadcast application of herbicides is not allowed within or adjacent to perennial streams, ponds, and other water sources;
- A pre-flight walking or flying inspection must be made within 72 hrs prior to applying herbicides aerially. This inspection should ensure that no land use changes have occurred, sensitive areas are clearly pointed out to the pilot, and proper buffer zones are maintained;
- Aerial application of liquid herbicides normally will not occur when surface wind speeds exceed five miles per hour (mph), in areas of fog, or during periods of temperature inversion or when other conditions exist that the label restricts;
- Pellet application normally will not occur when surface wind speeds exceed 10 mph or on frozen or water-saturated soils;
- Liquid application will cease when the temperature reaches 95 degrees (Fahrenheit) or above. Application during unstable, unpredictable, or changing weather patterns will be avoided. Equipment and techniques will be used that are designed to ensure maximum control of the spray swath with minimum drift; and
- Hand application of herbicides labeled for use within SMZs is used only selectively.

2.5.4. Standard BMPs – Tree Work

TVA employs many practices that encourage environmental stewardship during tree clearing activities. TVA (2017a) discusses how TVA clears vegetation in SMZ and wetlands. Specific BMPs used to minimize soil disturbance and erosion during tree clearing in SMZs and wetlands include:

- Stumps/roots are left in place;
- Hand cutting methods are used in SMZs; feller buncher use is permissible, but rarely used in SMZ for non-construction vegetation clearing; and
- Cut debris will be kept out of intermittent and perennial stream channels, wetlands, or groundwater infiltration zones. Should debris reach these areas, it would be promptly removed.

While not explicitly stated in TVA (2017a), the following practices are standard clearing procedures implemented throughout the ROW, not just in sensitive areas. These techniques limit the potential for erosion and include:

- Avoiding intentional soil disturbance during clearing – trees are hand cut with a chainsaw or cut above ground with machinery;
- Mechanical clearing equipment is not used on steep slopes exceeding 30 percent;
- Stumps and roots are left in place, allowing vegetation to quickly recover;
- Approximately 80 percent of chipping/mulching is completed <2 weeks from when trees are cut. Approximately 20 percent of chipping/mulching is completed >2 weeks from when trees are cut, usually because of weather constraints. In these situations, trees are cut and left in place until chipped or mulched; and
- TVA encourages contractors to adopt new technology as it becomes available. For example, TVA was an early adopter of the tracked chipper, which is a low ground pressure piece of equipment that results in very little soil disturbance.

Tree clearing practices designed to limit soil disturbance and erosion, resulting from clearing or rutting, is rarely problematic. If an aberrant erosion event occurred, the TVA ROW Forester would direct the contractor to immediately repair the damage resulting from TVA work. In this scenario, all work would be done according to the BMP manual (TVA 2017a). While not typically necessary, select practices used in these unusual situations could include:

- Mulch berms
- Silt fence
- Erosion control blankets
- Seeding temporary vegetation
- Seeding permanent vegetation.

2.5.5. Standard BMPs – Equipment Maintenance

All machinery requires petrochemicals in order to operate. TVA BMPs require all machinery to be in good working order (TVA 2017a). Examples of TVA BMPs designed to minimize discharge of pollutants to the environment include:

- All on-site vehicles must be monitored for leaks and receive regular preventative maintenance to reduce the chance of leakage;

- Heavy equipment may be serviced on the ROW except in designated sensitive areas. In that situation, proper ground cloths, matting, or plastic sheeting must be used to prevent releases of oil, fuel, or grease into the environment;
- Mobile and/or portable oil or fuel storage tanks should be positioned or located to prevent spilled oil from reaching watercourses; and
- Spill response equipment and sufficient absorbent material to contain and clean up fuel or chemical spills or leaks must be maintained on-site or be readily available.

2.5.6. Standard Operating Procedures

Indirect controls do not specifically direct how work is conducted, but do serve to incentivize behaviors that result in positive environmental outcomes, including reducing the potential for effects to listed species. Examples of indirect controls include direct ROW forester oversight, quality assurance/quality control (QA/QC) assessments, easement contract language, and property owner relationships. TVA also has a Condition Report/Corrective Action Plan (CR/CAP) process to identify and correct procedural and implementation issues related to its programs.

2.5.6.1. Direct Right-of-way (ROW) Forester Oversight

TVA ROW Foresters have direct day-to-day oversight over clearing contractors, who work on TVA ROW. A ROW Forester is assigned to each one of the twelve TVA ROW sectors (Figure 2-2) and has direct oversight of that particular sector. Before any work occurs in their sector, the TVA ROW Forester has a pre-job briefing with the tree clearing and herbicide contractors. During this meeting, TVA ensures that the scope of the project is clear, but also provides the clearing contractor with the TVA BMP manual and all environmental restrictions for the project area. This includes O-SAR guidance designed to protect caves, natural areas, SMZ, wetlands, and state and federally listed species. The contractor is encouraged to report issues, such as erosion events, as soon as they occur. While work is being conducted, ROW Foresters regularly visit the job site to ensure tasks are being properly conducted, including adherence to environmental standards. If issues are identified, the contractor must repair the damage immediately.

2.5.6.2. Quality Assurance/Quality Control Assessments

QA/QC assessments are a second tier of quality control that occurs at a broader scale than the direct ROW Forester oversight. The overall goal of the program is to ensure all contractors meet contract requirements in safety, vegetation management, and efficient use of resources. The inspection process provides an impartial and transparent feedback by using a third party who is not involved in the day to day activities of contractors. Specific inspection forms have been developed for each major type of inspection to be performed. Individual inspection forms are broken down into sub-categories defining specific requirements in the contract. A percentage compliant scale is used to score each type of inspection conducted. Each subcategory inspected receives a percent compliant score, which is compiled to achieve a percent compliant score for the overall completed inspection. Property damage, which includes soil disturbance and erosion, is specifically assessed. If issues are identified, the contractor must repair the damage immediately. For tree clearing projects in previously unmaintained portions of the ROW:

- A random selection of 33 percent of all spans (a span is the area between consecutive structures on a TL) is assessed in the field; and
- If problems are found, additional spans are inspected to ensure the full extent of issues is identified.

2.5.6.3. Easement/Contract Language

ROW easement and contract language are indirect, but important, mechanisms for preventing erosion when TVA clears trees. As the holder of an easement and not the landowner, TVA is responsible for repairing any damage done to a property during the course of TVA operations on ROW. Similarly, contracts for a given tree clearing project typically contain language stating that contractors are responsible for repairing damage done during work. Example language is:

> "Contractor will be responsible for erosion damage and especially for creating soil conditions that would threaten the stability or compaction of the ROW soil, the structures, or access to either."

TVA also places language in contracts to incentivize positive behavior from the herbicide and clearing contractors employed to manage vegetation on TVA ROW. Examples of contract language that facilitate support of environmental protection measures include:

- "Contractor will be subject up to a $2,500 assessment per violation or occurrence for non-compliance with environmental guidance";
- "Contractor will be financially responsible for all environmental mitigation, including direct and indirect costs incurred by TVA, that is needed to repair damage from herbicide applications resulting from Contractor error or non-adherence to TVA guidelines"; and
- "In the event a violation occurs due to Contractor's negligence or the negligence of its subcontractors, Contractor will be required to perform a root cause analysis".

2.6. Project-Level Process

In Section 1, we discussed the scope of the Action, including the methods of TVA ROW vegetation management funded, authorized, or carried to rely on this programmatic consultation for ESA compliance with respect to the listed plants that such activities may affect. In Section 2, we indicated specific activities not covered by the programmatic Action.

In Section 1.8 of the BA, TVA describes situations where it would not tier from this programmatic ROW vegetation management consultation including:

1. TVA and USFWS determine that species are LAA in a manner not identified in this programmatic consultation.
2. TVA is unable to adhere to SOPs, BMPs, or the TVA O-SAR process during vegetation management.

If TVA cannot use the programmatic consultation to address affects to listed species expected to occur during vegetation management of a new TL, TVA would address vegetation management, along with construction and operation of the new TL, during a stand-alone section 7 consultation with the USFWS.

2.7. Interrelated and Interdependent Actions

A BO evaluates the effects of a proposed Federal action. For purposes of consultation under ESA §7, the effects of a Federal action on listed species or critical habitat include the direct and indirect effects of the action, plus the effects of interrelated or interdependent actions.

> "Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration" (50 CFR §402.02).

The 12 methods addressed in this programmatic Action are routine components of projects that serve one or more of the three general action categories listed in section 2 of this BO. Projects authorized, funded, or carried out under these three action categories may or may not involve interrelated or interdependent actions. Section 1.8 of the BA indicates that "future ROW acquisitions and new TL construction would receive an independent review" and that, "TVA would enter into section 7 consultation with the USFWS for these projects if TVA determines that construction or operation of the new TL has the potential to affect listed species". Therefore, we believe that through TVA's independent O-SAR review process, potential interrelated or interdependent activities associated with one or more of the activities covered under this programmatic Action would be adequately addressed. Any assessment of interrelated and interdependent activities at the program level of this Action would be speculative, given its activity-level focus. Therefore, we do not further address the topic of interrelated or interdependent actions in this BO.

2.8. Cumulative Effects

For purposes of consultation under ESA §7(a)(2), cumulative effects are those caused by future state, local, or private actions that are reasonably certain to occur in the Action Area. Future Federal actions that are unrelated to the proposed action are not considered, because they require separate consultation.

The BA suggests that many types of non-federal actions may potentially occur within the 238,196-ac Action Area in the foreseeable future and have varying levels of impact on environmental resources. This is because TVA maintains only 47 percent (approximately 110,752 ac) of lands within the Action Area; approximately 52 percent of the transmission ROW is primarily maintained by landowners (Table 2-1). As examples, TVA lists state highway maintenance and improvement projects, airport operations and expansions, rail development projects, industrial/residential development, and mining operations. TVA further suggests that other actions may include routine management and/or improvement of public lands by state and local agencies or an influx of new companies that leads to new infrastructure. Future routine operations and maintenance (O&M) activities undertaken by TVA also have the potential to trigger state, private and non-federal actions. Other actions may include routine management and/or improvement of public lands by state and local agencies or an influx of new companies that leads to new infrastructure.

Many of the threats identified for the 18 plant species covered under this consultation and identified in their recovery plans and 5-year reviews partially occur as a result of future state, local, or private actions that are reasonably certain to occur in the Action Area. These include indiscriminate application of herbicides, incompatible mowing regimes, and tree clearing activities for industrial forestry and ROW maintenance; introduction and encroachment of invasive exotic species and competitive herbaceous and woody vegetation; loss, alteration, and/or degradation of suitable habitat from residential, commercial, and/or industrial development (urbanization), cropland agriculture, livestock grazing, and trampling; illegal ORV use; relic hunting (at a single location known to support Cumberland sandwort) resulting in disturbance to plants via trampling and/or digging in a rock house; and poaching of plants for commercial resale purposes.

While we expect the non-federal actions discussed above to occur, we lack specific data about such actions and where the effects of such actions would occur in the Action Area. The USFWS is, therefore, unable to meaningfully assess the cumulative effects that may be relevant to this consultation, except as discussed in the Opinion sections for some of the affected species in the sections below.

3. PRICE'S POTATO-BEAN

3.1. Status of Price's Potato-Bean

This section summarizes best available data about the biology and current condition of Price's potato-bean (*Apios priceana*) throughout its range that are relevant to formulating an opinion about the Action. The USFWS published its decision to list the species as threatened on January 5, 1990 (55 FR 429-433).

3.1.1. Description of Price's Potato-Bean

The Price's potato-bean is a twining, herbaceous perennial vine in the pea family (Fabaceae). The species' climbing, yellow-green vines may grow up to 15 ft long and arise from stout, potato-like tubers that are about 7 inches (in) in diameter. The leaves are alternate and pinnately compound. The greenish-white to brownish-pink flowers are about 0.4-in long and tinged with magenta at the apex. The fruit is a legume about 5–6 inches long and 0.4-in wide that tapers at both ends. There are typically 4–10 seeds per legume. Fruits and seeds are olive-green when fresh, and mature fruits are brownish-red with tan lines, while the seeds are brown and glaucous when dry.

3.1.2. Life History of Price's Potato-Bean

Price's potato-bean typically flowers from mid-July through mid-August and produces fruit in August and September. Flowers are pollinated by various native arthropod species, such as the long-tailed skipper (*Urbanus proteus*) and bumble bees (*Bombus spp.*), and by non-native honeybees (*Apis mellifera*), although bees are reported to have some difficulty accessing the nectar (Robinson 1898). Flowers in the genus *Apios* have a tripping mechanism that causes the keel to coil when triggered by an insect. When the keel coils, it exposes the anthers and pistil, allowing pollination to occur (Bruneau and Anderson 1988). Price's potato-bean is the only species of *Apios* in which the keel bends backwards after tripping rather than coiling (Woods 1988). This tripping mechanism prevents self-pollination of the flowers. A single plant of Price's potato-bean growing in a private garden has been observed to set seed, indicating that the species is self-compatible (E. Croom, University of Mississippi, pers. comm., 1992).

Price's potato-bean plants have been observed to produce few seeds (Robinson 1898; Chester and Holt 1990; P. Olwell, Center for Plant Conservation, pers. comm., 1992). Shading of the plants by trees and shrubs (Medley 1980; Woods 1988; USFWS 1993), drought, and insect damage to flowers and fruits of Price's potato-bean (E. Chester, Austin Peay University, pers. comm., 1991) may all contribute to low seed set. Observations of a Mississippi population suggest that water availability may limit seed set; greater seed set has been observed in years with higher rainfall (E. Croom, pers. comm., 1992). Vegetative reproduction, if prevalent, would result in low genetic diversity that could reduce the success of sexual reproduction. Low fruit production also is seen in the American groundnut (*Apios americana*). Several populations of the species have been found to have a triploid chromosome number which precludes sexual reproduction (Bruneau and Anderson 1988). Bruneau and Anderson (1988) also found low fruit production (6 percent) in diploid populations of American groundnut and attributed low levels of fruit and seed production in these populations to limited resources and pollinators. A population of Price's potato-bean in Kentucky was found to be diploid with a somatic chromosome number of 22 (Seabrook and Dionne 1976). It is possible, however, that other populations are composed of sterile, triploid plants. More studies are needed to determine the reasons for low seed production in Price's potato-bean. When seeds are produced, they germinate readily with scarification (L. McCook, pers. comm., 1992; C. Baskin, University of Kentucky, pers. comm., 1991; Walter *et al*. 1986). In a small germination test, 18 of 20 seeds germinated after scarification (C. Baskin, pers. comm., 1991). Temperature fluctuations probably act to break the impermeable seed coat in the wild (C. Baskin, pers. comm., 1991). No information is available on when the seeds germinate in the wild.

This perennial species grows from a single large tuber, whereas American groundnut grows from several small tubers. Perhaps having a single tuber limits dispersal and vegetative reproduction of Price's potato-bean. Tubers of Price's potato-bean are dispersed when floods carry them to a new location (Seabrook and Dionne 1976). Tubers and seeds of American groundnut, frequently found near streams, may also be dispersed by water. No studies have investigated the dispersal mechanisms of the species. Plants do not flower during their first year of growth, but they can grow as much as 5–6 ft in their first season (C. Baskin, pers. comm., 1991). Observations also indicate that the tuber can remain dormant during a growing season and have vigorous growth the following year (L. McCook, pers. comm., 1992).

3.1.3. Numbers, Reproduction, and Distribution of Price's Potato-Bean

Price's potato-bean occurs in the southeastern United States in rocky, open woods and forest borders, often associated with mixed oak (*Quercus spp.*) woods, limestone, and drainage areas. When the Recovery Plan for Price's Potato-bean was published in 1993, there were 25 known extant populations distributed among 15 counties and four states: Autauga (2), Madison (1), and Marshall (1) counties, Alabama; Livingston (1), Lyon (1), and Trigg (2) counties, Kentucky; Clay (1), Lee (1), and Oktibbeha (2) counties, Mississippi; and DeKalb (1), Hickman (6), Marion (1), Maury (1), Montgomery (1), and Williamson (3) counties, Tennessee (USFWS 1993). There were 11 other populations considered extirpated in 1993 (2 in Illinois, 6 in Kentucky, and 3 in Tennessee), bringing the total number of known populations of the species at that time to 36. The species is considered extirpated from the State of Illinois (Ebinger *et al*. 2010), as no populations have been discovered in the state since the recovery plan was published.

Based on data in unpublished reports and from the Natural Heritage Programs in Alabama, Kentucky, Mississippi, and Tennessee, there are now 59 known extant populations, distributed among 26 counties in four states. Twenty-four of these populations are located entirely, or in part, on public lands or privately owned conservation lands; however, not all of these populations on protected lands receive adequate management to ensure they persist.

<u>Alabama</u>
There currently are 16 known extant populations of Price's potato-bean in Alabama, distributed among nine counties: Autauga (2), Butler (1), Dallas (2), Jackson (2), Lawrence (1), Madison (5), Marshall (1), Monroe (1), and Wilcox (1) (Alabama Natural Heritage Program [ANHP] 2014; Barger *et al*. 2014). Ten of these populations are located on publicly owned lands or private conservation lands (Table 3-1). Landowners of these sites include Alabama Department of Conservation and Natural Resources (ADCNR), Department of Defense (DOD), Land Trust of North Alabama (LTNA), U.S. Army Corps of Engineers (COE), and USFWS. The remaining populations are located on privately owned lands, including two on timberlands. These 15 extant populations totaled at least 2,266 Price's potato-bean plants, as reported by ANHP (2014). During a 2011 population census, a total of 2,158 plants were counted at Redstone Arsenal alone, half of which had stems 2 millimeters (mm) or less in diameter and were considered to be juveniles, providing evidence of recent successful recruitment (Boyd 2014).

Two extant Alabama populations that were included in the recovery plan have remained stable (Table3- 2). Based on available data, we are unable to determine the status of the other two Alabama populations that were included in the recovery plan.

<u>Kentucky</u>
There currently are seven known extant populations of Price's potato-bean in Kentucky, distributed among three counties: Livingston (2), Lyon (3), and Trigg (2) (Kentucky State Nature Preserves Commission [KSNPC] 2015). Of these seven populations, three were included in the species' recovery plan – one in Lyon County and the two in Trigg County (USFWS 1993). A fourth population, at the Carrsville Bluff site in Livingston County that was included in the recovery plan, has since been extirpated. Price's potato-bean has not been observed at this

Table 3-1. Price's potato-bean sites on protected lands (ANHP 2014; Boyd 2014; KSNPC 2015; USFS 2015; H. Sullivan pers. comm. 2016; TDEC 2018).

State	County	Site	Land Ownership	Last Observation
AL	Autauga	Jones Bluff	COE	21 vines – 2010
	Jackson	Little Coon Creek	ADCNR	5 vines – 2012
		Sauta Cave	USFWS	152 vines – 2011
	Madison	Blevins Gap	ADCNR, LTNA	32 vines – 2011
		Monte Sano State Park	ADCNR	27 vines – 2011
		Redstone Arsenal	DOD	2158 vines – 2011
		Rainbow Mountain	LTNA	42 vines – 2011
		Hale Mountain	ADCNR	6 vines – 2011
KY	Livingston	Corley Farm	Private	4 vines – 2014
		Livingston Co. WMA	Livingston County	41 vines – 2013
	Lyon	Mammoth Furnace	USFS	13 vines – 2018
		Pisgah Bay	USFS	1 vine – 2018
	Trigg	Hematite Lake	USFS	136 vines – 2018
		Laura Furnace	USFS	405 vines – 2018
MS	Chickasaw	Tombigbee NF	USFS	2 vines – 2015
	Lee	Coonewah & Chickasaw	NMLT	>500 vines – 2012 >50 vines – 2014
		Natchez Trace	NPS	53 vines – 2014
TN	DeKalb	Center Hill Bluffs	COE	>60 vines – 2015
	Franklin	Bear Hollow Mtn. WMA	TWRA	346 of vines – 2015
		Bear Hollow Mtn. WMA	TWRA	1 vine – 2011
	Hardin	Ross Forest SNA	Private	54 vines – 2015
	Montgomery	Barnett's Woods SNA	TDEC	18 vines – 2017
	Stewart	Neville Creek	USFS	44 vines – 2018
		Ft. Donelson NB	NPS	7 vines – 2017

location since 1992, despite several searches (most recently in 2008). However, American groundnut was found at this site in 1996, raising a question about the accuracy of the original record's identification as Price's potato-bean. The three extant populations that were included in the recovery plan have remained stable (Table 3-2).

Table 3-2. Status of extant Price's potato-bean populations in Alabama, Kentucky, Mississippi, and Tennessee (ANHP 2014; KSNPC 2015; TDEC 2018) that were included in the recovery plan (USFWS 1993).

State	County	Number of Vines – Date	
		Recovery Plan	Last Observation
AL	Autauga	6 – 1988	21 – 2010
	Marshall	5 or less – 1991	7 – 2010
KY	Lyon	7 – 1990	10 – 2013
	Trigg	<25 – 1989	23 – 2014
		30-50 – 1989	42 – 2014
MS	Lee	1,000 – 1983	>500 – 2012
	Oktibbeha	10-16 – 1988	11 – 2012
TN	DeKalb	25-50 – 1990	>60 – 2015
	Hickman	25 – 1990	>75 – 2015
		4 – 1991	1 – 2015
		7-10 – 1991	8 – 2015
		12 – 1991	2 – 2015
		6 – 1991	100 – 2015
		1-2 – 1991	1 – 2010 (No plants found in 2015)
	Marion	100-200 – 1990	231 – 2015
	Maury	24 – 1990	4 – 2015
	Montgomery	30-40 – 1990	61 – 2017
	Williamson	18 – 1990	47 – 2015
		45 – 1990	51 – 2015
		7 – 1990	22 – 2006 (No plants found in 2015)

The Lyon County population included in the species' recovery plan is on privately owned land. While the current landowner of this population cooperates with KSNPC (now, the Office of Kentucky Nature Preserves) conservation efforts for Price's potato-bean, there is no protection agreement in place and the landowner has expressed interest in selling this property. Two of the three populations in Lyon County are on U.S. Forest Service (USFS) property at Land Between the Lakes National Recreation Area (LBL), as are the two Trigg County populations included in the recovery plan (Table 3-1).

Both extant populations in Livingston County are protected. One population is located on the privately owned Corley Farm State Natural Area (SNA), which receives voluntary protection from the landowner under a natural area registry established in 2006. The second population is located on a site owned by Livingston County government. The Nature Conservancy (TNC) transferred ownership of this site to the local government and the KSNPC has entered into an agreement with Livingston County to assist in managing Price's potato-bean at the site (USFWS 2016a).

Mississippi

There are currently five known extant populations of Price's potato-bean in Mississippi, distributed among the following counties: Chickasaw (1), Kemper (1), Lee (2), and Oktibbeha (1) (H. Sullivan, Mississippi Department of Wildlife, Fisheries, and Parks, pers. comm. 2010, 2016; ANHP 2014; J. Burton, National Park Service [NPS], pers. comm. 2014).

Chickasaw County's population is located on the Tombigbee National Forest (NF) and consisted of two vines in 2015 (H. Sullivan pers. comm. 2016). One Lee County population is located in the North Mississippi Land Trust's (NMLT) Coonewah Nature Preserve (NP) and extends onto the neighboring Chickasaw Preserve (owned by The Archaeological Conservancy), while another population was discovered in 2014 on NPS lands along the Natchez Trace National Parkway. There were more than 500 plants estimated in the population at Coonewah NP in 2012 (ANHP 2014), over 50 plants at the Chickasaw Preserve in 2014 (Brady Davis, The Chickasaw Nation, pers. comm. 2016), and 53 plants at the Natchez Trace Parkway site (J. Burton pers. comm. 2014). The Kemper County population, consisting of only 6 plants as of 2012, and the Oktibbeha County population, with 11 plants in 2012, are both on privately owned lands (ANHP 2014). The Lee and Oktibbeha county populations were both included in the recovery plan, and based on numbers reported in the recovery plan and in ANHP (2014), appear to have remained stable (Table 3-2).

Two of the four populations that were known to exist in Mississippi at the time the recovery plan was completed have since been extirpated: the Rock Hill population in Oktibbeha County and the Clay County population. The Rock Hill population was extirpated due to incompatible land uses, including timber harvest and gravel mining. The Clay County population was apparently destroyed by a habitat improvement project funded by the NRCS (H. Sullivan pers. comm. 2010).

Tennessee

There currently are 31 known extant Price's potato-bean populations in Tennessee, distributed among 11 counties: DeKalb (1), Franklin (2), Giles (2), Hardin (3), Hickman (10), Marion (1), Maury (2), Montgomery (1), Stewart (2), Wayne (3), and Williamson (4) (Tennessee Department of Environment and Conservation [TDEC] 2018). Of these occurrences, 13 were included in the species' recovery plan – 1 each in DeKalb, Marion, Maury, and Montgomery counties, 6 in Hickman County, and 3 in Williamson County. Many of these occurrences included in the recovery plan have remained stable (Table 3-2).

There are seven populations on protected lands in Tennessee (Table 3-1). One Stewart County population is located at LBL and the other at Fort Donelson National Battlefield (NB), a NPS unit. The Montgomery County population is located at Barnett's Woods Designated SNA, owned by the TDEC, and one of the Hardin County populations discovered in 2009 is located on a privately owned, Registered SNA. The two Franklin County populations are located on Tennessee Wildlife Resources Agency's (TWRA) Bear Hollow Mountain Wildlife Management Area (WMA). In addition to these sites, there are reports of two sites on NPS lands along the Natchez Trace National Parkway, in Tennessee, supporting plants suspected to be Price's potato-bean, but positive identification of these plants has not been confirmed (Phillips 2006; Hatch and Kruse 2008).

3.1.4. Conservation Needs of and Threats to Price's Potato-Bean

Threats to Price's potato-bean include development, incompatible logging *(i.e.*, clearcutting or heavy logging), excessive shading by canopy trees, ROW maintenance for roads and utilities, and competition with non-native, invasive plants. Selective removal (hand thinning) of the canopy, if done carefully, may be beneficial to this species by increasing available light levels. It remains unknown whether excessive timber harvesting causes permanent destruction of the species; however, Kral (1983) asserts that occurrences exist in second growth forests and may recover after heavy logging.

Other threats affecting Price's potato-bean include small population size, low reproductive vigor, and potential for diminished genetic variation within the species. Despite the fact that 23 Price's potato-bean populations are on protected lands, recent observations indicate that low numbers of plants are present in most of these populations (ANHP 2014; KSNPC 2015; TDEC 2018; USFS 2015). Evidence of sufficient recruitment of seedlings into larger size classes capable of reproduction is generally lacking, with the exception of Redstone Arsenal's large population (Boyd 2014).

Davenport (2007) included Price's potato-bean in an analysis of potential effects of climate change on Alabama's plant life. The analysis was based on best professional judgment of how various habitat types and associated species may respond to climate changes that models predict Alabama will experience. Davenport (2007) concluded that "species demanding shady ravines and stream banks will constrict in distribution", including the hardwood forests inhabited by Price's potato-bean.

A previously unrecognized threat to Price's potato-bean occurred in the form of a 100-year flood event in middle Tennessee during May 2010, which severely disturbed habitat at nine populations in Hickman, Maury, and Williamson counties (TDEC 2012). Many of the affected populations occurred on steep slopes along the sides of roads that were severely damaged by the flooding due to their locations near streams in narrow valleys. As a result, further disturbance to the slopes where Price's potato-bean is located occurred at some of these sites during the process of clearing and grading the roadbeds for emergency repairs to restore traffic flow.

Conservation measures that have been implemented for Price's potato-bean include federal and state regulatory protection; research pertaining to the species' biology, ecology, and life history; establishment of seed banks; site protection and management; and surveys and monitoring. Similar conservation efforts should continue in the future.

3.2. Environmental Baseline for Price's Potato-Bean

The environmental baseline is a "snapshot" of the species' health in the Action Area at the time of the consultation, and does not include the effects of the Action under review. This section is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the Price's potato-bean, its habitat, and ecosystem within the Action Area.

3.2.1. Action Area Numbers, Reproduction, and Distribution of Price's Potato-Bean

In the action area, the single known location of Price's potato-bean occurring on a TVA ROW is located in Stewart County, Tennessee, on the USFS's LBL. In cooperation with KSNPC, TDEC, and the USFWS's Kentucky FO, the USFS drafted a management plan in 2008 for sites where Price's potato-bean occurs at LBL (USFS 2009). This plan summarized management measures that TVA had taken at LBL during the mid-1990s, before transferring management authority to the USFS in 2004, and provides direction for future management and protection by USFS.

The population occurs on the lower-slopes of an east facing bluff on the left descending bank of the Cumberland River at approximately river mile (RM) 78.5. At this site, the Price's potato-bean population is found over approximately 5.5 ac and supported 54 individual plants as of 2015 (TVA 2018). Only a small part of the occupied habitat intersects the ROW, with less than five percent of the local population found within the ROW.

The most recent visit to the site by a TVA botanist was July 2013. The handful of plants observed in the ROW were located within 50 ft of the river downslope of a small limestone shelf that crosses the ROW along the contour of the slope, which runs parallel to the shoreline. Plants at this location occurred in deep shade, despite being in the ROW, because the population is located at the base of the steep slope and the TL conductor is high enough above the forest floor that trees in lower parts of the ROW do not need to be regularly maintained. Upslope of the limestone shelf in the ROW, the vegetation is thick young forest, dominated by black locust, and does not support Price's potato-bean. All plants occur in a portion of the ROW that is not currently maintained and is unlikely to be regularly maintained in the future.

Price's potato-bean's affinity for edge habitats suggests that it could be found along other transmission ROW sections in the PSA. TVA botanists have field surveyed about 4,900 ac (33 percent) of the estimated 15,000 ac of ROW in the counties where Price's potato-bean is known to occur and have not found new populations. TVA botanists have used the O-SAR process to designate about 10,250 and 400 ac of suitable habitat for Price's potato-bean in the Action Area as Class 1 and Class 2 plants, respectively. Given the limited area surveyed for the species and presence of suitable habitat in the Action Area, TVA is reasonably certain that additional Price's potato bean populations occur within the O-SAR polygons.

3.2.2. Action Area Conservation Needs of and Threats to Price's Potato-Bean

Populations of Price's potato bean on ROW and power line corridors are threatened by maintenance of the areas through indiscriminate application of herbicides, mowing, and tree clearing activities.

Conservation measures could include site protection (buffers), managing or eradicating competing vegetation, augmenting occurrences, and surveying for the species in undocumented areas.

3.3. Effects of Vegetation Management on Price's Potato-Bean

Direct effects are caused by the Action and occur at the same time and place. Indirect effects are caused by the Action, but are later in time and reasonably certain to occur. Our analyses are organized according to the description of the Action in section 2 of this BO[3].

This section analyzes the direct and indirect effects of the Action on Price's potato-bean. An effects analysis summary of the effects of various methods of vegetation management on Price's potato-bean and the other 17 listed LAA plant species from the BA has been included in Appendix II.

3.3.1. Effects of Manual Vegetation Clearing on Price's Potato-Bean

Manual vegetation clearing has the potential to adversely affect Price's potato-bean if trees need to be cleared on the lower slopes of the ROW where Price's potato-bean occurs. Direct injury or death of vines can occur during manual tree clearing activities. Indirectly, limited tree clearing activities resulting in increased light on sites where Price's potato-bean occurs will likely benefit the species by promoting growth and reproduction.

Adverse effects from mechanical clearing activities can be minimized by implementing BMPs (TVA 2017) and AMMs including flagging occupied habitat, and avoiding the use of heavy equipment (to and from the site) that may result in soil disturbance.

3.3.2. Effects of Mechanical Clearing on Price's Potato-Bean

All mechanical vegetation control methods used by TVA have the potential to adversely affect Price's potato-bean. There is some chance vegetation removal could benefit the species and promote reproduction, by increasing light availability and reducing competing vegetation. However, all of the vegetation removal activities could result in loss of individuals by trampling, cutting, and soil disturbance from machinery.

As with manual tree clearing, adverse effects from mechanical clearing activities can be minimized by implementing BMPs (TVA 2017) and AMMs including flagging occupied habitat, and avoiding the use heavy equipment that may result in soil disturbance.

3.3.3. Effects of Herbicide Use on Price's Potato-Bean

Broadcast herbicide, either from the air or ground, will adversely affect Price's potato-bean plants growing on and near the ROW edge if used in occupied habitat. Of all the methods and tools available to TVA, broadcast herbicide has the greatest potential to result in impacts that extirpate plants from the ROW. The use of broadcast herbicide in a TVA ROW that contained Price's potato-bean could result in the death of individual plants and may even lead to the extirpation of entire populations.

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[3] This text identifies the definitions of possible effects evaluated in a biological opinion and is applicable to all other plant species included in Section 3 of this biological opinion. This text is incorporated by reference for each subsequent Effects of Vegetation Management section in the biological opinion but has not been repeated in those sections to reduce redundancy in the document.

Spot treatment of herbicide is highly targeted and not likely to adversely affect Price's potato-bean at the population level, but could result in the death of individual plants if a broad spectrum herbicide is used in close proximity (direct contact) to individuals. Cut stump and hack and squirt applications could be used when cutting trees to prevent resprouting. If trees do not need to be cut immediately, but may threaten future TL reliability, spot treatments can be used to kill the trees without directly affecting Price's potato-bean, given appropriate buffers are established to protect from overspray. Even though localized herbicide application targets woody species within the ROW floor, the use of that tool would adversely affect the species. If individual Price's potato-bean plants occur within a few feet of a localized herbicide application, chances are high that the plant would experience some level of herbicide related damage which may rise to the level of individual plant death. These targeted applications may be less likely to damage Price's potato-bean plants beyond chemical burns or other limited effects (limiting or eliminating the application year's reproduction); however, the precise effects of such targeted herbicides on Price's potato-bean have not been studied, so they should still be used with caution.

In summary, all vegetation control methods that use herbicides may adversely affect Price's potato-bean if used in occupied habitat. Adverse effects from herbicide management activities can be minimized by implementing BMPs (TVA 2017) and AMMs including flagging occupied habitat, appropriate application and timing of herbicide treatment, conservation spraying, or another targeted herbicide application technique, such as spot application.

3.3.4. Effects of Debris Management on Price's Potato-Bean

All debris management techniques used by TVA have some potential to adversely affect Price's potato-bean. The aspect of debris removal most likely to affect the species is physical disturbance associated with manual or mechanized handling of debris. This disturbance could result from soil disturbance by machinery or dragging of debris over plants. At the requests of landowners, vegetation debris may be left for landowner's personal use under appropriate circumstances. TVA's facilitation of landowner use of wood has similar potential for small impacts as manual debris management methods.

Mechanical mulching is not expected to generate enough mulch to adversely affect Price's potato-bean. However, such mulching may cause physical disturbance to the plants or soil, resulting in damage or death of individuals.

In summary, all debris management activities are likely to adversely affect price's potato-bean. Adverse effects from mechanical clearing activities can be minimized by implementing BMPs (TVA 2017) and AMMs including flagging occupied habitat, and avoiding the use of heavy equipment that may result in soil disturbance.

3.4. Conclusion for Price's Potato-Bean

The purpose of a BO under §7(a)(2) of the ESA is to determine whether a Federal action is likely to:

- jeopardize the continued existence of species listed as endangered or threatened; or
- result in the destruction or adverse modification of designated CH.

"Jeopardize the continued existence" means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR §402.02).[4]

In this section, we interpret the findings of the previous sections (status, baseline, effects, and cumulative effects) for the Prices's potato-bean relative to the purpose of a BO under §7(a)(2) of the ESA.

Opinion

The Action will have localized adverse effects to Price's potato-bean. If any plants are adversely affected, they will likely represent only a small portion of any given population within the Action Area. We anticipate no populations will be extirpated by proposed vegetation management activities, given that TVA follows its AMMs, BMPs and SOPs. Other non-federal actions in the Action Area that are reasonably certain to occur and that may affect Price's potato-bean include the use of broadcast herbicide on adjacent agricultural lands, use of broadcast herbicides at ROW intersections (*e.g.* railroad crossings, roads), and timber management activities on adjacent lands (cumulative effects; see Section 2.8). We also anticipate that the Action will result in beneficial effects to Price's potato-bean by removing competing vegetation, which will in turn increase light availability and promote reproduction.

After reviewing the current status of the species, the environmental baseline for the Action Area, the effects of the Action, and the cumulative effects, it is the USFWS's biological opinion that the Action is not likely to jeopardize the continued existence of Price's potato-bean. We reached this determination based on the following factors: (1) The likelihood of the species being adversely affected is low with TVA's adherence to the AMMs, BMPs and SOPs, which, collectively, limit the probability that known and unknown populations of the species will be affected. (2) The Action would result in a mix of adverse and beneficial effects to the species. During proposed herbicide applications in particular, the incidental, localized removal of invasive species may provide some beneficial effects in circumstances where such invasive removal would reduce competition with the species and/or allow the species to expand into new habitat near or within the TVA ROW. (3) Only a fraction of the known, rangewide populations (one population out of a total of 59) exists within the Action Area, and less than five percent of that population (approximately two or three individuals, based on recent survey data) is found within the ROW; therefore, only a very small percentage of plants in the species range would be affected by the Action.

[4] This text identifies the purposes of a biological opinion and the definition of jeopardy and is applicable to all other plant species included in Section 3 of this biological opinion. This text is incorporated by reference for each subsequent Conclusion section in the biological opinion but has not been repeated in those sections to reduce redundancy in the document.

4. BRAUN'S ROCK-CRESS

4.1. Status of Braun's Rock-Cress

This section summarizes best available data about the biology and current condition of the Braun's rock-cress (*Arabis* [=*Boechera*] *perstellata*) throughout its range that are relevant to formulating an opinion about the Action. The USFWS published its decision to list the species as endangered on January 3, 1995 (60 FR 56-61).

4.1.1. Description of Braun's Rock-Cress

The Braun's rock-cress is a perennial herb that is distinguished from other members of the genus *Arabis* by the white, star-shaped hairs on stems and leaves that give the plant a grayish appearance. The fruit is a round, elongate, and densely, hairy silique. Flowers are produced from late March to early May; fruits mature from mid-May to early June (USFWS 1997).

4.1.2. Life History of Braun's Rock-Cress

Braun's rock-cress occurs on the slopes of calcareous mesophytic and sub-xeric forest types. The occurrence of this species does not appear to be limited to a particular slope aspect, elevation, or moisture regime within the slope forests. It is, however, sun intolerant and always occurs in at least partial shade. The largest and most vigorous populations occur on moist mid- to upper slope sites. Plants are often found around rock outcrops, protected sites on the downslope side of tree bases, and sites of natural disturbance, such as talus slopes and animal trails. It is rarely found growing among the leaf litter and herbaceous cover of the forest floor (USFWS 1997).

Braun's rock-cress is probably pollinated by insects, but the vector is not known nor is it clear whether it is self-fertile. It has no specific morphological mechanism for seed dispersal; it is likely that dispersal is occurring through wind or gravity, rather than animal movements. Seeds are probably most commonly dispersed downslope (USFWS 1997).

4.1.3. Numbers, Reproduction, and Distribution of Braun's Rock-Cress

Braun's rock-cress produces viable seeds, and plants can easily be grown from seeds under greenhouse conditions (USFWS 1997). It is not known, however, whether the plant depends on a seed bank to take advantage of opportunities for seed germination and establishment. Seedling survival may increase in years of high rainfall through the spring and early summer months. If suitable habitat is available, reproduction appears to be successful, but it is not clear whether it is successful at sufficient levels to maintain population viability (USFWS 1997).

The majority of Braun's rock-cress populations occur in Kentucky, and the last significant (rangewide) survey for Kentucky populations was conducted in 2012-2013 by the KSNPC, when 50 percent of populations were monitored. Within Kentucky, the species is currently restricted to 40 populations in three counties (Franklin, Henry, and Owen), all of which are associated with the Kentucky River or its tributaries (primarily Elkhorn Creek). Population trends in Kentucky indicate that two occurrences are increasing, seven are stable, 13 are declining, and 18 are of unknown status (USFWS 2018a).

Within Tennessee, all occurrences are monitored by TDEC every three to five years, with the most recent comprehensive survey completed in 2018 (USFWS 2018a). The six extant Tennessee populations (12 occurrences) occupy portions of three counties, Rutherford, Smith, and Wilson, with the majority of these situated along the Stones River (USFWS 2018a). Population trends in Tennessee indicate that three occurrences are increasing, three are declining, and six are of unknown status (USFWS 2018a).

4.1.4. Conservation Needs of and Threats to Braun's Rock-Cress

At the time of listing, Braun's rock-cress was threatened primarily by destruction or adverse modification of its habitat (USFWS 1997). Specifically, these threats included residential, commercial, or industrial development; livestock grazing and trampling; timber harvesting; and competition with native and exotic weedy species, especially the European garlic mustard (*Alliaria petiolata*). These threats are on-going (USFWS 2018a). The species could benefit from additional survey efforts, including evaluations of associated forest quality (2019-2020), studies on garlic mustard management, increased seed banking efforts, and increased augmentation and introductions to high quality sites that contain fewer invasive plants.

4.2. Environmental Baseline for Braun's Rock-Cress

The environmental baseline is a "snapshot" of the species' health in the Action Area at the time of the consultation, and does not include the effects of the Action under review. This section is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the Braun's rock-cress, its habitat, and ecosystem within the Action Area.

4.2.1. Action Area Numbers, Reproduction, and Distribution of Braun's Rock-Cress

No Kentucky Braun's rock-cress populations are known on TVA ROW. In Tennessee, however, Braun's rock-cress is known to occur in forests abutting three sections of TVA's TL ROW. One occurrence is on Scales Mountain in Rutherford County and the other two are associated with Walnut and Pilot knobs along the Wilson/Smith County line. Botanists from the Tennessee Natural Heritage Program (TNHP) surveyed the Scales Mountain population in 2015 and noted that 47 individual plants occurred on the site and that no plants were on the ROW. This data supports TVA's botanist's observations of the site from 2016 that noted no plants occurred on the ROW (or immediately adjacent to it) and that activities restricted to the cleared ROW (*i.e.*, ROW floor work) would not affect the species at this location.

TVA botanists first surveyed the ROW in Wilson County in 2013 and found about 200 - 250 individual plants at three areas located adjacent to the northern ROW. Most of these plants were near the edge of the ROW, in a previously unmaintained area that had been recently cleared of trees. The plants appeared healthy and vigorous at the time of the survey. A 2018 follow-up survey of the site found no plants in the ROW, but healthy plants were found on the ROW edge.

The site occurring on the southern ROW in Smith County was first identified in 2016. The 30-40 plants observed were all outside of the open ROW.

Additional undocumented occurrences of Braun's rock-cress may occur adjacent to the TVA ROWs. Approximately 2,600 ac of TVA ROW are situated in the three Tennessee counties where Braun's rock-cress is known to occur. While not all sections of TVA ROW are potential habitat for Braun's rock-cress, TVA botanists have used the O-SAR process to designate about 1,200 and 470 ac of ROW as Plants Class 1 and Plants Class 2, respectively. TVA believes that a small portion of the area covered by these O-SAR polygons likely contains Braun's rock-cress (TVA 2018).

4.2.2. Action Area Conservation Needs of and Threats to Braun's Rock-Cress

The conservation needs and threats of Braun's rock-cress within the Action Area have not been fully assessed; however, TVA ROW maintenance includes conservation measures to avoid and minimize effects to the species at known locations. In addition, removal of invasive species could improve habitat conditions at some sites.

4.3. Effects of Vegetation Management on Braun's Rock-Cress

This section analyzes the direct and indirect effects of the Action on Braun's rock-cress. An effects analysis summary of the effects of various methods of vegetation management on Braun's rock-cress and the other 17 listed LAA plant species from the BA has been included in Appendix II.

4.3.1. Effects of Manual Vegetation Clearing on Braun's Rock-Cress

Manual clearing is routinely used to avoid and minimize effects to listed plant species, including Braun's rock-cress. Use of hand tools in clearing activities is highly selective, used on relatively small scales, and, therefore, is unlikely to result in direct effects to Braun's rock-cress. Chainsaws may be used to remove individual trees from the transmission ROW floor, margins of the border zone, and danger trees within or adjacent to the ROW. Manual clearing of select trees in previously unmaintained parts of the ROW margin would have little direct effect on Braun's rock-cress if done to protect individual plants, but the resulting increase in sunlight could indirectly effect plants by exposing them to too much light.

4.3.2. Effects of Mechanical Clearing on Braun's Rock-Cress

Braun's rock-cress is normally found on steep slopes with rock outcrops that physically preclude the use of wheeled and tracked equipment. However, because the species is known to occur on the edges of ROWs, there is the potential that mechanical vegetation clearing activities could intersect habitat occupied by Braun's rock-cress. If Braun's rock-cress is present where bulldozers are being used, individual plants could be crushed by trees that are pushed over or damaged when plants or tree roots are dislodged. Sidewall trimming, either from the air or the ground, would directly affect trees being pruned, but would have few other effects, other than a marginal increase in light levels due to removal of individual limbs. Any soil disturbance from ground-based sidewall trimming would be minimal and short-term. The species is restricted to forests and ecotones between the forest and ROW and does not occupy open portions of the ROW. Therefore, mowing, which is restricted to regularly maintained areas within the ROW floor, is not likely to adversely affect the species.

4.3.3. Effects of Herbicide Use on Braun's Rock-Cress

Vegetation control methods that utilize herbicides are likely to adversely affect Braun's rock-cress if used in occupied habitat. Spot treatment with herbicide is highly targeted and not likely to adversely affect Braun's rock-cress because localized herbicide application is restricted to the existing ROW (where Braun's rock-cress typically does not grow). However, spot treatment could potentially adversely affect individual plants via direct contact. Individual plants that occur at the edge of the ROW could be inadvertently exposed to localized herbicide application if they are growing adjacent to an undesirable tree seedling. Broadcast herbicide could affect plants growing on and near the ROW edge; however, the steep terrain where Braun's rock-cress typically occurs would prevent the use of ground-based, broadcast spray treatments, and the relatively dense population and mixed land use of areas where Braun's rock-cress occurs would make use of aerial application of herbicide unlikely.

4.3.4. Effects of Debris Management on Braun's Rock-Cress

Debris management techniques used by TVA could result in the physical disturbance of individual plants associated with manual or mechanized handling of material. This disturbance could result from dragging of debris over plants or minor soil disturbance from operating machinery in the area, but is not expected to result in the death of individual plants. Given the steep, rocky terrain in local areas supporting Braun's rock-cress, it is unlikely chipping and mulching would occur in areas supporting the species; however, if it did occur, plants could be crushed by machinery or buried by mulch/chips. Burning would occur in the open ROW and would not affect Braun's rock-cress. TVA's facilitation of landowner use of wood materials in the ROW would have a similar potential for minor impacts as the other debris management methods.

4.4. Conclusion for Braun's Rock-Cress

In this section, we interpret the findings of the previous sections (status, baseline, effects, and cumulative effects) for the Braun's rock-cress relative to the purpose of a BO under §7(a)(2) of the ESA.

Opinion

The Action would have localized adverse effects to Braun's rock-cress. We do expect some damage or loss of individual plants that could result in local population declines; however, we expect those populations to persist. Additionally, canopy thinning and removal of invasive species could benefit the Braun's rock-cress in the future. Cumulative effects to Braun's rock-cress that may be relevant to this consultation are unknown.

After reviewing the current status of the species, the environmental baseline for the Action Area, the effects of the Action, and the cumulative effects, it is the USFWS's biological opinion that the Action is not likely to jeopardize the continued existence of the Braun's rock-cress. We reached this determination based on the following factors: (1) The likelihood of the species being adversely affected is low with TVA's adherence to the AMMs, BMPs and SOPs, which, collectively, limit the probability that known and unknown populations of the species will be affected. (2) The Action would result in a mix of adverse and beneficial effects to the species. During proposed herbicide applications in particular, the incidental, localized removal of invasive species may provide some beneficial effects in circumstances where such invasive removal would reduce competition with the species and/or allow the species to expand into new habitat near or within the TVA ROW. (3) While 46 known populations of the species occur in portions of Kentucky and Tennessee, none of these occur within TVA's ROW. Three occurrences do abut separate, existing sections of TVA ROW in Tennessee, with only one of these occurrences containing more than 200 individuals and a high probability of viability.

5. PYNE'S GROUND-PLUM

5.1. Status of Pyne's Ground-Plum

This section summarizes best available data about the biology and current condition of Pyne's ground-plum (*Astragalus bibullatus*) throughout its range that are relevant to formulating an opinion about the Action. The USFWS published its decision to list Pyne's ground-plum as endangered on September 26, 1991 (56 FR 48748 48751).

5.1.1. Description of Pyne's Ground-Plum

Pyne's ground-plum is a rare member of the pea family (Fabaceae). The following description of Pyne's ground plum is adapted from Barneby and Bridges (1987) and Somers and Gunn (1990): a herbaceous perennial, stems simple, 5 to 15 centimeters (cm) (2 to 6 in) tall, loosely tufted and arising from a shallowly buried root-crown attached to a stout vertical taproot, glabrous and leafless at base, usually bearing five to ten leaves with petioles 2 cm (0.79-in), once-pinnate with 19 to 27 elliptic or ellipticobovate leaflet. The inflorescence is a raceme supporting 10 to 16 purple flowers. The fruits are fleshy pods that usually mature in May and June; at maturity, the pods are colored red above and yellow below (USFWS 2011a).

5.1.2. Life History of Pyne's Ground-Plum

Pyne's ground-plum flowers from late April through early May. Fruiting begins in early May with seed dispersal beginning around the first of June. As many as 26 above-ground stems and 50 fruits have been observed on one plant (USFWS 2011a). Dispersal mechanisms appear to be limited to abiotic factors including gravity and water (Morris *et al*. 2002). At a few sites, bush-hogging to control woody vegetation encroachment appears to have facilitated an increase in the number of plants, likely due to reduction of shade and enhanced seed dispersal (USFWS 2011a).

Characteristics of Pyne's ground-plum seeds and habitat favor the development of a large, persistent seed bank that is stratified by age (Morris *et al*. 2002). The seeds of Pyne's ground-plum have a hard, impermeable seed coat that imposes a strong physical germination barrier. Soils in cedar glade habitats, where the species is found, contain an abundance of unconsolidated rock fragments in a soil matrix that is granular in structure (U.S. Department of Agriculture/Soil Conservation Service 1977); such soils, in combination with repeated frost-heaving and sedimentation processes, promote migration of Pyne's ground-plum seeds down through the soil column over time, likely stratifying seeds of different ages (Morris *et al*. 2002).

The pollinating agents for this plant are not known, but flying insects play a role in many other legumes. Factors relating to population structure and dynamics have not been researched. Population size seems to fluctuate dramatically in colonies from year to year, possibly in response to the amount of rainfall and the amount of disturbance (Somers and Gunn 1990).

5.1.3. Numbers, Reproduction, and Distribution of Pyne's Ground-Plum

Pyne's ground-plum is endemic to the limestone cedar glades in the Central Basin Section of the Interior Low Plateau in Tennessee (USFWS 2011a). The habitats of *Astragalus* species in the southeastern U.S. tend to be on rocky or sandy soils, providing a more arid contrast to the generally moist habitats found in the region (Weakley 2008), and this is true of native *Astragalus* in Tennessee. Pyne's ground-plum is known from eight extant occurrences, all occurring in the Stones River watershed in the vicinity of Murfreesboro, Rutherford County, Tennessee. Five of the eight occurrences are located on public lands. Four of these are designated SNAs, owned by TDEC. Three occurrences are located entirely on privately owned land (USFWS 2011a); the remaining occurrence is located on NPS lands. Table 5.1 provides a general summary of all extant and historic (extirpated) Pyne's ground-plum occurrences (USFWS 2011a).

Until 2006, the known occupied range of Pyne's ground-plum was restricted to an approximately 90 square kilometers (km2) (35 mi²) area, and no occurrences were separated by a distance greater than approximately 18 kilometers (km) (11 mi). An occurrence that TVA biologists discovered during a 2007 survey of a power line ROW extended the known range approximately 16 km (10 mi) to the southwest and expanded the area encompassing the species' range to approximately 235 km2 (90 mi²). TVA biologists discovered the occurrence in a small opening in an otherwise heavily wooded cedar forest, which would likely not have been recognized as suitable habitat for the species. This occurrence, in a small opening within a matrix of presumably unsuitable habitats, is located approximately 10 mi from the nearest historic or extant occurrence of Pyne's ground-plum (USFWS 2011a).

There are believed to be three extirpated wild occurrences of Pyne's ground-plum (Table 5.1), all from Rutherford County. The first was collected near the city of La Vergne by Augustin Gattinger, probably in 1881 (Barneby and Bridges 1987), and is represented by a specimen in the Smithsonian Institution [Gattinger s.n. (US-70229)] (Wurdack 2011). Vegetative material collected in June 1948 from a site near the Rutherford/Davidson County line by botanists from the University of Tennessee at Knoxville is represented in the University of Tennessee Herbarium (Wofford 2011); the site is now under Percy Priest Reservoir. Examinations of glades in both counties adjacent to the reservoir have failed to locate any additional Pyne's ground-plum. The third site occurred on private land that was commercially developed in the

Table 5.1. Summary of all extant and historic (denoted with a "*") occurrences of Pyne's ground-plum.[5]

EO Number	Ownership	Site Name	Population Data
1	TDEC	Flat Rock Cedar Glades and Barrens Designated SNA	1,000 – 2,800
2*	Private		<100
3	TDEC, Private	Flat Rock Cedar Glades and Barrens DSNA	50 - 200
4	TDEC	Overbridge Designated SNA	10 - 45
5	Private		20 - 200
6	Private		100 – rumored to have been planted
8*	Public		n/a
9	Public	Manus Road Cedar Glade Designated SNA	250 - 520
10*	Private		n/a
13	NPS	Stones River NB	110 individuals planted in 2001; 2 found in 2008
16*	TDEC	Sunnybell Cedar Glade Designated SNA	Failed introduction
18	Private		<300

mid-1990s. Recent surveys in this area have failed to locate any additional plants. Therefore, it is unlikely that this species still exists at these three sites. Occurrence number 16 is listed as extirpated in Table 5.1, but actually represents a failed attempt to establish a new occurrence on a designated SNA by transplanting nursery propagated plants into the habitat.

5.1.4. Conservation Needs of and Threats to Pyne's Ground-Plum

Pyne's ground-plum is extremely vulnerable because of its limited range and its specific use of limestone cedar glade habitat. The primary threat to the species is the loss, alteration, and/or degradation of habitat from residential, commercial, and/or industrial development from the nearby city of Murfreesboro; livestock grazing and trampling; encroachment of competing vegetation; and illegal ORV use. Only one of the eight known occurrences of Pyne's ground-plum is currently threatened by impacts from livestock grazing. All the known Pyne's ground-plum occurrences are threatened by the encroachment of more competitive herbaceous vegetation and/or woody plants, such as eastern red cedar (*Juniperus virginiana*), that produce shade and compete for limited water and nutrients. Habitat alteration and/or degradation due to invasive, encroaching exotic plant species also pose a threat to the species. Invasive exotic plants that currently are either being managed or have been noted as potential threats at Pyne's ground-plum occurrence sites include spotted knapweed (*Centaurea biebersteinii*), Japanese

[5] The column labeled "EO Number" refers to the element occurrence number assigned by TDEC. Site names are provided only for element occurrences on public lands. Population data are primarily from TDEC (2005) and represent approximate ranges from counts or estimates of abundance; where given, population data for extirpated occurrences are historic.

honeysuckle (*Lonicera japonica*), privet (*Ligustrum spp.*), and sericea lespedeza (*Lespedeza cuneata*), among others. Drought poses a potential threat to this species, as evidenced by the most severe drought in recorded history in middle Tennessee during summer 2007. It is possible that alterations in precipitation and drought frequency or severity that might accompany climate change could pose a growing threat to Pyne's ground-plum in the future (USFWS 2011b).

Due to the 2006 discovery of Pyne's ground-plum by TVA biologists approximately 10 mi from the nearest known occurrence of the species (see section 4.1.3), the cedar glade ecosystem of the Stones River Basin within Davidson, Rutherford, and Wilson counties should be considered the geographic range for recovering this species (USFWS 2011a). Conservation measures that have been implemented for Pyne's ground-plum include federal and state regulatory protection; investigating the species' biology, ecology, and life history; preserving germplasm and establishing or augmenting occurrences; site protection and management; and surveys and monitoring. Similar conservation approaches should continue in the future.

Five of the eight Pyne's ground-plum occurrences are located on public lands, providing them added protection. Four of these are designated SNAs, owned by TDEC, three of which were purchased using Recovery Land Acquisition grants funded through section 6 of the ESA. Of the remaining four occurrences, one was planted at the Stones River NB, one is located on private lands and managed under a SNA registry, and only three of the occurrences are on private lands and unprotected. TDEC manages and protects habitats at the occurrences on designated SNAs and at the site managed under a SNA registry.

5.2. Environmental Baseline for Pyne's Ground-Plum

The environmental baseline is a "snapshot" of the species' health in the Action Area at the time of the consultation, and does not include the effects of the Action under review. This section is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the Pyne's ground-plum, its habitat, and ecosystem within the Action Area.

5.2.1. Action Area Numbers, Reproduction, and Distribution of Pyne's Ground-Plum

In the Action Area, the Pyne's ground-plum has been documented from one location in Rutherford County, Tennessee along a TVA ROW. This small population was found in 2007 by TVA botanists as part of an environmental review for a proposed new TL and exists immediately off the TVA ROW on private land (A. Datillo, TVA, pers. comm., April 19, 2019). The TL was initially designed to pass through the center of a very small glade opening that comprises the entirety of the habitat for the species. TVA realigned the ROW to the east, prior to construction, so that the species would not be affected. While the species is not currently in the TVA ROW easement, plants do occur 25 to 30 ft from the ROW edge.

Intact cedar glade habitats are not mutually exclusive with ROW vegetation management, and it is not inconceivable that other undocumented occurrences intersect the transmission system. TVA botanists have reviewed all TLs located in Rutherford County using the O-SAR process. Given the propensity for glades (and ROW near glades) to harbor listed plant species and the ease which these habitats can be identified using aerial photos, TVA botanists have classified many areas as Class 2 Plants.

The vast majority of these areas, including one ROW just north of a more recently discovered population (2009) of Pyne's ground plum located near Flat Rock Cedar Glades and Barrens designated SNA, were subsequently field surveyed. These field surveys have resulted in discovery of multiple new populations of state and federally listed plant species on TVA ROW in Rutherford County, but no new occurrences of Pyne's ground plum. Few if any sizable, unsurveyed glades co-occurring on ROW remain in Rutherford County.

5.2.2. Action Area Conservation Needs of and Threats to Pyne's Ground-Plum

Few if any sizable, unsurveyed glades on TVA ROW remain in the Action Area. TVA botanists have conducted field surveys of nearly all of these sites and it is unlikely new populations of Pyne's ground-plum will be located on ROW. Threats to existing occurrences include loss, alteration, and/or degradation of habitat from residential, commercial, and/or industrial development; livestock grazing and trampling; encroachment of competing vegetation, including exotics; and illegal ORV use. Conservation measures could include managing or eradicating competing vegetation, augmenting occurrences and site protection.

5.3. Effects of Vegetation Management on Pyne's Ground-Plum

This section analyzes the direct and indirect effects of the Action on Pyne's ground-plum. An effects analysis summary of the effects of various methods of vegetation management on Pyne's ground-plum and the other 17 listed LAA plant species from the BA has been included in Appendix II.

5.3.1. Effects of Manual Vegetation Clearing on Pyne's Ground-Plum

Manual vegetation clearing has the potential to adversely affect Pyne's ground-plum. However, provided it does not intentionally disturb the soil, it is unlikely to result in the death of individual plants. Pyne's ground-plum is tolerant of sun, though it does not typically inhabit the interior of cedar glades. If tree clearing resulted in increased light on sites where it occurred, the effect would not likely be detrimental. The species would be susceptible to physical damage caused by clearing activities, but the shallow rocky soils characteristic of cedar glades do not rut easily and the species could resprout after the discrete widely-spaced instances of tree clearing.

Manually clearing vegetation on previously unmaintained ROW is a one-time event because these areas will subsequently be treated as ROW floor. Danger tree clearing occurs as needed. Danger tree clearing may never be needed in Pyne's ground-plum habitat near glades because the soils are not deep enough to support growth of trees tall enough to impact power lines.

5.3.2. Effects of Mechanical Clearing on Pyne's Ground-Plum

All mechanical vegetation control methods utilized by TVA have the potential to adversely affect Pyne's ground plum. However, as long as the method does not intentionally disturb the soil it is unlikely to result in the death of individual plants. Mowers are generally set 10 to 12 inches off the ground and would likely miss low-growing Pyne's ground-plum; if damaged, all but the weakest plants would resprout.

5.3.3. Effects of Herbicide Use on Pyne's Ground-Plum

Vegetation control methods that utilize herbicides are likely to adversely affect Pyne's ground-plum. Spot treatment with herbicides is highly targeted and not likely to adversely affect Pyne's ground-plum, but could affect individual plants via direct contact. Cut stump and hack and squirt applications could be used when cutting larger trees to prevent resprouting and as an AMM to control smaller trees in occupied habitat within the ROW floor. Pyne's ground-plum could occupy the floor of ROW and, therefore, be affected by localized herbicide applications, which are commonly used to control woody species in the open ROW.

While off target herbicide damage could kill individual plants, it is unlikely that entire populations would be extirpated. This is because habitats where Pyne's ground-plum is most likely to occur do not have significant numbers of tree seedlings in the ROW. These dry, rocky areas do not support rapid tree growth, and woody plant species are typically widely-spaced. This increases the odds that Pyne's ground-plum plants, if undocumented populations occur on TVA ROW, would survive instances of localized application of herbicide. Broadcast herbicide, either from the air or ground, could affect plants growing on and near the ROW. However, it is unlikely that this tool would be used in relatively densely populated areas of Rutherford County, Tennessee, where this species is likely to occur.

5.3.4. Effects of Debris Management on Pyne's Ground-Plum

All debris management techniques used by TVA have a small potential to adversely affect Pyne's ground-plum. The aspect of debris removal most likely to affect the species is physical disturbance associated with manual or mechanized handling of debris. This disturbance could result from dragging of debris over plants or the marginal soil disturbance that would be expected from use of machinery. The soil disturbance would be minimal because of the rocky habitats preferred by Pyne's ground-plum, which are well-drained and resistant to deep rutting. Neither form of disturbance would be likely to result in the death of individual plants. Pile burning could conceivably result in loss of individual plants, but the infrequent use of the tool, combined with the extreme rarity of the species, make the likelihood of this occurring very small. TVA's facilitation of landowner use of wood has similar potential for small impacts as manual debris management methods.

If mulching machines were used in Pyne's ground-plum habitat, it would not likely generate enough mulch to bury the species. This is because the amount of mulch or chips generated by the machine is directly proportional to the amount of vegetation the site supports. Dry glade margins stunt woody plant growth, and the layer of mulch left in these areas is often discontinuous and less than 1-in deep.

5.4. Conclusion for Pyne’s Ground-Plum

In this section, we interpret the findings of the previous sections for the Pyne’s ground-plum (status, baseline, effects, and cumulative effects) relative to the purpose of a BO under §7(a)(2) of the ESA.

Opinion

The Action would have localized adverse effects to Pyne’s ground-plum and result in no more than a few individual plants within the Action Area being adversely affected. Some non-federal actions in the Action Area are reasonably certain to occur and may affect the Pyne’s ground-plum. For example, a small population currently exists immediately off of the TVA ROW on private land (A. Datillo, TVA, pers. comm., April 19, 2019) that is at risk of potentially being affected by future management activities.

After reviewing the current status of the species, the environmental baseline for the Action Area, the effects of the Action, and the cumulative effects, it is the USFWS’s biological opinion that the Action is not likely to jeopardize the continued existence of the Pyne’s ground-plum. We reached this determination based on the following factors: (1) The likelihood of the species being adversely affected is low with TVA’s adherence to the AMMs, BMPs and SOPs, which, collectively, limit the probability that known and unknown populations of the species will be affected. (2) The Action would result in a mix of adverse and beneficial effects to the species. During proposed herbicide applications in particular, the incidental, localized removal of invasive species may provide some beneficial effects in circumstances where such invasive removal would reduce competition with the species and/or allow the species to expand into new habitat near or within the TVA ROW (i.e., A small, single population, comprised of a few plants, is currently located 25 to 30 ft from the ROW edge.). (3) Only a fraction of known total populations (one out of a total of eight) occurs within the Action Area, and the single population is located off of the ROW, where individual plants would be less likely to be adversely affected.

6. MOREFIELD'S LEATHER-FLOWER

6.1. Status of Morefield’s Leather-Flower

This section summarizes best available data about the biology and current condition of the Morefield’s leather-flower (*Clematis morefieldii*) throughout its range that are relevant to formulating an opinion about the Action. The USFWS published its decision to list the species as endangered on May 20, 1992 (57 FR 2156-21564).

6.1.1. Description of Morefield’s Leather-Flower

Morefield’s leather-flower is a perennial vine in the buttercup family (Ranunculaceae) that can grow up to 16 ft (5 meters [m]) long. This species has compound leaves, reaching lengths of 8 inches (2 decimeters [dm]), arranged in 9–11 leaflets, with terminal leaflets (one-three) forming tendrils. The flowers, which are present from May to July, are pinkish in color and 20–25 mm (0.8–1.0 in.) long. Fruits are clusters of hairy achenes (a type of simple, dry fruit containing only one seed). This species is a member of the *Viornae* subsection of *Clematis*, which is noted for its narrow endemics (Kral 1987). *Clematis* in this subsection are distinguished by urnshaped flowers which occur singly, or in few-flowered groups, in leaf axils. Their primary flower stalks (peduncles) are subtended by leafy bracts. Morefield's leather-flower is closely related to vasevine (*Clematis viorna*), a more variable species, but Morefield's leather-flower is distinguished from this species by the dense, white hairs on shoots, velvety lower leaf surfaces, and stouter, usually shorter (15–25 mm or 0.6–1.0 inches long) peduncles with sessile to nearly sessile bracts at the base (Kral 1987).

6.1.2. Life History of Morefield's Leather-Flower

Morefield's leather-flower blooms from May to July. Pollinated flowers are capable of producing abundant (15 or more per flower) achenes (Crabtree 2014). Little information on effective pollinators is available, but Crabtree (2011) observed bumblebees (*Bombus* spp.) visiting flowers of Morefield's leather-flower. Various studies and observations indicate that flower and fruit production are positively correlated with precipitation (Emanuel 2000; Boyd and Paris 2013; Crabtree 2014; Paris *et al*. 2015, 2016). Herbivory by vertebrates and insects is apparently common for Morefield's leather-flower (Boyd and Paris 2013; Paris *et al*. 2015, 2016) and can reduce a plants' flower and fruit production (Paris *et al*. 2015). Small flower buds are particularly vulnerable to herbivory by Lepidopteran larvae (Paris *et al*. 2016). A study by Paris *et al*. (2015) indicated that insecticide use could be an effective management tool to increase sexual reproduction of Morefield's leather-flower.

Seeds may remain dormant during their first year after dispersal, with many seeds germinating in the second year post-dispersal (Paris *et al*. 2016). Paris *et al*. (2016) noted that post-dispersal predation of achenes was generally low during a multi-year study. Crabtree (2011) repeatedly observed Morefield's leather-flower seedlings along deer trails, suggesting that white-tailed deer (*Odocoileus virginianus*) may be potential dispersal agents of the species' seeds, but additional research is needed to elucidate this putative relationship.

6.1.3. Numbers, Reproduction, and Distribution of Morefield's Leather-Flower

Morefield's leather-flower is endemic to limestone drains and outcrops on the Cumberland Plateau escarpments in northeast Alabama, northwest Georgia, and south-central Tennessee. This species occupies a narrow range, spanning fewer than 70 mi east to west and under 50 mi north to south, and is restricted to areas underlain by calcareous bedrocks (such as limestone) along south to southwest facing slopes within the Plateau Escarpment ecoregion. Plants occur at elevations of 700 - 1700 ft and are often found near seeps and springs in red cedar-hardwood forests, particularly within transitional zones between dry calcareous forests and mesic forests (Kral 1987; Weber 1991; Cook 2018; T. Crabtree, TDEC 2018; USFWS 1994a, 2018b).

Populations were not explicitly defined in the listing rule (57 FR 21562-21564), recovery plan (USFWS 1994a), or 2010 5-year review (USFWS 2010) for Morefield's leather-flower. In the most recent 5-year review for Morefield's leather-flower (USFWS 2018b), a provisional population definition of 1 km (0.6-mi) is used to delimit individual populations, which is in line with both the TNHP (2018) and the ANHP (2018) EOs. As such, individuals or groups of

Morefield's leather-flower that are separated by at least 1 km from their nearest known neighbors are considered to be a distinct population. Alternatively, Crabtree (2011) suggested that a separation distance of 500 m (1640 ft), based on flight distances of bumblebees (*Bombus spp.*) as potential pollinators, might be appropriate. However, this may underestimate flight distances, as recent studies have shown that maximum distances for various bumblebee species can range from 450 m (1476 ft) to 2.5 km (1.5 mi) (Knight *et al.* 2005; Osborne *et al.* 2008; Hagen *et al.* 2011). Indeed, Georgia Department of Natural Resources (GDNR) (2018) staff have suggested a 1.5-km separation distance may be appropriate. However, the region's rugged terrain and development (*e.g.*, roads) may limit potential pollinator movement between sites (Bhattacharya *et al*. 2003). Given this and the consistency between two of the three responsible state natural heritage programs (SNHPs), using a 1-km separation distance to delineate populations is appropriate at this time. Revisions to the current provisional population definition based on pollinator flight distances, and associated potential pollen and gene flow, or based on genetic studies and/or other factors (*e.g.*, topography) will likely alter the number of discrete populations and should be adopted if determined to be appropriate upon further evaluation (USFWS 2018b).

Under the 1-km provisional population definition, there are 34 known populations of Morefield's leather-flower across three states (Alabama, Tennessee, and Georgia), with 32 populations considered extant and two considered extirpated. With 20 extant populations in two counties, Franklin (18) and Grundy (2), Tennessee is home to nearly two-thirds of known populations (TNHP 2018). Six of Tennessee's populations, Franklin County (5) and Grundy County (1), have been discovered since 2010 (TNHP 2018). Alabama has 11 extant populations in two counties, Jackson (2) and Madison (9) (ANHP 2018). A previously unknown population was discovered in Walker County, Georgia in 2015 (GDNR 2018), which represents an extension of the species' known range into Georgia. No other occurrences from Georgia are known.

SNHPs in Alabama, Georgia, and Tennessee have tracked and ranked a combined 34 populations of Morefield's leather-flower in their states (ANHP 2018; GDNR 2018; TNHP 2018). Two of these tracked populations are thought to be extirpated; one population in Alabama was destroyed by a residential development in the 1980s (ANHP 2018), and one of Tennessee's populations was not found during surveys in 2009 and is presumed extirpated due to earlier road widening (T. Crabtree pers. comm. 2010; TNHP 2018). Another population in Alabama has been damaged by residential development in the state (Weber 1994). Of the remaining 32 presumed extant Morefield's leather-flower populations, four are considered to have excellent viability (ranked as "A"), while nine have been ranked as having good ("B") or good to fair ("BC") viability. Most (19) populations have been ranked as having fair ("C") or poor ("D") viability, 16 of which occur in Tennessee. However, over half (20) of extant populations have not been visited and assessed in more than five years and their current status may be different from their available ranked status.

As reported in the latest 5-year review (USFWS 2018b), current population size data are limited, and no systematic population monitoring and survey protocols are known for Morefield's leather-flower. The only known monitoring program for the species occurs in Tennessee, which is funded by the USFWS's ESA section 6 cooperative grant program and is conducted by TNHP (Bailey 2005; Crabtree 2011, 2014). While population size data are available for 31 of the 32 extant populations (no population size data are available for Georgia's only known population), only 20 populations have data available that were collected since the 2010 5-year review, 11 of which have data that are five years old or less. Available population data for the remaining 11 populations were collected between 1990 and 2009. Together, these data, ranging from one to 28 years old, indicate that the total population size of Morefield's leather-flower may be potentially as large as 16,000 individuals (Boyd and Paris 2013; Paris 2013; ANHP 2018; T. Cook, Huntsville Botanical Garden, pers. comm. 2018; TNHP 2018). Based on these latest available observations, one population supports over 7,000 individuals, two populations are greater than 1,000 individuals, 17 populations (over half of all extant populations) have fewer than 100 individuals, and 11 populations have 20 individuals or less. The lack of recent (less than five years), systematic survey and monitoring data for many populations increases the uncertainty of our assessment of individual population sizes, the species' total population size, and population trends.

Sixteen populations of Morefield's leather-flower occur entirely, or partially, on conservation lands. Of these 16 populations, six are ranked as having excellent or good viability (four in Alabama and two in Tennessee) by their respective SNHPs (ANHP 2018; TNHP 2018), while one, Georgia's only population, is ranked as having good to fair viability (GDNR 2018). Nine populations are ranked as having fair or poor viability (eight in Tennessee [TNHP 2018]; one in Alabama [ANHP 2018]). Nine populations occur on state-owned lands (one in Alabama; one in Georgia; seven in Tennessee), three populations are found on lands owned by the University of the South (Sewanee) in Tennessee, two populations are on TNC lands in Alabama, and one Alabama population occurs on lands of mixed public (City of Huntsville) and private conservation organization (LTNA) ownership (Paris 2013; ANHP 2018; Cook 2018; GDNR 2018; TNHP 2018). Populations occurring on conservation lands are not uniformly protected, however, with most lands managed primarily for wildlife, recreation, and/or mixed uses (*i.e.*, few of these conservation lands are apparently managed primarily for their biodiversity values and/or rare species). While at least some state-owned sites periodically receive management to improve Morefield's leather-flower habitat, such as clearing encroaching woody species (*e.g.*, T. Crabtree pers. comms. 2015, 2018), specific management and monitoring regimes for Morefield's leather flower are not known for many populations on conservation lands. As such, much of Morefield's leather-flower habitat management is likely ancillary to management for other conservation and land use priorities. However, it is likely that these populations are protected from outright habitat destruction and conversion.

6.1.4. Conservation Needs of and Threats to Morefield's Leather-Flower

Threats to Morefield's leather-flower include habitat destruction or modification due to urban development, timber management, roadside maintenance, and other activities. These activities have caused the loss or decline of populations and remain persistent threats to populations that are not under secure ownership by public or private conservation agencies and organizations. Conservation needs for Morefield's leather-flower include continued surveying and monitoring across the species' range; site protection and management; and additional research pertaining to the species' biology, ecology and life history. While periodic monitoring is ongoing for some populations, overall, it has been inconsistently implemented across all populations. Additionally, the discovery of new populations of Morefield's leather-flower in Tennessee and Georgia indicate the continued need for additional surveys throughout the species' range and, particularly, expansion of these surveys into Georgia (USFWS 2018b). Some former privately-owned sites in Tennessee have recently been acquired by the state. Continued work to protect and manage remaining privately-owned sites is needed. Limited studies have begun to elucidate some of the habitat parameters necessary for the species' survival and to assist with identifying additional survey areas. Management plans that specifically address the needs of Morefield's leather-flower and its habitat are not known for many sites; however, management activities to specifically benefit this species have been implemented. Expanding habitat management activities, such as implementation of prescribed fire and canopy thinning, are expected to improve the species' overall status.

6.2. Environmental Baseline for Morefield's Leather-Flower

The environmental baseline is a "snapshot" of the species' health in the Action Area at the time of the consultation, and does not include the effects of the Action under review. This section is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the Morefield's leather-flower, its habitat, and ecosystem within the Action Area.

6.2.1. Action Area Numbers, Reproduction, and Distribution of Morefield's Leather-Flower

While Morefield's leather-flower has not yet been observed in field surveys of TVA ROW, TVA is reasonably certain this species is present within the Action Area, given the TVA transmission system occurs on the Cumberland Plateau Escarpment slope in northeast Alabama and south-central Tennessee, where this species is known to occur. Additionally, only one-third of the roughly 5,300 ac of TVA ROW found within the counties where Morefield's leather-flower is known to occur have been surveyed, leaving much of the Action Area unsurveyed. While not all sections of TVA ROW are potential habitat for Morefield's leather-flower, TVA botanists have used the O-SAR process to designate about 3,200 and 250 ac of suitable habitat for Morefield's leather-flower in the Action Area as Plants Class 1 and Class 2, respectively. TVA botanists have field surveyed about 1,800 ac of ROW in the counties where Morefield's leather-flower is known to occur and have not found new populations. However, given the limited area surveyed for the species and presence of suitable habitat in the Action Area, TVA is reasonably certain that Morefield's leather-flower occurs within some of the O-SAR polygons.

Since field surveys have been conducted on about one-third of the ROW in those counties, and no new populations have been recorded, TVA believes that ROW are unlikely to provide primary habitat for the species. While Morefield's leather-flower has not been observed on TL ROW, it does do well (at least temporarily, data are limited) in gaps exposed to light within closed canopy forest. This suggests it could potentially persist along ROW edges, though ROW would not comprise the core habitat for this species. The ability of Morefield's leather-flower to exploit light gaps suggests the species may occupy edge habitats found along TVA TL ROW. As such, it is unlikely that undocumented populations would be confined to the ROW. Most plants in undocumented populations that intersect TVA ROW probably extend well off the ROW. As such, it is likely that only small portions of any individual population would intersect ROW vegetation management activities.

6.2.2. Action Area Conservation Needs of and Threats to Morefield's Leather-Flower

Populations of this species on ROW and power line corridors are threatened by maintenance of the areas through application of herbicides, mowing, tree clearing and debris management activities. Conservation measures for Morefield's leather flower in the Action Area include site protection (buffers, flagging), avoiding the use heavy equipment that may result in soil disturbance, and recognition of the species occurrence in undocumented areas.

6.3. Effects of Vegetation Management on Morefield's Leather-Flower

This section analyzes the direct and indirect effects of the Action on Morefield's leather-flower. An effects analysis summary of the effects of various methods of vegetation management on Morefield's leather-flower and the other 17 listed LAA plant species from the BA has been included in Appendix II.

6.3.1. Effects of Manual Vegetation Clearing on Morefield's Leather-Flower

Manual vegetation clearing has the potential to adversely affect Morefield's leather-flower. While tree clearing would increase light levels on site, potentially resulting in a benefit to Morefield's leather-flower, direct physical disturbance of the species is likely to occur. The disturbance could result from trampling, cutting, or soil disturbance. Increased light could benefit the species by spurring growth and reproduction, or it could favor more aggressive species like Japanese honeysuckle (*Lonicera japonica*) to the detriment of Morefield's leather-flower (USFWS 2010). Manual removal of single danger trees may have a positive effect on the species by providing a boost in light levels that could increase productivity and reproduction without fundamentally changing the vegetation structure and light regime in the immediate vicinity of the plant.

In summary, manual vegetation clearing is likely to adversely affect Morefield's leather-flower if conducted in occupied habitat. Adverse effects from mechanical clearing activities can be minimized by implementing BMPs (TVA 2017) and AMMs including flagging occupied habitat, and avoiding the use of heavy equipment (to and from the site) that may result in soil disturbance.

6.3.2. Effects of Mechanical Clearing on Morefield's Leather-Flower

If mechanical vegetation control methods utilized by the TVA ROW program intersect habitat occupied by Morefield's leather-flower, the species could be adversely affected. Morefield's leather-flower typically occurs in rocky, calcareous forests and is most likely to be found on the edge of a ROW; it is unlikely to inhabit the open portions of the ROW floor. Therefore, mowing, which is restricted to regularly maintained areas within the ROW floor, is not likely to adversely affect the species. Mechanical clearing and side-wall trimming could all adversely affect Morefield's leather-flower, though some of these methods have more potential to adversely affect than others. Mechanical clearing would adversely affect Morefield's leather-flower, if used in habitats where the species occurs, but the likelihood of using this type of equipment where the species occurs is small, given this species is found on steep slopes with rock outcrops that physically preclude the use of wheeled and tracked equipment.

In summary, mechanical tree clearing and side-wall trimming are likely to adversely affect Morefield's leather-flower. Mechanical mowing is unlikely to adversely affect Morefield's leather-flower. Adverse effects from mechanical clearing activities can be minimized by implementing BMPs (TVA 2017) and AMMs including flagging occupied habitat, and avoiding the use of heavy equipment that may result in soil disturbance.

6.3.3. Effects of Herbicide Use on Morefield's Leather-Flower

Broadcast herbicide, either from the air or ground, could affect plants growing on and near the ROW edge if it were used in occupied habitat; however, all areas of the Cumberland Plateau Escarpment slope within the range of Morefield's leather-flower have either been field surveyed or are designated as Class 1 or 2 Plants in O-SAR. This O-SAR restriction prohibits the use of broadcast herbicide either from the air or ground. Therefore, the potential for broadcast herbicide to adversely affect Morefield's leather-flower is discountable.

Spot treatment of herbicide is highly targeted and unlikely to affect Morefield's leather-flower at the population level, but could result in isolated, direct adverse effects on individual plants. Cut stump and hack and squirt applications could be used when cutting trees to prevent resprouting. These methods could also be used as an AMM to control smaller trees in occupied habitat. If the trees did not need to be cut immediately, but would present a threat to TL reliability in the future, spot treatment could be used to kill the trees while minimizing direct effects to Morefield's leather-flower. Localized herbicide is likely to adversely affect Morehead's leather-flower particularly at the ROW edge. In this area, individual plants growing adjacent to tree seedlings could be inadvertently affected by overspray.

In summary, all methods of herbicide use, except for broadcast herbicide application, would likely adversely affect Morefield's leather-flower. Adverse effects from herbicide management activities can be minimized by implementing BMPs (TVA 2017) and AMMs including flagging occupied habitat, appropriate application and timing of herbicide treatment, conservation spraying, or another targeted herbicide application technique such as spot application.

6.3.4. Effects of Debris Management on Morefield's Leather-Flower

Debris management techniques used by TVA may affect Morefield's leather-flower, particularly any physical disturbance associated with manual or mechanized handling of debris occurring on the open ROW edge. Effects from manual clearing are more likely to occur, given the rocky terrain where the species occurs would preclude the use machinery. These effects would include physical damage resulting from cutting or dragging trees, but would not likely result in death of individuals. The terrain would also likely prevent chipping and mulching from occurring due to equipment access limitations. If mulching/chipping did occur, the species could be directly affected by crushing from machinery and burial/smothering by mulch/chips. Burning would occur in the open ROW away from suitable habitat for Morefield's leather-flower and would not likely affect the species, but debris handling by machinery during burning operations could affect individual plants on the ROW edge. On landowner request, vegetation debris may be left for landowner use. TVA's facilitation of landowner use of wood has similar potential for small impacts as manual debris management methods.

In summary, all debris management activities are likely to adversely affect Morefield's leather-flower. Adverse effects from mechanical clearing activities can be minimized by implementing BMPs (TVA 2017) and AMMs including flagging occupied habitat, appropriate timing of debris management, and avoiding the use of heavy equipment that may result in soil disturbance.

6.4. Conclusion for Morefield's Leather-Flower

In this section, we interpret the findings of the previous sections (status, baseline, effects, and cumulative effects) for the Morefield's leather-flower relative to the purpose of a BO under §7(a)(2) of the ESA.

Opinion

The Action would, at most, have localized adverse effects to Morefield's leather-flower and result in only a few individual plants within the Action Area being adversely affected, if any. Although closed canopy forests comprise the primary habitat for the species, data suggests that the species does well when exposed to light gaps, such as those resulting from ROW edges. Other non-federal actions in the Action Area that are reasonably certain to occur and that may affect Morefield's leather-flower include the use of broadcast herbicide on adjacent agricultural lands, use of broadcast herbicides at ROW intersections (*e.g.* railroad crossings, roads), and timber management activities on adjacent lands (cumulative effects; see Section 2.8).

After reviewing the current status of the species, the environmental baseline for the Action Area, the effects of the Action, and the cumulative effects, it is the USFWS's biological opinion that the Action is not likely to jeopardize the continued existence of the Morefield's leather-flower. We reached this determination based on the following factors: (1) The likelihood of the species being adversely affected is low with TVA's adherence to the AMMs, BMPs and SOPs, which, collectively, limit the probability that known and unknown populations of the species will be affected. (2) The Action would result in a mix of adverse and beneficial effects to the species. During proposed herbicide applications in particular, the incidental, localized removal of invasive species may provide some beneficial effects in circumstances where such invasive removal would reduce competition with the species and/or allow the species to expand into new habitat near or within the TVA ROW. (3) Only a small fraction of rangewide populations could potentially occur within the limited amount of suitable habitat in the action area; 32 known extant populations of the species occur in Alabama, Georgia, and Tennessee, but no occurrences have yet been observed on TVA ROW. All documented populations are located well off of the ROW.

7. ALABAMA LEATHER-FLOWER

7.1. Status of Alabama Leather-Flower

This section summarizes best available data about the biology and current condition of the Alabama leather-flower (*Clematis socialis*) throughout its range that are relevant to formulating an opinion about the Action. The USFWS published its decision to list the Alabama leather-flower as endangered on September 26, 1986 (51 FR 34420-34422).

7.1.1. Description of Alabama Leather-Flower

The Alabama leather-flower is a small, perennial herb in the buttercup family (Ranunculaceae), found in the Coosa River Valley in damp, silty-clay neutral soils, generally in sunny, open, herb-dominated locations. Fire or other natural disturbances may be necessary to limit competition from tall woody plants, such as trees and shrubs.

The genus *Clematis* is composed of mostly vigorous, woody, climbing vines/lianas. Alabama leather-flower, in contrast, forms clumps of small, upright stems that reach only about 1-ft in height, rising from an underground network of rhizomes. Stems from a single rhizome are genetically identical clones of the original stem. The rhizomes branch out over time, producing large patches of above-ground stems that emerge from the ground, generally in March, as temperatures begin to rise. Leaves form on the stems in pairs and vary in shape. Lower leaves are often simple (with a single, entire blade), whereas upper leaves are composed of multiple leaflets. The thick, leathery sepals (the structures that encase the flower buds prior to opening) are the source of the species' common name (Boyd 2015).

7.1.2. Life History of Alabama Leather-Flower

Alabama leather-flower blooms in late April to May, produce fruits by June, and die back to underground rhizomes in late summer. The distinctive bell-shaped flowers are produced singly at the top of above-ground stems. When pollinated, the flower produces a cluster of hairy single-seeded fruits, or achenes, each about 1-in long. Plants are hard to see in tall grasses, but fruits are distinctive all summer (Chaffin 2008, Boyd 2015). Scientists have not observed new plants growing from seed. Survival of the species over time depends mainly on the long-lived rhizomes. Genetic sampling of populations in Alabama revealed that genetically-distinct individuals can be quite large, spreading to at least 36 ft via underground rhizomes (Goertzen *et al.* 2011). These data, coupled with earlier estimates that Alabama leather-flower's rhizomes grow approximately 4 inches per year (Goertzen and Boyd 2007), indicate that the species is relatively long-lived and can live at least 55 years.

7.1.3. Numbers, Reproduction, and Distribution of Alabama Leather-Flower

The plant first was discovered on a highway ROW in 1980 in St. Clair County, Alabama. It was known only from the type locality until 1985, when a second population was discovered 40 mi away on a highway ROW in Cherokee County, Alabama. A total of eight natural populations have been located in northeastern Alabama (Cherokee, Etowah, and St. Clair counties) and northwestern Georgia (Floyd County), but only six are extant. The species' entire known range spans less than 90 mi, with individual populations typically separated by 30 or more miles from their nearest neighbors (plants or groups of plants that are separated by at least 1-mi are considered to be distinct populations). All known populations occur within the Ridge and Valley physiographic province. Transplant efforts to establish a second Georgia population on land held under conservation easement by TNC have had limited success, and the population is not currently viable (USFWS 2017).

The Georgia population is owned by the Georgia Department of Transportation and managed by the Georgia Department of Natural Resources. A population in St. Clair County, Alabama, is owned by TNC. Most extant populations are small, occupying substantially less than 1 ac of habitat (USFWS 2017), and all populations continue to require active management to control competing vegetation and maintain suitable, open habitat conditions (Boyd 2015, USFWS 2017).

7.1.4. Conservation Needs of and Threats to Alabama Leather-Flower

Habitat for this species has been reduced through development, logging operations, and conversion to agriculture and pine (*Pinus spp.*) plantations (Boyd 2015). Remaining populations are threatened by inadequate management, particularly a lack of mowing, prescribed fire, and/or hand clearing. Alabama leather-flower is apparently a poor competitor; it is most vigorous in open areas with little competing vegetation and open canopies. The species benefits from occasional, limited disturbance (such as periodic mowing or prescribed fire), which reduces encroachment of competing vegetation, but individuals and/or populations may be affected by incompatible mowing regimes and errant herbicide application (USFWS 2017).

Alabama leather-flower's limited number of extant populations and relatively small, local population sizes increase the species' vulnerability to anthropogenic impacts and stochastic events. Small population sizes also increase the risks posed by inbreeding and genetic drift, which may limit the species' adaptive capacity and ability to cope with future stressors (Ellstrand and Elam 1993). However, the unexpectedly high level of genetic diversity maintained within Alabama leather-flower populations studied thus far (Goertzen and Boyd 2007, Goertzen *et al.* 2011), may limit some of the genetic threats posed by the species' small number of populations and overall small population size.

Climate change has potential to affect distribution and abundance of plants by influencing seasonal weather patterns, frequency and timing of severe weather events, and myriad plant physiological responses. Davenport (2007) suggested that Alabama leather-flower may be adversely affected by climate change if available habitat is reduced under drier conditions. Climate change may disrupt plant-pollinator interactions, shifting the timing of flowering and/or pollinator activity (Memmott *et al.* 2007, Hawkins *et al.* 2008) and reducing the already-low rate of sexual reproduction of Alabama leather-flower.

7.2. Environmental Baseline for Alabama Leather-Flower

The environmental baseline is a "snapshot" of the species' health in the Action Area at the time of the consultation, and does not include the effects of the Action under review. This section is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the Alabama leather-flower, its habitat, and ecosystem within the Action Area.

7.2.1. Action Area Numbers, Reproduction, and Distribution of Alabama Leather-Flower

Alabama leather-flower has not been observed on TVA ROW. However, sections of the ROW overlap with the range of the species and not all ROW has been surveyed. Given the known range of the species, the only plausible overlap of Alabama leather-flower and the TVA transmission system is along ROW near Centre, Alabama, within a few miles of Weiss Lake in the Coosa River valley. This area is along the southern edge of the TVA transmission system and less than 20 mi of ROW intersect places on the landscape that could support habitat for the plant. Much of the ROW in this area now supports highly disturbed habitats like agricultural, industrial, or residential land uses, but there are ROW within the range of Alabama leather-flower that do support natural vegetation. Field surveys for Alabama leather-flower and other rare plants have been conducted over more about 90 percent of these areas, but the plant has not been found. There is a reasonable likelihood that undocumented occurrences of Alabama leather-flower exist on TVA ROW, but it is unlikely that more than a handful of undocumented occurrences occur on TVA ROW.

7.2.2. Action Area Conservation Needs of and Threats to Alabama Leather-Flower

The primary threats to Alabama leather-flower in the Action Area include potential herbicide affects and competition from aggressive, competing vegetation.

The species benefits from occasional, limited disturbance, such as periodic mowing or prescribed fire, which reduces shading and encroachment of competing vegetation.

7.3. Effects of Vegetation Management on Alabama Leather-Flower

This section analyzes the direct and indirect effects of the Action on Alabama leather-flower. An effects analysis summary of the effects of various methods of vegetation management on Alabama leather-flower and the other 17 listed LAA plant species from the BA has been included in Appendix II.

7.3.1. Effects of Manual Vegetation Clearing on Alabama Leather-Flower

Manual clearing could adversely affect individual Alabama leather-flower plants, although the magnitude of the negative effect would likely be small. Clearing trees would increase light levels, potentially resulting in a benefit to Alabama leather-flower. However, there is potential for direct physical disturbance as a result of trampling, cutting, or minor soil disturbance.

7.3.2. Effects of Mechanical Clearing on Alabama Leather-Flower

Effects to Alabama leather-flower from mechanical clearing would be similar to those described under 7.3.1 for manual clearing. In addition, if mechanical vegetation control methods utilized by the TVA ROW program intersect habitat occupied by Alabama leather-flower, there is the potential that the species could be affected. The species occurs in areas disturbed by human activities and prospers in open conditions like those found along TL ROW. Alabama leather-flower could occur within the open floor of the ROW or along the relatively shady edges. Therefore, mowing, which is restricted to regularly maintained areas within the ROW floor could adversely affect individual plants, especially if the mowing was conducted during the flowering period or before fertilized plants could disperse seed. Although mowing can temporarily reduce woody species concentration, repeated mowing in wetter habitats, which are most likely to support Alabama leather-flower, would shatter the stumps of individual trees and shrubs located within the ROW. This would promote sprouting and the proliferation of woody species within the ROW over time, and, therefore, could be detrimental to Alabama leather-flower. However, given the dependence of Alabama leather-flower on asexual reproduction from underground rhizomes, it is unlikely mechanical vegetation control measures implemented by TVA for ROW vegetation management would remove the species from a site.

7.3.3. Effects of Herbicide Use on Alabama Leather-Flower

Vegetation control methods that utilize herbicides are likely to adversely affect Alabama leather-flower if used in occupied habitat, though the magnitude of effect would not likely be large enough to remove the species from a site. Spot treatment of herbicide is highly targeted and unlikely to adversely affect Alabama leather-flower at the population level, but could result in isolated, direct adverse effects on individual plants. Cut stump and hack and squirt applications could be used when cutting trees to prevent resprouting. These methods could also be used as an AMM to control smaller trees in occupied habitat. If the trees did not need to be cut immediately, but would present a threat to TL reliability in the future, spot treatment could be used to kill the trees while minimizing direct effects to Alabama leather-flower.

Even though localized herbicide application targets woody species within the ROW floor, the use of that tool could have some level of adverse effects on the species. If individual Alabama leather-flower plants occur within a few feet of a tree seeding treated with localized herbicide application, chances are high that the plant would experience some level of herbicide related damage. This damage may rise to the level of individual plant death. Broadcast herbicide, either from the air or ground, could adversely affect plants growing on and near the ROW edge if it were used in occupied habitat. However, all areas of the ROW near Centre, Alabama, within the range of Alabama leather-flower have either been field surveyed or are designated as Plants Class 1 and 2 in O-SAR. This O-SAR restriction prohibits the use of broadcast herbicide either from the air or ground. Therefore, the potential for broadcast herbicide to adversely affect Alabama leather-flower is discountable.

7.3.4. Effects of Debris Management on Alabama Leather-Flower

Debris management techniques used by TVA have a small potential to adversely affect Alabama leather-flower. Any physical disturbance associated with manual or mechanized handling of debris occurring on the open ROW edge could directly affect plants. These effects would include physical damage resulting from cutting or dragging trees and would not likely result in death of individuals. If mulching/chipping did occur, the species could be directly affected by crushing from machinery and burial by mulch/chips. Pile burning could conceivably result in the loss of individual plants, but the infrequent use of the tool combined with the extreme rarity of the species make the likelihood of this occurring small. TVA's facilitation of landowner use of wood has similar potential for small impacts as manual debris management methods.

7.4. Conclusion for Alabama Leather-Flower

In this section, we interpret the findings of the previous sections for the Alabama leather-flower (status, baseline, effects, and cumulative effects) relative to the purpose of a BO under §7(a)(2) of the ESA.

Opinion

The Action would have localized adverse effects on Alabama leather flower and result in no more than a few individual plants within the Action Area being adversely affected. The species could also benefit from occasional, limited disturbance, such as periodic mowing or prescribed fire, which reduces shading and encroachment of competing vegetation. Cumulative effects to Alabama leather-flower that may be relevant to this consultation are unknown.

After reviewing the current status of the species, the environmental baseline for the Action Area, the effects of the Action, and the cumulative effects, it is the USFWS's biological opinion that the Action is not likely to jeopardize the continued existence of the Alabama leather-flower. We reached this determination based on the following factors: (1) The likelihood of the species being adversely affected is low with TVA's adherence to the AMMs, BMPs and SOPs, which, collectively, limit the probability that known and unknown populations of the species will be affected. (2) The Action would result in a mix of adverse and beneficial effects to the species. During proposed herbicide applications in particular, the incidental, localized removal of invasive species may provide some beneficial effects in circumstances where such invasive removal would reduce competition with the species and/or allow the species to expand into new habitat near or within the TVA ROW. (3) Only a fraction of the known rangewide populations would potentially occur on the TVA ROW because less than 20 mi of unsurveyed ROW intersect places on the landscape that could support habitat for the plant, and much of that remaining unsurveyed area is highly disturbed.

8. LEAFY PRAIRIE-CLOVER

8.1. Status of Leafy Prairie-Clover

This section summarizes best available data about the biology and current condition of leafy prairie-clover (*Dalea foliosa*) throughout its range that are relevant to formulating an opinion about the Action. The USFWS published its decision to list leafy prairie-clover as endangered on May 1, 1991 (56 FR 19953-19959).

8.1.1. Description of Leafy Prairie-Clover

Leafy prairie-clover is a member of the legume family or Fabaceae. Leafy prairie-clover is easily distinguished from most other species of the genus *Dalea* east of the Mississippi River on the basis of the leaflet number, which ranges from nine (Barneby 1977) to 31 (Gleason and Cronquist 1963), but typically is between 20 and 27 (Fernald 1950). Leafy prairie-clover is a glabrous, stout perennial herb, with one to several stems 2 to 8 dm (8 to 31 in) long arising from a hardened root crown. The dense conic to cylindric flowering heads are between 0.4 and 8.9 cm (0.15 to 3.5 in) long and 0.6 to 1.0 cm (0.24 to 0.4 in) wide (DeMauro and Riddle, unpublished data) on short peduncles, 0 to 2 mm (0 to 0.08 in) long, with lance-ovate, long acuminate bracts which surpass the small (up to 5 mm [0.2 in] long) lavender-purple calyx that has five petals and five strongly exerted anthers with orange pollen (Fernald 1950, Gleason and Cronquist 1963, Wemple 1970, Barneby 1977).

8.1.2. Life History of Leafy Prairie-Clover

Leafy prairie-clover is a short-lived, herbaceous perennial forb that has no capacity for vegetative spread (Baskin and Baskin 1973; Schwegman and Glass, unpublished data). In March, new ramets (stems) begin to grow from buds on the root crown just below the soil surface. By July, these ramets are 40 to 65 cm (15.7 to 25.6 in) tall (Baskin and Baskin 1973). Non-flowering plants have from one to four ramets, and flowering plants have from one to 20 ramets. A single ramet will develop one or more inflorescence buds in late June (USFWS 1996a).

Flowering begins in late July, peaks in mid-August, and can continue until late August. Plants may take up to three years to flower (Baskin and Baskin 1989). Mature plants may have from one to ten (or more) flowering ramets. The average number of flowering ramets per plant varies from 0.58 to nearly three in extant leafy prairie-clover populations throughout the species' range (USFWS 1996a). The number of flowers per inflorescence varies from 40 to 495 (mean of 158.95 + 97.04 standard deviation) (DeMauro and Riddle, unpublished data). Leafy prairie-clover seeds ripen by early October and disperse from the erect dead ramets from late fall to early spring (Baskin and Baskin 1973). Potential dispersal vectors include wind, gravity, birds, and small mammals. Dormant seeds are capable of forming a persistent seed bank. Under natural conditions, several years are required to soften the hard seed coat, although mechanical scarification yields high germination rates in fresh seeds (Baskin and Baskin 1973, 1989). Germination occurs in April and, by late May, the seedlings have several leaves (Baskin and Baskin 1973).

Seedlings are killed by summer drought and frost heave and very few survive to maturity (Baskin and Baskin 1973; Schwegman and Glass, unpublished data). The oldest living plants monitored to date have reached seven to eight years of age (Schwegman and Glass, unpublished data). Dormancy has been observed in mature plants; some plants have been dormant for two consecutive years. Mature plants may not flower every year and may show decreased vegetative growth following a year of exceptionally vigorous growth (USFWS 1996a).

8.1.3. Numbers, Reproduction, and Distribution of Leafy Prairie-Clover

Leafy prairie-clover is currently known from north-central Alabama, northeastern Illinois, and central Tennessee. The plant occurs only in open habitats with thin, calcareous soils. In Tennessee and Alabama, the preferred habitat is limestone or dolomite glades, while in Illinois, this plant is restricted to very rare dolomite prairie habitat (USFS 2018).

Alabama

In Alabama, there are three known extant populations, one in Franklin County and two in Lawrence County (Schotz 2011; Adam Dattilo pers. comm. 2019). There are four occurrences of uncertain status, located in Franklin, Jefferson, and Morgan counties. No other occurrences are known to have been extirpated from Alabama besides those reported in the recovery plan (USFWS 1996a), all within these same counties.

According to the most recent survey data included in the BA, biologists from TVA observed 52 plants in one Lawrence County population in 2018 (this is a well-documented population that was first observed in 1989); this population was estimated to consist of 30 to 40 plants in 1989. The second Lawrence County population was first observed by TVA in 2012 and supported 65 plants; more recent 2018 survey data, included in the BA, indicates that there are 336 plants now at this site. There were 72 plants at the Franklin County site as of 2011 (Schotz 2011).

Illinois

There currently are 14 known extant populations in Illinois, ranging in size from a few hundred to several thousand individuals (Redmer and Lah 2008, J. Armstrong pers. comm. 2012, C. Pollack pers. comm. 2015). One population is located in Cook County, four in DuPage County, and the others are in Will County. A population at Midewin National Tallgrass Prairie in Will County was discovered in 1997 (Molano-Flores 2004). The Cook County population was first observed in 2002 (Illinois Department of Natural Resources 2008). Contrary to the statement in the recovery plan that the population at Lockport Prairie East was extirpated, we have concluded based on information in our records that this population is represented by the Will County population that was discovered in 2001 at Dellwood Park West (Barbers and Wilhelm 2005). The leafy prairie-clover was extirpated from Kane, Kankakee, and LaSalle counties in the late 1800s (USFWS 1996a).

Monitoring data for the population at Lockwood Prairie NP in Will County display considerable interannual variability with respect to abundance in each of three stages: seedling/juvenile, non-flowering adult, and flowering adult. Between 1990 and 2004, 11 leafy prairie-clover censuses were conducted at this site. Total number of plants ranged from a high of 5,636 in 1990, to a low of 1,056 in 2000. The total number rebounded to 5,022 in 2004 (Key 2004). This population increased to a total of 13,345 total individuals in 2006 (J. Armstrong pers. comm. 2012).

Monitoring was conducted in 2002 and 2004 at the Dellwood Park West site in Lockport, where a leafy prairie-clover population was discovered in 2001. The total number of plants increased over this period from 154 to 1,289, apparently in response to removal of invasive woody plants and subsequent fire management (Barbers and Wilhelm 2005). In 2014, there were 1,410 plants at this site, 1,002 of which were flowering or fruiting (C. Pollack pers. comm. 2015).

The total number of plants at Romeoville Prairie NP in Will County, inclusive of all life history stages, peaked at 2006, the last year during which a population census was conducted.

Considerable variability has also been observed in the population at Midewin National Tallgrass Prairie in Will County from 2002 through 2014, during which time the total number of plants ranged from a low of 92 in 2002, to a high of 839 in 2014, 375 of which were flowering or fruiting (USFS no date; C. Pollack pers. comm. 2015).

The Illinois Natural History Survey began monitoring a population of leafy prairie-clover at Keepataw Forest Preserve in Will County in 2005, under contract with the Illinois Toll Highway Authority (Taft *et al*. 2010). There are five colonies at this site, from which census data are collected for four life history stages: seedlings, juveniles, non-flowering adults, and flowering adults. The data from 2005-2006 display an increase, followed by a decrease in total numbers of plants from 2006-2010. Despite the fact that the total number of plants recorded was lowest in 2010, both the number of flowering adults and inflorescence spikes per adult reached their recorded peak, yielding the greatest potential reproductive output in 2010 compared to the five prior years (Taft *et al*. 2010).

<u>Tennessee</u>
There currently are 55 known extant occurrences in Tennessee in the following counties: Bedford (1), Davidson (7), Marshall (2), Maury (14), Rutherford (15), Williamson (1), and Wilson (15). Ten of these occurrences were found in surveys conducted during 2001 through 2003, mostly on public lands or private conservation lands (TDEC 2004a). In addition to the 55 sites reported by TDEC (2004a), two occurrences have been found in TVA ROW (TDEC 2015). There are 11 occurrences that are considered either historic or extirpated, distributed among the following counties: Davidson (2), Maury (1), Rutherford (5), Sumner (1), Williamson (1), and Wilson (1) (TDEC 2004a). No occurrences are known to have been extirpated from Tennessee besides those reported in the recovery plan (USFWS 1996a).

From 1996 through 2001, TVA monitored six leafy prairie-clover occurrences that are located within the Yanahli WMA and Duck River Complex Designated SNA. The TVA monitored no more than two of these occurrences per year, and TDEC assumed responsibility for monitoring these occurrences in 2003 (TDEC 2004b). Because of the inconsistencies among occurrences with respect to the years that monitoring occurred and sampling design used, we only discuss here the general trends reported by TDEC (2004b). Site names and element occurrence (EO) numbers, in parentheses, for the monitored occurrences include:

- Blue Springs (049)
- Columbia Glade (005)
- Columbia Glade East (054)
- Sowell Mill North Glade (028)
- Sowell Mill North Glade A.T.&T. ROW(068)
- Nancy Branch (047).

TDEC (2004b) reported a general decline during the period 1996 through 2003 in numbers of plants, stems, flowering stems, and flowering heads at all of these occurrences besides 005 and

068. Increases were observed in numbers of flowering stems and flowering heads at 005, despite a decrease in total number of plants, and in all leafy prairie-clover metrics at 068. The most notable decline was observed at 047, where total numbers of plants declined from 1,589 plants in 2000 to 32 plants in 2003. Given the considerable inter-annual fluctuation that has been observed at locations that have been monitored more consistently in Illinois, inferring trends from the data for these six occurrences is difficult due to inconsistency among monitoring years and methods. Monitoring data has demonstrated the importance of monitoring populations at a sufficient frequency, ideally annually, for detecting trends and cyclical variation in leafy prairie-clover populations (USFWS 2015b).

TDEC conducted general surveys of 18 leafy prairie-clover occurrences during 2004, to provide current data on numbers of plants (Table 8.1) (TDEC 2005). Beginning in 2009, TDEC began annual monitoring using permanent plots at 16 protected sites in Tennessee (TDEC 2014). This monitoring approach does not allow for tracking changes within entire populations present at each protected site, but does provide a means for examining variability in density over the full range of monitored sites. Data are recorded for the following variables in each plot: flowering plants, flowering stems, non-flowering plants (excluding seedlings), non-flowering stems, seedlings, and browsed stems (USFWS 2015b).

As is the case for monitoring data collected from Illinois, preliminary analysis of these monitoring data, conducted for this status review, demonstrate considerable variability both among sites and among years for all sites combined. The mean number of plants per square meter (m^2) for all stages combined decreased from 2009 through 2012, but peaked at 23.9 during 2014. The number of flowering plants/m^2 peaked at 13.17 in 2010, but was less than 4 in all other years. Non-flowering plants, excluding seedlings, were most abundant in 2009 (16.27/m^2), decreased through 2012, but increased during 2013 and 2014. The mean number of seedlings/m^2 has remained low throughout all years, with a high in 2013 of 2.27. Based on these preliminary analyses, these 16 protected leafy prairie-clover have fluctuated considerably, and mean numbers of flowering and non-flowering plants per m^2 suggest some decline since 2009. However, assessment of the species' overall status require additional years of data and more careful analysis before reaching firm conclusions (USFWS 2015b).

As noted above, analyzing data for trends across all 16 monitored populations does not effectively examine trends within individual sites or groups of sites. In the future, these data will be analyzed to provide insight into trends at individual sites. This will be necessary due to the variability in leafy prairie-clover abundance among the sites and differences in threats affecting them, as well as varying levels of management to address those threats (USFWS 2015b).

8.1.4. Conservation Needs of and Threats to Leafy Prairie-Clover

There currently are 44 occurrences on protected lands throughout the species' range. Nonetheless, several of the threats to leafy prairie-clover habitat identified in the recovery plan still have the potential to negatively affect this species even in protected sites, namely, degradation due to invasive exotic or native species encroachment, illegal ORV use, and incompatible management of utility ROW. The main threat to protected sites comes from the

Table 8.1. Results from general surveys of 18 *D. foliosa* occurrences conducted in Tennessee in 2004 ("- -" indicates data not collected) (TDEC 2005).

Site Name	EO Number	Non-flowering	Flowering	Total Plants
Flat Rock/Adams #3 Glade	011	--	544	544+
Couchville South	014	23	6	29
Cedars of Lebanon – S. of Cedar Forest Road	018	3	6	9
Cedars of Lebanon – Richmond Shop Barren	024	0	5	5
Long Hunter State Park – Wet Barren	031	--	--	37
Hall Farms Glades	032	--	559	559+
Cedars of Lebanon – Rowland Barren	033	--	187	187+
Jones Mill Glade / Campbell Road	037	--	--	70
Hamilton Creek Glade	040	--	--	442
Cedars of Lebanon State Forest – Quarry Creek	044	--	14	14
Cedars of Lebanon – Cedars Natural Area, Moccasin Road	052	0	0	0
Rocky Hill Glade	057	--	28	28
Cedars of Lebanon – Cedar Forest Road West 8	059	--	244	244
Long Hunter State Park	060	--	--	51
Cedars of Lebanon State Forest	064	--	80	80+
Flat Rock / Adams #2 Glades, Roadside, Trailside	065	0	0	0
Couchville North	066	0	1	1
Hall Farm Glades	067	--	824	824+
TOTALS		26+	2934+	3118+

potential for either exotic or native, invasive plant species to displace leafy prairie-clover from otherwise suitable habitat. The final listing rule for leafy prairie-clover (56 FR 19953) stated that all known populations were threatened by encroachment from competing herbaceous vegetation and/or woody plants, and this remains largely true today (USFWS 2015b). In addition to the threat of habitat degradation, the combined threats of small population size, low genetic variability, and accelerated climate change could increase the risk of localized extinction facing many leafy prairie-clover populations (Barrett and Kohn 1991; Molano-Flores and Bell 2012).

Conservation needs for leafy prairie-clover include: 1) increased use of prescribed fire, or other techniques to maintain open conditions with limited competing vegetation in areas with sufficient soil depth to support the plant, 2) continued efforts to reintroduce/augment Illinois populations, 3) development of a population viability analysis for the species across its entire range to provide a better estimation of the extinction risk faced by individual populations and the species as a whole, and 4) increasing the frequency of monitoring in Tennessee and Alabama populations.

8.2. Environmental Baseline for Leafy Prairie-Clover

The environmental baseline is a "snapshot" of the species' health in the Action Area at the time of the consultation, and does not include the effects of the Action under review. This section is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the leafy prairie-clover, its habitat, and ecosystem within the Action Area.

8.2.1. Action Area Numbers, Reproduction, and Distribution of Leafy Prairie-Clover

In the Action Area, leafy prairie-clover has been documented from active TVA ROW in three discrete areas in Tennessee and two sites in Alabama. One of the Tennessee populations is located just north of Cedars of Lebanon State Forest and was first observed by TVA botanists in 2008. While there are cedar glades occurring with 500 ft of known locations of leafy prairie-clover, there is no off-ROW habitat immediately adjacent to this population.

Without the existence of the ROW, the plants would not occur on-site because the adjacent forest is unsuitable for the species. The small population was comprised of seven individual plants in 2008. During the most recent visit of the site in 2014, TVA botanists noted the population had increased to approximately 20 individual plants. The shallow soils found on the site retard invasion of woody species and result in a relatively low woody stem count and a diverse herbaceous plant community.

The other two Tennessee populations were both first observed several miles southeast of the city of Columbia in 2009 during field surveys for a proposed new TL. At both sites, the proposed new TL was sited parallel to an existing TVA TL that crossed through a natural cedar glade complex. The majority of leafy prairie-clover plants found at both locations were situated on the existing ROW. The initial observation of one population noted that about 125 individual plants occurred in the existing ROW, while an additional 20 plants occurred adjacent to a cedar glade off the ROW. After construction of the new TL, all leafy prairie-clover plants at this site remained in an open ROW. Subsequent surveys in 2018 noted that 52 plants remained on the site. Approximately 23 individual leafy prairie-clover plants were initially observed at the second site. The area was heavily grazed by horses, to the extent that it was surprising to find the plants present on the site. Leafy prairie-clover was restricted to small, wet portions of the glade. Subsequent surveys in 2018 found no plants extant in this population. The cause of the apparent declines at these sites is difficult to ascertain and could be the result of action taken by the private landowner (grazing), TVA vegetation management, or some combination of the two.

The two leafy prairie clover sites in Alabama lie on the northern edge of the William Bankhead NF. One of the sites is a well-documented site that was first observed in 1989 by botanist, David Webb. The TL ROW intersects a limestone cedar glade complex that supports a number of state and globally rare plant species. On this site, leafy prairie clover inhabits dry ROW and has never been observed outside of the TL easement. The site has not been systematically monitored, but botanists have made detailed observations multiple times since the site was first discovered.

Population counts have fluctuated over time, but appear relatively stable. Individual plant counts of this population include: 30-40 (1989); 100-200 (1993); 21 (2008); 40 (2012); 56 (2014); 31 (2016); and 52 (2018). The recent increase in the frequency of monitoring efforts is linked to TVA's ROW floor vegetation management, which occurs every third year. TVA botanists survey the site before work takes place.

The second population was first observed by TVA botanists in 2012. This occurrence is comprised of three sub-sites that span about 4,000 ft of ROW. This population is situated on the same TL ROW as the other population, but about 1-mi to the southeast. At this site, there are no open cedar glades adjacent to the ROW and no off-ROW habitat for leafy prairie-clover. The population appears stable based on available plant count data: 65 (2012), 290 (2014), 200 (2016), and 336 (2018). The low value in 2012 may be the result of the timing of survey, which was the third week in May. This is too early in the season to effectively monitor leafy prairie-clover, but late enough in the season for TVA botanists to find small plants growing in the ROW.

8.2.2. Action Area Conservation Needs of and Threats to Leafy Prairie-Clover

In Tennessee, the primary threats to leafy prairie-clover in the Action Area are encroachment by competitive herbaceous and woody vegetation into suitable habitat for the species and adverse land use activities by private landowners *(e.g.*, grazing suitable habitat). In Alabama, TVA vegetation management, primarily localized herbicide applications used to control woody vegetation in ROW, is the primary threat and may result in limited inadvertent adverse effects to the leafy prairie-clover. Reducing these threats may be best addressed by continued coordination with TVA regarding maintenance of ROW.

8.3. Effects of Vegetation Management on Leafy Prairie-Clover

This section analyzes the direct and indirect effects of the Action on leafy prairie-clover. An effects analysis summary of the effects of various methods of vegetation management on leafy prairie-clover and the other 17 listed LAA plant species from the BA has been included in Appendix II.

8.3.1. Effects of Manual Vegetation Clearing on Leafy Prairie-Clover

Manual vegetation clearing, when utilized by TVA, has the potential to adversely affect leafy prairie-clover. However, provided clearing does not intentionally disturb the soil, it is unlikely to result in the death of individual plants. Leafy prairie-clover prefers sunny conditions, though it does not typically inhabit the interior of cedar glades. Plants frequently inhabit ROW edges. If tree clearing resulted in increased light on ROW edges where leafy prairie-clover occurred, the effect would not likely be detrimental. The species would be susceptible to physical damage from clearing activities, but the shallow rocky soils, characteristic of cedar glades, do not rut easily, and the species could resprout after tree clearing.

Clearing previously unmaintained ROW is a one-time event because these areas would subsequently be treated as ROW floor. Danger tree clearing occurs as needed. Danger tree clearing may never be needed in leafy prairie-clover habitat near glades because the soils are not sufficiently deep to support growth of taller trees.

8.3.2. Effects of Mechanical Clearing on Leafy Prairie-Clover

All of TVA's mechanical vegetation control methods have the potential to adversely affect leafy prairie-clover. Mowers are generally set 10 to 12 inches off the ground and would likely miss leafy prairie-clover if mowing occurred before June. If damaged during mowing, all but the weakest plants would resprout because TVA mowing would not be employed more frequently than once every three years.

8.3.3. Effects of Herbicide Use on Leafy Prairie-Clover

Vegetation control methods that utilize herbicides are likely to adversely affect leafy prairie-clover. Spot treatment of herbicide is highly targeted and unlikely to adversely affect leafy prairie-clover at the population level, but could result in isolated, direct adverse effects on individual plants. Cut stump and hack and squirt applications could be used when cutting larger tree to prevent resprouting and as an AMM to control smaller trees in occupied habitat within the ROW floor. Leafy prairie-clover often occurs on the floor of ROW and could, therefore, be affected by localized herbicide applications, which are commonly used to control woody species in the open ROW.

While off target herbicide damage could kill individual plants, it is unlikely that whole populations would be extirpated. This is because habitats where leafy prairie-clover is most likely to occur do not have significant stringers of tree seedlings in the ROW. These dry, rocky areas do not support rapid tree growth, and woody plant species are typically widely-spaced. This increases the odds that leafy prairie-clover plants, if any undocumented populations occur on TVA ROW, would survive instances of localized application of herbicide. Broadcast herbicide, either from the air or ground, could affect plants growing on and near the ROW. However, it is unlikely that this tool would be used in areas that might support leafy prairie-clover because nearly all glade and barrens habitat that could potentially support the species has been field surveyed by TVA botanists or is restricted with a Class 1 or 2 Plants O-SAR polygon, which restricts use of broadcast herbicide.

8.3.4. Effects of Debris Management on Leafy Prairie-Clover

All debris management techniques used by TVA have a small potential to adversely affect leafy prairie-clover. The aspect of debris removal most likely to affect the species is physical disturbance associated with manual or mechanized handling of debris. This disturbance could result from dragging of debris over plants or the marginal soil disturbance that would be expected from use of machinery. The soil disturbance would be minimal because of the rocky habitats preferred by leafy prairie-clover, which are usually well-drained and resistant to deep rutting. Neither form of disturbance would likely result in death of individual plants. Pile burning could conceivably result in loss of individual plants, but the infrequent use of the tool, combined with the extreme rarity of the species, make the likelihood of this occurring slight.

TVA's facilitation of landowner use of wood has similar potential for small impacts as manual debris management methods.

If mulching machines were used in leafy prairie-clover habitat, it would not likely generate enough mulch to bury the species. This is because the amount of mulch or chips generated by the machine is directly proportional to the amount of vegetation the site supports. Dry glade and barrens margins stunt woody plant growth, and the layer of mulch left in these areas is often discontinuous and less than 1-in deep.

8.4. Conclusion for Leafy Prairie-Clover

In this section, we interpret the findings of the previous sections for the leafy prairie-clover (status, baseline, effects, and cumulative effects) relative to the purpose of a BO under §7(a)(2) of the ESA.

Opinion

The Action would have localized adverse effects to leafy prairie-clover and result in only a few individual plants within the Action Area being adversely affected. The species only occurs on TVA ROW because of the existence of the ROW; the open conditions of the ROW provide suitable habitat, whereas the plants do not occur in adjacent forested areas because such habitat is unsuitable for leafy prairie-clover. Cumulative effects to leafy prairie-clover that may be relevant to this consultation are unknown.

After reviewing the current status of the species, the environmental baseline for the Action Area, the effects of the Action, and the cumulative effects, it is the USFWS's biological opinion that the Action is not likely to jeopardize the continued existence of the leafy prairie-clover. We reached this determination based on the following factors: (1) The likelihood of the species being adversely affected is low with TVA's adherence to the AMMs, BMPs and SOPs, which, collectively, limit the probability that known and unknown populations of the species will be affected. (2) The Action would result in a mix of adverse and beneficial effects to the species. During proposed herbicide applications in particular, the incidental, localized removal of invasive species may provide some beneficial effects in circumstances where such invasive removal would reduce competition with the species and/or allow the species to expand into new habitat near or within the TVA ROW. (3) The ROW provides suitable cedar glade habitat conditions for the five populations in the Action Area, thus supporting the conservation of the species. (4) Only a fraction of the known rangewide population (five small populations out of a total of 71) exists within the Action Area; therefore, only a small percentage of plants in the species range would be adversely affected by the Action.

9. WHORLED SUNFLOWER

9.1. Status of Whorled Sunflower

This section summarizes best available data about the biology and current condition of whorled sunflower (*Helianthus verticillatus*) throughout its range that are relevant to formulating an opinion about the Action. The USFWS published its decision to list whorled sunflower as endangered on August 1, 2014 (79 FR 44712- 44718).

9.1.1. Description of Whorled Sunflower

A member of the aster family (Asteraceae), whorled sunflower is a perennial herb arising from horizontal, tuberous-thickened roots with slender rhizomes, producing stems that can reach 4 m (13 ft) or more in height (Matthews *et al*. 2002). The leaves are opposite on the lower stem, verticillate (whorled) in groups of three to four at the mid-stem, and alternate or opposite in the inflorescence (flower-bearing portion of a plant). Individual leaves are firm in texture and have a prominent mid-vein, but lack the prominent lateral veins found in many members of the genus. The leaves are linear-lanceolate in shape, narrowing at the tip to a point, and 7.5 to 18.5 cm (3 to 7.2 in) long and 0.7 to 2.0 cm (0.3- to 0.8 in) wide. The flowers are arranged in a branched inflorescence, typically consisting of three to seven heads, each with deep yellow ray flowers and lighter yellow disk flowers. Achenes are 0.4 to 0.5 cm (0.16 to 0.2 in) long.

9.1.2. Life History of Whorled Sunflower

Whorled sunflower is found in moist-soiled areas ranging from degraded sites along roadsides, railroads, and agricultural fields to higher integrity prairie remnants in openings in woodlands and adjacent to creeks. Creation and maintenance of whorled sunflower habitat requires managing for open conditions by controlling invasive plants and competing woody vegetation with careful herbicide application, prescribed fire, and/or properly-timed mechanical thinning.

Whorled sunflower appears to be a habitat specialist, occurring in natural wet meadows or prairies and calcareous barrens. Despite the commonly degraded condition of these habitats, the list of associated species in these areas indicates a community with strong prairie affinities as specified in Schotz (2001); Matthews *et al*. (2002); Tennessee Division of Natural Areas (TDNA) (2008a).

9.1.3. Numbers, Reproduction, and Distribution of Whorled Sunflower

Whorled sunflower is endemic to the Loess Plains, Northern Hilly Gulf Coastal Plain, and Southern Shale Valleys ecoregions. There are five known extant whorled sunflower populations found in four states including Alabama (1), Georgia (1), Mississippi (1), and Tennessee (2) and one known historical population in Tennessee. A general summary of all extant whorled sunflower occurrences can be found in Table 9.1. The Georgia population is located in Floyd County and composed of four subpopulations. The Alabama population is located in Cherokee County and composed of two subpopulations. The populations in Georgia and Alabama are less than 2 km (1.2 mi) apart. In Tennessee, there is one population composed of six subpopulations in McNairy County and the second population composed of four subpopulations in Madison County. A small, roadside population was found in Marshall County, Mississippi, in 2017 (Collection Manager, University of Memphis Herbarium, pers. comm., August 12, 2017). Follow-up searches in 2018 discovered more plants growing upstream of the original site within a forested riparian corridor between agricultural fields (D. Brandon pers. comm., August 29, 2018). Table 9.1 lists these populations and subpopulations, and relates them to EO numbers used by state conservation agencies to track their status. Given this recent discovery, expansion of surveys may discover more whorled sunflower populations in northern Mississippi and/or southwestern Tennessee.

Table 9-1. Summary of extant whorled sunflower populations and subpopulations by state and county, with corresponding site names and EO numbers from state conservation agency databases in Alabama, Georgia, and Tennessee.[6]

Population (County, State)	Site Name	EO Number	Subpopulation Number(s)
Cherokee, AL	Kanady Creek Prairie	AL 1	1
	Locust Branch Prairie	AL 2	2
Floyd, GA	Jefferson Road Wet Prairie	GA 1	1
	Kanady Creek Wet Prairie	GA 4	2
	Upper Mud Creek Wet Prairies	GA 5	3
	Sunnybell Prairie	GA 7	4
Marshall, MS	Clear Creek	n/a	n/a
Madison, TN	Turk Creek	TN 2	1–6
McNairy, TN	Prairie Branch	TN 3	1–4

Whorled sunflower is a self-incompatible, clonal perennial and flowers from August–October (Matthews *et al*. 2002; Ellis and McCauley 2009). Self-incompatibility is a common strategy of flowering plants to promote outcrossing and prevent inbreeding (Silva and Goring 2001). Whorled sunflower propagates clonally via rhizomes, as well as by sexual reproduction (*i.e.*, flowering and seed production); thus, many stems that appear to be individual plants are genetically identical to their neighbors, resulting in a clumped distribution (Ellis *et al*. 2006; Mandel 2010). Clumped distribution combined with the species' self-incompatibility and short flight distances of potential pollinators (*e.g.*, two-spotted long-horned bees [*Mellisodes bimaculatus*] and honeybees [*Apis mellifera*] have been observed visiting flowers of the species) increase the likelihood of geitonogamous self-pollination (transfer of pollen between flowers of this same genetic individual) that will result in unsuccessful pollination (Ellis 2008; Mandel 2010). Whorled sunflower lacks adaptations for wind pollination, so pollinating invertebrates are likely required for successful reproduction, although studies to determine effective pollinators of this species have not been conducted.

The species is easily cultivated and seed germination is high in the laboratory. Upon transplanting, this species has been shown to reproduce rapidly from rhizomes, creating dense colonies of stems that can reach over 4 m (13 ft.) in height (Matthews *et al*. 2002). However, Ellis and McCauley (2009) reported lower germination rates in seeds produced from crosses between plants from the Madison County, Tennessee, population compared to plants from the larger Alabama population. Lower rates of seed viability were also observed in second-

[6] Due to its recent discovery, some data was not available for the Mississippi population.

generation (F2) crosses of the Tennessee versus Alabama plants. These results suggest a possible influence of population size on individual fitness in whorled sunflower populations.

9.1.4. Conservation Needs of and Threats to Whorled Sunflower

Loss and degradation of habitat represent the greatest threats to whorled sunflower. Past and ongoing risks of adverse effects from mechanical or chemical vegetation management for industrial forestry, ROW maintenance, or agriculture threaten three of the five extant populations of this species. Degradation of the species' remnant prairie habitats, due to shading and competition resulting from vegetation succession, also threatens these three populations, limiting growth and reproductive output of whorled sunflower. Whorled sunflower is vulnerable to localized extinction because of its extremely restricted distribution and small population sizes at most known locations. Small population size may affect reproductive fitness of whorled sunflower by limiting availability of compatible mates and/or by causing higher rates of inbreeding among closely related individuals. Extant populations vary in size, but are relatively small and isolated, making it more difficult for the species to withstand and recover from stochastic or catastrophic events. Furthermore, the species is likely suffering genetic isolation and reduced adaptive capacity. These threats are expected to continue into the foreseeable future absent conservation efforts to intervene.

9.2. Environmental Baseline for Whorled Sunflower

The environmental baseline is a "snapshot" of the species' health in the Action Area at the time of the consultation, and does not include the effects of the Action under review. This section is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the whorled sunflower, its habitat, and ecosystem within the Action Area.

9.2.1. Action Area Numbers, Reproduction, and Distribution of Whorled Sunflower

In the Action Area, whorled sunflower has been previously reported in close proximity to one small section of a TVA ROW in McNairy County, Tennessee, associated with Prairie Creek. Plants were originally observed by TDNA biologists in 2006. Individuals were recorded from multiple locations along the railroad easement, creek banks, agricultural field edges, and roadsides. No whorled sunflower plants have been documented in the TVA ROW near the Prairie Creek population, which was last visited by TVA botanists in 2013. The nearest plants to the ROW were located about 700 ft to the south along the margins of a soybean field. The initial discovery of whorled sunflower in Mississippi in 2017 (D. Brandon pers. comm., August 12, 2017) was along the U.S. Highway 72 ROW at Clear Creek, and surveys conducted since then have discovered several additional plants growing along Clear Creek in the same general vicinity. This known location is also within 0.5-mi of an existing TVA ROW.

The ability of whorled sunflower to occupy disturbed, open habitat suggests that the species could occupy other sites on TVA TL ROW. TVA botanists have surveyed 480 ac (46 percent) of the 1,100 ac of TVA ROW area situated in counties where whorled sunflower is known to occur. While not all sections of TVA ROW contain suitable habitat for whorled sunflower, TVA botanists have used the O-SAR process to designate about 560 and 70 ac of ROW as Plants Class

1 and Class 2, respectively. It is impossible to quantify with certainty, but given the limited area surveyed for the species and presence of suitable habitat in the Action Area, TVA is reasonably certain that whorled sunflower occurs within the O-SAR polygons.

9.2.2. Action Area Conservation Needs of and Threats to Whorled Sunflower

Threats to this species in the Action Area include mechanical and chemical vegetation management for industrial forestry, ROW maintenance (*i.e.*, incompatible mowing regimes, indiscriminate herbicide application); agriculture; shading and competition resulting from vegetation succession; and limited distribution and small population sizes.

Management of whorled sunflower habitat requires maintaining open conditions by controlling invasive plants and woody vegetation with careful herbicide application, prescribed fire, and/or properly timed mechanical thinning (*e.g.*, mowing).

9.3. Effects of Vegetation Management on Whorled Sunflower

This section analyzes the direct and indirect effects of the Action on whorled sunflower. An effects analysis summary of the effects of various methods of vegetation management on whorled sunflower and the other 17 listed LAA plant species from the BA has been included in Appendix II.

9.3.1. Effects of Manual Vegetation Clearing on Whorled Sunflower

Manual vegetation clearing has the potential to adversely affect whorled sunflower. While tree clearing would increase light levels on-site, potentially resulting in a benefit to whorled sunflower, direct physical disturbance of the species is likely to occur. The disturbance could result from trampling, cutting, or soil disturbance. Given the ability of whorled sunflower to reproduce asexually from underground rhizomes, it is unlikely manual vegetation clearing would completely remove the species from a site. Likewise, the presence, if any, of a soil seed bank of whorled sunflower may limit the effects of such activities on local populations.

In summary, manual vegetation clearing is likely to adversely affect whorled sunflower if conducted in occupied habitat. Adverse effects from manual clearing activities can be minimized by implementing BMPs (TVA 2017) and AMMs including flagging occupied habitat, and avoiding the use of heavy equipment (to and from the site) that may result in soil disturbance.

9.3.2. Effects of Mechanical Clearing on Whorled Sunflower

All mechanical vegetation control methods used by TVA have the potential to adversely affect whorled sunflower. Whorled sunflower occurs in areas disturbed by human activities and thrives in open conditions like those found along TL ROWs. Whorled sunflower could occur within the open floor of the ROW or along the relatively shady edges. The effects caused by mechanical clearing are similar to those from manual vegetation clearing. In addition, mowing, which is restricted to regularly maintained areas within the ROW floor, could adversely affect individual plants, especially if the mowing was conducted during the flowering period or before fertilized plants could disperse seed. Even though mowing can temporarily reduce woody species concentration, repeated mowing in moist-soil habitats, most likely to support whorled sunflower, would shatter the stumps of individual trees and shrub, thereby promoting sprouting and the proliferation of woody species. Allowing a woody canopy to develop within the ROW may be detrimental to whorled sunflower over time.

Mechanical clearing and side-wall trimming will increase light levels on-site, potentially resulting in a benefit to whorled sunflower. However, there is a potential for direct physical disturbance with all methods. The disturbance could result from trampling, cutting, or soil disturbance resulting from machinery (*e.g.*, rutting from tires, and tracked equipment/vehicles).

In summary, all mechanical vegetation control methods used by TVA are likely to adversely affect whorled sunflower. Adverse effects from mechanical clearing activities can be minimized by implementing the same BMPs (TVA 2017) and AMMs described under 9.3.1.

9.3.3. Effects of Herbicide Use on Whorled Sunflower

Broadcast herbicide, either from the air or ground, will adversely affect plants growing on and near the ROW edge if used in occupied habitat. Broadcast herbicide used in an agricultural setting and for vegetation management along the nearby railroad have been detrimental to whorled sunflower in the Prairie Creek population. Many TVA ROWs in west Tennessee that have non-native, naturalized vegetation have been assigned a Class 1 Plants O-SAR polygon, but the fairly ubiquitous nature of whorled sunflower habitat makes it difficult to effectively identify areas that might harbor the species using the O-SAR process. In addition, while not currently used, broadcast herbicide could be used in the future in the isolated parts of the TVA study area, such as west Tennessee. If broadcast herbicide would be used in a TVA ROW that contained whorled sunflower, the population could be severely damaged.

Spot treatment with herbicide is highly targeted and unlikely to adversely affect whorled sunflower at the population level, but could result in isolated, direct adverse effects on individual plants if a broad spectrum herbicide is used in close proximity to individuals. Cut stump and hack and squirt applications could be used when cutting trees to prevent resprouting. These methods could also be used as an AMM to control smaller trees in occupied habitat. If trees do not need to be cut immediately, but may threaten future TL reliability, spot treatments can be used to kill the trees without directly affecting whorled sunflower. Although localized herbicide application targets woody species within the ROW floor, the use of that tool would have some level of adverse effects on the species. If individual whorled sunflower plants occur within a few feet of a of a localized herbicide application, chances are high that the plant would experience some level of herbicide related damage. This damage may rise to the level of individual plant death. These targeted applications may be less likely to damage whorled sunflower plants beyond chemical burns or other limited effects (limiting or eliminating the application year’s reproduction); however, the precise effects of such targeted herbicides on whorled sunflower have not been studied, so they should still be used with an abundance of caution.

In summary, all vegetation control methods that use herbicides are likely to adversely affect whorled sunflower if used in occupied habitat. Adverse effects from herbicide management activities can be minimized by implementing BMPs (TVA 2017) and AMMs including flagging occupied habitat, appropriate application and timing of herbicide treatment, conservation spraying, or another targeted herbicide application technique such as spot application.

9.3.4. Effects of Debris Management on Whorled Sunflower

Debris management techniques used by TVA are likely to adversely affect whorled sunflower. Any physical disturbance associated with manual or mechanized handling of debris occurring on the open ROW edge could directly affect plants. These effects include physical damage resulting from cutting or dragging trees and would not likely result in death of individuals. If mulching/chipping is used, the species could be directly affected by crushing and grinding from machinery and smothering by mulch/chips. Pile burning could conceivably result in the loss of individual plants, but the infrequent use of the tool, combined with the extreme rarity of the species, make the likelihood of this occurring small. At the requests of landowners, vegetation debris may be left for landowner's personal use under appropriate circumstances. TVA's facilitation of landowner use of wood has similar potential for small impacts as manual debris management methods.

In summary, all debris management activities are likely to adversely affect whorled sunflower. Adverse effects from mechanical clearing activities can be minimized by implementing BMPs (TVA 2017) and AMMs including flagging occupied habitat, appropriate timing of debris management, and avoiding the use heavy equipment that may result in soil disturbance.

9.4. Conclusion for Whorled Sunflower

In this section, we interpret the findings of the previous sections for the whorled sunflower (status, baseline, effects, and cumulative effects) relative to the purpose of a BO under §7(a)(2) of the ESA.

Opinion

The Action would have localized adverse effects on whorled sunflower and result in a few individual plants, if any, within the Action Area being damaged or destroyed. Other non-federal actions in the Action Area, that are reasonably certain to occur and that may affect whorled sunflower, include the use of broadcast herbicide on adjacent agricultural lands, use of broadcast herbicides at ROW intersections (*e.g.*, railroad crossings, roads), and other timber management activities on adjacent lands (cumulative effects; see Section 2.8).

After reviewing the current status of whorled sunflower, the environmental baseline for the Action Area, the effects of the proposed Action, and the cumulative effects, it is the USFWS's biological opinion that the Action is not likely to jeopardize the continued existence of the whorled sunflower. We reached this determination based on the following factors: (1) The likelihood of the species being adversely affected is low with TVA's adherence to the AMMs, BMPs and SOPs, which, collectively, limit the probability that known and unknown populations of the species will be affected. (2) The Action would result in a mix of adverse and beneficial effects to the species. During proposed herbicide applications in particular, the incidental, localized removal of invasive species may provide some beneficial effects in circumstances where such invasive removal would reduce competition with the species and/or allow the species to expand into new habitat near or within the TVA ROW. (3) Only a fraction of the known rangewide populations (one population out of six) exists within the Action Area, and this population is located 700 ft from the ROW, where individual plants would likely not be affected by the Action. (4) The species has the ability to occupy disturbed, open habitat; therefore, the plant would likely persist following removal of vegetation in the Action Area.

10. SMALL WHORLED POGONIA

10.1. Status of Small Whorled Pogonia

This section summarizes best available data about the biology and current condition of small whorled pogonia (*Isotria medeoloides*) throughout its range that are relevant to formulating an opinion about the Action. The USFWS published its decision to list the small whorled pogonia as endangered on September 9, 1982 (53 FR 39827-39831). On October 6, 1994, the USFWS reclassified the species from endangered to threatened (59 FR 50852-50857).

10.1.1. Description of Small Whorled Pogonia

Small whorled pogonia is a perennial herb in the orchid family with long, pubescent roots and a smooth, hollow stem, 3.7 to 9.8 inches tall, terminating in a whorl of five or six light green, elliptical leaves that are somewhat pointed and measure up to 3.1 x 1.6 inches. A flower, or occasionally two flowers, is produced at the top of the stem. Small whorled pogonia's nearest relative is the purple five-leaf orchid (*Isotria verticillata*), which is similar looking, but can be distinguished by its purplish stem and by differences in the flower structure. The purple five-leaf orchid is much more common and widespread than the small whorled pogonia. When not in flower, young plants of Indian cucumber-root (*Medeola virginiana*) also resemble small whorled pogonia. However, the hollow stout stem of the small whorled pogonia will separate it from the genus *Medeola*, which has a solid, more slender stem (USFWS 1992).

10.1.2. Life History of Small Whorled Pogonia

Small whorled pogonia is a forest species and is often found in colonies. The species tends to occupy mesic, second-growth deciduous or deciduous coniferous forest with a robust herb layer (NatureServe Explorer 2018a). It prefers areas with a layer of leaf litter and decaying material, but it can sometimes occupy edges and disturbed successional forests, such as those that may be found along a ROW margin. Flowering typically occurs May-June, although some individuals within a colony may remain underground in a dormant state for several years, making it difficult to determine population size and viability.

10.1.3. Numbers, Reproduction, and Distribution of Small Whorled Pogonia

Small whorled pogonia is a small orchid that is wide ranging, occurring in 22 states from Georgia to Maine. There are about 150 populations of small whorled pogonia throughout its range. Rangewide, the status of the species is considered to be stable. There are approximately 61 populations of small whorled pogonia in the states containing TVA TL ROW including: seven in North Carolina, 33 in Virginia, 19 in Georgia, and two in Tennessee. Most southeastern populations number less than 25 plants, although Georgia has two populations numbering about 100 plants each. In the Southeast, North Carolina has two protected sites, both of which are viable; and Georgia has seven protected sites, four of which are viable (USFWS 2008). Recent data is sparse and many populations have not been monitored. The most recent report (from a small whorled pogonia workshop in 2016) indicated that Georgia had five extant populations ranging in size from 1 to 30 plants and only one population had more than five individuals. The patterns for North Carolina were reported to be similar. Of the 18 populations found in North Carolina between 1978 and 2013, nine populations were extirpated or had not been found since 2004 and the population size ranged from one to 15 plants. Six populations in North Carolina were reported to be stable, and three populations were declining (Isotria Workshop 2016).

10.1.4. Conservation Needs of and Threats to Small Whorled Pogonia

Of the known populations of small whorled pogonia in the southeast, few are provided long-term protection. Primarily, protection of small whorled pogonia populations in the southeast has transpired as a result of surveys documenting populations on state and federal lands (USFWS 2008). Also, because the species can remain dormant for years, monitoring and collection of data to assess the health of populations is difficult. The limitations, associated with monitoring of small whorled pogonia, create data gaps and difficulty in assessing population density and viability. Additional research and monitoring of known populations, rangewide surveys to locate previously unknown populations, and mechanisms to ensure long-term protection and management of populations are needed to aid in recovery of this species.

The primary threat to small whorled pogonia is the loss of populations and degradation of habitat from urban development. Forestry practices have also been known to degrade or eliminate suitable habitat for the species. Other lesser threats that can lead to habitat degradation or loss of individual plants are recreational activities and trampling.

10.2. Environmental Baseline for Small Whorled Pogonia

The environmental baseline is a “snapshot” of the species’ health in the Action Area at the time of the consultation, and does not include the effects of the Action under review. This section is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the small whorled pogonia, its habitat, and ecosystem within the Action Area.

10.2.1. Action Area Numbers, Reproduction, and Distribution of Small Whorled Pogonia

Small whorled pogonia is an interior forest species and is very unlikely to occur on the floor of a TL ROW. Although there are no known occurrences of small whorled pogonia in the Action

Area, there are a number of populations in the TVA PSA and within proximity of TVA ROWs. Most known occurrences of small whorled pogonia in the PSA inhabit mountain slopes and are at least 5 mi distance from the nearest TVA TL ROW. The nearest documented location for small whorled pogonia in North Carolina is 12 mi from the eastern edge of the PSA; the other occurrences are more than 20 mi distance. Similarly, the Lee County, Virginia record for the species is more than 20 mi north of the nearest TVA ROW. In Georgia, where the majority of occurrences of small whorled pogonia occur in the TVA PSA, all records are more than 5 mi away from the nearest TV TL. Tennessee records of the species are generally closer to the TVA ROW with the Hamilton, Washington, and Marion county records being about 4, 1, and 0.15-mi away, respectively, but these populations are small, averaging about four plants per population.

10.2.2. Action Area Conservation Needs of and Threats to Small Whorled Pogonia

Because small whorled pogonia is restricted to forests and ecotones between the forest and ROW and does not occupy open portions of ROW floor, mowing in regularly maintained areas within the ROW is not likely to adversely affect the species. However, other vegetation management activities, such as manual and mechanical tree clearing and trimming, and herbicide use in and adjacent to areas of suitable habitat, could affect small whorled pogonia. Debris management techniques (*e.g.*, piling, chipping, and burning of brush) also have the potential to affect small whorled pogonia when utilized adjacent in the ROW edges.

Although there are no known populations of small whorled pogonia adjacent to TVA ROWs, suitable habitat does occur adjacent to TVA ROW. For this reason, it is likely small whorled pogonia populations could occur where vegetation management actions will take place. Though the probability is low, there is the possibility that vegetation management and debris management activities could affect small whorled pogonia.

10.3. Effects of Vegetation Management on Small Whorled Pogonia

This section analyzes the direct and indirect effects of the Action on small whorled pogonia. An effects analysis summary of the effects of various methods of vegetation management on small whorled pogonia and the other 17 listed LAA plant species from the BA has been included in Appendix II.

10.3.1. Effects of Manual Vegetation Clearing on Small Whorled Pogonia

Manual vegetation management activities, such as tree clearing, have the potential to affect small whorled pogonia by crushing or cutting individual plants, disturbing the soil profile, and/or changing lighting regimes. Large increases in sunlight from canopy removal could result in adverse effects to plants occurring in the area; however, some canopy clearing in densely vegetated areas could result in increased light levels that could increase productivity and reproduction without fundamentally changing the vegetation structure and light regime in the immediate vicinity of the plant, but this is unclear (NatureServe Explorer 2018a).

10.3.2. Effects of Mechanical Clearing on Small Whorled Pogonia

Mechanical vegetation management activities, such as ROW sidewall trimming, also have the potential to affect small whorled pogonia by crushing or cutting individual plants, disturbing the soil profile, and/or changing lighting regimes. Effects and potential benefits to small whorled pogonia from mechanical vegetation management are similar to those described in section 10.3.1.

10.3.3. Effects of Herbicide Use on Small Whorled Pogonia

Vegetation control methods that use herbicides are likely to adversely affect small whorled pogonia if used in occupied habitat, though the probability of herbicides intersecting the species is small. Spot treatment with herbicides is highly targeted and unlikely to adversely affect small whorled pogonia at the population level, but could result in isolated, direct adverse effects on individual plants. Because it is restricted to the ROW floor where small whorled pogonia does not grow, localized herbicide application is not likely to intersect the species. There is a potential nexus with localized herbicide application and small whorled pogonia at the ROW edge. In this area, individual plants growing adjacent to tree seedlings could be inadvertently affected by overspray. Broadcast herbicide, either from the air or ground, could affect plants growing on and near the ROW edge. The chances of broadcast herbicide being used adjacent to small whorled pogonia are very small because areas in Tennessee and Georgia most likely to support the species have been given a Class 1 Plants designation in the O-SAR database, which prohibits the use of broadcast spray. These restricted areas include TVA ROW that bisects higher elevation, natural forests within counties where small whorled pogonia is known to occur.

10.3.4. Effects of Debris Management on Small Whorled Pogonia

Debris management techniques used by TVA have a small potential to adversely affect small whorled pogonia. Any physical disturbance associated with manual or mechanized handling of debris occurring on the open ROW edge could directly affect plants, but the removal of trees preceding debris management activities could ultimately result in plants occurring there dying over time. If chipping and mulching did occur, the effect could be direct affected by crushing from machinery and burial by mulch/chips. Burning would occur in the open ROW and would not affect small whorled pogonia, but debris handling by machinery could affect individual plants on the ROW edge. TVA's facilitation of landowner use of wood have similarly low potential for effects as other debris management methods.

10.4. Conclusion for Small Whorled Pogonia

In this section, we interpret the findings of the previous sections for the small whorled pogonia (status, baseline, effects, and cumulative effects) relative to the purpose of a BO under §7(a)(2) of the ESA.

Opinion

The Action would at most have localized adverse effects to small whorled pogonia and result in only a few individual plants within the Action Area being adversely affected. Cumulative effects to small whorled pogonia that may be relevant to this consultation are unknown.
After reviewing the current status of the species, the environmental baseline for the Action Area, the effects of the Action, and the cumulative effects, it is the USFWS's biological opinion that the Action is not likely to jeopardize the continued existence of the small whorled pogonia. We reached this determination based on the following factors: (1) The likelihood of the species being adversely affected is low with TVA's adherence to the AMMs, BMPs and SOPs, which, collectively, limit the probability that known and unknown populations of the species will be affected. (2) The species is currently unknown to occur on the TVA ROW (i.e., Because the species inhabits interior forests, it is unlikely that it would occur on the ROW.). (3) The Action would result in a mix of adverse and beneficial effects to the species. During proposed herbicide applications in particular, the incidental, localized removal of invasive species may provide some beneficial effects in circumstances where such invasive removal would reduce competition with the species and/or allow the species to expand into new habitat near the TVA ROW. (4) Rangewide, there are 150 populations in 22 states, including 61 known populations in four of the states within TVA's PSA; the nearest known populations to the TVA ROW occur about 4.1 and 0.15-mi from the ROW in Tennessee, averaging only four plants per population, and, therefore, any adverse effects would occur to only a small proportion of the rangewide population.

11. FLESHY-FRUIT GLADECRESS

11.1. Status of Fleshy-Fruit Gladecress

This section summarizes best available data about the biology and current condition of fleshy-fruit gladecress (*Leavenworthia crassa*) throughout its range that are relevant to formulating an opinion about the Action. The USFWS published its decision to list fleshy-fruit gladecress as endangered on August 1, 2014 (79 FR 44712-44718).

11.1.1. Description of Fleshy-Fruit Gladecress

Fleshy-fruit gladecress (Family: Brassicaceae) is a glabrous, having no trichomes (bristles or hair-like structures), winter annual known from Lawrence and Morgan counties, Alabama. It usually grows 10 to 30 cm (4 to 12 in) tall. The leaves are mostly basal, forming a rosette, and entire to very deeply, pinnately (multiple leaflets attached in rows along a central stem) lobed or divided, to 8 cm (3.1 in) long. Flowers are on elongating stems, and the petals are approximately 0.8 to 1.5 cm (0.3- to 0.6 in) long, obovate to spatulate, and emarginate (notched at the tip). Flower color is either yellow with orange or white with yellow, usually with both color forms intermixed in a single population. The fruit is globe-shaped or slightly more elongate and about 1.2 cm (0.5-in) long with a slender beak at the tip, which is 0.25 to 0.60 cm (0.1- to 0.24 in) in length. Seeds are dark brown, nearly round in shape, and winged.

11.1.2. Life History of Fleshy-Fruit Gladecress

Fleshy-fruit gladecress is an annual, spring-flowering member of the mustard family (Brassicaceae). As an annual, the seeds germinate in the fall, overwinter as rosettes, and commence a month-long flowering period beginning in mid-March. The first seeds mature in late April, and during most years the plants dry and drop seed by the end of May. It is unlikely that all seeds produced in spring germinate the next fall, but the length of dormancy in the soil is not known (McDaniel and Lyons 1987), and we do not know whether the species is capable of forming a seed bank. Native bees in the families Andrenidae and Halictidae (sweat bees), including the species *Halictus ligatus*, were observed carrying pollen from fleshy-fruit gladecress and Alabama gladecress (*Leavenworthia alabamica*) in northern Alabama (Lloyd 1965).

Fleshy-fruit gladecress was described by Rollins (1963) from material collected in 1959 in Morgan County, Alabama. Rollins (1963) delineated the species into two varieties (var. *crassa* and var. *elongata*) based on differences in fruit length. However, herbarium and field studies have shown var. *elongata* to have variation in fruit length within the range of fruit lengths for var. *crassa* (McDaniel and Lyons 1987). Thus, the species is treated as one taxon.

11.1.3. Numbers, Reproduction, and Distribution of Fleshy-Fruit Gladecress

Fleshy-fruit gladecress is endemic to a 21-km (13-mi) radius area in north central Alabama within Lawrence and Morgan counties (Rollins 1963). A 1961 record from Lauderdale County, Alabama has never been confirmed (McDaniel and Lyons 1987). Surveys by Lyons (*in litt.* 1981 to R. Sutter), McDaniel and Lyons (1987), and Hilton (1997) were unsuccessful at locating a number of historical sites for fleshy-fruit gladecress. McDaniel and Lyons (1987) failed to locate eight sites previously reported by Rollins (1963), and Lloyd (1965) and Hilton (1997) were unsuccessful at locating seven sites listed in McDaniel and Lyons (1987).

Currently, there are seven known extant occurrences of fleshy-fruit gladecress documented, three in Morgan County and four in Lawrence County, Alabama (Table 11-1). One of these occurs on USFS lands. The majority of other sites are actively grazed, a practice that has, for the most part, maintained favorable growing conditions for the species. However, adjusting grazing patterns to take place during the species' dormant cycle would greatly reduce potential mortality of reproducing plants, while maintaining ideal habitat conditions.

Table 11-1 lists these populations and subpopulations, and relates them to EO rank used by state conservation agencies to track their status. The EO final rank is a summary of ranking criteria that includes quality, condition, viability, and defensibility of the population. The ranking is given based on a scale from A to D, with A meaning excellent, B meaning good, C meaning marginal, and D meaning poor.

Table 11-1. List of fleshy-fruit gladecress populations by county, with corresponding site names and EO rank from state conservation agency databases in Alabama.

County	Designation	EO Rank	Land Ownership
Lawrence	Bluebird Glades	D	Private & State ROW Stover Branch Glades
	Glades	C	Private
	Indian Tomb Hollow	A	Federal--USFS Glade
	Hillsboro Glade	*	Private
Morgan	Cedar Plains South	C	Private
	Cedar Plains North	B	Private
	Massey Glade	C	Private

*Recently discovered population.

11.1.4. Conservation Needs of and Threats to Fleshy-Fruit Gladecress

Fleshy-fruit gladecress is endemic to cedar glade areas in north-central Alabama that have been significantly altered from their original condition. More than a 50 percent loss in glade habitat has occurred since European settlement (Hilton 1997), with resulting glade habitats reduced to remnants fragmented by agriculture and development. Hilton (1997) conducted a thorough survey of cedar glade communities in northern Alabama using historical records, soil maps, topographic maps, geology, and aerial photography; 22 high priority glades were identified. However, field surveys found only five of these to be in good condition and restorable, and only two of these were considered high quality sites. Threats to fleshy-fruit gladecress from habitat destruction and modification are occurring throughout the entire range of the species. These threats include agricultural conversion or incompatible practices, maintenance of transportation ROW, residential and industrial development, and shading and competition. The conservation efforts of the USFS have removed threats associated with ORV use and encroachment of invasive species at one site; however, maintenance of transportation ROW and use of ORV could adversely affect the remaining six extant populations. The population-level effects from these activities are expected to continue into the future. State and federal regulations that might help conserve rare species on state highway ROW, including avoidance or minimization of habitat destruction, as well as regulations that protect plants from herbicide applications, can help protect this species. However, no existing regulations protect the species on privately owned land, where most of the remnant gladecress populations are found.

Fleshy-fruit gladecress is vulnerable to localized extinction because of the small number of occurrences and the small population sizes within the species' limited range. Small population sizes decrease the resilience of individual fleshy-fruit gladecress occurrences to recover from effects of other threats affecting the species' habitat. There are only seven remaining fleshy-fruit gladecress occurrences, and only one of these is protected. The loss of any occurrence would significantly affect the species' viability by reducing its redundancy on the landscape, which would increase its vulnerability to stochastic environmental stressors and reduce the species' resilience to recover from effects of threats. Three of the seven populations of fleshy-fruit gladecress are small in size as a result of effects of habitat loss. The loss of populations and reductions in population sizes have resulted in spatial isolation between these remnant populations. These isolated populations are vulnerable to extinction by reductions in genetic variation among the populations (Klank *et al.* 2012; Schotz, pers. comm., 2013). Genetic variation is low in self-compatible populations of fleshy-fruit gladecress (Koelling *et al.,* 2011), which could limit their adaptive potential to respond to environmental change (Primack 1998). Habitat disturbance or unintentional human movement resulting in contact between populations of fleshy-fruit gladecress and Alabama gladecress could also increase the threat of hybridization, but, at this time, these species do not occur together in the wild and the potential for hybridization is reduced by incompatibility between them (Koelling and Mauricio 2010).

Based on this information, we conclude that the small number of populations and the small size of populations within the species' limited range are significant threats to fleshy-fruit gladecress.

11.2. Environmental Baseline for Fleshy-Fruit Gladecress

The environmental baseline is a "snapshot" of the species' health in the Action Area at the time of the consultation, and does not include the effects of the Action under review. This section is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the fleshy-fruit gladecress, its habitat, and ecosystem within the Action Area.

11.2.1. Action Area Numbers, Reproduction, and Distribution of Fleshy-Fruit Gladecress

Fleshy-fruit gladecress has been documented from one location on TVA ROW about 2.5 mi south of the town of Hillsboro in Lawrence County, Alabama. This site was first identified by TVA botanists during desktop O-SAR reviews while examining aerial photos, topographic maps, and TVA Natural Heritage data. This site was subsequently surveyed in the field, which resulted in the discovery of seven state-listed plant species, as well as the population of fleshy-fruit gladecress. No population estimate was made during the initial observation, but a 2018 field survey noted that thousands of flowering fleshy-fruit gladecress occur within the ROW. The population may sound large, but the species is less than 5 cm tall and viable habitat within the ROW only covers a few thousand square feet.

No high quality habitat occurs adjacent to the ROW; most habitat off-ROW is closed canopy forest or agricultural fields and pasture. Fleshy-fruit gladecress can be found in these suboptimal open habitats, but populations in these situations are often ephemeral due to the dynamic nature of plant communities found there. Intact cedar glade habitats are not mutually exclusive with ROW vegetation management and it is not inconceivable that other undocumented occurrences of fleshy-fruit gladecress intersect the transmission system in Alabama. However, TVA botanists have reviewed all TL located in northern Alabama using the O-SAR process. Given the propensity for glades (and ROW near glades) to harbor listed plant species and the ease which these habitats can be identified using aerial photos, TVA botanists have classified many areas as Class 2 Plants in O-SAR. The vast majority of these areas have been subsequently field surveyed. Multiple new populations of state and federally listed species have been found on TVA ROW in this part of Alabama, including other rare gladecress species, but no new occurrences of fleshy-fruit gladecress. Few, if any, sizable, unsurveyed glades co-occurring on ROW remain in northern Alabama.

11.2.2. Action Area Conservation Needs of and Threats to Fleshy-Fruit Gladecress

Conservation efforts involve using hand removal of invasive plants to maintain the open, well-lit conditions fleshy-fruit gladecress favors. The population at Hillsboro glade along the power line ROW seems to respond well to management that maintains open, well-lit conditions.

ROW floor work would use timing restrictions, and other AMMs, as discussed in Section 2.4 to eliminate the risk of herbicide applications inadvertently affect the population. If new populations of fleshy-fruit gladecress are documented from TVA ROW, the location would be added to the O-SAR database and subsequent vegetation management would seek to avoid impacts using AMMs.

11.3. Effects of Vegetation Management on Fleshy-Fruit Gladecress

This section analyzes the direct and indirect effects of the Action on fleshy-fruit gladecress. An effects analysis summary of the effects of various methods of vegetation management on fleshy-fruit gladecress and the other 17 listed LAA plant species from the BA has been included in Appendix II.

11.3.1. Effects of Manual Vegetation Clearing on Fleshy-Fruit Gladecress

Manual vegetation clearing, when utilized by TVA, has the potential to adversely affect fleshy-fruit gladecress. However, provided clearing does not intentionally disturb the soil, it is unlikely to result in the death of individual plants. Fleshy-fruit gladecress prefers sunny conditions; and typically inhabits the interior of cedar glades. If tree clearing resulted in increased light on ROW edges where fleshy-fruit gladecress occurred, the effect would not likely be detrimental. The species is susceptible to physical damage from clearing activities, but the shallow rocky soils, characteristic of cedar glades, do not rut easily, and the species could resprout after tree clearing.

Clearing previously unmaintained ROW is a one-time event because these areas would subsequently be treated as ROW floor. Danger tree clearing occurs as needed. Danger tree clearing may never be needed in fleshy-fruit gladecress habitat near glades because the soils are not sufficiently deep to support growth of taller trees.

11.3.2. Effects of Mechanical Clearing on Fleshy-Fruit Gladecress

All mechanical vegetation control methods utilized by TVA have the potential to adversely affect fleshy-fruit gladecress. Effects to the species from mechanical clearing are similar to those described under manual clearing. As long as the clearing method would not intentionally disturb the soil, it is unlikely to result in death of individual plants.

Mowers are generally set 10 to 12 inches off the ground and would likely miss the low-growing fleshy-fruit gladecress.

11.3.3. Effects of Herbicide Use on Fleshy-Fruit Gladecress

Vegetation control methods that utilize herbicides are not likely to affect fleshy-fruit gladecress, but an adverse effect resulting from this control technique is not impossible. The low probability of herbicide adversely affecting fleshy-fruit gladecress is related to two factors: seasonality of herbicide application in relation to species life cycle and habitat preferences of the plant. Fleshy-fruit gladecress is a winter annual, which means that seeds germinate in the fall, overwinter as a rosette, flower in the spring, and die by June of any given year. TVA cannot spray herbicide until tree species growing in the ROW have leafed out sufficiently. This is because without enough leaf area on any given tree, foliar herbicides will not be taken up by an individual plant, which would result in low efficacy of the application. Therefore, herbicide treatments often do not start until mid-May in many parts of the TVA system. Fleshy-fruit gladecress would be setting seed and nearing the end of its life cycle at this time. In addition, fleshy-fruit gladecress grows in flat, limestone outcrops that often have soil depths of less than 1 cm. These areas are dry in summer and typically do not support tree growth characteristics that are targeted for herbicide application.

Even if ROW containing undocumented locations for fleshy-fruit gladecress were sprayed using low-volume foliar application of herbicide, the chemical would be unlikely to intersect the species because few trees would be present. Broadcast herbicide, either from the air or ground, could affect plants growing on and near the ROW, if applications were made early in the season. However, it is unlikely that this tool would be used in areas where fleshy-fruit gladecress might occur because the region is characterized by a patchwork of land uses, making broadcast spray a less desirable option.

11.3.4. Effects of Debris Management on Fleshy-Fruit Gladecress

All debris management techniques used by TVA have a small potential to adversely affect fleshy-fruit gladecress. The characteristic of debris removal most likely to affect the species is physical disturbance associated with manual or mechanized handling of material. This disturbance could result from dragging of debris over plants or the marginal soil disturbance that would be expected from use of machinery. The soil disturbance would be minimal because of the rocky habitats preferred by fleshy-fruit gladecress, which are well drained and resistant to deep rutting. Neither form of disturbance would be likely to result in the death of individual plants. Pile burning could conceivably result in the loss of individual plants, but the infrequent use of the tool, combined with the extreme rarity of the species, make the likelihood of this occurring very small. TVA's facilitation of landowner use of wood has similar potential for small impacts as other debris management methods.

If mulching machines were used in fleshy-fruit gladecress habitat, it would not likely generate enough mulch to bury the species. This is because the amount of mulch or chips generated by the machine is directly proportional to the amount of vegetation a site supports. Dry glade margins stunt woody plant growth and the layer of mulch left in these areas is often discontinuous and less than 1-in deep.

11.4. Conclusion for Fleshy-Fruit Gladecress

In this section, we interpret the findings of the previous sections for the fleshy-fruit gladecress (status, baseline, effects, and cumulative effects) relative to the purpose of a BO under §7(a)(2) of the ESA.

Opinion

The Action would have localized adverse effects to fleshy-fruit gladecress and result in only a few individual plants within the Action Area being adversely affected. The plant responds well to vegetation clearing because suitable habitat for the species includes open, well-lit conditions. Cumulative effects to fleshy-fruit gladecress that may be relevant to this consultation are unknown.

After reviewing the current status of the species, the environmental baseline for the Action Area, the effects of the Action, and the cumulative effects, it is the USFWS's biological opinion that the Action is not likely to jeopardize the continued existence of the fleshy-fruit gladecress. We reached this determination based on the following factors: (1) The likelihood of the species being adversely affected is low with TVA's adherence to the AMMs, BMPs and SOPs, which, collectively, limit the probability that known and unknown populations of the species will be affected. (2) The Action would result in a mix of adverse and beneficial effects to the species. During proposed herbicide applications in particular, the incidental, localized removal of invasive species may provide some beneficial effects in circumstances where such invasive removal would reduce competition with the species and/or allow the species to expand into new habitat near or within the TVA ROW. (3) We do not expect to lose the single population on the ROW due to benefits (increased light conditions) provided by TVA's ongoing maintenance, which offsets the likelihood of adverse effects on the species. (4) While the population on TVA's ROW is substantial (i.e., several thousand plants), it is only one of seven populations, and the loss of this population is not expected as discussed in #3 above.

12. LYRATE BLADDERPOD

12.1. Status of Lyrate Bladderpod

This section summarizes best available data about the biology and current condition of lyrate bladderpod (*Lesquerella* [=*Paysonia*] *lyrata*) throughout its range that are relevant to formulating an opinion about the Action. The USFWS published its decision to list lyrate bladderpod as threatened on September 28, 1990 (55 FR 39864-39868).

12.1.1. Description of Lyrate Bladderpod

Lyrate bladderpod, an annual, herbaceous member of the mustard family (Brassieaceae), is 10 to 30 cm (4 to 12 in) tall. The plants are shortly pubescent and usually branched at the base. The stem leaves are alternate, ovate to elliptic in shape, smoothed or toothed on the margins, with prominent ear-like projections at the bases. The flowers are ascending, on the stalks 10 to 15 mm (0.4 to 0.6 in) long, with yellow petals 5 to 7 mm (0.2 to 0.3 in) in length. The fruits are silques, globose in shape 2.5 to 3.5 mm (0.1 in) long and 3 to 4 mm (0.1 to 0.2 in) wide (USFWS 1990). The species resembles the Duck River Bladderpod (*Lesquerella densipila,*), which has fruits and styles that are pubescent, but the lyrate bladderpod has glabrous fruits and styles.

12.1.2. Life History of Lyrate Bladderpod

The lyrate bladderpod is endemic to cedar glade areas in northern Alabama. The species appears to be an early successional species that historically colonized shallow soils on or adjacent to cedar glade habitats. The lyrate bladderpod slowly disappears as the soil layer develops and other competing plants establish themselves (USFWS 1996b). Lyrate bladderpod has an annual dormancy/non-dormancy cycle, with dormancy loss occurring in the summer and dormancy induction in late autumn/winter. Seeds are dormant at maturity in May and have a high temperature requirement to break dormancy; whereas, low temperatures cause non-dormant seeds to reenter dormancy (Baskin and Baskin 2000). After germination and initial growth, young plants overwinter as rosettes (USFWS 1990). The growth period for the lyrate bladderpod is from September/October into May. Flowering takes place usually from mid-March to April, and seed dispersal generally occurs from the end of flowering until mid-May (USFWS 1990).

12.1.3. Numbers, Reproduction, and Distribution of Lyrate Bladderpod

Populations of lyrate bladderpod in Franklin and Colbert counties are located near growing urban areas (Schotz 2008). At the time of this species' listing in 1990, a large number of individual plants were observed in cultivated fields; however, these areas are no longer cultivated, and plants today are located in pasturelands. The population in Lawrence County is located in pastureland that is lightly-grazed outside of the growing season and is thriving; however, remaining populations have shown declines in numbers due to field abandonment (Webb and Kral 1986; USFWS 1990, 1996b).

12.1.4. Conservation Needs of and Threats to Lyrate Bladderpod

Most cedar glades have been unable to escape human disturbances, including those glades that naturally supported populations of the lyrate bladderpod (Webb and Kral 1986; McDaniel 1987; USFWS 1990, 1996b; Hilton 1996). Shading causes decreased vigor and death and decreases the number of seeds at the site (Baskin and Baskin 1998, 2000). In typical glade habitats, the shallow, droughty soils inhibit the establishment of competing plants. Cedar glades have been fragmented by agriculture and development and mostly exist as remnants today.

Housing development, trash dumping, adverse agricultural practices, and road building have destroyed or negatively impacted a number of cedar glade systems, including those associated with the lyrate bladderpod (USFWS 1990, 1996b). Urban and residential development poses a threat to populations in Franklin and Colbert counties (Schotz 2008). Plants extend onto roadsides at several sites, and mowing or herbicide application prior to seed set would negatively affect these populations (USFWS 1990, 1996b). Certain agricultural practices are compatible with the survival of this species. Plowing associated with row crop farming and grazing on pasturelands, provides the needed disturbance to arrest succession in these populations. Row crop farming incompatibility comes into play when plowing takes place prior to seed set and when pre-emergent herbicides are used.

12.2. Environmental Baseline for Lyrate Bladderpod

The environmental baseline is a "snapshot" of the species' health in the Action Area at the time of the consultation, and does not include the effects of the Action under review. This section is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the lyrate bladderpod, its habitat, and ecosystem within the Action Area.

12.2.1. Action Area Numbers, Reproduction, and Distribution of Lyrate Bladderpod

Within the Action Area, the lyrate bladderpod has not been documented in the TVA ROW. Multiple TVA TLs occur within Colbert, Franklin, and Lawrence counties, Alabama, but the vast majority of these ROW do not possess suitable habitat for the species. Cedar glade habitat is easily identifiable during O-SAR desktop reviews, and all sections of TVA ROW that have significant potential to contain lyrate bladderpod have already been identified in O-SAR and field surveyed. One section of TVA ROW, located about 2.5 mi southeast of the Prairie Grove Glades population of lyrate bladderpod, possesses extensive suitable cedar glade habitat within the ROW. Field surveys of the site documented ten state-listed plant species in the ROW, but lyrate bladderpod was not present. Few, if any, sizable, unsurveyed glades are co-occurring on ROW in northern Alabama.

12.2.2. Action Area Conservation Needs of and Threats to Lyrate Bladderpod

TVA should make every effort to locate and protect all remaining cedar glade habitat in TVA ROW that could potentially support lyrate bladderpod. Loss and disturbance of these areas is the one threat to lyrate bladderpod in the Action Area.

12.3. Effects of Vegetation Management on Lyrate Bladderpod

This section analyzes the direct and indirect effects of the Action on lyrate bladderpod. An effects analysis summary of the effects of various methods of vegetation management on lyrate bladderpod and the other 17 listed LAA plant species from the BA has been included in Appendix II.

12.3.1. Effects of Manual Vegetation Clearing on Lyrate Bladderpod

All manual vegetation control methods utilized by TVA have the potential to adversely affect lyrate bladderpod if they occurred in undocumented habitat for the species. However, as long as manual clearing does not intentionally disturb the soil, it is unlikely to result in death of individual plants. Lyrate bladderpod requires sunny conditions and typically inhabits the interior of cedar glades away from the shade cast by trees. If tree clearing resulted in increased light on sites where it occurred, the effects would not likely be detrimental. The species would be susceptible to physical damage caused by clearing activities, but the shallow rocky soils, characteristic of cedar glades, do not rut easily.

Danger tree clearing occurs as needed. Danger tree clearing may never be needed in lyrate bladderpod habitat near glades because the soils are not sufficiently deep to support growth of taller trees.

12.3.2. Effects of Mechanical Clearing on Lyrate Bladderpod

Similar to manual vegetation clearing, all mechanical vegetation control methods utilized by TVA would have the potential to adversely affect lyrate bladderpod. Mowers are generally set 10 to 12 inches off the ground and would likely miss the low-growing lyrate bladderpod.

12.3.3. Effects of Herbicide Use on Lyrate Bladderpod

Vegetation control methods that utilize herbicides in occupied lyrate bladderpod habitat could result in adverse effects, but the probability of that occurring is low. The low probability of herbicides affecting lyrate bladderpod is related to two factors: seasonality of herbicide application in relation to species life cycle and habitat preferences of the plant. Lyrate bladderpod is a winter annual, which means that seeds germinate in the fall, overwinter as a rosette, flower in the spring, and die by June of any given year. TVA cannot spray herbicides until tree species growing in the ROW have leafed out sufficiently. This is because without enough leaf area on any given tree, foliar herbicides will not be taken up by an individual plant, which would result in low efficacy of the application. Therefore, herbicide treatments often do not start until mid-May in many parts of the TVA system. Lyrate bladderpod would be setting seed and nearing the end of its life cycle at this time.

In addition, lyrate bladderpod grows in flat, limestone outcrops that often have soil depths of less than 1 cm. These areas are dry in summer and typically do not support tree growth characteristics that are targeted for herbicide application. Even if ROW containing undocumented locations for lyrate bladderpod were sprayed using low-volume foliar application of herbicide, the chemical would be unlikely to intersect the species because few trees would be present. Broadcast herbicide, either from the air or ground, could affect plants growing on and near the ROW if applications were made early in the season. However, it is unlikely that this tool would be used in areas where lyrate bladderpod might occur because the region is characterized by a patchwork of land uses, making broadcast spray a less desirable option.

12.3.4. Effects of Debris Management on Lyrate Bladderpod

All debris management techniques used by TVA have a small potential to adversely affect lyrate bladderpod. The aspect of debris removal most likely to affect the species is physical disturbance associated with manual or mechanized handling of material. This disturbance could result from dragging of debris over plants or the marginal soil disturbance that would be expected from use of machinery. The soil disturbance would be minimal because of the rocky habitats preferred by lyrate bladderpod, which are well drained and resistant to deep rutting. Neither form of disturbance would be likely to result in death of individual plants.

If mulching machines were used in lyrate bladderpod habitat it would not likely generate enough mulch to bury the species. This is because the amount of mulch or chips generated by the machine is directly proportional to the amount of vegetation the site supports. Dry glade margins stunt woody plant growth, and the layer of mulch left in these areas is often discontinuous and less than 1-in deep.

Pile burning could conceivably result in the loss of individual plants, but the infrequent use of the tool combined with the extreme rarity of the species make the likelihood of this occurring very small. TVA's facilitation of landowner use of wood have similarly low potential for impacts as other debris management methods.

12.4. Conclusion for Lyrate Bladderpod

In this section, we interpret the findings of the previous sections for the lyrate bladderpod (status, baseline, effects, and cumulative effects) relative to the purpose of a BO under §7(a)(2) of the ESA.

Opinion

The Action would have localized adverse effects to lyrate bladderpod, resulting in only a small percentage of undocumented, individual plants within the Action Area being affected, if any; no populations would be extirpated by TVA ROW vegetation management activities. Cumulative effects to lyrate bladderpod that may be relevant to this consultation are unknown.

After reviewing the current status of the species, the environmental baseline for the Action Area, the effects of the Action, and the cumulative effects, it is the USFWS's biological opinion that the Action is not likely to jeopardize the continued existence of the lyrate bladderpod. We reached this determination based on the following factors: (1) The likelihood of the species being adversely affected is low with TVA's adherence to the AMMs, BMPs and SOPs, which, collectively, limit the probability that known and unknown populations of the species will be affected. (2) The Action would result in a mix of adverse and beneficial effects to the species. During proposed herbicide applications in particular, the incidental, localized removal of invasive species may provide some beneficial effects in circumstances where such invasive removal would reduce competition with the species and/or allow the species to expand into new habitat near or within the TVA ROW. (3) The species' range is restricted to three counties in northern Alabama, and several areas on TVA ROW in one of these counties possess suitable cedar glade habitat; the species has not been observed at these sites during surveys, so the potential for adverse effects is limited.

13. SPRING CREEK BLADDERPOD

13.1. Status of Spring Creek Bladderpod

This section summarizes best available data about the biology and current condition of Spring Creek bladderpod (*Lesquerella* [=*Paysonia*] *perforata*) throughout its range that are relevant to formulating an opinion about the Action. The USFWS published its decision to list Spring Creek bladderpod as endangered on December 23, 1996 (61 FR 67493-67497).

13.1.1. Description of Spring Creek Bladderpod

The following description of Spring Creek bladderpod is adapted from Kral (1983) and Rollins (1955): a herbaceous annual, stems several to many, outer ones usually decumbent at base, inner ones erect, simple or branched, 10 to 15 cm (3.9 to 5.9 in) tall, stems and leaves are covered with fine or coarse hairs. The stem leaves are sessile, articulate, oblong to obovate, with few to many teeth on the margins. The cross-shaped flowers are arranged in a raceme, have white to pale lavender petals with a yellow base, and are 7 to 9 mm (0.28- to 0.35-in) long. The fruits are broadly obovoid to pear-shaped, very inflated, 4 to 7 mm (0.16- to 0.28-in) long, and divided into two halves (USFWS 2006).

13.1.2. Life History of Spring Creek Bladderpod

Spring Creek bladderpod is a winter annual that germinates between September and early October, over-winters as a small rosette of leaves, and fully develops and flowers the following spring. Full sun is a requirement for optimum growth. Flowering usually occurs in March and April. The fruit splits open upon maturity in late April and early May, and the enclosed seeds are dispersed and lie dormant until autumn (USFWS 2006). The plant dies back soon after the fruits mature. Germination can only occur when the correct temperature coincides with adequate moisture (Pearson 1967). Upon germination, the cycle starts over again.

The life history and the seed dispersal mechanism of Spring Creek bladderpod result in many seeds, continuous turnover, and easy movement to new sites. Each of these characteristics favor the ability to persist as long as habitat is available and competing vegetation does not crowd it out (USFWS 2006).

13.1.3. Numbers, Reproduction, and Distribution of Spring Creek Bladderpod

While Spring Creek bladderpod habitat does occur in cedar glades, it is more often found in scour zones and dynamic riparian areas associated with Spring Creek and Bartons Creek in Wilson County, Tennessee. When the Recovery Plan for Spring Creek bladderpod was published in 2006 (USFWS 2006), there were 21 known occurrences of the species, all in the vicinity of the City of Lebanon. Of those 21 occurrences, six were located along Spring Creek, 11 along Bartons Creek and its tributaries, and four along Cedar Creek. All sites occurred on private or municipally owned land, which remains the case today. Based on information in USFWS files and data provided to USFWS by TDEC (2011a), there currently are 22 extant occurrences of Spring Creek bladderpod. The current distribution of Spring Creek bladderpod includes:

<u>Barton's Creek</u>
There currently are 11 occurrences considered extant in the Barton's Creek drainage (TDEC 2011a). One occurrence (EO 34) in this drainage, estimated to contain greater than 1,000 plants,

was discovered during 2008. Only three occurrences have management agreements, but those agreements are non-binding, and occur in the Barton's Creek drainage (EOs 4, 11 and 21).

Cedar Creek
There currently are four occurrences considered extant in the Cedar Creek drainage (TDEC 2011a). One occurrence (EO 28) was thought to have been extirpated by excavation that was first noted during 2004. The site was visited again during 2006, at which time no plants were observed, but plants were observed there in 2011. No other historic or extirpated occurrences are known from this drainage.

Spring Creek
There currently are seven occurrences considered extant in the Spring Creek drainage (TDEC 2011a). EO 24 has not been observed since 1997, thus its status is questionable. One new occurrence (EO 32) was discovered in 2006 following publication of the recovery plan.

13.1.4. Conservation Needs of and Threats to Spring Creek Bladderpod

Habitat destruction or modification from development, cattle grazing, and cropland farming practices (*i.e.*, soil disturbances from tillage and lack of conservation practices) are the primary threats to the Spring Creek bladderpod. Private lands in the City of Lebanon, primarily in Barton's Creek drainage, remain at high risk of loss to urbanization. Increased cattle grazing has transpired across all three drainages in the species' range. Ground disturbance, largely as a result of cropland cultivation between September 15 and May 15, has adversely affected seed bank maintenance for the species (TDNA 2008b; USFWS 2011c).

Based on knowledge of the species' seed ecology and life cycle, Fitch *et al.* (2007) proposed that cropland management for Spring Creek be conducted as follows:

- Planting, field preparation, or other soil disturbance for cultivation should occur after mid-May when seeds disperse, but before seeds are photostimulated. Once seeds are photostimulated, by about mid-July under current climatic conditions, they would be prone to higher germination rates than if they were buried during cultivation prior to this time. While higher germination rates might seem desirable, excessive germination rates could result in seed bank depletion over time.
- Crops should be harvested before seeds germinate in early September to minimize disturbance to newly germinated plants.
- Fields should not be disturbed from September until completion of the above-ground life cycle of the plant, in May.

Additional Spring Creek bladderpod sites need to be enrolled in cooperative management agreements to assist in protection and recovery of the species. Currently, only three sites are enrolled in cooperative management agreements, and inconsistencies in management at these sites have contributed to fluctuations in habitat condition and Spring Creek bladderpod abundance over time. The remaining sites are all located on private lands, primarily under agricultural uses. Additional coordination with landowners and refinement of cropland management practices will be necessary to manage the threat of habitat loss or decline on agricultural lands. Sites on private lands in the City of Lebanon also need to be protected from urbanization (USFWS 2011c).

13.2. Environmental Baseline for Spring Creek Bladderpod

The environmental baseline is a "snapshot" of the species' health in the Action Area at the time of the consultation, and does not include the effects of the Action under review. This section is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the Spring Creek bladderpod, its habitat, and ecosystem within the Action Area.

13.2.1. Action Area Numbers, Reproduction, and Distribution of Spring Creek Bladderpod

In the Action Area, the Spring Creek bladderpod has been documented from two areas within TVA ROW. The first site is located in the floodplain of Bartons Creek, and the species was first observed at this location in 1992. That area is now dominated by cool season grasses and used as a hayfield. During a 2009 site visit by TVA botanists, three flowering plants were observed within a portion of riparian area regularly scoured by high flows where there was bare soil and little competition from other species. The second site is within an urban area near downtown Lebanon and is under significant development pressure. The TVA ROW runs adjacent to a railroad bed and is very disturbed. In 2009, about 20 flowering plants were observed in the TVA ROW at this site. Searches were not systematically conducted off the TVA ROW, but several hundred plants were seen outside of the ROW that could be adversely affected by the TVA ROW vegetation management program.

13.2.2. Action Area Conservation Needs of and Threats to Spring Creek Bladderpod

Consistent with the threats described in Section 13.1.4., disturbances to the Spring Creek bladderpod in the Action Area include cropland agriculture and development associated with urbanization. Reducing these threats is best addressed by working with private landowners and the City of Lebanon to promote conservation and recovery of the species.

13.3. Effects of Vegetation Management on Spring Creek Bladderpod

This section analyzes the direct and indirect effects of the Action on Spring Creek bladderpod. An effects analysis summary of the effects of various methods of vegetation management on Spring Creek bladderpod and the other 17 listed LAA plant species from the BA has been included in Appendix II.

13.3.1. Effects of Manual Vegetation Clearing on Spring Creek Bladderpod

All manual vegetation control methods utilized by TVA have the potential to adversely affect Spring Creek bladderpod if they are carried out in habitat occupied by the species. The most likely effects would be from trampling or crushing individual plants, either from foot traffic or handling cut vegetation. While direct physical disturbances could result in adverse effects, the removal of overstory and consequential increases in light levels would result in future benefits to the affected population.

13.3.2. Effects of Mechanical Clearing on Spring Creek Bladderpod

Similar to manual vegetation clearing, all mechanical vegetation control methods utilized by TVA would have the potential to adversely affect Spring Creek bladderpod. The effects would result from trampling or crushing, handling cut vegetation, and machinery traffic. Mechanical clearing would also result in increased light levels, potentially benefitting future Spring Creek bladderpod populations. Mowers are generally set 10 to 12 inches off the ground and would likely miss the low-growing Spring Creek bladderpod.

13.3.3. Effects of Herbicide Use on Spring Creek Bladderpod

Herbicide use that adversely affects Spring Creek bladderpod is not probable, but adverse effects from herbicide application is possible. The low probability of herbicides adversely affecting Spring Creek bladderpod is related to two factors: (1) seasonality of herbicide application in relation to the species life cycle and (2) habitat preferences of the plant. Spring Creek bladderpod is a winter annual, which means that seeds germinate in the fall, overwinter as a rosette, flower in the spring, and die by June of the following year. TVA cannot spray herbicide until tree species growing in the ROW have leafed out sufficiently, because without enough leaf area on a tree, foliar herbicides will not be taken up by the tree. Therefore, herbicide treatments often do not start until mid-May in many parts of the TVA system. Broadcast herbicide, either from the air or ground, could affect plants growing on and near the ROW if applications were made early in the season. However, it is unlikely that this tool would be used in areas where Spring Creek bladderpod might occur, because the region is characterized by a patchwork of land uses, making broadcast spray a less desirable option.

13.3.4. Effects of Debris Management on Spring Creek Bladderpod

All debris management techniques used by TVA have a small potential to adversely affect Spring Creek bladderpod. The debris removal phase most likely to affect the species is physical disturbance associated with manual or mechanized handling of material. This disturbance could result from dragging of debris over plants or the marginal soil disturbance that would be expected from use of machinery. The soil disturbance would be minimal because of the rocky habitats preferred by Spring Creek bladderpod, which are well drained and resistant to deep rutting. Neither form of disturbance would be likely to result in the death of individual plants. Pile burning could conceivably result in the loss of individual plants, but the infrequent use of the tool combined with the extreme rarity of the species make the likelihood of this occurring very small. TVA’s facilitation of landowner use of wood has similar potential for small impacts as other debris management methods.

If mulching machines were used in occupied Spring Creek bladderpod habitat it would likely generate enough mulch to bury, or partially bury, individual plants. This immediate effect would adversely affect the species, but Spring Creek bladderpod seed can remain viable for many years and the long-term increase in open habitat could benefit a population.

13.4. Conclusion for Spring Creek Bladderpod

In this section, we interpret the findings of the previous sections for the Spring Creek bladderpod (status, baseline, effects, and cumulative effects) relative to the purpose of a BO under §7(a)(2) of the ESA.

Opinion

The Action would have localized adverse effects to Spring Creek bladderpod and result in very few individual plants within the Action Area being adversely affected. Cumulative effects to Spring Creek bladderpod that may be relevant to this consultation are unknown.

After reviewing the current status of the species, the environmental baseline for the Action Area, the effects of the Action, and the cumulative effects, it is the USFWS's biological opinion that the Action is not likely to jeopardize the continued existence of the Spring Creek bladderpod. We reached this determination based on the following factors: (1) The likelihood of the species being adversely affected is low with TVA's adherence to the AMMs, BMPs and SOPs, which, collectively, limit the probability that known and unknown populations of the species will be affected. (2) The Action would result in a mix of adverse and beneficial effects to the species. During proposed herbicide applications in particular, the incidental, localized removal of invasive species may provide some beneficial effects in circumstances where such invasive removal would reduce competition with the species and/or allow the species to expand into new habitat near or within the TVA ROW. (3) Only two of the known 22 rangewide extant populations occur in the Action Area on TVA ROW, and these two populations total no more than 23 plants based on the most recent survey data, so only a very small percentage of plants in the species' range would be affected by the Action on the ROW. (4) Several hundred plants have been observed outside of the TVA ROW that could be adversely affected by the Action, but this risk is diminished due to the distance from ROW vegetation management activities, and no more than a few plants could be adversely affected.

14. MOHR'S BARBARA'S BUTTONS

14.1. Status of Mohr's Barbara's Buttons

This section summarizes best available data about the biology and current condition of Mohr's Barbara's buttons (*Marshallia mohrii*) throughout its range that are relevant to formulating an opinion about the Action. The USFWS published its decision to list Mohr's Barbara's buttons as threatened on September 7, 1988 (53 FR 34698-34701).

14.1.1. Description of Mohr's Barbara's Buttons

Mohr's Barbara's buttons is a herbaceous perennial in the Aster family (Asteraceae) that occurs in the Cumberland Plateau and Ridge and Valley physiographic provinces from north central Alabama to northwestern Georgia. It is native to seasonally-wet, sandy-clay soils in prairie-like meadows, along margins of shale-bedded streams, on public utility/highway ROW, and in habitats with widely spaced trees (barrens or glades). Leaves form a basal rosette, with leaves decreasing in size and number upward on the stem. The leaves are elliptic to spathulate in outline, entire, slightly pubescent, and have three prominent veins (Chafin 2008; Alabama Herbarium Consortium 2019).

14.1.2. Life History of Mohr's Barbara's Buttons

Mohr's Barbara's button flowers mid-May to June (Patrick *et al.* 1995). Flowers are pollinated by beetles, butterflies, and other small insects and must be cross-pollinated to set viable fruit. To avoid self-pollination, flowers on a given plant produce pollen before that plant's stigmas become receptive (Chafin 2008). Flowers are produced in heads, with 1-10 in number held at the tip of the branches on long peduncles. Each head is composed of numerous five-lobed disc flowers. Buds and newly opened flowers are pink, while older flowers are white. The fruit is about 1/8-in long, seed-like, oblong, ribbed, and hidden among bracts of the flower head (Chafin 2008; Alabama Herbarium Consortium 2019). Seeds likely are dispersed by birds and other small animals (Chafin 2008).

14.1.3. Numbers, Reproduction, and Distribution of Mohr's Barbara's Buttons

Mohr's Barbara's buttons first was collected by Charles Mohr in Cullman County, Alabama, in 1882. It historically was known from 28 populations (22 in Alabama, 5 in Georgia, and 1 shared by both states); 19 of these populations are extant (Bibb, Calhoun, Cherokee, Jefferson, and Walker Counties, Alabama, and Floyd County, Georgia); 8 have not been found in recent years and are considered historical; and 1 is confirmed extirpated (USFWS 2016b). Current rangewide Mohr's Barbara's buttons population size may approach 10,000 plants (Schotz 2014; Alabama Army National Guard 2015; M. Hodges pers. comm. 2015; TVA 2015b). Individual sites may range from fewer than 20 plants to well over 1,000 (Schotz 2014; Alabama Army National Guard 2015; TVA 2015b); although, most (27 [79%]) of the 34 extant sites surveyed by Schotz support 200 or fewer plants. At this time, only eight of the extant populations and portions of populations receive some protection from habitat loss or lack of habitat management.

14.1.4. Conservation Needs of and Threats to Mohr's Barbara's Buttons

Primary anthropomorphic threats affecting the species include (as summarized in USFWS 2016):

- Timber harvest and conversion to pine plantation or agriculture;
- Damage associated with recreational uses, such as ATV use;
- Development and associated habitat destruction;
- Fire suppression that promotes vegetation succession and encroachment of invasive species (particularly Chinese privet), which can out-compete Mohr's Barbara's buttons for resources (*e.g.*, moisture, nutrients, light, and recruitment sites); and
- Herbicide use and incompatible mowing regimes on highway and utility ROW.

Most extant populations are small and vulnerable to anthropogenic impacts and stochastic events. Small population size increases the risks posed by inbreeding and genetic drift, which may limit the species' adaptive capacity and ability to cope with future stressors (Ellstrand and

Elam 1993). Climate change also has potential to affect distribution and abundance of plants by influencing seasonal weather patterns, frequency and timing of severe weather events, and myriad plant physiological responses. Davenport (2007) suggested that Mohr's Barbara's buttons may be adversely affected by climate change if available habitat is reduced under drier conditions. Climate change may disrupt plant-pollinator interactions, shifting the timing of flowering and/or pollinator activity (Memmott *et al*. 2007) and reducing the Barbara's buttons' sexual reproduction.

14.2. Environmental Baseline for Mohr's Barbara's Buttons

The environmental baseline is a "snapshot" of the species' health in the Action Area at the time of the consultation, and does not include the effects of the Action under review. This section is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the Mohr's Barbara's buttons, its habitat, and ecosystem within the Action Area.

14.2.1. Action Area Numbers, Reproduction, and Distribution of Mohr's Barbara's Buttons

TVA scientists located Mohr's Barbara's buttons in 2014 at three sites on a TVA ROW in Jefferson County, Alabama. There is currently no off-ROW habitat for the species near these populations and, given the age of the surrounding forest, there has not been for many years. This suggests that ROW vegetation management is, overall, beneficial to the species. Absent the disturbance necessary to keep ROW free of woody species, Mohr's Barbara's buttons likely would not exist at these locations.

In 2014, Population 1 contained a large population that was reported to contain "many hundreds to 1000+ plants" (TVA 2018). The clonal nature of the species makes precise counts of plants difficult without intensive, consistent monitoring, but the cited numbers suggest the species was common over an approximate 2.5-ac area within the ROW where it occurred. The site was comprised of largely native and herbaceous species. Population 2 consists of "many hundreds of plants, many beginning to flower". Plants in this area were continuous in areas and formed extensive colonies over approximately 1.3 ac. Population 3 extended over about 0.5-mi of ROW (approximately 7.5 ac) and contained hundreds of plants. The number of woody stems in the ROW containing Mohr's Barbara's buttons was low.

There is a reasonable likelihood that undocumented occurrences of Mohr's Barbara's buttons occur elsewhere on TVA ROW. The most likely place the species would be found is on other portions of the Jefferson County ROW that is known to support the species. About 50 percent of the potential habitat for this species on TVA ROW in Jefferson County has been surveyed. All of the un-surveyed areas that could support the species have at least a Class 1 Plants polygon in the O-SAR database.

14.2.2. Action Area Conservation Needs of and Threats to Mohr's Barbara's Buttons

The TL has been in service since 1939, and previous ROW management included mowing, low-volume foliar herbicide application, and possibly broadcast aerial herbicide. As indicated under

Section 14.2.1, there currently is no off-ROW habitat for the species near these populations; this suggests that TVA ROW vegetation management is, overall, beneficial to the species, since it maintains the ROW free of woody species.

14.3. Effects of Vegetation Management on Mohr's Barbara's Buttons

This section analyzes the direct and indirect effects of the Action on Mohr's Barbara's buttons. An effects analysis summary of the effects of various methods of vegetation management on Mohr's Barbara's buttons and the other 17 listed LAA plant species from the BA has been included in Appendix II.

14.3.1. Effects of Manual Vegetation Clearing on Mohr's Barbara's Buttons

Manual vegetation clearing could adversely affect individual Mohr's Barbara's buttons plants, though the magnitude of the negative effect would likely be small. Clearing of trees would increase light levels on-site and potentially result in a benefit to Mohr's Barbara's buttons. However, there would also be a potential for direct physical disturbance. The disturbance could result from trampling or cutting. It is unlikely manual clearing implemented by TVA for ROW vegetation management would remove the species from a site.

14.3.2. Effects of Mechanical Clearing on Mohr's Barbara's Buttons

Mohr's Barbara's buttons could be adversely affected if mowing operations are conducted during the flowering period or before fertilized plants could disperse seed. The magnitude of the negative effect would likely be small, since mowing creates and maintains the open habitats required by the plant. Such negative effects could include disturbance due to trampling, cutting, or minor soil disturbance resulting from machinery. Repeated mowing, particularly in wetter situations, also can shatter the stumps of individual trees and shrubs located within the ROW, promoting sprouting and the proliferation of woody species. Promotion of this woody canopy within the ROW may be detrimental to Mohr's Barbara's buttons over time.

14.3.3 Effects of Herbicide Use on Mohr's Barbara's Buttons

Vegetation control methods that utilize herbicides are likely to adversely affect Mohr's Barbara's buttons if used in occupied habitat, though the magnitude of effect would not likely be large enough to remove the species from a site. Spot treatment of herbicide is highly targeted and unlikely to adversely affect Mohr's Barbara's buttons at the population level, but could result in isolated, direct adverse effects on individual plants. Cut stump and hack and squirt applications could be used when cutting trees to prevent resprouting. These methods could also be used as an AMM to control smaller trees in occupied habitat. Even though localized herbicide application targets woody species within the ROW floor, the use of that tool could have some adverse effects, including death, on individuals near a tree treated with localized herbicide application.

Broadcast herbicide, either from the air or ground, would affect plants growing on and near the ROW edge if it were used in occupied habitat. This would most likely degrade the overall quality of the habitat, as well as populations of Mohr's Barbara's buttons over time. Areas of potential habitat along un-surveyed portions of the TL known to contain the species have all been designated as Class 1 Plant areas in the O-SAR database. This prevents the use of broadcast spray at these locations.

14.3.4. Effects of Debris Management on Mohr's Barbara's Buttons

Debris management techniques used by TVA have a small potential to adversely affect Mohr's Barbara's buttons. Any physical disturbance associated with manual or mechanized handling of debris occurring on the open ROW edge could directly affect plants. These effects would include physical damage resulting from cutting or dragging of trees and would not likely result in death of individuals. If mulching/chipping did occur, the species could be directly affected by crushing from machinery and burial by mulch/chips. Pile burning could conceivably result in the loss of individual plants, but the infrequent use of the tool combined with the extreme rarity of the species make the likelihood of this occurring small. TVA's facilitation of landowner use of wood has similar potential for small impacts as other debris management methods.

14.4. Conclusion for Mohr's Barbara's Buttons

In this section, we interpret the findings of the previous sections for the Mohr's Barbara's buttons (status, baseline, effects, and cumulative effects) relative to the purpose of a BO under §7(a)(2) of the ESA.

Opinion

The Action would have localized adverse effects on Mohr's Barbara's buttons and result in no more than a few individual plants within the Action Area being adversely affected. The TL has been in service since 1939 at the three sites in Jefferson County, Alabama, where the species is known to occur. Suitable habitat for the species includes open, disturbed sites, lacking woody vegetation. Off-ROW areas adjacent to these three populations are forested and unsuitable for the species. Therefore, the species is not found off-ROW. Mohr's Barbara's buttons would not exist in the ROW absent the disturbance necessary to keep the ROW free of woody species. TVA's vegetation management activities appear to have increased light levels and benefitted Mohr's Barbara's buttons, allowing it to persist on the ROW. Cumulative effects to Mohr's Barbara's buttons that may be relevant to this consultation are unknown.

After reviewing the current status of the species, the environmental baseline for the Action Area, the effects of the Action, and the cumulative effects, it is the USFWS's biological opinion that the Action is not likely to jeopardize the continued existence of Mohr's Barbara's buttons. We reached this determination based on the following factors: (1) The likelihood of the species being adversely affected is low with TVA's adherence to the AMMs, BMPs and SOPs, which, collectively, limit the probability that known and unknown populations of the species will be affected. (2) The Action would result in a mix of adverse and beneficial effects to the species. During proposed herbicide applications in particular, the incidental, localized removal of invasive species may provide some beneficial effects in circumstances where such invasive removal would reduce competition with the species and/or allow the species to expand into new habitat near or within the TVA ROW. (3) Relative to the rangewide population (19 individual populations believed to approach 10,000 plants), the three known ROW populations are comprised of several hundred plants each, so only a fraction of plants in the species' range would be affected by the Action.

15. CUMBERLAND SANDWORT

15.1. Status of Cumberland Sandwort

This section summarizes best available data about the biology and current condition of Cumberland sandwort (*Minuartia* [=*Arenaria*] *cumberlandensis*) throughout its range that are relevant to formulating an opinion about the Action. The USFWS published its decision to list Cumberland sandwort as endangered on June 23, 1988 (53 FR 23745-23748).

15.1.1. Description of Cumberland Sandwort

Cumberland sandwort, a perennial, herbaceous member of the Pink family (Caryophyllaceae), is 4 to 6 inches (10 to 15 cm) tall, and has small white-petaled flowers and relatively long narrow leaves (USFWS 1996c). The species resembles the mountain sandwort (*Minuartia* [=*Arenaria*] *groenlandica*) and glabrous mountain sandwort (*Minuartia* [=*Arenaria*] *glabra*), but Kral (1983) states that it can be distinguished by "its longer, broader, thinner, veinier leaves, leafier upper stems, which produce fewer flowers as a rule, and by its distinctive seed sculpture."

15.1.2. Life History of Cumberland Sandwort

Cumberland sandwort generally occurs in several noncontiguous patches in one or more sandstone rock houses or cliff faces which are located in a linear or vertical pattern with no barriers present (USFWS 2013). The species flowers May through August and develops fruit September through November. The plants are probably self-incompatible, and dispersal is highly localized, as seedlings are typically distributed adjacent to previously reproductive adults (Winder 2004). Seed viability appears to be high in natural populations (Winder 2004). The plant has a narrow ecological niche requiring cool temperatures, perpetually moist sand, and deep shade. Associated species include: roundleaf catchfly (*Silene rotundifolia*), mountain meadow-rue (*Thalictrum clavatum*), littleflower alumroot (*Heuchera parviflora*), and Lucy Braun's snakeroot (*Ageratina luciae-brauniae*) (USFWS 1996c).

15.1.3. Numbers, Reproduction, and Distribution of Cumberland Sandwort

The species is currently known from the Cumberland Plateau of south-central Kentucky (McCreary County) and north-central Tennessee (Fentress, Pickett and Scott counties). Historically, the plant also occurred in Morgan County, Tennessee, but is now believed to be extirpated (USFWS 2013).

In order to evaluate the species' status in relation to recovery criteria, TDEC (2011b) developed specifications for delineating EOs of Cumberland sandwort. An EO is a fundamental unit of information in the NatureServe Natural Heritage methodology, and is defined as "an area of land and/or water in which a species or natural community is, or was present" (USFWS 2013).

There are 64 extant EOs of Cumberland sandwort, 34 of which TDEC and KYNPC consider viable, indicating that they likely are self-sustaining. Three of the viable EOs are located on privately owned lands in Fentress County, Tennessee. The remaining 31 are located on conservation lands, owned and managed by the NPS, TDNA, Tennessee State Parks, and Tennessee Division of Forestry. The county distribution of these occurrence sites is as follows: Fentress County, Tennessee (eight), McCreary County, Kentucky (one), Pickett County, Tennessee (21), and Scott County, Tennessee (one). Thus, there are only ten protected and presumably, self-sustaining occurrences located outside of Pickett County (USFWS 2013).

Monitoring data collected by TDEC provide a basis for assessing the persistence of EOs over time and documenting coarse changes in the area they occupy, but they do not provide insight into demographic processes, such as reproductive output, germination and recruitment, and mortality rates that influence population growth rates (USFWS 2013). The only data currently available concerning seed production and germination in the species are anecdotal observations by Winder (2004), who noted that populations he sampled for an investigation of genetic diversity in Cumberland sandwort produced copious viable seed during the years he observed them and that young seedlings were present frequently in most populations. Additional monitoring measures to understand demographic processes could become necessary at monitoring sites where declining trends become apparent from sustained decreases in estimates of area occupied by Cumberland sandwort. Conducting monitoring late in the growing season for Cumberland sandwort, rather than during the winter as it often occurs, would allow for an assessment of whether seed production and seedling germination are occurring at monitoring sites (USFWS 2013).

Winder (2004) found reduced levels of heterozygosity in individual populations of Cumberland sandwort, with some containing little or no heterozygosity despite having considerable haplotype diversity, and noted that this pattern is consistent with the effects of inbreeding. Winder (2004) suggested investigation factors that could influence breeding patterns in Cumberland sandwort, specifically suggesting two factors: (1) determining whether movement of pollen and seeds is highly restricted, potentially even within a single rock house population, and (2) conducting breeding system studies to determine whether there could be high rates of self-fertilization in populations of Cumberland sandwort.

15.1.4. Conservation Needs of and Threats to Cumberland Sandwort

Cumberland sandwort plants growing on rock house floors are vulnerable to trampling by hikers, campers, and picnickers on public lands where the species occurs. Trampling by persons who are rappelling poses a threat to plants growing on ledges or solution pockets on sandstone rock faces (USFWS 2013). Relic digging is one of the most destructive threats facing these habitats (Bailey and Shea 2000), despite the fact that the activity is illegal on public lands. In some rock houses, fire pits are present from historic or recent recreational use. In addition to these threats resulting from recreational activities, feral hogs have caused intensive soil disturbance at a few Cumberland sandwort sites (USFWS 2013).

Measures to prevent or reduce threats related to recreational activities have been installed in eight rock houses, located along trails at Big South Fork National Scenic River and Recreation Area (BISO), Pickett State Forest (PSF) and Pickett State Park (PSP). While these threats remain at many sites, they do not currently place Cumberland sandwort at imminent risk of extinction; therefore, the FWS consider them to continue to be moderate (USFWS 2013). Coordination with land managers at BISO, PSF, and PSP is encouraged to maintain existing and install additional protective measures to reduce or eliminate threats from recreational activities.

15.2. Environmental Baseline for Cumberland Sandwort

The environmental baseline is a "snapshot" of the species' health in the Action Area at the time of the consultation, and does not include the effects of the Action under review. This section is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the Cumberland sandwort, its habitat, and ecosystem within the Action Area.

15.2.1. Action Area Numbers, Reproduction, and Distribution of Cumberland Sandwort

In the Action Area, the Cumberland sandwort has been recorded from a single location on a TVA ROW. This site is located on PSF at a location where an existing TL intersects a large rock house. Cumberland sandwort were first discovered at this site in 1979, but the population was not estimated until a March 2000 survey noted that, "100's of plants" were observed in the rock house (TVA 2018). A subsequent visit in 2007 noted, "1000 plants concentrated in 4 areas" at the site. However, during a 2012 site visit, one of the four areas, which had supported the largest number of Cumberland sandwort, no longer appeared to support the plants.

The TVA TL that intersects the rock house was first placed into service in 1951. While there is uncertainty about population trends at this site, the dispersal mechanism and the narrow habitat preferences of Cumberland sandwort suggest that the species has persisted with TVA ROW vegetation management for nearly 70 years. It is unlikely that other rock houses containing this species intersect TVA ROW because of the very restricted range of the species. Only one other TVA TL is located in the vicinity of a documented occurrence of Cumberland sandwort and that occurrence is within 4 mi of the TL.

15.2.2. Action Area Conservation Needs of and Threats to Cumberland Sandwort

Consistent with the threats described in Section 15.1.4., relic hunting has been noted in the Action Area at the single location known to support Cumberland sandwort; relic hunting can result in disturbance to plants via trampling and/or digging in the rock house. Reducing these threats is best addressed by coordination with PSF land managers to maintain existing and install additional protective measures to reduce or eliminate threats from relic hunting.

15.3. Effects of Vegetation Management on Cumberland Sandwort

This section analyzes the direct and indirect effects of the Action on Cumberland sandwort. An effects analysis summary of the effects of various methods of vegetation management on Cumberland sandwort and the other 17 listed LAA plant species from the BA has been included in Appendix II.

15.3.1. Effects of Manual Vegetation Clearing on Cumberland Sandwort

TVA has identified approximately 2,500 areas of transmission ROW, using their O-SAR database with habitat to support, or potentially could support, federally or state-listed plant species. The rock house habitat most frequently associated with the Cumberland sandwort does not support tree growth, but trees are found just outside of this habitat. Manual tree clearing would be unlikely to directly affect Cumberland sandwort, but tree removal adjacent to a rock house containing the species could result in increased light levels that may change soil moisture levels or result in increased competition. These affects could put Cumberland sandwort at a disadvantage compared to other plant species.

One occurrence, totaling several hundred Cumberland sandwort plants (< 1,000) over three areas, was last observed in a rock house; therefore, manual tree clearing could cause the permanent loss of some Cumberland sandwort due to increased light levels.

15.3.2. Effects of Mechanical Clearing on Cumberland Sandwort

Mechanical clearing could adversely affect Cumberland sandwort if used in habitats where the species occurs, but the likelihood of using this type of equipment where the species occurs is small. This is because rock hoses supporting the species are typically located in steep rocky areas that are inaccessible to this type of machinery. Similarly, mowing, which is restricted to regularly maintained areas within the ROW floor, is not likely to adversely affect the species. Side-wall trimming, if it were to occur adjacent to occupied habitat would have similar potential affects to manual tree clearing.

In summary, side-wall trimming could result in the permanent loss of some Cumberland sandwort due to increased light levels, but other types of mechanical clearing would not likely adversely affect the species.

15.3.3. Effects of Herbicide Use on Cumberland Sandwort

Vegetation control methods that utilize herbicides are likely to adversely affect Cumberland sandwort if used in occupied habitat, though the probability of herbicide intersecting the species is small. Spot treatment with herbicides is highly targeted and unlikely to adversely affect Cumberland sandwort at the population level, but could result in isolated, direct adverse effects on individual plants. These methods could be used as an AMM to control smaller trees adjacent to occupied habitat. Trees do not grow in rock houses where Cumberland sandwort occurs. Therefore, localized herbicide application, which targets woody species, would be unlikely to adversely affect Cumberland sandwort.

Broadcast herbicide, either from the air or ground, could affect plants growing in a rock house within a TVA ROW, but is not likely. All areas of potential habitat adjacent to the single TVA TL, located near documented locations for Cumberland sandwort have either been field surveyed or are designated as Class 1 or 2 Plants in O-SAR. This O-SAR restriction prohibits the use of broadcast herbicide either from the air or ground.

In summary, while the probability of effects would be low due to no additional occurrences of Cumberland sandwort being known in the Action Area and an O-SAR restriction prohibiting broadcast herbicide in areas designated as Class 1 or 2 Plants, Cumberland sandwort could be adversely affected by all types of herbicide application, but it would unlikely based on the rationale provided above.

15.3.4. Effects of Debris Management on Cumberland Sandwort

Debris management techniques used by TVA have a small potential to adversely affect Cumberland sandwort. Any physical disturbance associated with manual or mechanized handling of debris could directly affect plants, but the likelihood of any disturbance resulting from debris management negatively affecting Cumberland sandwort is negligible. The rock houses most likely to support the species do not support tree growth. Any handling of downed trees adjacent to a rock house would be at a sufficient distance from Cumberland sandwort to have no measurable effect on the plants. The terrain would also prevent chipping and mulching from occurring because equipment could not maneuver on the site. Burning would occur in the open ROW and would not affect Cumberland sandwort. TVA's facilitation of landowner use of wood would have similar small potential for impacts as the above debris management methods.

In summary, debris management techniques, including manual, mechanical, burning and landowner use, would not likely adversely affect the Cumberland sandwort.

15.4. Conclusion for Cumberland Sandwort

In this section, we interpret the findings of the previous sections for the Cumberland sandwort (status, baseline, effects, and cumulative effects) relative to the purpose of a BO under §7(a)(2) of the ESA.

Opinion

The Action would at most have localized adverse effects to Cumberland sandwort and result in only a few individual plants within the Action Area being adversely affected. Cumulative effects to Cumberland sandwort that may be relevant to this consultation are unknown.

After reviewing the current status of the species, the environmental baseline for the Action Area, the effects of the Action, and the cumulative effects, it is the USFWS's biological opinion that the Action is not likely to jeopardize the continued existence of the Cumberland sandwort. We reached this determination based on the following factors: (1) The likelihood of the species being adversely affected is low with TVA's adherence to the AMMs, BMPs and SOPs, which, collectively, limit the probability that known and unknown populations of the species will be affected. (2) The Action would result in a mix of adverse and beneficial effects to the species. During proposed herbicide applications in particular, the incidental, localized removal of invasive species may provide some beneficial effects in circumstances where such invasive removal would reduce competition with the species and/or allow the species to expand into new habitat near or within the TVA ROW. (3) Only a fraction of the known rangewide populations (four populations out of 64 extant populations) have existed on TVA ROW within the Action Area, and no plants have been observed at the site of the largest of the four populations since 2012; therefore, very few plants would be affected by the Action. (4) Due to the location and rugged nature of the habitat, plants would largely be protected and away from TVA's vegetation management activities, minimizing their exposure to the Action.

16. SHORT'S BLADDERPOD

16.1. Status of Short's Bladderpod

This section summarizes best available data about the biology and current condition of Short's bladderpod (*Physaria globosa*) throughout its range that are relevant to formulating an opinion about the Action. The USFWS published its decision to list Short's bladderpod as endangered on August 1, 2014 (79 FR 44712-44718).

16.1.1. Description of Short's Bladderpod

Short's bladderpod is an upright biennial or perennial plant in the mustard family (*Brassicaceae*) (79 FR 44712-44718). It grows up to 20 in tall. Clusters of small, yellow flowers top single and sometimes, multiple stems from April to early June. The scientific name of the plant is derived from the globe-shaped fruits it produces (USFWS 2018c).

16.1.2. Life History of Short's Bladderpod

Short's bladderpod typically grows on steep, rocky, wooded slopes and talus slopes and along tops, bases, and ledges of bluffs, often near rivers or streams and on south- to west-facing slopes. Most populations are closely associated with calcareous outcrops (Shea 1993).

Short's bladderpod lives for two years or longer. Preliminary results from research at the Missouri Botanical Garden indicate that seed viability is high in one of the Tennessee populations they studied and that seeds germinated at higher rates under greenhouse conditions approximating mean diurnal temperatures that occur during late spring/early autumn and summer, versus those approximating conditions that occur during early spring/late autumn (79 FR 44712-44718).

16.1.3. Numbers, Reproduction, and Distribution of Short's Bladderpod

Short's bladderpod is known to occur in Posey County, Indiana; Clark, Franklin, and Woodford counties, Kentucky; and Cheatham, Davidson, Dickson, Jackson, Montgomery, Smith, and Trousdale counties, Tennessee (79 FR 44712-44718). Populations of Short's bladderpod vary in size from two to about 1,500 individuals, with most populations containing fewer than 50 plants. In a 1992 status survey for Short's bladderpod, Shea (1993) observed the species at only 26 of 50 historical sites: one in Indiana, 14 in Kentucky, and 11 in Tennessee. The remaining 24 records were of sites from which the species had been extirpated or lacked sufficient location information to be relocated during the survey. Later surveys in Tennessee found Short's bladderpod extant at two of these sites, Tennessee EO numbers 8 and 12, which correspond to Shea's population numbers 34 and 29, respectively (Table 16.1) (78 FR 47109-47134).

Based on data provided by conservation agencies (Indiana Natural Heritage Data Center [INHDC]) 2012, Kentucky Natural Heritage Program [KNHP] 2012, Tennessee (Tennessee Natural Heritage Inventory Database [TNHID] 2012) in the states where the species occurs, the USFWS determined the current distribution and status of Short's bladderpod (78 FR 47109-47134). Difficulty in relating the species' distribution at the time of Shea's (1993) status survey to its current distribution was a result of state conservation agencies revising the mapping of some EOs in these databases. In two instances, pairs of occurrences that Shea (1993) considered distinct were combined into single EOs (Table 16.1). Conversely, TNHID (2012) treats as two distinct EOs the two locations that Shea (1993) mapped together as population number 23. One of these occurrences (TN EO number 22) was extant as of 2012 (Table 16.1), while the other

(TN EO number 2) is extirpated (Table 16.2). Based on current mapping, state conservation agencies now recognize 24 EOs that correspond to populations that Shea (1993) found extant in 1992. Of these 24 occurrences, 18 were extant in 2012. Accounting for rediscovery of the two Tennessee occurrences that Shea (1993) did not find during 1992, and recent changes in EO mapping, a total of 20 occurrences that were documented by Shea (1993) were still considered extant as of 2012 (Table 16.1). The approximate range of abundance shown in Table 16.1 is primarily based on individual plants. As a result of location, it was impossible to enumerate individual plants. This resulted in are two instances where TNHID surveyed these populations from a boat and reported the approximate range in clusters (78 FR 47109-47134).

There are now eight known extant occurrences in Kentucky, 17 in Tennessee, and one in Posey County, Indiana (Table 16.1). Extant occurrences in Kentucky are distributed among Clark (1), Franklin (6), and Woodford (1) counties, and in Tennessee among Cheatham (5), Davidson (2), Dickson (1), Jackson (2), Montgomery (3), Smith (1), and Trousdale (2) counties. One Tennessee occurrence straddles the county line between Cheatham and Davidson counties. There are 19 occurrences in Kentucky and ten in Tennessee that have either been extirpated or for which inadequate information exists to relocate them. Adding the seven populations that Shea (1993) treated as either historical or lacking complete locality information, and which are not represented in state-maintained databases used to create Tables 16.1 and 16.2, these numbers rise to 20 for Kentucky and 16 for Tennessee. Thus, there is a total of 62 occurrences that have been reported for Short's bladderpod. However, when reporting percentages of all known occurrences that are now or historically were in the case of extirpated occurrences, affected by various threats, we only use the 55 records that have been verified and are currently tracked in state-maintained databases (78 FR 47109-47134).

Table 16.1. List of known extant Short's bladderpod occurrences by state and county, with E.O. numbers assigned by state natural heritage programs (INHDC (2012), KNHP (2012), TNHID (2012)), numbers assigned to populations reported in Shea (1993), and first and last years of known observations.

State	County	EO Number (Shea Population Number)	First Observed	Last Observed	Approximate Range of Abundance	Land Ownership
Indiana	Posey	1 (1)	1941	2012	3–1000s	IDNR
Kentucky	Clark	1 (3	1957	2009	2	Private
	Franklin	4 (11, 12)	1979	2011	100–500	Private
		7 (10)	1981	2004	1-100	Private
		11 (13)	1983	2003	1–52	Private
		18 (4)	1992	2012	20-350	City of Frankfort
		22 (9)	1990	2012	2-200	Private; KSNPC
		23 (14)	1990	2011	60-500	Private
	Woodford	28	2005	2010	few	Private
Tennessee	Cheatham	1 (18)	1956	2008	100s–1000s	COE; Private
		15 (17)	1955	2008	few–20	COE
		17 (16)	1953	2012	20– ~1500	Town of Ashland City; Private
		29	1998	2008	~50	COE; Private
		30	1998	2008	10–25	COE; Private
	Davidson; Cheatham	10 (21,22)	1935	2012	10s–1000s	Private
	Davidson	4 (19)	1971	2012	100s–1000s	Private; COE easement
		8 (34)	1886	2008	~50	Private; COE easement
	Dickson	32	2008	2008	~7 clusters	COE
	Jackson	26	1998	2008	3 clusters	COE
		27	1998	2008	~50	COE
	Montgomery	12 (29)	1946	2008	~50	Private; COE easement
		22 (23a)	1969	2008	20–50	Private; COE easement
		28	1998	2008	~300	Private; COE easement
	Smith	24	1998	2008	~10	COE
	Trousdale	3 (25)	1969	2008	40–500	COE; Private
		21 (26)	1992	2008	100–250	COE; Private

Table 16.2. List of extirpated Short's bladderpod occurrences by state and county, with EO numbers assigned by state natural heritage programs (INHDC (2012), KNHP (2012), TNHID (2012)), numbers assigned to populations reported in Shea (1993), and first and last years of known observations.

State	County	EO Number (Shea Population Number)	First Observed	Last Observed	Abundance	Land Ownership
Kentucky	Bourbon	* 19 (2)	1963	2005	10–120	Private
	Fayette	12 (38)	1931	1931	n/a	Private
		16 (37)	1892	1900	n/a	Private
	Franklin	* 2 (6)	1979	1992	11	Private
		* 3 (8)	1979	1994	4	Private
		5 (39)	1880	1880	n/a	Private
		8 (27)	1981	1981	-40	Private
		14 (40)	1856	1856	n/a	Private
		* 20 (5)	1992	1992	21	Private
		* 21 (7)	1992	1992	7	Private
	Jessamine	6 (42)	1942	1942	n/a	Private
		13 (32)	1939	1939	n/a	Private
		17 (28)	1991	2019	n/a	Private
		+ 27	1990	1993	1-7	Private
	Madison	10 (43)	1903	1903	n/a	Private
	Mercer	24 (44)	1916	1916	1-7	Private
	Nelson	25	1935	2019	n/a	Private
	Powell	15 (45)	1923	1923	n/a	Private
	Scott	* 9 (15)	1930	1992	2	Private
Tennessee	Cheatham	14 (33)	1969	1969	n/a	Private
	Davidson	* 9 (20)	1974	1998	20-29	Private; COE easement
		+ 23	1997	1997	-200	Private
	Jackson	+ 25	1998	1998	5	COE
	Maury	7 (31)	1955	1955	n/a	Private
	Montgomery	2 (23b	1968	1992	1	Private
		13 (30)	1975	1975	n/a	Private
		18 (35)	1967	1967	n/a	Private
		31	1979	1979	n/a	Private
	Smith	20 (24)	1992	1998	30	Private; COE easement

* Occurrences observed by Shea (1993), but which are now considered extirpated.
+Occurrences not documented in Shea (1993) that have been observed since 1992, but which are now considered extirpated.

Despite the rediscovery of the two Tennessee occurrences and the discovery of ten additional occurrences since the 1992 status survey, only 26 extant occurrences of Short's bladderpod are known to remain due to the loss of ten occurrences during the last 20 years (Table 16.2). Seven of the occurrences that Shea (1993) observed in 1992, and three others (Kentucky EO number 27 and Tennessee EO numbers 23 and 25) that were seen after 1992, have since been extirpated (Table 16.2). This constitutes a loss of 27 percent of all occurrences that were extant during 1992 or later (78 FR 47109-47134).

There are 19 extant Short's bladderpod occurrences that are located on city, state, or federal lands. The Indiana occurrence is on lands owned by the State of Indiana and managed by the Indiana Department of Natural Resources (IDNR). A portion of one occurrence in Kentucky is located in a state NP, owned and managed by the KSNPC, and another occurs in a park owned by the City of Frankfort, where access is limited, but no specific management is provided for the species or its habitat. In Tennessee, there are 15 occurrences that are entirely or partially located on lands owned or leased by the COE adjacent to the Cumberland River. Some of these COE lands are WMAs, cooperatively managed by TWRA. The plants at EO numbers 29 and 32 are located in TWRA's Cheatham WMA, and those at EO numbers 24 through 27 are located in TWRA's Cordell Hull WMA. Part of one occurrence in Tennessee is located on lands owned by Ashland City (78 FR 47109-47134).

Dr. Carol Baskin (Professor, University of Kentucky) observed low fruit set in the Indiana population and, based on lack of seed production from plants in a greenhouse from which pollinators were excluded, she concluded that the species likely is self-incompatible. Self-incompatibility has been reported in other species of Physaria (Bateman 1955; Claerbout et al. 2007; Edens-Meier et al. 2011; Tepedino et al. 2012), and the molecular mechanisms underlying self-recognition between pollen and stigma and subsequent pollen rejection have been well studied in the Brassicaceae (Takayama and Isogai 2005). Dr. Baskin also observed that seeds produced by Short's bladderpod apparently are capable of forming a seed bank, as seeds that were planted in a greenhouse were observed to germinate and produce seedlings over several years, rather than all germinating in the year they were planted (78 FR 47109-47134).

16.1.4. Conservation Needs of and Threats to Short's Bladderpod

The most significant threats to Short's bladderpod are the loss and degradation of its habitat. The main causes for habitat loss and degradation are potential future construction and ongoing maintenance of transportation ROW; prolonged inundation and soil erosion due to flooding and water level manipulation; and overstory shading due to forest succession and shading and competition from invasive, nonnative plant species (78 FR 47109-47134).

Conservation of Short's bladderpod should include continuation of monitoring known populations for status of threats, site condition, and abundance of plants, and surveying potential habitat for new populations. This species requires open areas, so manual removal of shrubs would help open up habitat, where it is declining due to being shaded. Controlled burning could also be beneficial in this situation. Mechanical disturbance of the area should be limited or avoided because the soils are thin where this species occurs (Pyne *et al.* 1995); soil compaction and damage to the seed bank could occur. Non-native plants should be controlled, so that they do not dominate the vegetation where this species grows (NatureServe Explorer 2018b).

16.2. Environmental Baseline for Short's Bladderpod

The environmental baseline is a "snapshot" of the species' health in the Action Area at the time of the consultation, and does not include the effects of the Action under review. This section is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the Short's bladderpod, its habitat, and ecosystem within the Action Area.

16.2.1. Action Area Numbers, Reproduction, and Distribution of Short's Bladderpod

The TVA transmission system does not intersect habitat for Short's bladderpod in Kentucky or Indiana, but it does overlap the species range in Tennessee. In the Tennessee portion of the Action Area, Short's bladderpod occurs primarily in association with bluffs along the Cumberland River between RM 134 in Montgomery County in the vicinity of Clarksville upstream to RM 344 in Jackson County in the vicinity of White's Bend. There are 17 TVA TL crossings within this reach of the river. Topographic maps and aerial photos suggest that nine of the ROW crossings have no potential to support Short's bladderpod. These sections of ROW are flat, lacking prominent rock outcrops or bluff features, which typically serve as suitable habitat for the species. The remaining eight ROW crossings intersect potentially suitable habitat as evidenced by the presence of steep south and west facing slopes, broken canopied forest adjacent to the ROW, and the presence of exposed rock at the soil surface.

Field surveys have been performed at three of the Cumberland River locations where Short's bladderpod has been previously observed within a 1,000 ft of a TVA ROW; the species was not found in or adjacent to the TVA ROW at any of these locations. If an undocumented site for Short's bladderpod does occur at a TVA ROW Cumberland River crossing, the species would most likely occur in a spanned section of forest where the conductor is high enough above mature trees that clearing is unnecessary. This often occurs where TL cross large rivers because structures are usually placed on high points to allow conductors to span long crossings.

Some Tennessee populations of Short's bladderpod do not occur along bluffs and are found at more disturbed sites, such as road medians, eroding river banks, and riprap slopes. Therefore, it is difficult to predict where the species might occur in disturbed habitat in the Action Area.

16.2.2. Action Area Conservation Needs of and Threats to Short's Bladderpod

In the Action Area, the most likely threats to Short's bladderpod are habitat loss and degradation from overstory shading due to forest succession and shading and competition from invasive, nonnative plant species. These threats can be reduced by monitoring site conditions of known populations and manually removing shrubs, burning, and controlling invasive, non-native plants to open up habitat that is being shaded.

16.3. Effects of Vegetation Management on Short's Bladderpod

This section analyzes the direct and indirect effects of the Action on Short's bladderpod. An effects analysis summary of the effects of various methods of vegetation management on Short's bladderpod and the other 17 listed LAA plant species from the BA has been included in Appendix II.

16.3.1. Effects of Manual Vegetation Clearing on Short's Bladderpod

Direct physical disturbance associated with manual tree removal could adversely affect Short's bladderpod, but the increased sunlight associated with canopy removal has the potential to benefit plants suppressed by a dense forest canopy.

16.3.2. Effects of Mechanical Clearing on Short's Bladderpod

If mechanical vegetation control methods utilized by the TVA ROW program intersect habitat occupied by Short's bladderpod, there is the potential the species could be adversely affected. The species most often occurs in open, rocky calcareous forests, but it also tolerates higher light conditions and could theoretically occur, both, on the ROW floor and in adjacent forests. Mowing could adversely affect Short's bladderpod if implemented in occupied habitat in the ROW, but the species usually inhabits areas that are far too steep to allow the use of mowers. The likelihood of Short's bladderpod being adversely affected by TVA ROW mowing is very small. Similarly, mechanical clearing and side-wall trimming require equipment access, which would most likely be precluded by the steep slopes and rock outcrops. Therefore, though these tools could adversely affect Short's bladderpod if used in occupied habitat, the chances of these tools intersecting the species is very low because the terrain would likely prevent their application. Aerial side-wall trimming would result in more light reaching the herbaceous layer of vegetation, with no physical ground disturbance. This would most likely have beneficial effects if used in the vicinity of Short's bladderpod, but could result in small adverse effects depending on the situation.

16.3.3. Effects of Herbicide Use on Short's Bladderpod

Vegetation control methods that utilize herbicides are likely to adversely affect Short's bladderpod if used in occupied habitat. Spot treatment with herbicide is highly targeted and unlikely to adversely affect Short's bladderpod at the population level, but could result in isolated, direct adverse effects on individual plants. Cut stump and hack and squirt applications could be used when cutting trees to prevent resprouting and as an AMM to control smaller trees in occupied habitat. Localized herbicide application could affect plants in, both, the open ROW floor and along the edge of the ROW, especially if Short's bladderpod plants grow adjacent to woody plants targeted for removal. Broadcast herbicide, either from the air or ground, could affect plants growing on and in the vicinity of the ROW edge if this method were used in occupied habitat. However, all TVA ROW crossings of the Cumberland River that could potentially support Short's bladderpod have Class 1 or 2 Plants in O-SAR. This O-SAR restriction prohibits the use of broadcast herbicide either from the air or ground.

16.3.4. Effects of Debris Management on Short's Bladderpod

Debris management techniques used by TVA have a small potential to adversely affect Short's bladderpod. Any physical disturbance associated with manual or mechanized handling of debris occurring on the open ROW edge could directly affect plants. Effects from manual clearing are more likely because the rocky terrain where the species occurs would preclude the use of machinery. These effects would include physical damage resulting from cutting or dragging trees and would not likely result in death of individuals. The terrain would also likely prevent chipping and mulching from occurring because equipment could not maneuver on the site. If mulching/chipping did occur, the species could be directly affected by crushing from machinery and burial by mulch/chips. Burning is very unlikely to occur in the steep sections of ROW that could potentially support Short's bladderpod, but debris handling by machinery could theoretically affect individual plants on the ROW edge. TVA's facilitation of landowner use of wood has the similar potential for small impacts as manual debris management methods.

16.4. Conclusion for Short's Bladderpod

In this section, we interpret the findings of the previous sections for the Short's bladderpod (status, baseline, effects, and cumulative effects) relative to the purpose of a BO under §7(a)(2) of the ESA.

Opinion

The Action would have localized adverse effects to Short's bladderpod and result in very few individual plants within the Action Area being adversely affected, if any. Cumulative effects to Short's bladderpod that may be relevant to this consultation are unknown.

After reviewing the current status of the species, the environmental baseline for the Action Area, the effects of the Action, and the cumulative effects, it is the USFWS's biological opinion that the Action is not likely to jeopardize the continued existence of the Short's bladderpod. We reached this determination based on the following factors: (1) The likelihood of the species being adversely affected is low with TVA's adherence to the AMMs, BMPs and SOPs, which, collectively, limit the probability that known and unknown populations of the species will be affected. (2) The Action would result in a mix of adverse and beneficial effects to the species. During proposed herbicide applications in particular, the incidental, localized removal of invasive species may provide some beneficial effects in circumstances where such invasive removal would reduce competition with the species and/or allow the species to expand into new habitat near or within the TVA ROW. (3) Rangewide, there are 26 known extant populations, and, in the Action Area, there are eight TVA ROW crossings supporting suitable habitat where the species may occur; therefore, only a very small percentage of plants (if present) in the species' range could potentially be affected by the Action. (4) The species would likely occur in a spanned section of forest, where the TVA conductor would be high above mature trees and vegetation clearing unnecessary, reducing the probability of the action adversely affecting plants.

17. WHITE FRINGELESS ORCHID

17.1. Status of White Fringeless Orchid

This section summarizes best available data about the biology and current condition of white fringeless orchid (*Plantanthera integrilabia*) throughout its range that are relevant to formulating an opinion about the Action. The USFWS published its decision to list white fringeless orchid as threatened on September 13, 2016 (81 FR 62826-62833).

17.1.1. Description of White Fringeless Orchid

White fringeless orchid is a perennial herb with a light green, 60 cm long stem that arises from a tuber. The leaves are alternate with entire margins and are narrowly elliptic to lanceolate in shape. The white flowers are borne in a loose cluster at the end of the stem. The plants flower from late July through September, and the small narrow fruiting capsule matures in October (Shea 1992).

17.1.2. Life History of White Fringeless Orchid

White fringeless orchid typically inhabits wetlands that occur on mineral soils and do not accumulate peat. They often are located at stream heads and connected to ephemeral streams via dispersed sheet flow or concentrated surface flow in incipient channels. However, further study is needed to characterize the range of variation in soils, hydrology, physicochemistry, and origin of wetlands throughout the range of white fringeless orchid. Most sites where white fringeless orchid populations exist are on soils formed over sandstone bedrock, which usually are low in fertility and organic matter content and are acidic (Shea 1992). The species often occurs in swamps dominated by red maple (*Acer rubrum*) and blackgum (*Nyssa sylvatica*).

Like most terrestrial orchids, white fringeless orchid depends on a symbiotic relationship with mycorrhizal fungi to enhance seed germination and promote seedling development and establishment (Rasmussen and Whigham 1993). In addition to providing a carbon source for seedling development, mycorrhizal fungi enhance germination by promoting increased water uptake by orchid seeds (Yoder *et al*. 2000). Their small size permits dispersal of orchid seeds to new environments via wind currents; however, very few of the seeds likely encounter suitable habitats where host fungi are present (Yoder *et al*. 2010). This likelihood is further reduced in the case of species such as white fringeless orchid, which may rely on a single fungal host species, *Epulorhiza inquilina,* to complete its life cycle (Currah *et al.* 1997).

Known pollinators for white fringeless orchid include three diurnal species from two families of butterflies (Lepidoptera): silver spotted skipper (Hesperiidae: *Epargyreus clarus*), spicebush swallowtail (Papilionidae: *Papilio troilus*), and eastern tiger swallowtail (Papilionidae: *Papilio glaucus*) (Zettler *et al.* 1996). Based on floral characteristics, it is likely that more effective pollinators for white fringeless orchid exist in the nocturnal sphingid moth family (Zettler *et al.* 1996); however, this has not been confirmed.

17.1.3. Numbers, Reproduction, and Distribution of White Fringeless Orchid

White fringeless orchid has a self-compatible breeding system, allowing individuals to produce seed using their own pollen; however, the proportions of fruits produced through self-pollination versus cross-pollination are not known (Zettler and Fairey 1990). Zettler and McInnis (1992) speculated that higher rates of fruit set were probably more typical, historically, when larger populations provided greater opportunities for cross-pollination to occur.

The white fringeless orchid's distribution is concentrated in the Cumberland Plateau section of the Appalachian Plateaus physiographic province, with isolated populations scattered across the Blue Ridge, Piedmont, and Coastal Plain provinces (Fenneman 1938). The species' current distribution includes 35 counties where extant and uncertain occurrences exist in Kentucky, Alabama, Tennessee, Mississippi, South Carolina, and Georgia. More occurrences are included in the species' current distribution than were historically known to exist, likely as a result of increased survey effort; however, low numbers of flowering plants have been observed at most sites (80 FR 55304 - 55321). For example, fewer than 50 flowering plants have ever been observed at one time at 45 (64 percent) of the 70 extant and uncertain occurrences for which data are available. At 26 (37 percent) of these occurrences, fewer than 10 flowering plants have ever been recorded (81 FR 62826 - 62833).

17.1.4 Conservation Needs of and Threats to White Fringeless Orchid

Habitat modification caused by development, silvicultural practices, invasive plant species, disturbance by feral hogs, shading due to understory and canopy closure, altered hydrology, and ROW maintenance have impacted the range and abundance of white fringeless orchid. While the species is present in a number of sites on conservation lands, few conservation actions have been undertaken to address these threats to the species' habitat, and those that have been implemented, have been met with limited success (80 FR 55304 - 55321).

17.2. Environmental Baseline for White Fringeless Orchid

The environmental baseline is a "snapshot" of the species' health in the Action Area at the time of the consultation, and does not include the effects of the Action under review. This section is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the white fringeless orchid, its habitat, and ecosystem within the Action Area.

17.2.1. Action Area Numbers, Reproduction, and Distribution of White Fringeless Orchid

White fringeless orchid has been documented from TVA ROWs at five locations on the Cumberland Plateau near Spencer, Tennessee and at one location on Lookout Mountain near Fort Payne, Alabama. Population information is detailed in the BA and summarized below.

> <u>Population 1</u>: Population 1 was first observed by TVA botanists in 2009 as part of an environmental review for a minor TL infrastructure repair project. At that time, about 20 flowering plants were observed in a small ROW swale. Less than five plants occurred in

the adjacent forest. Counts of flowering stems from Population 1 are 20 (2009), 37 (2011), 369 (2013), 950 (2014), 1537 (2015), 761 (2016), and 991 (2017).

Population 2: Population 2 is located in a narrow strip of suitable habitat that straddles Simmons Creek, where it crosses the TVA ROW. There is no suitable habitat immediately adjacent to the ROW. In this area, the ROW bisects a loblolly pine (*Pinus taeda*) plantation. The site was only visited once by TVA botanists; nine flowering plants were seen in 2013.

Population 3: Population 3 was located by TVA botanists during a 2010 field survey for a new distribution line that was sited adjacent to an existing TVA TL. This small population grows in what could likely be considered marginal habitat. During all surveys of the site, white fringeless orchid was difficult to discern because of dense growth of competing vegetation. Counts of flowering stems from Population 3 are 7 (2010), 25 (2011), 0 (2014), 28 (2015), and 9 (2016).

Population 4: Population 4 covers more than 2.25 ac of ROW and was first observed in 1983. This relatively large occurrence persists as part of a diverse, herbaceous plant community within the ROW. The data available for the site suggests that the population is stable. Counts from Population 4 are about 40-50 plants (1984-1990), 487 (1997), 111 (2000), 7 (2008), 16 (2011), 205 (2014), 687 (2015), 883 (2016), and 920 (2017).

Population 5: Population 5 was discovered in August of 2018. About 50 flowering plants were observed within the TVA ROW, and no plants were seen outside of the ROW.

Population 6: Population 6 was discovered in 2013 and is the first occurrence of the species in DeKalb County, Alabama. This populations occurs near a sandstone complex with several other globally rare species, including sun-facing coneflower (*Rudbeckia heliopsidis*), woodland tickseed (*Coreopsis pulchra*), and longleaf sunflower (*Helianthus longifolius*). Plants were observed in July 2018, but no count was conducted.

It is likely additional undocumented populations of white fringeless orchid occur on TVA ROW, particularly on the Cumberland Plateau of Tennessee. About 11,500 ac of TVA ROW are situated in counties where white fringeless orchid is known to occur. While not all sections of these TVA ROWs are potential habitat for white fringeless orchid, TVA botanists have used the O-SAR process to designate about 8,300 and 500 ac of ROW as Plants Class 1 and Class 2, respectively. TVA botanists have field surveyed about 2,700 ac of ROW in the counties where white fringeless orchid is known to occur, and have found five of the populations listed above.

17.2.2. Action Area Conservation Needs of and Threats to White Fringeless Orchid

Consistent with the threats described in Section 17.1.4., disturbances to the white fringeless orchid have not been fully assessed in the Action Area, but observations during surveys indicate that invasive plant species, shading due to understory and canopy closure and ROW maintenance have resulted in declines to the species. However, TVA ROW maintenance is being tailored to minimize effects to the species at known locations. In addition, removal of invasive species and thinning of the canopy could improve habitat conditions at some locations.

17.3. Effects of Vegetation Management on White Fringeless Orchid

This section analyzes the direct and indirect effects of the Action on white fringeless orchid. An effects analysis summary of the effects of various methods of vegetation management on white fringeless orchid and the other 17 listed LAA plant species from the BA has been included in Appendix II.

17.3.1. Effects of Manual Vegetation Clearing on White Fringeless Orchid

All manual vegetation control methods utilized by TVA have the potential to adversely affect white fringeless orchid if they are carried out in habitat occupied by the species. The most likely effects would be from trampling or crushing individual plants from foot traffic or handling cut vegetation. While direct physical disturbances could result in adverse effects, the removal of overstory and resultant increases in light levels could benefit affected populations.

17.3.2. Effects of Mechanical Clearing on White Fringeless Orchid

All mechanical vegetation control methods utilized by TVA have the potential to adversely affect white fringeless orchid as a result of trampling or crushing from machinery traffic, in addition to foot traffic. Mechanical clearing could also result in increased light levels, benefitting future white fringeless orchid populations. In addition, given the propensity of white fringeless orchid to reproduce asexually from underground shoots, it is unlikely that mechanical vegetation control measures implemented by TVA would remove the species from a site.

17.3.3. Effects of Herbicide Use on White Fringeless Orchid

Vegetation control methods that utilize herbicides are likely to adversely affect white fringeless orchid; however, spot treatment with herbicide is highly targeted and unlikely to adversely affect white fringeless orchid at the population level, but could result in isolated, direct adverse effects on individual plants. Even though localized herbicide application typically targets woody species within the ROW floor, it is likely that white fringeless orchid plants that occur nearby would experience some level of herbicide related damage or death. Broadcast herbicide, from either the air or ground, could affect plants growing on and near the ROW edge if it were used in occupied habitat. However, most sections of TVA ROW, with naturalized vegetation and situated on the Cumberland Plateau, have either been field surveyed or are designated as Class 1 or 2 Plants in O-SAR, which prohibits the use of broadcast herbicide either from the air or ground making exposure unlikely.

17.3.4. Effects of Debris Management on White Fringeless Orchid

All debris management techniques used by TVA have a small potential to adversely affect white fringeless orchid. The debris removal phase most likely to affect the species is physical disturbance associated with manual or mechanized handling of material. This disturbance could result from dragging of debris over plants or the marginal soil disturbance that would be expected from use of machinery, but is not anticipated to result in the death of individual plants. If mulching/chipping occurs, the species could be directly affected by crushing from machinery and burial by mulch/chips. Pile burning could conceivably result in the loss of individual plants, but infrequent use, combined with the rarity of the species, makes the likelihood of this occurring small. TVA's facilitation of landowner use of wood materials in the ROW would have a similar potential for minor impacts as the other debris management methods.

17.4. Conclusion for White Fringeless Orchid

In this section, we interpret the findings of the previous sections for the white fringeless orchid (status, baseline, effects, and cumulative effects) relative to the purpose of a BO under §7(a)(2) of the ESA.

Opinion

The Action would have localized adverse effects to white fringeless orchid. Although some damage to plants is expected and individual plants could be adversely affected, we do not expect the extent of adverse effects to result in declines at the population level. Additionally, canopy thinning and removal of invasive species could benefit the white fringeless orchid in the future at some sites. Cumulative effects to white fringeless orchid that may be relevant to this consultation are unknown.

After reviewing the current status of the species, the environmental baseline for the Action Area, the effects of the Action, and the cumulative effects, it is the USFWS's biological opinion that the Action is not likely to jeopardize the continued existence of the white fringeless orchid. We reached this determination based on the following factors: (1) The likelihood of the species being adversely affected is low with TVA's adherence to the AMMs, BMPs and SOPs, which, collectively, limit the probability that known and unknown populations of the species will be affected. (2) The Action would result in a mix of adverse and beneficial effects to the species. During proposed herbicide applications in particular, the incidental, localized removal of invasive species may provide some beneficial effects in circumstances where such invasive removal would reduce competition with the species and/or allow the species to expand into new habitat near or within the TVA ROW. (3) Only a fraction of the known rangewide populations (six populations out of a total of 70 extant populations) occurs on ROW within the Action Area, and only a small percentage of the plants in the species range would be adversely affected by the Action. (4) Two of the six populations on TVA ROW have increased to nearly 1,000 plants per population, while the other, much smaller populations have fluctuated, but persisted, suggesting ROW vegetation management is not adversely affecting the species.

18. GREEN PITCHER PLANT

18.1. Status of Green Pitcher Plant

This section summarizes best available data about the biology and current condition of the green pitcher plant (*Sarracenia oreophila*) throughout its range that are relevant to formulating an opinion about the Action. The USFWS published its decision to list the green pitcher plant as endangered on September 21, 1979 (44 FR 54922-54923).

18.1.1. Description of Green Pitcher Plant

Green pitcher plant is a carnivorous, perennial herb in the pitcher plant family (Sarraceniaceae). Green pitcher plant grows from moderately branched rhizomes that are 1 to 1.5 cm (0.4- to 0.6 in) in diameter. The leaves are of two types. One type, the hollow leaves (the pitcher), appear in spring, are 20 to 75 cm (8 to 30 in) long, 6 to 10 cm (2.4 to 4 in) in circumference at the orifice (top opening), and gradually narrow toward the base. The pitchers are green to yellow-green with some being maroon suffused, maroon veined externally, or rarely with a purple blotch at the orifice. At the top of the pitcher, a similarly colored hood arches over the opening. Pitchers wither by mid- to late-summer, depending on soil moisture. The second type of leaves appear after flowering or when the plant is stressed, forming a rosette of flat leaves that are erect and then strongly curved downward and are approximately 5 to 18 cm (2 to 7 in) long. Flowers have five yellow petals, five yellow-green sepals, and an inverted, yellow-green, umbrella-shaped central disc. The flowers occur singly on a leafless flower stalk that is approximately 45 to 70 cm (18 to 28 in) long. The fruit is a tuberculate capsule 1.5 to 1.8 cm (0.6- to 0.7 in) wide. All of these descriptive features can be variable in this species. This description of green pitcher plant was summarized from a more thorough description found in Troup and McDaniel (1980); Catalani (2004); Chafin (2007); and Weakley (2015).

18.1.2. Life History of Green Pitcher Plant

The green pitcher plant is classified as an obligate wetland species, meaning that the species almost always occurs in wetlands (Lichvar *et al.* 2016). Green pitcher plant habitats can be generally grouped into two types: streambanks and upland bogs (Troup and McDaniel 1980; USFWS 1994b, 2014a; Sutter and Rudd 1997). These sites occur in a range of open to forested conditions and are thought to be underlain by semi-impervious clay layers that help maintain the relatively moist soil conditions (USFWS 2014a). Further characterizations of habitats by Carter *et al.* (2006) of several Alabama populations described habitats as poorly draining oak-pine flatwoods and red maple-blackgum swamps and seepage bogs with limited canopy cover. Control of competing vegetation through periodic scouring or fire may help maintain appropriate habitat conditions for green pitcher plant (USFWS 2014a). Plants found along streambanks may be more susceptible to extirpation caused by excessive scouring of the habitat during periodic extreme flood events (USFWS 2014a).

Green pitcher plant populations grow and spread by both sexual reproduction (production of seeds and recruitment of seedlings) and asexual, vegetative clones (via underground rhizomes) (Folkerts 1992; USFW 1994b). Sexual reproduction and genetic variability of populations of this species may be limited by the availability and movements of their pollinators. Queen bumblebees (*Bombus* spp.) are considered the primary pollinator of green pitcher plants (Folkerts 1992; Folkerts 1999). The movement distance for typical queen bumblebees is less than 1-mi (Folkerts 1992); therefore, pollen flow (and consequent gene flow) is restricted by the inability of pollinators to traverse this distance (Folkerts 1999). Dispersal of plants to new locations and recolonization of extirpated populations rely on the seed dispersal through insect or water movement (USFWS 2014a).

18.1.3. Numbers, Reproduction, and Distribution of Green Pitcher Plant

Green pitcher plant is found in the Cumberland Plateau and the Ridge and Valley provinces of Alabama, and the Blue Ridge physiographic province of Georgia and North Carolina. Within green pitcher plant's extant range, the species' distribution can be broadly divided into four geographic areas: Coosa Valley, Lake Chatuge, Lookout Mountain, and Sand Mountain (Dennis 1980; USFWS 1994b). Lake Chatuge green pitcher plant colonies are restricted to Georgia and North Carolina, whereas Coosa Valley, Lookout Mountain, and Sand Mountain green pitcher plant distribution is restricted to Alabama (USFWS 2014a).

Because of the limits of primary pollinators, populations of green pitcher plant are defined as plants that are separated from their nearest neighbors by at least 1-mi (USFWS 2014a). As of 2013, there were 15 known populations of green pitcher plant rangewide. The colonies in North Carolina and Georgia represent a single population, and the 28 colonies in Alabama represent an additional 14 populations (USFWS 2014a). Rangewide, ten green pitcher plant populations (20 colonies/sites) are protected. Three populations are protected by TNC in Alabama, Georgia, and North Carolina; two populations are protected by the State of Alabama; and five populations are protected by the NPS. Of the five populations protected by the NPS, the current status of three is currently unknown, but these populations are considered to have poor viability by the ANHP (USFWS 2014a). Populations occurring along streambanks have an unknown future, because flooding could scour and destroy those populations.

18.1.4. Conservation Needs of and Threats to Green Pitcher Plant

The primary threats identified in the Final Rule listing the green pitcher plant as endangered included a reduction in range from over-collecting, changes in land use (*e.g.*, residential, agricultural, and silvicultural development), inundation from construction of reservoirs, mining, road construction, and succession of bog and wetland communities caused by removal of fire from the landscape (44 FR 54922-54923). Additional threats addressed in the latest 5-year review include cattle grazing, logging, and pollinator limitations (USFWS 2014a).

Although many populations of this species occur on protected lands, these plants are still vulnerable to poaching, changes to soil moisture from surrounding hydrologic alterations, and from succession of the landscape, which degrades the species' habitat (USFWS 2014a).

Research has identified that the small, isolated populations of this species are likely pollinator limited (Folkerts 1999). Any activities that reduce pollinator numbers or effectiveness may adversely affect the extant populations of green pitcher plant. This limitation has also likely resulted in low genetic diversity of existing populations and increased genetic isolation of populations (USFWS 2014a). Continued land use changes throughout the southeast coupled with pollinator declines will continue to threaten and isolate extant populations.

18.2. Environmental Baseline for Green Pitcher Plant

The environmental baseline is a "snapshot" of the species' health in the Action Area at the time of the consultation, and does not include the effects of the Action under review. This section is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the green pitcher plant, its habitat, and ecosystem within the Action Area.

18.2.1. Action Area Numbers, Reproduction, and Distribution of Green Pitcher Plant

In the Action Area, green pitcher plant is known to occur at one site on the TVA ROW at Little River Canyon National Preserve (LRCNP) in DeKalb County, Alabama. Green pitcher plants in this location were first observed in 1985 and extend off the ROW in many areas throughout this section of the park. TVA has deferred to the NPS on vegetation management on this section of ROW and has not used herbicide to manage vegetation on this TL for many years. The NPS uses mowing to control woody plant growth within the ROW and prescribed fire to maintain habitats, both within and outside of the ROW.

18.2.2. Action Area Conservation Needs of and Threats to Green Pitcher Plant

Few, if any, sizable, unsurveyed upland seepage bogs or streambank habitats that could host significant populations or colonies of green pitcher plant on TVA ROW remain in the Action Area. TVA botanists have used desktop reviews to identify areas that are likely to support green pitcher plant near Weiss Lake in the Coosa River valley, as well as on Lookout and Sand mountains. Since 2013, TVA botanists have field surveyed over 120 discrete sections of the Action Area in Alabama that were identified as having potential habitat, but no new populations of green pitcher plant were observed.

Threats to existing occurrences of green pitcher plant include loss, alteration, and/or degradation of habitat from residential, commercial, and/or industrial development, livestock grazing and trampling, encroachment of competing vegetation (including exotics), poaching, and ORV use. The population that occurs in the TVA ROW is threatened by woody vegetation encroachment and lack of fire, which promotes encroachment of shortleaf pine (*Pinus echinata)*, blackberry (*Rubus spp*.), and sparkleberry (*Vaccinium arboreum*) (Emanuel 1998).

Conservation measures could include managing or eradicating competing vegetation through prescribed fire, manual mowing and removal of woody vegetation, augmenting occurrences, support of safeguarding efforts, and the development of a management plan with the NPS for the population at LRCNP. The hydrology of this pitcher plant bog has already been impacted by activities associated with the power line ROW, as noted in Emanuel's 1998 management plan for the species at this location: "The hydrologic flow in this seepage bog has been interrupted by the woods road alongside the power line. Deep ruts have been created by vehicles driving across the seepage area. Three lanes of ruts have been created by avoidance of an existing rut that was muddy and impassable. The topographical gradient should be repaired to the original level and an alternative means of traversing the seepage area or avoiding it completely should be investigated. The interrupted hydrologic flow is detrimental to the southern portion of the seepage bog where other green pitcher plants exist." (Emanuel 1998).

18.3. Effects of Vegetation Management on Green Pitcher Plant

This section analyzes the direct and indirect effects of the Action on green pitcher plant. An effects analysis summary of the effects of various methods of vegetation management on green pitcher plant and the other 17 listed LAA plant species from the BA has been included in Appendix II.

18.3.1. Effects of Manual Vegetation Clearing on Green Pitcher Plant

Manual vegetation clearing has the potential to adversely affect green pitcher plant; however, provided such clearing does not excessively disturb the soil, it is unlikely to result in the death of individual plants. Green pitcher plant populations decline as succession of their habitats increases and clearing of woody vegetation will help maintain increased light levels and the appropriate hydrology the populations need. The plants are susceptible to physical damage caused by clearing activities, but the species could resprout if soils in the area are not excessively compacted by heavy equipment. The soil disturbance should be minimal because of BMPs designed for activities in wetlands.

Manually clearing trees on previously unmaintained ROW is a one-time event because these areas will subsequently be treated as ROW floor. Danger tree clearing occurs as needed and may not be needed in areas where green pitcher plant occur, because those populations are maintained as early successional habitats and have minimal overstory structure.

18.3.2. Effects of Mechanical Clearing on Green Pitcher Plant

All mechanical vegetation control methods used by TVA have the potential to adversely affect green pitcher plant. However, as long as the method does not excessively disturb the soil, it is unlikely to result in the death of individual plants. Mowers are generally set 10 to 12 inches off the ground and would likely miss much of the vegetative growth of this species; if damaged, however, this species would likely resprout. As previously stated, opening of the canopy through this type of clearing could benefit green pitcher plant populations.

18.3.3. Effects of Herbicide Use on Green Pitcher Plant

Vegetation control methods that use herbicides are likely to adversely affect green pitcher plant. Spot treatment with herbicides is highly targeted and unlikely to adversely affect green pitcher plant at the population level, but could result in isolated, direct adverse effects on individual plants. Cut stump and hack and squirt applications could be used when cutting larger woody material in and near the ROW to prevent resprouting and as an AMM to control smaller trees in occupied habitat within the ROW floor. Green pitcher plants occupy the ROW floor, and, therefore, are likely to be adversely affected by localized herbicide applications in those areas.

If individual green pitcher plants occur within a few feet of a tree treated with localized herbicide application, chances are high that the plant would experience some level of herbicide related damage. This damage may rise to the level of individual plant death especially if areas supporting the species were mowed for many years before application of herbicide, which would result in a proliferation of woody plant stems that would form a low tree canopy within the ROW. Broadcast herbicide, either from the air or ground, could affect plants growing on and near the ROW edge if it were used in occupied habitat. Most, but not all, sections of TVA ROW with naturalized vegetation located near green pitcher plant occurrences have either been field surveyed or are designated as Plants Class 1 and 2 in O-SAR. This O-SAR restriction prohibits the use of broadcast herbicide from the air or ground.

According to TVA's BA, herbicide use is not to occur on NPS or USFS lands without the written permission of government officials; this should ensure herbicide use on the population of green pitcher plant at LRCNP has been reviewed and complies with the management plan for the LRCNP. Because TVA does not use herbicide to manage this population of green pitcher plant and the NPS uses mowing and prescribed fire to maintain this population, there should be no effect from herbicide use on the population.

18.3.4. Effects of Debris Management on Green Pitcher Plant

All debris management techniques (manual or mechanized handling of debris, mulching or chipping, and pile burning) used by TVA have some potential to adversely affect green pitcher plant. The characteristic of debris removal most likely to affect the species is physical disturbance associated with manual or mechanized handling of debris. This disturbance could result from dragging of debris over plants or soil disturbance that is expected from use of machinery. Wetland BMPs should minimize soil disturbance from these activities. Pile burning could result in loss of some plants if piles are located directly on top of or immediately adjacent to plants, but the infrequent use of the tool, the extreme rarity of the species, and the unlikely possibility of using a wetland habitat for burning make the likelihood of this technique adversely affecting green pitcher plant improbable. These effects can be avoided by marking known populations prior to these activities to ensure that piles are not located on the plants. TVA's facilitation of landowner use of vegetation debris (*e.g.*, fire wood) has similar potential for effects as manual debris management methods. Impacts from this activity can be reduced by ensuring wood placement and landowner access is not in an area with green pitcher plants.

18.4. Conclusion for Green Pitcher Plant

In this section, we interpret the findings of the previous sections for the green pitcher plant (status, baseline, effects, and cumulative effects) relative to the purpose of a BO under §7(a)(2) of the ESA.

Opinion

The Action will have localized adverse effects to green pitcher plant and result in no more than a few individual plants within the Action Area being adversely affected. Cumulative effects to green pitcher plant that may be relevant to this consultation are unknown.

After reviewing the current status of the species, the environmental baseline for the Action Area, the effects of the Action, and the cumulative effects, it is the USFWS's biological opinion that the Action is not likely to jeopardize the continued existence of the green pitcher plant. We reached this determination based on the fact that the single population on TVA ROW is located on lands owned and managed by the NPS, which uses mowing and prescribed fire to maintain this population and prohibits herbicide use. Since TVA vegetation management activities likely will not be implemented at this site due to NPS management there, the Action could not affect plants at this site, and NPS's interrelated action to manage the ROW (i.e., in-lieu of TVA ROW management) does not appear to adversely affect the species.

If the NPS were to cease managing the population and if TVA began managing the ROW, it is also the USFWS's biological opinion that the Action is not likely to jeopardize the continued existence of the green pitcher plant based on the following factors: (1) The likelihood of the species being adversely affected is low with TVA's adherence to the AMMs, BMPs and SOPs, which, collectively, limit the probability that known and unknown populations of the species will be affected. (2) The Action would result in a mix of adverse and beneficial effects to the species. During proposed herbicide applications in particular, the incidental, localized removal of invasive species may provide some beneficial effects in circumstances where such invasive removal would reduce competition with the species and/or allow the species to expand into new habitat near or within the TVA ROW. (3) Only a fraction of the known rangewide populations (one population out of a total of 15 extant populations) occurs on ROW within the Action Area; therefore, only a small percentage of the plants in the species range potentially would be adversely affected by the Action.

19. LARGE-FLOWERED SKULLCAP

19.1. Status of Large-Flowered Skullcap

This section summarizes best available data about the biology and current condition of large-flowered skullcap (*Scutellaria montana*) throughout its range that are relevant to formulating an opinion about the Action. The USFWS published its decision to list large-flowered skullcap as endangered on June 20, 1986 (51 FR 22521-22524) and its decision to reclassify the species from endangered to threatened on January 14, 2002 (67 FR 1662-1668).

19.1.1. Description of Large-Flowered Skullcap

Large-flowered skullcap is a perennial herb with solitary, erect, square stems, usually from 30 to 50 cm (11.8 to19.7 in) tall. The leaves are lanceolate to ovate, on 1 to 2 cm (0.4- to 0.8-in) petioles, with blades 5 to 8 cm (2 to 3.2 in) long and 3 to 5 cm (1.2 to 2 in) wide, crenate to serrate margins, and hairy on both surfaces. The inflorescence is a terminal, leafy-bracted raceme, with or without paired lateral racemes at the base. The calyx is two-lobed (characteristic of the genus *Scutellaria*). The corolla is relatively large, 2.6 to 3.5 cm (1 to 1.4 in) long, blue and white, and lacking a fleshy ridge (annulus) within the corolla tube near the top of the calyx. Flowering occurs from mid-May to early June and fruits mature in June and early July (USFWS 1996d).

19.1.2. Life History of Large-Flowered Skullcap

Bridges (1984) described the habitat of large-flowered skullcap as rocky, submesic to xeric, well-drained, slightly acidic slope, ravine and stream bottom forests in the Ridge and Valley and Cumberland Plateau provinces of Northwestern Georgia, and adjacent southeastern Tennessee. TDEC (2008) reported that large-flowered skullcap can apparently live eight or more years.

Nutlets are released from mid-June to mid-July, overwinter, and apparently germinate in late March. Mature individuals that have perenneated as root stocks begin shoot growth in late March. By early April, plants are 5 to 10 cm (2 to 3.9 in) tall and are pushing through leaf litter. Anthesis typically begins during mid-May and continues through early June. Pollination is principally exclusively by Hymenoptera of the superfamily Apoideae (bees). The corolla shrivels somewhat and falls from the calyx one or two days after pollination, presumably within 24 hrs of fertilization. The calyx closes around the developing fruit immediately after corolla abscission. During the next two to four weeks, the calyx and the enclosed nutlets enlarge and mature. The calyx then dehisces by the loss of the upper lip and the nutlets are released (USFWS 1996d).

A different course is followed if fertilization does not occur. The corolla shrivels markedly and may or may not remain united to the calyx. The entire calyx, still open at the mouth, falls leaving the pedicel bare (USFWS 1996d).

Long distance seed dispersal appears to be limited for the large-flowered skullcap; dispersal distance is not known to exceed 2 mi (USFWS 1996d). Cruzan (2001) observed that large, gravity-dispersed seeds likely constrain the species' dispersal ability and cited unpublished data that indicated a persistent seed bank is likely in large-flowered skullcap because cold treatments failed to break seed dormancy in this species; whereas, the same treatments resulted in fairly high germination rates for closely related falseteeth skullcap (*Scutellaria pseudoserrata*).

19.1.3. Numbers, Reproduction, and Distribution of Large-Flowered Skullcap

The large-flowered skullcap has been found in Bledsoe, Hamilton, Marion, and Sequatchie counties in Tennessee; and Catoosa, Dade, Floyd, Gordon and Walker counties in Georgia (51 FR 22521-22524). According to TDEC (2014), there are currently 164 extant large-flowered skullcap EOs in Tennessee, distributed among 28 extant populations. Of the 28 extant populations in Tennessee, 22 have at least 100 plants and are located, in whole or part, on protected land (*i.e.*, they meet the criteria for viability) (USFWS 2015a). In Georgia, there are 52 extant EOs, but their distribution among populations has not been evaluated (USFWS 2015a).

In completing a status survey of large-flowered skullcap in Tennessee, TDEC (2014) applied the following criteria for delineating populations among the 164 extant occurrences:

1. Populations are defined as groups of EOs that are located in a major drainage within a HUC-12 watershed and have topographic continuity (*e.g.*, in some cases populations are delineated between groups of occurrences on top of the Cumberland Plateau and those on the escarpment within the same HUC-12).

2. Subpopulations are defined as groups of EOs within a population that occur in continuous habitat with no apparent physical barriers to gene flow.

Based on these criteria, there are 30 populations distributed among 16 HUC-12 watersheds in Tennessee, 28 of which are extant (*i.e.*, not F- or X-ranked as discussed below and reported in Table 19.1). Within eight of these populations, 22 subpopulations have been delineated because of significant discontinuity in habitat between some groups of occurrences included within those populations (TDEC 2014).

Using available data on large-flowered skullcap abundance and threats for each EO, TDEC (2014) assessed the viability of the 30 populations in Tennessee (Table 19.1). The viability ranks are based on criteria in the recovery plan that a population will be considered self-sustaining if monitoring data support the conclusion that it is reproducing successfully and is stable or increasing in size and if the minimum number of individuals is at least 100 (67 FR 1662-1668). The rank specifications that follow are based on the most recent information taking into account habitat quality, including invasive plant species and expert opinion:

A-rank (Excellent Viability): population of large-flowered skullcap contains greater than 1,000 plants with the number of plants in each occurrence that makes up a population. A smaller population with the number of plants in each occurrence having 500-1,000 plants with minimal habitat disturbance and no or few invasive exotic plant species.

B-rank (Good Viability): population of large-flowered skullcap with 500 -1,000 plants with the number of plants in each occurrence that makes up a population with some habitat disturbance, or smaller population with the number of plants in each occurrence having 100-500 plants in sites with minimal habitat disturbance and no or few invasive exotic plant species. Site may be restorable to an A rank.

C-rank (Fair Viability): population of large-flowered skullcap with 100 -500 plants with the number of plants in each occurrence that makes up a population with some habitat disturbance and some invasive exotic species.

D-rank (Poor Viability): population of large-flowered skullcap with less than 100 plants with the number of plants in each occurrence that makes up a population. Restoration of disturbed or degraded sites would be unlikely.

E-rank: Extant but no data available, habitat does exist at the site.

F-rank: Failed to find during survey period.

H-rank: Historic, not seen in 25 years.

X-rank: Extirpated.

Using these rank specifications and available data on minimum abundance recorded at each EO, TDEC (2014) determined that there are 22 viable populations (Table 19.1) in Tennessee. In many cases, recent counts of plants beyond those in permanent monitoring plots were not available, and the evaluation was based on plants in the plots alone. In other cases, no recent data were available. Of the 22 viable populations, 11 occur completely on protected lands and the other 11 are partially protected. In most cases, the majority of the EOs within the partially protected populations are located on protected lands (USFWS 2015a).

Table 19.1. Population ranks and protection status for *Scutellaria montana* in Tennessee (TDEC 2014).

	A-rank	B-rank	C-rank	D-rank	F-rank	X-rank
Total	8	2	12	6	1	1
Protected	5	1	5	3	1	0
Partially-protected	3	1	7	3	0	0

19.1.4. Conservation Needs of and Threats to Large-Flowered Skullcap

A recent status survey for large-flowered skullcap in Tennessee identified the following potential threats to the species and its habitat (USFWS 2015a):

- ORV traffic on undesignated trails
- Invasive exotic plants
- Trail construction and maintenance on public and conservation lands
- Power line maintenance including the use of herbicide, manual, and mechanical treatments for vegetation management
- Wildfire suppression involving construction of large fire lines
- Recreational impacts including unauthorized hiking, camping and picnicking on public and conservation lands
- Mineral mining and quarrying
- Removal of mature forest by logging or development on private lands.

While these threats to habitat remain on the landscape and potentially could affect large-flowered skullcap, the large number of populations and the protected status of many populations likely provides the redundancy and resilience needed for the species' conservation. Based on available data, no known threats to habitat are both widespread and severe enough to place the species at risk of extinction, nor are they likely to cause the species to become at risk of extinction in the foreseeable future given the fact that all viable populations are either partially or completely protected.

The proposed rule to reclassify large-flowered skullcap from endangered to threatened maintained that wildfire poses a threat to the species (65 FR 42976). However, a recent study demonstrated that large-flowered skullcap transplanted into a previously burned site had greater survival rates than a control plot and plots that had been either canopy-thinned or burned and canopy-thinned (Kile *et al*. 2013). This study did not examine effects of fire on individuals that were present at the time of the treatments. Anecdotal data from eight monitoring plots in the Tennessee River gorge, half of which burned in a 2007 wildfire, reveal no detectable difference in stage-specific or overall abundance of large-flowered skullcap between burned and unburned plots, and large-flowered skull cap abundance was greater in burned than unburned plots in preliminary results from a study in TNC's Marshall Forest Preserve in Georgia (S. Monteleone, Associate Professor of Biology, Shorter University, unpublished data). Based on the results of these studies, we no longer consider wildfire to be a threat to large-flowered skullcap. However, the potential exists for plants and habitat to be damaged during suppression operations that involve mechanical construction of fire lines (TDEC 2014).

Conservation needs for the species include continued monitoring across the species' range to infer general trends, collection of census data from populations for which recent data are lacking to evaluate viability ranks assigned by TDEC (2014) and to establish viability ranks for populations in Georgia, and development of management agreements for protected sites to ensure that conservation of the species would continue into the future if the species is delisted. The USFWS is working with partners via an informal recovery working group, coordinated by TVA, to develop a strategy for completing these actions within three to five years (USFWS 2015a).

19.2. Environmental Baseline for Large-Flowered Skullcap

The environmental baseline is a "snapshot" of the species' health in the Action Area at the time of the consultation, and does not include the effects of the Action under review. This section is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the Large-Flowered Skullcap, its habitat, and ecosystem within the Action Area.

19.2.1. Action Area Numbers, Reproduction, and Distribution of Large-Flowered Skullcap

In the Action Area, large-flowered skullcap is known to occur on the only two TVA ROW crossing the Cumberland Plateau within the range of the species. Field surveys of these two TL, L6103-CH and L6068, were originally conducted by TVA botanists because both ROW crossed forest with multiple EO records for the species. In addition, one flowering plant was observed in 2002 along the open ROW of L6068. Large-flowered skullcap occurs primarily in forested habitats (USFWS 2015a), but the confirmed presence of the species within the open ROW suggested the possibility that plants might occur in larger numbers within the open ROW.

In May 2013, during the flowering period for the species, TVA botanists surveyed all potentially suitable ROW on L6068 east of the Sequatchie Valley and west of the Ridge and Valley. Along this 12+ mi of ROW within potentially suitable habitat, 16 patches with 313 total plants were recorded from on or adjacent to the ROW. No attempt was made to survey areas off the ROW. Some plants were observed on the open ROW floor, but most favored the edge of the ROW where the individuals received relatively more sunlight than the adjacent closed-canopy forest. Many plants occurring on the ROW edge were situated in a thin band along the ROW margin that had been recently cleared of trees, so it is possible that these individuals established in a closed-canopy forest even though they were observed in more open conditions.

On the L6103-CH TL ROW, about half of the 9 mi of potentially suitable habitat on the Cumberland Plateau were surveyed in July of 2013. Only two flowering and two vegetative large-flowered skullcap plants were observed at a single location during this survey.

Large-flowered skullcap plants have not been observed on open TL ROW within the Ridge and Valley physiographic province. TVA botanists have not visited all ROW within Georgia and Tennessee that bisect forest that may support the species.

TVA ROW on the Cumberland Plateau regularly contain relatively intact herbaceous plant communities; this is uncommon on ROW situated in the Ridge and Valley near Chattanooga, Tennessee. Large-flowered skullcap could occur on TVA ROW in the Ridge and Valley in this small section of Georgia and Tennessee, but the individuals on the ROW would likely be few and comprise only a small part of the population in the surrounding forest.

19.2.2. Action Area Conservation Needs of and Threats to Large-Flowered Skullcap

The potential exists for habitat encroachment from invasive exotic plants and vegetation management (herbicide applications and manual, and mechanical treatments) to threaten large-flowered skullcap in the Action Area. Reducing these threats is best addressed by continued coordination with TVA regarding maintenance of ROW.

19.3. Effects of Vegetation Management on Large-Flowered Skullcap

This section analyzes the direct and indirect effects of the Action on large-flowered skullcap. An effects analysis summary of the effects of various methods of vegetation management on large-flowered skullcap and the other 17 listed LAA plant species from the BA has been included in Appendix II.

19.3.1. Effects of Manual Vegetation Clearing on Large-Flowered Skullcap

Large-flowered skullcap can occupy ecotones between the forest and ROW. Manual clearing in these habitats would most likely affect individuals growing along the edge of the ROW. Manual removal of single danger trees may have a positive effect on the species by providing a boost in light levels that could increase productivity and reproduction without fundamentally changing the vegetation structure and light regime in the immediate vicinity of the plant. Manual removal of swaths of previously unmaintained trees along a ROW margin may have beneficial or adverse effects depending on the situation. Large-flowered skullcap seems to favor ecotones as evidenced by the surveys of L6068 in 2013, but many of these plants likely established in shadier conditions and may not survive in the long-term. However, plants observed in higher light conditions were generally more vigorous than plants in the adjacent, shaded forest, so there may be some advantage to individuals that occur in habitats situated along the edge of the closed canopy forest.

Manual clearing would have the potential to directly affect individual plants by trampling, cutting, and crushing, but it is unlikely this disturbance would result in the death of individual plants.

In summary, all methods of manual vegetation clearing would likely adversely affect the species to varying degrees, but not always result in permanent loss of plants. Beneficial effects could result from manual clearing in instances where light levels were increased.

19.3.2. Effects of Mechanical Clearing on Large-Flowered Skullcap

If mechanical vegetation control methods utilized by the TVA ROW program intersect habitat occupied by large-flowered skullcap, the species could be adversely affected. As described above under Section 2.3.1., as with manual clearing, mechanical clearing also has the potential to provide beneficial or adverse effects via removal of swaths of previously unmaintained trees along a ROW margin, depending on the situation, and to directly affect individual plants individual plants by trampling, cutting, and crushing, but likely would not result in the death of individual plants.

Side wall trimming may have some minor direct or indirect effect on large-flowered skullcap plants if that tool were used, but the physical disturbance or change in light levels would be unlikely to result in the loss of plants from a given area.

In summary, all methods of mechanical clearing would likely adversely affect the species to varying degrees, but not always result in permanent loss of plants. Beneficial effects could result from mechanical clearing in instances where light levels were increased.

19.3.3. Effects of Herbicide Use on Large-Flowered Skullcap

Vegetation control methods that utilize herbicides are likely to adversely affect large-flowered skullcap if used in occupied habitat, although the tool would likely only effect relatively small parts of populations that occur on ROW. Plants occurring off the ROW would not be affected. Spot treatment of herbicide is highly targeted and unlikely to adversely affect large-flowered skullcap at the population level, but could result in isolated, direct adverse effects on individual plants. Cut stump and hack and squirt applications could be used when cutting trees to prevent resprouting or as an AMM to control smaller trees in occupied habitat. Localized herbicide application has the potential to adversely affect plants occurring on the open ROW floor where that tool is used. Individual plants would likely be killed if located adjacent to woody species targeted for removal. This process of targeting woody species for removal would also favor herbaceous species over woody species, which could result in more habitat for large-flowered skullcap in the long-term.

Broadcast herbicide, either from the air or ground, could affect plants growing on and near the ROW edge. This tool is non-selective and would injure or kill large-flowered skullcap if used in occupied habitat, but all ROW along the Cumberland Plateau within the known range of the species has either been field surveyed or is designated as Class 1 or 2 Plants in the O-SAR database. This designation prohibits the use of broadcast herbicide.

In summary, all methods of herbicide use would likely adversely affect the species.

19.3.4. Effects of Debris Management on Large-Flowered Skullcap

Debris management techniques used by TVA have potential to adversely affect large-flowered skullcap. Any physical disturbance associated with manual or mechanized handling of debris occurring on the open ROW edge could directly affect plants. Leaving debris in place typically has little direct effect on vegetation, but the subsequent vegetation control efforts can be hindered by larger debris piles. Specifically, low-volume foliar herbicide applications can be less targeted around piles because applicators have a difficult time moving amongst the downed branches. This problem has been observed on the L6068 ROW. Large-flowered skullcap was observed growing through piles of cut trees along with other small tree seedlings along the recently re-cleared ROW margin. TVA did not apply herbicide directly adjacent to plants, because the location was known. However, localized herbicide application would be more likely to produce off-target damage to surrounding vegetation amongst slash piles, which could affect undocumented rare plant occurrences that occur on ROW across the system. This potential negative effect would diminish over time as the woody material decomposes.

Mulching and chipping in occupied habitat could result in burial of individual plants. This could result in death of some plants occurring in the work area; however, during the 2013 survey of L6068 ROW, vigorous large-flowered skullcap plants were observed growing through mulch along the ROW edge. The limited evidence available suggests that it is unlikely that mulching or chipping in occupied habitat would result in the loss of all plants present. Mulching or chipping debris could also result in crushing from machinery.

Burning would occur in the open ROW and would not affect large-flowered skullcap, but debris handling by machinery could adversely affect individual plants on the ROW edge. TVA's facilitation of landowner use of wood has similar potential for small impacts as manual debris management methods.

In summary, all methods of debris management (manual, mechanical, burning, and landowner use) would likely adversely affect the species.

19.4. Conclusion for Large-flowered Skullcap

In this section, we interpret the findings of the previous sections for the large-flowered skullcap (status, baseline, effects, and cumulative effects) relative to the purpose of a BO under §7(a)(2) of the ESA.

Opinion

The Action would have localized adverse effects to large-flowered skullcap and result in only a few individual plants within the Action Area being adversely affected. Manual and mechanical clearing may provide some beneficial effects to the species because plants observed in higher light conditions were generally more vigorous than plants in the adjacent forest. Therefore, those individuals in habitats situated along the edge of closed canopy forest could benefit from the Action. Cumulative effects to large-flowered skullcap that may be relevant to this consultation are unknown.

After reviewing the current status of the species, the environmental baseline for the Action Area, the effects of the Action, and the cumulative effects, it is the USFWS's biological opinion that the Action is not likely to jeopardize the continued existence of the large-flowered skullcap. We reached this determination based on the following factors: (1) The likelihood of the species being adversely affected is low with TVA's adherence to the AMMs, BMPs and SOPs, which, collectively, limit the probability that known and unknown populations of the species will be affected. (2) The Action would result in a mix of adverse and beneficial effects to the species. During proposed herbicide applications in particular, the incidental, localized removal of invasive species may provide some beneficial effects in circumstances where such invasive removal would reduce competition with the species and/or allow the species to expand into new habitat near or within the TVA ROW. (3) Only a fraction of the known rangewide populations (two populations, comprised of over 300 plants, out of a total of 80 extant populations, comprised of several thousand plants) occurs on TVA ROW in the Action Area; therefore, only a small percentage of plants in the species range would be affected by the Action.

20. TENNESSEE YELLOW-EYED GRASS

20.1. Status of Tennessee Yellow-Eyed Grass

This section summarizes best available data about the biology and current condition of Tennessee yellow-eyed grass (*Xyris tennesseensis*) throughout its range that are relevant to formulating an opinion about the Action. The USFWS published its decision to list Tennessee yellow-eyed grass as endangered on July 26, 1991 (56 FR 34151 34154).

20.1.1. Description of Tennessee Yellow-Eyed Grass

Tennessee yellow-eyed grass is a rare perennial monocot that is an obligate wetland plant that prefers relatively high pH seeps and streambanks. The plant ranges from 7 to 10 dm (2.3 to 3.3 ft) in height. Plants typically occur in clumps where they arise from fleshy bulbous bases. Leaves are basal, the outermost scale-like, the larger one linear, twisted, deep green and 14 to 45 cm (5.5 to 17.7 in) in length. The inflorescence consists of brown conelike spikes, 1 to 1.5 cm (0.4- to 0.6 in) in length, which occur singly at the tips of long slender stalks from 30 to 70 cm (12 to 28 in) long. The flowers, which are pale yellow in color and 4.5 mm (0.2 in) long, unfold in the late morning and wither by mid-afternoon. Fruits are thin-walled capsules containing numerous seeds 0.5 to 0.6 mm (0.02-in) in length. Flowering occurs from August through September.

20.1.2. Life History of Tennessee Yellow-Eyed Grass

Tennessee yellow-eyed grass is restricted to calcareous seeps, fens, and spring runs in Alabama, Georgia, and Tennessee. The species is not only at risk as a wetland plant, but is also extremely rare due to its unusual habitat requirement among North American xyrids for circumneutral pH soils overlying calcareous substrates. In addition, it has been shown to be a poor competitor and quickly succumbs to ecological succession without periodic disturbance.

20.1.3. Numbers, Reproduction, and Distribution of Tennessee Yellow-Eyed Grass

The known current and historic distribution of Tennessee yellow-eyed grass is restricted to the states of Alabama, Georgia, and Tennessee almost exclusively within the Interior Plateau and Ridge and Valley ecoregions. Tennessee yellow-eyed grass was known from only seven sites, five in Tennessee, one in Georgia, and one in Alabama, at the time of listing in 1991 (56 FR 34151-34154). However, surveys since its listing have resulted in the location of 16 additional populations. Currently, a total of 22 populations are known to be extant including three in Bibb County, four in Calhoun County, and one each in Shelby and Franklin Counties, Alabama; four in Bartow County, one in Floyd County, and one in Whitfield County, Georgia; and seven in Lewis County, Tennessee. Status surveys conducted in 1998-1999 listed 17 sites with plants (Moffett 2008). A resurvey of several of these sites in the summer and fall of 2008 revealed a decline in populations following several years of drought (Boyd and Moffett 2010). A population survey conducted in the summer and fall of 2009 by Auburn University concluded that the known population size has been relatively stable during the past decade. The 2009 study (Boyd and Moffett 2010) found known occurrences from 23 sites, an increase from the 17 known sites from the 1998-1999 surveys. A population survey conducted across the species three-state range in the summer and fall of 2009 by Auburn University found occurrences at 23 sites. Three of the sites in the 2009 surveys were new occurrences, all discovered in Georgia.

Seedlings appear to need relatively moist soils with significant sun exposure to become established and grow to maturity. Further, this species tends to be disturbance dependent and needs active management to maintain populations for long-term survival (Boyd and Moffett 2010). Current research on Tennessee yellow-eyed grass indicates that flower production and (perhaps) seedling recruitment are most extensive in locations that are relatively sunny and lack an overstory of shrub or tree canopies. The species does best in relatively open moist sites. According to Moffett (2008), woody competition that shades out the species and herbaceous competition that shades and competes with the species can suppress its growth and reproduction. This management strategy reveals that conservation of the species requires a more hands-on management approach than some endangered plant species.

20.1.4. Conservation Needs of and Threats to Tennessee Yellow-Eyed Grass

Because this species depends on open, sunny sites for establishment, modification of habitat through natural succession or lack of disturbance is considered a major threat to the success of Tennessee yellow-eyed grass. Due to the level of destruction and degradation of habitat associated with human population growth in the southeastern U.S., active conservation and management for this species are critical to its continued existence. In situ efforts focus on habitat protection, acquisition, and/or restoration and management of CH for rare taxa. This species continues to be threatened by habitat destruction, including stream impoundment, habitat conversion for agriculture and residential development, and poor management practices of the few remaining populations (Johnson *et al*. 2012).

20.2. Environmental Baseline for Tennessee Yellow-Eyed Grass

The environmental baseline is a “snapshot” of the species’ health in the Action Area at the time of the consultation, and does not include the effects of the Action under review. This section is an analysis of the effects of past and ongoing human and natural factors leading to the current status of Tennessee yellow-eyed grass, its habitat, and ecosystem within the Action Area.

20.2.1. Action Area Numbers, Reproduction, and Distribution of Tennessee Yellow-Eyed Grass

Tennessee yellow-eyed grass has not been documented on TVA ROW, but the species may be found in unsurveyed ROW. The species prefers open, moist conditions, which are not necessarily mutually exclusive with a TL ROW (UFWS 2014b). However, for the species to be present, a ROW would have to intersect a calcareous seep or other similar feature, which are rare on the landscape. Known populations from Alabama, Georgia, and Tennessee all occur with 1.5 mi of one or more TVA TL. Portions of these and other nearby TVA TL segments with naturalized vegetation and wetland features have been designated as Class 1 Plants in O-SAR, but the rarity of the species reduces the likelihood that it occurs within TVA ROW.

20.2.2. Action Area Conservation Needs of and Threats to Tennessee Yellow-Eyed Grass

Tennessee yellow-eyed grass prefers higher light levels than those found in closed canopy forest. The species can thrive in canopy gaps within forested situations and can occur in open habitats, such as the “roadside ditch” in Franklin County, Alabama, that is referenced in the BA. Disturbance associated with TVA ROW vegetation management could adversely affect individual plants, but since the program is focused on removing woody vegetation, there would be a disproportionally larger impact on woody species. This focus on woody species removal on ROW can favor light-loving herbaceous species such as Tennessee yellow-eyed grass and result in beneficial effects to entire populations, even if individual plants are adversely affected. In addition, methods such as broadcast herbicide that can produce entire, ROW-wide changes to vegetation composition would not be used in areas near known populations of the species because of restrictions in the O-SAR database.

20.3. Effects of Vegetation Management on Tennessee Yellow-Eyed Grass

This section analyzes the direct and indirect effects of the Action on Tennessee yellow-eyed grass. An effects analysis summary of the effects of various methods of vegetation management on Tennessee yellow-eyed grass and the other 17 listed LAA plant species from the BA has been included in Appendix II.

20.3.1. Effects of Manual Vegetation Clearing on Tennessee Yellow-Eyed Grass

Tennessee yellow-eyed grass could occur within the open ROW floor or along the ROW edge if the TL intersects appropriate habitat. Since Tennessee yellow-eyed grass would occur in a wetland or SMZ, manual vegetation control techniques would be used to remove trees. This could result in direct adverse effects resulting from physical disturbance, but could also increase light levels on-site that could benefit the population.

In summary, manual vegetation clearing would likely adversely affect the species. Beneficial effects could also potentially be realized by manual clearing in instances where light levels were increased to plants.

20.3.2. Effects of Mechanical Clearing on Tennessee Yellow-Eyed Grass

If mechanical vegetation control methods utilized by the TVA ROW program intersect habitat occupied by Tennessee yellow-eyed grass, there is the potential the species could be adversely affected. Extensive rutting throughout a seep could also result in local changes to hydrology that may affect the long-term viability of the population, if present. Side-wall trimming may result in a very small amount disturbance that could adversely affect Tennessee yellow-eyed grass, but the resulting increase in light reaching the forest floor may be beneficial to the species if that tool were used in occupied habitat.

In summary, all methods of mechanical clearing have the potential to adversely affect the species (if present) in varying degrees, but not always resulting in permanent loss of plants. Beneficial effects could also potentially be realized by mechanical clearing in instances where light levels were increased to the plants.

20.3.3. Effects of Herbicide Use on Tennessee Yellow-Eyed Grass

Vegetation control methods that utilize herbicides are likely to adversely affect Tennessee yellow-eyed grass if used in occupied habitat. Spot treatment of herbicide is highly targeted and unlikely to adversely affect Tennessee yellow-eyed grass at the population level, but could result in isolated, direct adverse effects on individual plants. Cut stump and hack and squirt applications could be used when cutting trees to prevent resprouting. These methods could also be used as an AMM to control smaller trees in occupied habitat. Even though localized herbicide application targets woody species within the ROW floor, the use of that tool would have some level of effects on the species. If individual Tennessee yellow-eyed grass plants occur within a few feet of a tree seeding treated with localized herbicide application, chances are high that the plant would experience some level of herbicide related damage. This damage may rise to the level of individual plant death. However, removal of competing woody species may benefit populations of Tennessee yellow-eyed grass over the long-term.

Broadcast herbicide, either from the air or ground, could adversely affect plants growing on and near the ROW. However, all ROW situated near populations of Tennessee yellow-eyed grass have been reviewed using the O-SAR process, and areas with naturalized vegetation and wetlands features have been designated as Class 1 Plants. This O-SAR restriction prohibits the use of broadcast herbicide either from the air or ground.

In summary, all methods of herbicide use would likely adversely affect the species.

20.3.4. Effects of Debris Management on Tennessee Yellow-Eyed Grass

Debris management techniques used by TVA have a small potential to adversely affect Tennessee yellow-eyed grass. Any physical disturbance associated with manual or mechanized handling of debris occurring on the open ROW edge could directly affect plants. These effects would include physical damage resulting from cutting or dragging trees and would not likely result in death of individuals. If mulching/chipping did occur, the species could be directly affected by crushing from machinery and burial by mulch/chips. Pile burning could conceivably result in the loss of individual plants, but the infrequent use of the tool combined with the extreme rarity of the species make the likelihood of this occurring discountable. TVA's facilitation of landowner use of wood has similar potential for small impacts as manual debris management methods.

In summary, all methods of debris management (manual, mechanical, burning, and landowner use) would likely adversely affect the species if present.

20.4. Conclusion for Tennessee Yellow-Eyed Grass

In this section, we interpret the findings of the previous sections for Tennessee yellow-eyed grass (status, baseline, effects, and cumulative effects) relative to the purpose of a BO under §7(a)(2) of the ESA.

Opinion

The Action would have localized adverse effects to Tennessee yellow-eyed grass, resulting in only a small percentage of undocumented, individual plants within the Action Area being affected, if any; no populations would be extirpated by TVA ROW vegetation management activities. Cumulative effects to Tennessee yellow-eyed grass that may be relevant to this consultation are unknown.

After reviewing the current status of the species, the environmental baseline for the Action Area, the effects of the Action, and the cumulative effects, it is the USFWS's biological opinion that the Action is not likely to jeopardize the continued existence of Tennessee yellow-eyed grass. We reached this determination based on the following factors: (1) The likelihood of the species being adversely affected is low with TVA's adherence to the AMMs, BMPs and SOPs, which, collectively, limit the probability that known and unknown populations of the species will be affected. (2) The Action would result in a mix of adverse and beneficial effects to the species. During proposed herbicide applications in particular, the incidental, localized removal of invasive species may provide some beneficial effects in circumstances where such invasive removal would reduce competition with the species and/or allow the species to expand into new habitat near or within the TVA ROW. (3) Of the 22 extant populations that are known rangewide, none of those populations currently occur within the Action Area. (4) For the species to occur on a ROW, it would have to intersect a calcareous seep or other similar feature, which are inherently rare habitats on the landscape.

21. REPORTING REQUIREMENTS

This section provides the specific instructions for reporting. As necessary and appropriate to fulfill this responsibility, the TVA must require any permittee, contractor, or grantee to accomplish the reporting through enforceable terms that are added to the permit, contract, or grant document.

1. Annual Reporting. Each year from 2020–2041, TVA will file a report not later than December 31 covering the preceding fiscal year ending September 30. The report will:

    a. Summarize system-wide vegetation management activities that complied with ESA §7(a)(2) by relying on the programmatic consultation;
    b. Identify total acreage of floor work and tree work, including a summary of the use of each vegetation control method considered in the consultation during the reporting period; enumerate known sites of federally listed plants that were intersected by the TVA vegetation management program during the reporting period and identify the vegetation control and debris and debris management methods used on those sites;
    c. Provide the results of any surveys for known and newly discovered populations of federally listed plants associated with TVA ROW vegetation management projects during the survey period;
    d. Identify the number of listed plants adversely affected to the extent practicable, if any, and, when possible, the number of listed plants beneficially affected;
    e. Summarize the outcome of any coordination with USFWS Field Offices; and
    f. Be provided to the U.S. Fish and Wildlife Service, Tennessee Field Office, 446 Neal Street, Cookeville, Tennessee 38501.

2. Annual Coordination. After the receipt of the final report, TVA and the USFWS Tennessee Field Office will determine if a follow-up meeting is necessary to discuss the annual report, review the progress of the Action, or review any new information relevant to the Action and its effects on the plant species considered in this consultation. If one or both parties determines a meeting is needed, TVA and the USFWS will meet on a mutually agreeable date between February 1 and May 1.

22. CONSERVATION RECOMMENDATIONS

ESA §7(a)(1) directs Federal agencies to use their authorities to further the purposes of the ESA by conducting conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary activities that an action agency may undertake to avoid or minimize the adverse effects of a proposed action, implement recovery plans, or develop information that is useful for the conservation of listed species. The USFWS offers the following recommendations that are relevant to the listed species addressed in this BO and that we believe are consistent with the authorities of the TVA. In general, our recommendations are to continue and expand the various programs that TVA already undertakes to contribute to rare plant conservation.

1. Protect listed plants from clearing, development, and use of herbicides.
2. Avoid mowing during the growing season on sites where listed plants may be present.
3. Use hand-clearing or prescribed fire to control competing woody plants and to create sunny openings for listed plant species that prefer increased sunlight exposure.
4. Eradicate invasive exotic plant species from TVA ROWs, especially areas in close proximity to known locations of listed plants.
5. Promote (fund and allow) research on these listed plant species within the TVA PSA.

23. REINITIATION NOTICE

Formal consultation for the Action considered in this BO is concluded. Reinitiating consultation is required if the TVA retains discretionary involvement or control over the Action (or is authorized by law) when:

a. new information reveals that the Action may affect listed species or designated CH in a manner or to an extent not considered in this opinion;
b. the Action is modified in a manner that causes effects to listed species or designated CH not considered in this opinion; or
c. a new species is listed or CH designated that the Action may affect.

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25. APPENDIX I - NOT LIKELY TO ADVERSELY AFFECT SPECIES

Listed species (LE=listed as endangered; LT=listed as threatened) and designated critical habitats (CH) that TVA has determined the proposed Action is not likely to adversely affect (NLAA).

Scientific Name	Common Name	Federal Status	CH (Y=Yes)	TVA Species Determination	TVA CH Determination
Mammals					
Glaucomys sabrinus coloratus	Carolina Northern Flying Squirrel	LE	-	NLAA	-
Birds					
Charadrius melodus	Piping Plover	LT	-	NLAA	-
Grus americana	Whooping Crane	LE	-	NLAA	-
Mycteria americana	Wood Stork	LT	-	NLAA	-
Picoides borealis	Red-cockaded Woodpecker	LE	-	NLAA	-
Sterna antillarum athalassos	Interior Least Tern	LE	-	NLAA	-
Reptiles					
Graptemys oculifera	Ringed Map Turtle	LT	-	NLAA	-
Sternotherus depressus	Flattened Musk Turtle	LT	-	NLAA	-
Amphibians					
Gyrinophilus gulolineatus	Berry Cave Salamander	C	-	NLAA	-
Necturus alabamensis	Black Warrior Waterdog	LE	Y	NLAA	NLAA
Fishes					
Acipenser oxyrinchus desotoi	Gulf Sturgeon	LT	-	NLAA	-
Chrosomus saylori	Laurel Dace	LE	Y	NLAA	NLAA
Cottus paulus (pygmaeus)	Pygmy Sculpin	LT	Proposed	NLAA	NE*
Crystallaria cincotta	Diamond Darter	LE	Y	NLAA	NLAA
Cyprinella caerulea	Blue Shiner	LT	-	NLAA	-
Elassoma alabamae	Spring Pygmy Sunfish	LT	Proposed	NLAA	NLAA
Erimonax monachus	Spotfin Chub	LT	Y	NLAA	NLAA
Erimystax cahni	Slender Chub	LT	Y	NLAA	NLAA
Etheostoma akatulo	Bluemask Darter	LE	-	NLAA	-
Etheostoma boschungi	Slackwater Darter	LT	Y	NLAA	NLAA
Etheostoma chermocki	Vermilion Darter	LE	Y	NLAA	NE*
Etheostoma chienense	Relict Darter	LE	-	NLAA	-

Scientific Name	Common Name	Federal Status	CH (Y=Yes)	TVA Species Determination	TVA CH Determination
Etheostoma nuchale	Watercress darter	LE	-	NLAA	-
Etheostoma percnurum	Duskytail Darter	LE	-	NLAA	-
Etheostoma phytophilum	Rush Darter	LE	Y	NLAA	NE*
Etheostoma rubrum	Bayou Darter	LT	-	NLAA	-
Etheostoma spilotum	Kentucky Arrow Darter	LT	-	NLAA	-
Etheostoma susanae	Cumberland Darter	LE	Y	NLAA	NLAA
Etheostoma trisella	Trispot Darter	PT	-	NLAA	-
Etheostoma wapiti	Boulder Darter	LE	-	NLAA	-
Moxostoma sp. 2	Sicklefin Redhorse	Under Review	-	NLAA	-
Notropis albizonatus	Palezone Shiner	LE	-	NLAA	-
Notropis cahabae	Cahaba Shiner	LE	Proposed	NLAA	NE*
Noturus baileyi	Smoky Madtom	LE	Y	NLAA	NE*
Noturus crypticus	Chucky Madtom	LE	Y	NLAA	NE*
Noturus flavipinnis	Yellowfin Madtom	LT	Y	NLAA	NE*
Noturus stanauli	Pygmy Madtom	LE	-	NLAA	-
Percina antesella	Amber Darter	LE	Y	NLAA	NLAA
Percina aurolineata	Goldline Darter	LT	Proposed	NLAA	NE*
Percina aurora	Pearl Darter	LT	-	NLAA	-
Percina jenkinsi	Conasauga Logperch	LE	Y	NLAA	NLAA
Percina tanasi	Snail Darter	LT	-	NLAA	-
Phoxinus cumberlandensis	Blackside Dace	LT	-	NLAA	-
Scaphirhynchus albus	Pallid Sturgeon	LE	-	NLAA	NLAA
Scaphirhynchus suttkusi	Alabama Sturgeon	LE	-	NLAA	-
Speoplatyrhinus poulsoni	Alabama Cavefish	LE	Y	NLAA	NE*
Freshwater mussels					
Alasmidonta atropurpurea	Cumberland Elktoe	LE	Y	NLAA	NLAA
Alasmidonta raveneliana	Appalachian Elktoe	LE	Y	NLAA	NE*
Cumberlandia monodonta	Spectaclecase	LE	-	NLAA	-
Cyprogenia stegaria	Fanshell	LE	-	NLAA	-

Scientific Name	Common Name	Federal Status	CH (Y=Yes)	TVA Species Determination	TVA CH Determination
Dromus dromas	Dromedary Pearlymussel	LE	-	NLAA	-
Epioblasma brevidens	Cumberlandian Combshell	LE	Y	NLAA	NLAA
Epioblasma capsaeformis	Oyster Mussel	LE	Y	NLAA	NLAA
Epioblasma florentina florentina	Yellow-blossom Pearlymussel	LE	-	NLAA	-
Epioblasma florentina walkeri	Tan Riffleshell	LE	-	NLAA	-
Epioblasma metastriata	Upland Combshell	LE	Y	NLAA	NLAA
Epioblasma obliquata obliquata	Purple Catspaw	LE	-	NLAA	-
Epioblasma othcaloogensis	Southern Acornshell	LE	Y	NLAA	NLAA
Epioblasma penita	Southern Combshell	LE	-	NLAA	-
Epioblasma torulosa gubernaculum	Green Blossom Pearlymussel	LE	-	NLAA	-
Epioblasma torulosa rangiana	Northern Riffleshell	LE	-	NLAA	-
Epioblasma torulosa torulosa	Tuberculed Blossom Pearlymussel	LE	-	NLAA	-
Epioblasma triquetra	Snuffbox	LE	-	NLAA	-
Epioblasma turgidula	Turgid Blossom Pearlymussel	LE	-	NLAA	-
Fusconaia cor	Shiny Pigtoe Pearlymussel	LE	-	NLAA	-
Fusconaia cuneolus	Fine-rayed Pigtoe	LE	-	NLAA	-
Hemistena lata	Cracking Pearlymussel	LE	-	NLAA	-
Lampsilis abrupta	Pink Mucket	LE	-	NLAA	-
Lampsilis altilis	Fine-lined Pocketbook	LT	Y	NLAA	NLAA
Lampsilis perovalis	Orange-nacre Mucket	LT	Y	NLAA	NLAA
Lampsilis virescens	Alabama Lampmussel	LE	-	NLAA	-
Lemiox rimosus	Birdwing Pearlymussel	LE	-	NLAA	-
Leptodea leptodon	Scaleshell	LE	-	NLAA	-
Medionidus acutissimus	Alabama Moccasinshell	LT	Y	NLAA	NLAA
Medionidus parvulus	Coosa Moccasinshell	LE	Y	NLAA	NLAA
Obovaria retusa	Ring Pink	LE	-	NLAA	-
Pegias fabula	Little-wing Pearlymussel	LE	-	NLAA	-
Plethobasus cicatricosus	White Wartyback	LE	-	NLAA	-

Scientific Name	Common Name	Federal Status	CH (Y=Yes)	TVA Species Determination	TVA CH Determination
Plethobasus cooperianus	Orange-foot Pimpleback	LE	-	NLAA	-
Plethobasus cyphyus	Sheepnose	LE	-	NLAA	-
Pleurobema clava	Clubshell	LE	-	NLAA	-
Pleurobema curtum	Black Clubshell	LE	-	NLAA	-
Pleurobema decisum	Southern Clubshell	LE	Y	NLAA	NLAA
Pleurobema furvum	Dark Pigtoe	LE	Y	NLAA	NLAA
Pleurobema georgianum	Southern Pigtoe	LE	-	NLAA	-
Pleurobema gibberum	Cumberland Pigtoe	LE	-	NLAA	-
Pleurobema hanleyianum	Georgia Pigtoe	LE	-	NLAA	-
Pleurobema marshalli	Flat Pigtoe	LE	-	NLAA	-
Pleurobema perovatum	Ovate Clubshell	LE	Y	NLAA	NLAA
Pleurobema plenum	Rough Pigtoe	LE	-	NLAA	-
Pleurobema taitianum	Heavy Pigtoe	LE	-	NLAA	-
Pleuronaia dolabelloides	Slabside Pearlymussel	LE	Y	NLAA	NLAA
Potamilus capax	Fat Pocketbook	LE	-	NLAA	-
Potamilus inflatus	Alamabama (inflated) Heelsplitter	LT	-	NLAA	-
Ptychobranchus greenii	Triangular Kidneyshell	LE	Y	NLAA	NLAA
Ptychobranchus subtentum	Fluted Kidneyshell	LE	Y	NLAA	NLAA
Quadrula cylindrica	Rabbitsfoot	LT	Y	NLAA	NLAA
Quadrula cylindrica strigillata	Rough Rabbitsfoot	LE	Y	NLAA	NLAA
Quadrula fragosa	Winged Mapleleaf	LE	-	NLAA	-
Quadrula intermedia	Cumberland Monkeyface	LE	-	NLAA	-
Quadrula sparsa	Appalachian Monkeyface	LE	-	NLAA	-
Quadrula stapes	Stirrupshell	LE	-	NLAA	-
Toxolasma cylindrellus	Pale Lilliput	LE	-	NLAA	-
Villosa fabalis	Rayed Bean	LE	-	NLAA	-
Villosa perpurpurea	Purple Bean	LE	Y	NLAA	NLAA
Villosa trabalis	Cumberland Bean	LE	-	NLAA	-
Snails					

Scientific Name	Common Name	Federal Status	CH (Y=Yes)	TVA Species Determination	TVA CH Determination
Anguispira picta	Painted Snake Coiled Forest Snail	LT	-	NLAA	-
Athearnia anthonyi	Anthony's River Snail	LE	-	NLAA	-
Campeloma decampi	Slender Campeloma	LE	-	NLAA	-
Leptoxis ampla	Round Rocksnail	LT	-	NLAA	-
Leptoxis foremani	Interrupted Rocksnail	LE	Y	NLAA	NLAA
Leptoxis plicata	Plicate Rocksnail	LE	-	NLAA	-
Leptoxis taeniata	Painted Rocksnail	LT	-	NLAA	-
Lioplax cyclostomaformis	Cylindrical Lioplax	LE	-	NLAA	-
Pleurocera foremani	Rough Hornsnail	LE	-	NLAA	-
Pyrgulopsis ogmorhaphe	Royal Marstonia	LE	-	NLAA	-
Pyrgulopsis pachyta	Armored Marstonia	LE	-	NLAA	-
Insects					
Neonympha mitchellii	Mitchell's Satyr	LE	-	NLAA	-
Crustaceans					
Orconectes shoupi	Nashville Crayfish	LE	-	NLAA	-
Flowering Plants					
Arabis georgiana	Georgia Rock-cress	LT	Y	NLAA	NE*
Conradina verticillata	Cumberland Rosemary	LT	-	NLAA	-
Liatris helleri	Heller's Blazing Star	LT	-	NLAA	-
Lindera melissifolia	Pondberry	LE	-	NLAA	-
Ptilimnium nodosum	Harperella	LE	-	NLAA	-
Sagittaria secundifolia	Kral’s Water-plantain	LT	-	NLAA	-
Spigelia gentianoides	Gentian Pinkroot	LE	-	NLAA	-
Spiraea virginiana	Virginia Spiraea	LT	-	NLAA	-

*NE = No Effect

26. APPENDIX II - SUMMARY OF EFFECTS ANALYSIS FOR LIKELY TO ADVERSELY AFFECT PLANT SPECIES

(source: BA Table 6-1)

Summary of Effects Analysis for all LAA Plant Species

Category	METHODS[1]	EXPLANATION	EXPOSURE[2]	STRESSOR AND RESPONSE[2]	AVOIDANCE MEASURES[3]	EFFECT[4]
Vegetation Control	Manual	Cutting or pulling using hand tools or chainsaws	Most likely to occur on ROW edges while clearing danger trees, in other unmaintained parts of ROW, or in areas where herbicide is not permitted	Physical damage up to death; Change to vegetation structure on-site resulting in positive or negative response of listed species	Known sites recorded in O-SAR as Class 2 Plants	APPR = LAA ARPE = LAA ASBI = LAA CLMO = LAA CLSO = LAA DAFO = LAA HEVE = LAA ISME = LAA LECR = LAA LELY = LAA LEPE = LAA MAMO = LAA MICU = LAA PHGL = LAA PLIN = LAA SAOR= LAA SCMO = LAA XYTE= LAA
Vegetation Control	Mechanical - Clearing	Clearing of trees and shrubs where previous vegetation maintenance has been infrequent and woody plants have encroached into ROW or removal of vegetation in areas where trees were never cleared. Can also be used to safely remove off-ROW danger trees	Most likely to occur on ROW edges while clearing danger trees or in other unmaintained parts of ROW; One-time event on ROW as cleared areas will be subsequently treated as ROW floor; Exposure to chips/mulch is on-going	Physical damage up to death; Change to vegetation structure on-site resulting in positive or negative response of listed species; mulch/chips could impede the growth of listed species or competing vegetation	Known sites recorded in O-SAR as Class 2 Plants Bulldozer use requires site specific review	APPR = LAA ARPE = LAA ASBI = LAA CLMO = LAA CLSO = LAA DAFO = LAA HEVE = LAA ISME = LAA LECR = LAA LELY = LAA LEPE = LAA MAMO = LAA MICU = LAA PHGL = LAA PLIN = LAA SAOR= LAA SCMO = LAA XYTE= LAA

Category	METHODS[1]	EXPLANATION	EXPOSURE[2]	STRESSOR AND RESPONSE[2]	AVOIDANCE MEASURES[3]	EFFECT[4]
Vegetation Control	Mechanical - Mowing	Mowing of herbaceous plants and seedlings to maintain vegetation within the floor area of the ROW	Periodic, once every three years maximum on open ROW	Physical damage up to death; Change to vegetation structure on-site resulting in positive or negative response of listed species	Known site recorded in O-SAR as Class 2 Plants	APPR = LAA ARPE = NLAA ASBI = LAA CLMO = NLAA CLSO = LAA DAFO = LAA HEVE = LAA ISME = NLAA LECR = LAA LELY = LAA LEPE = LAA MAMO = LAA MICU = NLAA PHGL = LAA PLIN = LAA SAOR= LAA SCMO = LAA XYTE= LAA
Vegetation Control	Mechanical – Side-Wall Trimming	Tree trimming, from ground or air, on ROW edge	Periodic as needed depending on tree growth. Temporary change in light conditions	Change to vegetation structure on-site resulting in positive or negative response of listed species	Known site recorded in O-SAR as Class 2 Plants	APPR = LAA ARPE = LAA ASBI = LAA CLMO = LAA CLSO = LAA DAFO = LAA HEVE = LAA ISME = LAA LECR = LAA LELY = LAA LEPE = LAA MAMO = LAA MICU = LAA PHGL = LAA PLIN = LAA SAOR= LAA SCMO = LAA XYTE= LAA

Category	METHODS[1]	EXPLANATION	EXPOSURE[2]	STRESSOR AND RESPONSE[2]	AVOIDANCE MEASURES[3]	EFFECT[4]
Vegetation Control	Herbicide - Spot	Highly targeted herbicide application like stump treatment or hack and squirt	Direct contact with herbicide, which is unlikely given targeted nature. Every three years on the ROW floor, as trees are cut if used to treat stumps after tree clearing	Physical damage up to death; Change to vegetation structure on-site resulting in positive or negative response	Known site recorded in O-SAR as Class 2 Plants	APPR = LAA ARPE = LAA ASBI = LAA CLMO = LAA CLSO = LAA DAFO = LAA HEVE = LAA ISME = LAA LECR = LAA LELY = LAA LEPE = LAA MAMO = LAA MICU = LAA PHGL = LAA PLIN = LAA SAOR= LAA SCMO = LAA XYTE= LAA
Vegetation Control	Herbicide - Localized	Low volume foliar most common. Basal treatment, localized granular application, and bareground treatments also included	Direct contact with herbicide. Every three years on the ROW floor.	Physical damage up to death; Change to vegetation structure on-site resulting in positive or negative response	Known site recorded in O-SAR as Class 2 Plants	APPR = LAA ARPE = LAA ASBI = LAA CLMO = LAA CLSO = LAA DAFO = LAA HEVE = LAA ISME = LAA LECR = LAA LELY = LAA LEPE = LAA MAMO = LAA MICU = LAA PHGL = LAA PLIN = LAA SAOR= LAA SCMO = LAA XYTE= LAA

Category	METHODS[1]	EXPLANATION	EXPOSURE[2]	STRESSOR AND RESPONSE[2]	AVOIDANCE MEASURES[3]	EFFECT[4]
Vegetation Control	Herbicide – Broadcast (ground)	Non-selective herbicide application made from the ground	Direct contact with herbicide	Physical damage up to death; Change to vegetation structure on-site resulting in positive or negative response	Known site recorded in O-SAR as Class 2 Plants Undocumented sites would be protected by O-SAR Class 1 Plants	APPR = LAA ARPE = LAA ASBI = LAA CLMO = NLAA CLSO = NLAA DAFO = LAA HEVE = LAA ISME = LAA LECR = LAA LELY = LAA LEPE = LAA MAMO = LAA MICU = NLAA PHGL = LAA PLIN = LAA SAOR= LAA SCMO = LAA XYTE= LAA
Vegetation Control	Herbicide – Broadcast (aerial)	Non-selective herbicide application made from the ground	Direct contact with herbicide	Physical damage up to death; Change to vegetation structure on-site resulting in positive or negative response	Known site recorded in O-SAR as Class 2 Plants Undocumented sites would be protected by O-SAR Class 1 Plants	APPR = LAA ARPE = LAA ASBI = LAA CLMO = NLAA CLSO = NLAA DAFO = LAA HEVE = LAA ISME = LAA LECR = LAA LELY = LAA LEPE = LAA MAMO = LAA MICU = NLAA PHGL = LAA PLIN = LAA SAOR= LAA SCMO = LAA XYTE= LAA

Category	METHODS[1]	EXPLANATION	EXPOSURE[2]	STRESSOR AND RESPONSE[2]	AVOIDANCE MEASURES[3]	EFFECT[4]
Debris Management	Manual	Cut and leave trees. Material may be cut into smaller pieces to facilitate decomposition	Physical disturbance during cutting of debris; Subsequent vegetation control efforts may be less precise due to large dead trees left on ROW edge	Physical damage from debris management; indirect negative effects up to death of individual if debris left in place hinders future herbicide applications	Known site recorded in O-SAR as Class 2 Plants	APPR = LAA ARPE = LAA ASBI = LAA CLMO = LAA CLSO = LAA DAFO = LAA HEVE = LAA ISME = LAA LECR = LAA LELY = LAA LEPE = LAA MAMO = LAA MICU = NLAA PHGL = LAA PLIN = LAA SAOR= LAA SCMO = LAA XYTE= LAA
Debris Management	Mechanical	Chipping, mulching, and off-site hauling of debris	Physical disturbance during debris handing; Exposure to chips/mulch is on-going	Physical damage up to death; mulch/chips could impede the growth of listed species or competing vegetation	Known site recorded in O-SAR as Class 2 Plants	APPR = LAA ARPE = LAA ASBI = LAA CLMO = LAA CLSO = LAA DAFO = LAA HEVE = LAA ISME = LAA LECR = LAA LELY = LAA LEPE = LAA MAMO = LAA MICU = NLAA PHGL = LAA PLIN = LAA SAOR= LAA SCMO = LAA XYTE= LAA

Category	METHODS[1]	EXPLANATION	EXPOSURE[2]	STRESSOR AND RESPONSE[2]	AVOIDANCE MEASURES[3]	EFFECT[4]
Debris Management	Burning	Burning in piles or containers	Physical disturbance during debris or container handling; heat from burning	Physical damage up to death resulting from crushing or effects of fire	Known site recorded in O-SAR as Class 2 Plants	APPR = LAA ARPE = LAA ASBI = LAA CLMO = LAA CLSO = LAA DAFO = LAA HEVE = LAA ISME = LAA LECR = LAA LELY = LAA LEPE = LAA MAMO = LAA MICU = NLAA PHGL = LAA PLIN = LAA SAOR= LAA SCMO = LAA XYTE= LAA
Debris Management	Landowner Use	Debris can be provided to the landowner in the form of firewood or mulch	Physical disturbance during debris handling	Physical damage up to death resulting from crushing	Known site recorded in O-SAR as Class 2 Plants	APPR = LAA ARPE = LAA ASBI = LAA CLMO = LAA CLSO = LAA DAFO = LAA HEVE = LAA ISME = LAA LECR = LAA LELY = LAA LEPE = LAA MAMO = LAA MICU = NLAA PHGL = LAA PLIN = LAA SAOR= LAA SCMO = LAA XYTE= LAA

[1] Methods are described in detail in Chapter 3 Description of Proposed Actions.

[2] *Stressor* resulting from the activity; *exposure* (*e.g.*, life stage, activity intensity, duration) of species to potential stressors resulting from actions; *response* (*e.g.*, growth, flowering incidence, death) by the species that results from exposure.
[3] Conservation measures are discussed in Chapter 4 Right-of-Way Processes and Procedures
[4] Effects: NE = No effect, NLAA = Not likely to adversely affect, LAA = Likely to adversely affect
Species: APPR =*Apios priceana*, ARPE = *Arabis perstellata*, ASBI = *Astragalus bibullatus*, CLMO = *Clematis morefieldii*, CLSO = *Clematis socialis*, DAFO = *Dalea foliosa*, HEVE = *Helianthus verticillatus*, ISME = *Isotria medeoloides*, LECR = *Lesquerella crassa*, LELY = *Leavenworthia lyrata*, LEPE = *Lesquerella perforata*, MAMO = *Marshallia mohrii*, MICU = *Minuartia cumberlandensis*, PHGL = *Physaria globosa*, PLIN = *Platanthera integrilabia*, SAOR = *Sarracenia oreophila*, SCMO = *Scutellaria montana*; XYTE = *Xyris tennesseensis*

United States Department of the Interior

NATIONAL PARK SERVICE
Southeast Regional Office
Atlanta Federal Center
1924 Building
100 Alabama St., SW.
Atlanta, Georgia 30303

IN REPLY REFER TO:
1.A.2 (SERO-PC)

APR 10 2019

Tricia Roelofs
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, Tennessee 37901

Dear Ms. Roelofs:

Enclosed is a signed General Agreement between the Tennessee Valley Authority and the National Park Service (NPS) which addresses vegetation management for electric transmission and distribution line right-of-way easements and permits on NPS lands. If you have any questions, please contact Anita Barnett at Anita_Barnett@nps.gov or 404-507-5706.

Sincerely,

Robert A. Vogel
Regional Director

Enclosure

GENERAL AGREEMENT
ON VEGETATION MANAGEMENT FOR POWERLINE RIGHTS-OF-WAY

Between

TENNESSEE VALLEY AUTHORITY

and

U.S. DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

I. Purpose

This General Agreement (GA) is entered into by the Tennessee Valley Authority (TVA) and the National Park Service (NPS) and addresses vegetation management for electric transmission and distribution line right-of-way (ROW) easements and permits (referred to throughout this GA as powerline ROWs) on NPS lands. The GA will help facilitate cooperation and coordination among TVA and the NPS regarding vegetation management within and immediately adjacent to existing and future powerline ROWs and associated facilities. Specifically, the GA will expedite implementation of cost-effective and environmentally sound vegetation management plans, procedures, and practices for powerline ROWs that will identify and, if possible, reduce any potential adverse environmental and cultural impacts while enhancing the ability of utilities to provide uninterrupted electrical service to customers and address public safety, including the public safety risks that may arise from wildfires caused by inadequate vegetation management.

This GA does not substitute for park-specific agreements, which should be established, or updated where existing, between TVA and individual NPS parks to address issues specific to that park unit, including consideration and/or protection of cultural resources, protection of state and federally listed species and habitats, and other similar relevant issues.

II. Authorities

TVA is a federal agency and instrumentality of the United States, created by and existing pursuant to the TVA Act (1933) to foster the social and economic welfare of the people in the Tennessee River Valley, promote stewardship of the region's natural resources, provide low cost energy, and improve flood control and navigation of the Tennessee River and its tributaries. In furtherance of that mission, TVA operates and maintains the nation's largest public power system, including hydropower, coal, gas, nuclear, solar and wind generation facilities, auxiliary structures and electrical distribution lines and facilities. Also in furtherance of that mission, TVA maintains approximately 237,000 acres of transmission line ROW powerline easements, collectively over 16,200 circuit miles.

The NPS is directed to manage all national park lands to protect and preserve natural and cultural resources, pursuant to the National Park Service Organic Act, 54 U.S.C. 100101. The NPS is responsible for managing nearly 84 million acres with over 400 units of the National Park System. The mission of the NPS is to preserve unimpaired the natural and cultural resources and values of the National Park System for the enjoyment, education, and inspiration of current and future generations. The NPS also has management responsibilities over other areas, including parts of the National Wild and Scenic Rivers System, National Trails System, National Heritage Areas, and NPS Affiliated Areas, which are closely linked in importance and purpose to those areas directly managed by the NPS. Each park unit has its own enabling legislation that defines the purpose of the park and other specifics related to resource protections. Management, including the issuance of permits, for each NPS unit is directed by each unit's superintendent.

III. Coordination and Cooperation

A number of TVA's powerline easements pass through NPS land. Therefore, coordination and cooperation between TVA and the NPS is important to enhance electric transmission reliability, increase maintenance efficiencies, reduce management costs, prevent the spread of invasive plants, reduce fuel loads, reduce the risk of wildfires, and minimize other potential environmental and cultural resource impacts and human safety risks. This coordination and cooperation should include each party's best efforts toward the following goals:

A. Completion of natural resource surveys to identify sensitive habitats and threatened and endangered flora within TVA ROWs on NPS land where appropriate.
B. Sharing data on state and federal listed species and protected habitats within and adjacent to ROWs to ensure that ROW access and management within ROWs protects sensitive species and habitats to the full extent possible.
C. Development of vegetation management plans that identify vegetation control prescriptions within a given year for each powerline ROW on NPS land. Such vegetation management plans must comply with applicable federal mandates and policies, be consistent with operations and maintenance plans for each powerline, and consider requirements for Federal reliability standards.
D. Develop protocols for maintenance, access, and safety. This includes protocols for wildfire management and response.

IV. Roles and Responsibilities

A. Both TVA and the NPS will:
    a. Facilitate coordination with each other at the local level to develop vegetation management plans, and cooperate to complete any necessary vegetation surveys for plan development. In addition, the Parties will work together on any necessary land use authorizations for powerline ROWs on NPS lands.
    b. Promote safety during vegetation management activities associated with powerline ROWs on NPS lands. The parties to this GA acknowledge that:
        i. In general, the safety of electric utility workers and the public at transmission and distribution facilities is the responsibility of TVA. Moreover, TVA will conduct their operations in accordance with applicable National Electrical Safety Code (NESC) and Occupational Safety and Health Administration (OSHA) standards, and the terms and

conditions in the ROW authorizations, and other worker protection standards where applicable.

   ii. The NPS will coordinate with TVA to develop appropriate measures to ensure personal and public safety and protection of NPS lands and resources during vegetation management activities.

c. Address the management of trees that have the potential to interfere with the reliable operation of TVA's transmission system in all vegetation management plans and authorizations.
d. Prevent and control the spread of invasive species through a proactive and integrated management approach along powerline ROWs on NPS lands.
e. Work together to identify resource protection needs or cooperative resource management opportunities within TVA ROWs on NPS lands, such as pollinator enhancement projects and/or establishment of early successional habitat through the use of selective herbicide application or other methods.
f. Coordinate their efforts to comply with Section 106 of the National Historic Preservation Act. NPS and TVA will work together to address any cultural or tribal resources potentially affected by vegetation management and seek ways to balance and integrate cultural and natural resource management, including working together to identify opportunities for selective herbicide use to avoid potential impacts to cultural resources
g. Coordinate measures to protect sensitive species or habitats.
h. Consider the impacts of various vegetation management strategies on other resources, such as potential impacts to water quality from herbicide use or soil erosion.
i. Consider wetland impacts, both permanent and temporary, from vegetation management actions, such as use of heavy equipment, changes to the plant community and potential hydrology alterations.
j. Work together to establish site-specific wildfire prevention and response plans.

B. TVA will:
   a. Provide the NPS with the necessary information for development of the proposed or revised vegetation management plan for ROWs on NPS lands. The information will include vegetation surveys, proposed treatment procedures and herbicide or pesticide use, maps, best management practices, and mitigation measures.
   b. Develop site-specific vegetation management plans collaboratively with the NPS.
   c. Collaborate and coordinate with the NPS on vegetation management activities associated with the powerline ROW with individual parks.
   d. Ensure that TVA employees and contractors are informed on the terms and conditions of applicable ROW permits and approved vegetation management plans to best ensure compliance and avoid unauthorized boundary encroachment and resource damage.
   e. Ensure this GA is disseminated to appropriate TVA staff and contractors within three months of the effective date.

C. NPS will:
   a. To the extent practicable and consistent with other NPS obligations and priorities, strive to review requests for any required, non-emergency vegetation management for powerline ROWs on NPS lands within 60 calendar days of receipt from TVA.
   b. Review and provide park-level input on draft vegetation management plans, including wildlife protection requirements and mitigation measures.
   c. When necessary, the NPS will use information provided by TVA to develop permit terms and conditions.
   d. Ensure this GA is disseminated to all appropriate units of the National Park System within three months of the effective date.
   e. Identify cultural resources on NPS lands that may need to be addressed in ROW vegetation plans and any related resource protection requirements; information regarding certain cultural resources, including their exact location, may be legally protected under Federal law and require safeguarding.

V. Principal Contacts

The principal contacts for this GA are:

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VI. Implementation, Amendments, and Termination

This GA will become effective on the date it is fully executed and will remain in effect for five years, unless it is terminated in writing by TVA or NPS prior to its expiration. This GA may be amended with the written consent of TVA and NPS.

VII. Non-Fund-Obligating Document

Each party will fund its own participation under this GA and will carry out its separate activities in a coordinated and mutually beneficial manner. Nothing in this Agreement obligates the NPS to expend in any one fiscal year any sum in excess of appropriations made by Congress, or to involve the NPS in any contract or other obligation for the further expenditure of money in excess of such appropriations or allocations.

Although TVA is committed to cooperating with the NPS to the full extent possible, nothing in this Agreement shall obligate TVA to spend funds in excess of its annual ROW vegetation management budget.

VIII. Limitations

This GA is not intended to and does not create any right, benefit, or trust responsibility, substantive or procedural, enforceable at law or equity, by a party against the United States, its agencies, its officers, or any person. This GA has no legal effect on existing or future land use authorizations for powerline ROWs on NPS lands.

Nothing in this Agreement obligates TVA or the NPS to expand their respective legal obligations under the National Environmental Policy Act, the Endangered Species Act, National Historic Preservation Act, or any other law or regulation applicable to their respective activities on TVA ROW powerline easements.

IX. Authorized Representatives

In Witness Hereof, the Parties hereto have signed their names and executed this General Agreement.

Tricia L. Roelofs
Senior Manager
Tennessee Valley Authority

5.2.19
Date

Robert A. Vogel
Southeast Regional Director
National Park Service

4-10-19
Date

Appendix E – TVA Vegetation Management Guidelines

Transmission Environmental Protection Procedures
Right-Of-Way Vegetation Management Guidelines

1.1 Overview

A. The Tennessee Valley Authority (TVA) must manage the vegetation on its rights-of-way and easements to ensure emergency maintenance access and routine access to structures, switches, conductors, and communications equipment. In addition, TVA must maintain adequate clearance, as specified by the National Electrical Safety Code, between conductors and tall growing vegetation and other objects. This requirement applies to vegetation within the right-of-way (ROW) as well as to trees located off the right-of-way.

B. Each year TVA assesses the conditions of the vegetation on and along its rights-of-way. This is accomplished by aerial inspections, ground inspections, periodic field inspections, aerial photography, LiDAR / Phodar data and information from TVA personnel, property owners and the general public. TVA utilizes this data to evaluate vegetation clearances and identifies vegetation on and off ROW that does, or could potentially pose a risk to reliability.

C. TVA transmission foresters develop a vegetation re-clearing plan that is specific to each line segment and is based on terrain conditions, species mix, growth, and density.

2.1 Right-of-Way Management Methods

A. TVA takes an Integrated Vegetation Management (IVM) approach that is based on a carefully planned, multidimensional strategy developed in consultation with forestry and habitat experts. Integrated vegetation management aims to improve safety and prevent power outages by creating healthy and self-sustaining ecosystems in ROWs while ensuring compliance with regulatory standards (NERC 2006). These ecosystems foster beneficial, attractive and low-maintenance habitat where tall trees won't grow and other, more benign forms of vegetation can thrive. Integrated vegetation management encourages early successional native habitats that pose less threat to power reliability yet offer safe havens for desirable plants and animals. By combining selective use of herbicides with physical removal, integrated vegetation management can more thoroughly eradicate problem vegetation and allow more compatible species to fill in, making it harder for tall-growing trees to reestablish.

TVA executes its transmission vegetation maintenance on a 2-, 3-, or 4-year cycle based on data that is acquired by various inspection methods. Photogrammetry, LiDAR, ground inspection and aerial inspection data are utilized to evaluate the next year's scheduled work to determine the annual vegetation maintenance work scope. LiDAR and Photogrammetry technologies provide a detailed vegetation threat analysis that can be used to assess risk as well as prioritize vegetation management work plans. This detailed analysis supports TVA's efforts to target incompatible species as well as promote the growth of compatible vegetation. This precision management approach is effective in reducing overall environmental impact by limiting work to specific areas of incompatibility.

B. TVA uses a variety of herbicides specific to the species present with a variety of possible application techniques. Herbicides are selectively applied from the ground with backpack sprayers or vehicle-mounted sprayers. Any herbicides used are applied in accordance with applicable state and federal laws and regulations. Only herbicides registered with the United States Environmental Protection Agency (USEPA) are used.

C. In very steep terrain, in sensitive environmental areas, in extensive wetlands, at stream banks, and in sensitive property owner land use areas, hand clearing may be utilized. Hand clearing is recognized as one of the most hazardous occupations documented by the Occupational Health and Safety Administration. For that reason, TVA utilizes low volume herbicide applications in these areas when feasible.

D. TVA does not encourage tree re-clearing by individual property owners because of the high hazard potential of hand clearing, possible interruptions of the line, and electrical safety considerations for untrained personnel that might do the work.

E. Mechanical mowers not only cut the tall saplings and seedlings on the right-of-way, they also shatter the stump and the supporting near surface root crown. The tendency of resistant species is to re-sprout from the root crown and shattered stumps can produce a multi-stem dense stand in the immediate area. Repeated use of mowers on short cycle re-clearing with many original stumps re-growing in the above manner can create a single species thicket or monoculture. With the original large root system and multiple stems, the resistant species can produce re-growth at the rate of 5-10 feet in a year. In years with high rainfall, the growth can reach 12-15 feet in a single year. These dense, monoculture stands can become nearly impenetrable for even large tractors. Such stands have low diversity, little wildlife food or nesting potential, and become a property owner concern. Selective herbicide application may be used to control monoculture stands.

3.1 Herbicide Program

A. TVA has worked with universities (such as Mississippi State University, University of Tennessee, Purdue University and others), chemical manufacturers, other utilities, U.S. Department of Transportation, U.S. Fish and Wildlife Service (USFWS), and U.S. Forest Service (USFS) personnel to explore options for vegetation control. The results have been strong recommendations to use species-specific, low volume herbicide applications in more situations. Research, demonstrations, and other right-of-way programs show a definite improvement of rights-of-way treated with selective low-volume applications of new herbicides using a variety of application techniques and timing. Table 1 below identifies herbicides currently used on TVA rights-of-way. Table 2 identifies pre-emergent herbicides currently being used on bare ground areas on TVA rights-of-way and in substations. Table 3 identifies TGRs that may be used on tall trees that have special circumstances that require trimming on a regular cycle, e.g., restrictions on complete removal. The rates of application utilized are those listed on the U.S. Environmental Protection Agency (USEPA) approved label and consistent with utility standard practice throughout the Southeast.

Table 1 - Herbicides Currently Used on TVA Rights-of-Way

Trade Name	Active Ingredient	Label Signal Word
Accord/Accord XRT II	Glyphosate/Liquid	Caution
Arsenal	Imazapyr/Liquid/Granule	Caution
Chopper	Imazapyr/RTU	Caution
Clearstand	Imazapyr/Metsulfuron Methyl/Liquid	Caution
Escort	Metsulfuron Methyl/Dry Flowable	Caution
Garlon	Triclopyr/Liquid	Caution
Garlon 3A	Triclopyr/Liquid	Danger
Habitat	Imazapyr/Liquid	Caution
Krenite S	Fosamine Ammoinium	Caution
Milestone VM	Aminopyralid/Liquid	Caution
Pathfinder II	Triclopyr/RTU	Caution
Rodeo	Glyphosate/Liquid	Caution
Roundup	Glyphosate/Liquid	Caution
Roundup Pro	Glyphosate	Caution
Streamline	Aminocyclopyrachlor/ Metsulfuron Methyl/Liquid	Caution
Transline	Clopyralid/Liquid	Caution
Viewpoint	Imazapyr/Aminocyclopyrachlor/ Metsulfuron Methyl/Liquid	Caution

Table 2 - Pre-Emergent Herbicides Currently Used for Bare Ground Areas
On TVA Rights-of-Way

Trade Name	Active Ingredients	Label Signal Word
Arsenal 5G	Imazapyr/Granule	Caution
Sahara	Diuron/Imazapyr	Caution
SpraKil SK-26	Tebuthiuron/Diuron/Granules	Caution
SpraKil S-5	Tebuthiuron/Granules	Caution
Topsite	Diuron/Imazapyr	Caution

Table 3 - Tree Growth Regulators (TGRs) Currently Used On TVA Rights-of-Way

Trade Name	Active Ingredients	Label Signal Word
Profile 2SC	TGR-paclobutrazol	Caution
TGR	Flurprimidol	Caution

B. The herbicides listed in Table 1 and 2 and TGRs listed in Table 3 have been evaluated in extensive studies in support of registration applications and label requirements. Many have been reviewed in the USFS vegetation management environmental impact statements (EISs), and those evaluations are incorporated here by reference (USFS 1989a, 1989b, 2002a, and 2002b). Electronic copies can be accessed at https://cdxnodengn.epa.gov/cdx-enepa- public/action/eis/search. The result of these reviews has been a consistent finding of limited environmental impact beyond that of control of the target vegetation. All the listed herbicides have been found to be of low environmental toxicity when applied by trained applicators following the label and registration procedures, including prescribed measures, such as buffer zones, to protect threatened and endangered species.

C. Low volume herbicide applications are recommended since research demonstrates much wider plant diversity after such applications. There is better ground erosion protection and more wildlife food plants and cover plants develop. In most situations there is increased development of wild flowering plants and shrubs. In conjunction with herbicides, the diversity and density of low-growing plants provide control of tall-growing species through competition.

D. Herbicides are used in place of rotary mowing in order to avoid damage to nesting and tunneling wildlife. This method retains ground cover year around with a better mix of food species and associated high-protein insect populations for birds in the right seasons. Most also report less damage to soils (even when compared with rubber-tired equipment).

E. Best Management Practices (BMPs) governing application of herbicides are contained within *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities* (Muncy 2016) which is incorporated by reference. Herbicides can be liquid, granular, or powder and can be applied aerially or by ground equipment and may be selectively applied or broadcast, depending on the site requirements, species present, and condition of the vegetation. Water quality considerations include measures taken to keep herbicides from reaching streams whether by direct application or through runoff of or flooding by surface water. "Applicators" must be trained, licensed, and follow manufacturers' label instructions, USEPA guidelines, and respective state regulations and laws.

F. When herbicides are used, their potential adverse impacts are considered in selecting the compound, formulation, and application method. Herbicides that are designated "Restricted Use" by USEPA require application by or under the supervision of applicators certified by the respective state control board. Applications are done either by TVA or by contractors in accordance with the following guidelines identified in the TVA BMP manual (Muncy 2016):

   1. The sites to be treated are selected and application directed by the appropriate TVA official.
   2. A preflight walking or flying inspection is made within 72 hours prior to applying herbicides aerially. This inspection ensures that no land use changes have occurred, that sensitive areas are clearly identified to the pilot, and that buffer zones are maintained.
   3. Aerial application of liquid herbicides will normally not be made when surface wind speeds exceed 5 miles per hour, in areas of fog, or during periods of temperature inversion.
   4. Pellet application will normally not be made when the surface wind speeds exceed 10 miles per hour, or on frozen or water saturated soils.
   5. Liquid application is not performed when the temperature reaches 95 degrees Fahrenheit or above.

6. Application during unstable, unpredictable, or changing weather patterns is avoided. Equipment and techniques are used that are designed to ensure maximum control of the spray swath with minimum drift.
7. Herbicides are not applied to surface water or wetlands unless specifically labeled for aquatic use. Filter and buffer strips will conform at least to federal and state regulations and any label requirements. The use of aerial or broadcast application of herbicides is not allowed within a streamside management zone (SMZ) adjacent to perennial streams, ponds, and other water sources. Hand application of certain herbicides labeled for use within SMZs is used only selectively.
8. For aerial inspections, buffers and filter strips (200 feet minimum width) are maintained next to agricultural crops, gardens, farm animals, orchards, apiaries, horticultural crops, and other valuable vegetation.
9. Herbicides are not applied in the following areas or times: (a) in city, state, and national parks or forests or other special areas without written permission and/or required permits (b) off the right-of-way and (c) during rainy periods or during the 48- hour interval prior to rainfall predicted with a 20 percent or greater probability by local forecasters, when soil active herbicides are used.

G. TVA currently uses primarily low volume applications of foliar and basal applications, e.g., Accord (Glyphosate), Arsenal (Imazapyr), Clearstand (Imazapyr / Metsulfuron Methyl), Milestone VM (Aminopyralid) and Streamline (Aminocyclopyrachlor / Metsulfuron Methyl).

4.1 Benefits

A. Proper maintenance—including vegetation management—of ROW and its supporting facilities is crucial to ensuring the reliable transmission of affordable electrical power. Unmanaged and poorly maintained vegetation can cause electricity outages, wildfires, soil erosion, and water quality issues. Utility companies that adopt long-term IVM approaches often benefit from significant vegetation management cost savings, which can be reflected in customer rates.

B. ROW also provide important wildlife habitats. As wildlife habitats in the United States are lost to development, these ROW become increasingly important. The IVM approach can create natural, diverse, and sustaining ecosystems, such as a meadow transition habitat. A variety of wildlife species (including threatened and endangered species) consider these habitats home, such as butterflies, songbirds, small mammals, and deer. These habitats also encourage the growth of native plant species and can increase plant diversity.

C. Invasive and exotic species are often a problem on ROW, and, consequently, the surrounding land. IVM techniques (such as selective herbicide application) can minimize this problem, while ensuring native and endangered species are not affected.

5.0 References

Integrated Vegetation Management (IVM) on Rights-of-Way Fact Sheet. (2012, May) Retrieved from http://www.epa.gov/pestwise/htmlpublications/row_fact_sheet.html

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Appendix F – Sensitive Areas Class Definitions for Re-clearing

Appendix F

TVA Sensitive Areas Class Definitions for

Right-of-Way Re-clearing

Plants

Class 1: No broadcast herbicide application. Alternatives are: 1) Select spray woody plants, 2) Mechanical or hand-clearing, 3) Request field surveys by TVA botanist to determine if species exists in the subject area.

Class 2: Contact TVA botanist at least three weeks before conducting maintenance activities in subject areas to determine if the proposed activities require restrictions.

Natural Areas

Class 1: No broadcast herbicide application. Alternatives are: 1) Select spray woody plants, 2) Mechanical or hand-clearing, 3) Request field surveys by TVA Biological Compliance staff to determine if species exists in the subject area.

Class 2: Must contact area land manager prior to entering or conducting maintenance in subject area. No broadcast herbicide application. Alternatives are: 1) Select spray woody plants, 2) Mechanical or hand-clearing, 3) Request field surveys by TVA Biological Compliance staff to determine if species exists in the subject area.

Class 3: Contact TVA Natural Areas biologist at least three weeks before conducting maintenance activities to determine if the proposed activities require restrictions.

Wetland Areas

Class 1: Wetland/potential wetland- Refer to "Wetlands ROW Re-clearing and Pole Replacement Guidelines" for restrictions.

Terrestrial Animal Areas

Class BALDEAGLE: Bald Eagle nest- Either 1) Assume presence. No disturbance, spraying or vegetation clearing between Dec. 1 - July 1 within 660 feet of nest site; OR 2) Request seasonal field survey to determine if nest is active.

Class CAVE: Cave - No herbicide use within 200 ft of cave due to potentially sensitive subterranean aquatic resource. Hand or small machinery clearing only (ie: chainsaws, bush hog, mowers). Vehicles and equipment confined to existing access roads. Avoid entering cave.

Class HERONOSPREY: Heronry and Osprey - Either 1) Assume presence. No broadcast spraying. Only use bushogs or mowers for vegetation removal or selective herbicide spraying between February 1 and July 15 within 660 feet of nest site; OR 2) Request seasonal field survey to determine if nests are active.

Class HERONRY: Heronry - Either 1) Assume presence. No broadcast spraying. Only use bushogs or mowers for vegetation removal or selective herbicide spraying between February 1 and July 15 within 660 feet of nest site; OR 2) Request seasonal field survey to determine if nests are active.

Class IBAT: Potential Indiana Bat Summer Roosting Habitat - Cut trees with exfoliating bark Nov 15 - Mar 31. If cutting necessary outside of time restriction a bat and/or habitat survey is required.

Class IBATNLEBAT: Potential Indiana Bat and Northern Long-Eared Bat Summer Roosting Habitat-Cut trees with exfoliating bark during the following seasons differentiated by state: VA, KY, TN and NC = Nov 15-Mar 31; AL, MS and GA = Dec 1 - Mar 15. If cutting necessary outside of time restriction a bat and/or habitat survey is required.

Class NLEBAT: Potential Northern Long-Eared Bat Summer Roosting Habitat - Cut trees with exfoliating bark during the following seasons differentiated by state: VA and KY = Nov 15 - Mar 31; TN and NC = Oct 15 - Mar 31; AL, MS, and GA = Dec 1 - Mar 15. If cutting necessary outside of time restriction a bat and/or habitat survey is required.

Class OSPREY: Osprey nest - Either 1) Assume presence. No broadcast spraying. Only use bushogs or mowers for vegetation removal or selective herbicide spraying between March 1 and July 15 within 660 feet of nest site; OR 2) Request seasonal field survey to determine if nests are active.

Class SPECIAL: Special Circumstance - Contact TVA Terrestrial Zoologist at least three weeks before conducting maintenance activities in buffered area to determine if the proposed activities require restrictions.

Aquatic Animal Areas

Class 1: No broadcast herbicide application. Alternatives are: 1) Select spray woody plants, 2) Mechanical or hand-clearing, 3) Request field surveys by TVA aquatic biologist to determine if species exists in the subject area.

Class 2: Contact TVA aquatic biologist at least three weeks before conducting maintenance activities in subject areas to determine if the proposed activities require restrictions.

ROW ACCESS

O-SAR data is appropriate and applicable to projects where all vehicular access to or within the ROW is existing and no access road improvements are required. The data provided in O-SAR does not apply to work involving road building, upgrading, improvement, or repair, such as but not limited to additional fill greater than 0.10 -acre, new or upgraded stream crossings, and vegetation removal outside the originally cleared ROW footprint. In such cases, a separate environmental review is necessary.

Appendix G – Wetland Re-Clearing and Pole Replacement Guidelines

Appendix G

TVA Wetlands Right-of-Way Re-Clearing and Pole Replacement Guidelines

(revised 2016)

The Office-Level Sensitive Area Review (O-SAR) projects conducted by the Biological Compliance office result in the provision of mapped potential wetland areas. The wetland dataset provided in O-SAR is comprised of two layers: 1) the National Wetland Inventory (NWI) data (dark blue) and 2) the O-SAR Wetlands Area layer. The NWI includes the bulk of mapped wetland information incorporated and provided in the O-SAR Viewer. The O-SAR Wetlands Area layer includes additional potential or field verified wetland areas (pink outline, black fill) not captured on the NWI. Field verified wetland polygons are designated as such in the O-SAR Wetland Area database. However, as with NWI data, the vast majority of O-SAR Wetland Area polygons indicate *potential* wetland areas. These polygons are identified by Biological Compliance wetland biologists based on interpretation of mapped topographic features, water bodies, soils boundaries, and proximity to NWI features.

The NWI wetlands are shown power-service-area-wide in the O-SAR Viewer. However, NWI data was compiled using high-altitude aerial photography, some of which is now over 30 years old, with very limited field verification. Because of this, the NWI data is notoriously inaccurate and lacking.

While NWI is a good starting reference, Biological Compliance's wetland biologists are able to identify additional potential wetland areas within a smaller footprint using higher resolution and more current aerial imagery, hydrology data, and soils information to map additional potential wetland areas.

Likewise, BCC wetland biologists conduct field delineations across TVA's ROW system and include field delineated wetland information in the database for reference.

These two datasets, the NWI and O-SAR Wetland Areas layers, are provided as a means of implementing avoidance strategies and/or best management practices for projects where the type of impacts (if conducted within the parameters provided) is generally nominal to wetland resources. However, the limitations of this data must be considered when conducting ROW activities. There may be wetlands present for which no map evidence or other data currently exists, and they are, therefore, undetectable via desk top review. **Only on-the-ground verification can accurately determine wetland presence, extent, and condition.** Transmission crews should remain alert to such things as standing water, soil saturation, etc. and work accordingly within these guidelines to protect wetland resource.

In the absence of a ground survey by a wetland biologist to determine wetland presence and location throughout TVA's ROW system, wetland best management practices (BMPs) (Muncy 2016), would be implemented within **all** locations where mapped NWI wetlands and additional O-SAR Wetland Areas are indicated . General rules (Muncy 2016 pg. 27-28) for applying wetland BMPs during ROW re- clearing and pole replacement projects include:

- Adhere to dry season schedule (September to mid-November) when practicable;

- Soil ruts shall not exceed 12”; only low ground pressure equipment, such as rubberized tracks, wide tires, or lightweight equipment (ATVs) should enter wetlands to minimize rutting and soil compaction;
- Woody vegetation should be cut less than 12” from ground level;
- Woody debris is to be removed outside the wetland area;
- Stumps are not removed or grubbed;
- Only aquatic approved herbicides within wetlands are permissible.
- Flow into or out of wetlands are not restricted during work activities;
- Erosion control techniques implemented within 50’ of wetland boundary where soil disturbance is proposed;
- All contours within wetlands are restored to preconstruction specifications
- All disturbed and exposed wetland soils to be seeded upon completion of work (or within 14 days, whichever comes first);

Specific to ROW Access

The NWI and O-SAR Wetland Area data is appropriate and applicable to projects where all vehicular access to or within the ROW is existing and no access road improvements are required. As such, all access, ROW re-clearing, and pole replacement activities would be conducted in accordance with the General Rules for wetland BMPs using standard best management practices (Muncy 2016) to avoid or minimize wetland impacts sufficiently. Where access cannot be conducted within the parameters of these guidelines, Wetland Access Methods (WAM #1-3, Muncy 2016 pg. 29), may be utilized.

The data provided on the NWI and O-SAR Wetland Areas layers is not applicable for determining wetland impacts associated with any access activities that involve road building, upgrades, improvements, or repair, such as but not limited to addition of fill, new or upgraded stream crossings, and vegetation removal outside the originally cleared ROW footprint. If new, upgraded, improved, or repaired access roads are necessary to conduct ROW re-clearing or pole replacement projects, a separate environmental review of those particular access areas would be required.

Specific to ROW Re-Clearing

In addition to the general rules, the BMPs titled Wetland and Wetland Buffer Clearing Methods (WCM #1-7, Muncy 2016 pg. 28-29) would be implemented for clearing vegetation within all mapped potential wetland areas within existing ROWs. Of note, WCM-1, which states no clearing would be required in all emergent and/or scrub-shrub wetland areas, would be applied to these types of wetland habitats. By implementing these standards, the majority of potential wetland impacts would be avoided or minimized sufficiently to an insignificant level. ROW re-clearing methods that cannot meet the criteria of these guidelines should be reviewed separately for wetland impacts.

Specific to Pole Replacement

In addition to the general rules, the BMPs titled Wetland and Wetland Buffer Structure Placement Methods (WSP #1-4, Muncy 2016 pg. 29-30) would be implemented for replacing poles within all mapped potential wetland areas on existing ROWs. Of note, certain activities that may occur during pole replacement in wetlands are regulated under Sections 404 and 401 of the Clean Water Act and are further protected under Executive Order (E.O.) 11990, Protection of Wetlands. Nationwide General Permit (NWP) #12 authorizes certain activities related to utility line construction and contains conditions to ensure that impacts to wetlands are minimal. Section 401 gives states the authority to certify whether activities permitted under Section 404 are in accordance with state water quality standards. Should a pole replacement project result in a regulated activity, a qualified wetland biologist would be required to delineate the wetland(s), and provide the wetland determination data forms required for obtaining the appropriate permit.

Appendix H – List of Compatible Trees and Shrubs

Table H-1. Comprehensive List of Trees and Shrubs that are Compatible Within TVA ROWs

Scientific Name	Common Name	Native Species?	Cultivars Available?	Evergreen or Deciduous?	Comments
Abelia X grandiflora	Glossy Abelia	No	Yes	Deciduous	Easy to grow and tolerant of many habitats; white-pink flowers
Aesculus parviflora	Bottlebrush Buckeye	Yes	No	Deciduous	Multi-stem, colony-forming shrub with large spikes of white flowers
Buxus microphylla	Littleleaf Boxwood	No	Yes	Evergreen	Easily shaped with pruning
Buxus sempervirens	Common Boxwood	No	Yes	Evergreen	Easily shaped with pruning
Callicarpa japonica	Japanese Beautyberry	No	Yes	Deciduous	Multi-stem shrub producing showy berries
Callicarpa americana	American Beautyberry	Yes	Yes	Deciduous	Multi-stem shrub producing showy berries
Calycanthus floridus	Sweetshrub	Yes	Yes	Deciduous	Maroon-red sweet-scented flowers
Chaenomeles speciosa	Flowering Quince	No	Yes	Deciduous	Flowers ranging from red to white; rounded form with spiny twigs
Clethra alnifolia	Sweet Pepperbush	Yes	Yes	Deciduous	Fragrant, with long flower spikes
Cornus sericea	Red Osier Dogwood	Yes	Yes	Deciduous	Multi-stem shrub with showy bark
Cotinus coggygria	Smokebush	No	Yes	Deciduous	Many with red-purple foliage, airy flowers, good fall color
Forsythia X intermedia	Forsythia	No	Yes	Deciduous	Showy yellow flowers in early spring
Fothergilla gardenii	Dwarf Fothergilla	Yes	Yes	Deciduous	2 to 3 ft. tall, white flowers in spring with good fall color
Fothergilla major	Large Fothergilla	Yes	Yes	Deciduous	To 10 ft. tall, white flowers in spring with good fall color
Hamamelis vernalis	Vernal Witch Hazel	Yes	Yes	Deciduous	Flowers from late winter to early spring; good screen and fall color

Table H-1. Comprehensive List of Trees and Shrubs that are Compatible Within TVA ROWs

Scientific Name	Common Name	Native Species?	Cultivars Available?	Evergreen or Deciduous?	Comments
Hibiscus syriacus	Rose of Sharon	No	Yes	Deciduous	Summer flowering; good for borders
Hydrangea arborescens	Smooth Hydrangea	Yes	Yes	Deciduous	Many cultivated varieties available, white flowers
Hydrangea macrophylla	Bigleaf Hydrangea	No	Yes	Deciduous	Rounded shrub with large, showy flowers
Hydrangea quercifolia	Oakleaf Hydrangea	Yes	Yes	Deciduous	Attractive exfoliating bark and showy flowers
Hypericum spp.	Shrubby St. Johnswort	In Part	Yes	Deciduous	Multiple species; groundcovers and shrubs with large, yellow flowers
Ilex crenata	Japanese Holly	No	Yes	Evergreen	Attractive berries, numerous cultivated, low-growing varieties
Ilex glabra	Inkberry	Yes	Yes	Evergreen	Attractive berries, numerous cultivated, low-growing varieties
Ilex verticillata	Common Winterberry	Yes	Yes	Deciduous	Showy red fruit in winter; Ilex verticillata X serrata hybrids are also ornamental
Illicium floridanum	Florida Anisetree	Yes	Yes	Evergreen	Rare in the wild; attractive red flowers, prefers part sun to shade
Itea virginica	Virginia Sweetspire	Yes	Yes	Variable	Ranging from deciduous to evergreen; attractive white flowers
Juniperus horizontalis	Creeping Juniper	Yes	Yes	Evergreen	Low-growing, sprawling shrub; good ground cover
Kalmia latifolia	Mountain Laurel	Yes	Yes	Evergreen	Attractive flowers, numerous cultivated, low-growing varieties
Leucothoe spp.	Fetterbush, Dog-hobble	In Part	Yes	Evergreen	Multiple species; low-growing shrub with lustrous foliage
Lindera benzoin	Spicebush	Yes	Yes	Deciduous	Nice flowers, fruit; good for wetter areas

Table H-1. Comprehensive List of Trees and Shrubs that are Compatible Within TVA ROWs

Scientific Name	Common Name	Native Species?	Cultivars Available?	Evergreen or Deciduous?	Comments
Loropetalum chinense	Chinese Fringe-flower	No	Yes	Evergreen	Shrub with attractive flowers, choose low-growing varieties
Neviusia alabamensis	Alabama Snow-wreath	Yes	No	Deciduous	Rare in the wild with showy white flowers in spring; colonial, good for borders
Philadelphus inodorus	Mock Orange	Yes	No	Deciduous	Shrub with rounded form and white flowers
Physocarpus opulifolius	Common Ninebark	Yes	Yes	Deciduous	Exfoliating bark on older stems, good for borders; cultivated varieties are superior
Pieris floribunda	Mountain Pieris	Yes	No	Evergreen	Native, attractive low-growing shrub
Pieris japonica	Japanese Pieris	No	Yes	Evergreen	Attractive foliage and flowers; good for borders
Prunus laurocerasus	Cherry Laurel	No	Yes	Evergreen	Multi-stemmed, numerous cultivated, low-growing varieties
Rhododendron carolinianum	Carolina Rhododendron	Yes	Yes	Evergreen	Showy flowers; prefers good drainage and some shade
Rhododendron catawbiense	Catawaba Rhododendron	Yes	Yes	Evergreen	Showy flowers; prefers good drainage and some shade
Rhododendron spp.	Azalea	In Part	Yes	Deciduous	Showy flowers, some repeat blooming; choose low-growing varieties
Rhus aromatica	Fragrant Sumac	Yes	Yes	Deciduous	Spreading shrub with red berries; leaves fragrant when crushed
Rosa spp.	Rose	In Part	Yes	Deciduous	Multiple species with numerous cultivars; grown for the attractive flowers
Styrax americanus	American Snowbell	Yes	No	Deciduous	Bell-shaped white flowers in early summer

Table H-1. Comprehensive List of Trees and Shrubs that are Compatible Within TVA ROWs

Scientific Name	Common Name	Native Species?	Cultivars Available?	Evergreen or Deciduous?	Comments
Syringa spp.	Common Lilac	No	Yes	Deciduous	Aromatic flowers, numerous cultivated, low-growing varieties
Vaccinium spp.	Blueberry	Yes	Yes	Deciduous	Fantastic edible, good fall color, requires acidic soil
Viburnum spp.	Viburnum	In Part	Yes	Variable	Attractive flowers, numerous cultivated, low-growing varieties
Weigela florida	Weigela	No	Yes	Deciduous	Large, adaptable shrub with arching branches; appropriate for borders

Appendix I – Herbaceous Plant Communities of Conservation Importance

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Appendix I: Herbaceous Plant Communities of High Conservation Importance

Twenty herbaceous communities recognized as high conservation importance have the potential to occur within TVA right-of-ways (ROWs). High conservation importance is defined as those communities assigned conservation ranks of G1-G3 in accordance to the NatureServe conservation ranking system, where G1 = critically imperiled, G2 = imperiled, and G3 = vulnerable. Some ranks followed by either a "Q" or "?", where "Q" implies questionable taxonomic distinctiveness of a specific entity at the current level and "?" denotes an uncertain numeric rank (e.g., G2?). The herbaceous communities summarized below are commonly identified as either glades, barrens, prairies, or grasslands, and can be expected to occur within TVA ROWs. Three types, the Cumberland Plateau Clifftop Sandstone Barrens, the Central Limestone Glade, and the Little Bluestem – Bluestem Grassland, have the greatest likelihood of occurring most frequently based on their conservation rank (each is ranked as G3, indicating a given community is represented by the highest number of sites of the three conservation ranks) and their relatively broad distribution throughout the project area. The level of probability in which each community is likely to intersect ROWs is provided, ranked as either low, medium, or high. In addition to nomenclature (scientific, translated, and common names), brief overviews on the description and distribution of each community are also provided. References for each of the following community types can be accessed through NatureServe Explorer at: http://explorer.natureserve.org/servlet/NatureServe?init=Ecol.

Bigelowia nuttallii - Coreopsis pulchra - Liatris microcephala Grassland

Translated Name: Nuttall's Rayless-goldenrod - Woodland Tickseed - Small-head Blazing-star Grassland

Common Name: Alabama Cumberland Sandstone Glade

Description: This community is characteristic of shallow soils associated with sandstone outcrops on Lookout and Sand mountains in northeastern Alabama, ranging sporadically southwestward to the vicinity of Birmingham. Occurrences of this community type can attain dimensions as large as 4 to 5 acres. Typically, a scattering of small trees and shrubs, including Virginia pine (*Pinus virginiana*), red maple (*Acer rubrum*), fringetree (*Chionanthus virginicus*), mountain laurel (*Kalmia latifolia*), tree sparkleberry (*Vaccinium arboreum*), and various oaks (*Quercus* spp.), inhabit deeper soils that may have accumulated in crevices and along the periphery. The herbaceous component is represented by a high diversity of graminoids and forbs, with the following species being typical: Nuttall's rayless goldenrod (*Bigelowia nuttallii*), little bluestem (*Schizachyrium scoparium*), silver bluestem (*Andropogon ternarius*), slim-spike three-awn grass (*Aristida longispica*), switchgrass (*Panicum virgatum*), goat's-rue (*Tephrosia virginiana*), St. Andrew's-cross (*Hypericum hypericoides*), slender false-foxglove (*Agalinis tenuifolia*), Indian paintbrush (*Castilleja coccinea*), late purple aster (*Symphyotrichum patens*), eastern silvery aster (*Symphyotrichum concolor*), whorled tickseed (*Coreopsis major*), woodland tickseed (*Coreopsis pulchra*), woodland sunflower (*Helianthus divaricatus*), small-head blazing-star (*Liatris microcephala*), grass-leaf golden-aster (*Pityopsis graminifolia*), and slender goldenrod (*Solidago erecta*). Several regional endemics and rare species are largely restricted to this community, including Little River onion (*Allium speculae*), woodland tickseed, Harper's dodder (*Cuscuta harperi*), mountain bush-honeysuckle (*Diervilla rivularis*), longleaf sunflower

(*Helianthus longifolius*)*,* Boynton's oak (*Quercus boyntonii*)*,* Texas sunnybell (*Schoenolirion wrightii*), and Menge's fameflower (*Phemaranthus mengesii*).

Distribution: Restricted to northeast Alabama, within the range of woodland tickseed.

NatureServe Conservation Rank: G2

Diamorpha smallii – Minuartia glabra Sandstone Grassland

Translated Name: Elf Orpine – Appalachian Stitchwort Sandstone Grassland

Common Name: Cumberland Sandstone Flatrock Glade

Description: This association is an annual herbaceous community occurring as a zonal component of sandstone flatrock communities primarily confined to mountain summits of the southern Cumberland Plateau. The association is limited to hollowed-out areas in sandstone outcrops in which water seasonally (mostly in winter/early spring) collects. Floral diversity is low, largely dominated by elf orpine (*Diamorpha smallii*) and Appalachian stitchwort (*Minuartia glabra*).

Distribution: Currently restricted to Tennessee in Franklin, Grundy, Putnam, and Marion counties. Similar conditions may exist in adjacent Alabama and Georgia, and can be expected in these states.

NatureServe Conservation Rank: G2G3

Schizachyrium scoparium – Danthonia sericea – Liatris microcephala – (*Eurybia surculosa*) Grassland

Translated Name: Little Bluestem – Silky Oatgrass – Small-head Blazing-Star – (Creeping Aster) Grassland

Common Name: Cumberland Plateau Clifftop Sandstone Barrens

Description: These are sandstone barrens found on clifftops, exposed slopes, and other rocky areas primarily in the Cumberland Plateau, with a small number of examples occurring in adjacent provinces. Most examples are isolated and limited in extent, with many occurrences existing as very narrow bands. Vegetation is herb-dominated, existing as patches in thin soils and rock crevices. Principal herbs include little bluestem (*Schizachyrium scoparium*), silky oatgrass (*Danthonia sericea*), poverty dropseed (*Sporobolus vaginiflorus*), small-head blazing-star (*Liatris microcephala*), creeping aster (*Eurybia surculosa*), orangegrass (*Hypericum gentianoides*), blue toadflax (*Nuttallanthus canadensis*), daisy-fleabane (*Erigeron strigosus*), prickly-pear (*Opuntia humifusa*), Menge's fameflower (*Phemeranthus mengesii*), and in some examples, Appalachian stitchwort (*Minuartia glabra*) and Cuthbert's onion (*Allium cuthbertii*). Fruticose lichens such as *Cladonia* spp. and *Cladina* ssp. are also common. In deeper soils of rock crevices and along the margins scattered shrubs and small trees occur, most notably Virginia pine (*Pinus virginiana*), fringetree (*Chionanthus virginicus*), and tree sparkleberry (*Vaccinium arboreum*).

Distribution: This community is restricted to the Cumberland Plateau and possibly adjacent provinces in Alabama, Kentucky, and Tennessee.

NatureServe Conservation Rank: G3

Dalea foliosa - Mecardonia acuminata - Mitreola petiolata Seep Grassland

Translated Name: Leafy Prairie-clover - Axil-flower - Lax Hornpod Seep Grassland

Common Name: Limestone Glade Streamside Meadow

Description: This herbaceous community is a zonal component of Central Basin cedar glades of Tennessee. It occupies small areas along ephemeral streams, where the vegetation is rooted in thin soil over limestone. Vegetation is characterized by axil-flower (*Mecardonia acuminata*), lax hornpod (*Mitreola petiolata*), brown-eyed Susan (*Rudbeckia triloba*), small-fruit seedbox (*Ludwigia microcarpa*), and the federally-listed leafy prairie-clover (*Dalea foliosa*), along with various graminoids and nonvascular plants. Sites are seasonally saturated, becoming drier during the heat of summer, when moisture primarily comes from rainstorm events.

Distribution: Central Basin of Tennessee.

NatureServe Conservation Rank: G2

Eleocharis (bifida, compressa) - Nothoscordum bivalve Seep Grassland

Translated Name: (Glades Spikerush, Flat-stem Spikerush) - Crow-poison Seep Grassland

Common Name: Kentucky Glade Seep

Description: This herbaceous community is a zonal component of limestone glade vegetation in Kentucky. Examples contain glade spikerush (*Eleocharis bifida*), flat-stem spikerush (*Eleocharis compressa*), false garlic (*Nothoscordum bivalve*), Butler's quillwort (*Isoetes butleri*), and yellow stargrass (*Hypoxis hirsuta*). This vegetation type is poorly known, occurring at a small scale. Similar examples occur in Alabama and Tennessee, but are distinguished by the presence of yellow sunnybells (*Schoenolirion croceum*).

Distribution: Kentucky

NatureServe Conservation Rank: G3Q

Eleocharis (bifida, compressa) - Schoenolirion croceum - Carex crawei - Allium cernuum Seep Grassland

Translated Name: (Glades Spikerush, Flat-stem Spikerush) - Yellow Sunnybell - Crawe's Sedge - Nodding Onion Seep Grassland

Common Name: Limestone Seep Glade

Description: This herbaceous seepage community is a zonal component known from the limestone cedar glades in the Central Basin of Tennessee and from the Moulton Valley in Alabama. The vegetation is herb-dominated, characterized by a prominence of glade spikerush (*Eleocharis bifida*), flat-stem spikerush (*Eleocharis compressa*), yellow sunnybells (*Schoenolirion croceum*), Crawe's sedge (*Carex crawei*), and nodding onion (*Allium cernuum*). Other diagnostic species include false garlic (*Nothoscordum bivalve*), Butler's quillwort (*Isoetes butleri*), and yellow stargrass (*Hypoxis hirsuta*). This vegetation type is supported by seasonal seepage of groundwater from unconfined aquifers during winter and spring, becoming dry and hardly discernible during the summer and fall.

Distribution: Central Basin of Tennessee and Moulton Valley in northwest Alabama.

NatureServe Conservation Rank: G2

Juniperus virginiana / Schizachyrium scoparium - (Andropogon gerardii, Sorghastrum nutans) - Silphium terebinthinaceum Wooded Grassland

Translated Name: Eastern Red-cedar / Little Bluestem - (Big Bluestem, Indiangrass) - Prairie Rosinweed Wooded Grassland

Common Name: Moulton & Tennessee Valley Limestone Hill Barrens

Description: This herb-dominated association is known from the Western Highland Rim in the Western Valley of the Tennessee River in Tennessee and Kentucky, and from limestone exposures in the Moulton Valley of Colbert and Franklin counties in northwestern Alabama. Two phases of this vegetation type have been identified. Areas presumably of deeper soil are dominated by big bluestem (*Andropogon gerardii*), Indiangrass (*Sorghastrum nutans*), and little bluestem (*Schizachyrium scoparium*). Other herbs typical of this phase include rough blazing-star (*Liatris aspera*), prairie dock (*Silphium terebinthinaceum*), whorled rosinweed (*Silphium trifoliatum var. latifolium*), and false boneset (*Brickellia eupatorioides*). This phase grades into areas of shallower soil with a sparser grass cover, comprised primarily of little bluestem. Also present in this more common little bluestem-dominated phase are cylindric blazing-star (*Liatris cylindracea*), false dragonhead (*Physostegia virginiana ssp. praemorsa*), hairy wild petunia (*Ruellia humilis*), annual poverty grasses (*Sporobolus* spp.), eastern silvery aster (*Symphyotrichum concolor*), Short's aster (*Symphyotrichum shortii*), and slender heliotrope (*Heliotropium tenellum*). Up to 50% of the ground surface in the drier phase may be covered by red or gray fossiliferous gravel in the Kentucky and Tennessee examples, or by shaly, "marly" limestone fragments in examples occurring in Alabama. This vegetation type is apparently restricted to very specific substrates in a limited range. The global range is estimated to be about 1500 square km (600 square miles), includes not more than 500 square km (200 square miles) in Tennessee and a similar area in Alabama. The complete range in Kentucky is unknown but is projected to be of similar size.

Distribution: Northwest Alabama, south-central Kentucky, central Tennessee, and potentially western Virginia.

NatureServe Conservation Rank: G2

Quercus muehlenbergii - Juniperus virginiana / Schizachyrium scoparium - Manfreda virginica Wooded Grassland

Translated Name: Chinquapin Oak - Eastern Red-cedar / Little Bluestem - False Aloe Wooded Grassland

Common Name: Central Limestone Glade

Description: This limestone glade or barrens community is widely distributed throughout the central and eastern United States, occurring on gentle to steep slopes of hills, knobs, ridges, bluffs along streams, and broad terraces. Aspect is variable, but is generally best developed on southern and western exposures in very shallow, well-drained substrates consisting of surficial exposures of either limestone, cherty limestone, dolomite, or calcareous shale. Soils are neutral to alkaline, shallow to moderately deep, and contain a homogenous mixture of rock fragments of various sizes. Herbaceous cover is very uneven, ranging from very dense in some areas to absent in others. Some dominant or characteristic grasses include little bluestem (*Schizachyrium scoparium*), Indiangrass (*Sorghastrum nutans*), three awn grasses (*Aristida* spp.), side-oats grama (*Bouteloua curtipendula*), and tall dropseed (*Sporobolus compositus*), with big bluestem (*Andropogon gerardii*) occurring in deeper soils. Tree canopy is often sparse with chinquapin oak (*Quercus muehlenbergii*), post oak (*Q. stellata*), and eastern red cedar (*Juniperus virginiana var. virginiana*) appearing most frequent. Other trees that may be present include redbud (*Cercis canadensis*), blue ash (*Fraxinus quadrangulata*), black oak (*Quercus velutina*), white oak (*Q. alba*), and blackjack oak (*Q. marilandica*). The subcanopy is absent or very sparse.

Distribution: Alabama, Georgia, Illinois, Indiana, Kentucky, Ohio, Tennessee, West Virginia, and Virginia.

NatureServe Conservation Rank: G2G3

Sporobolus (neglectus, vaginiflorus) - Aristida longispica - Panicum flexile - Panicum capillare Grassland

Translated Name: (Barrens Dropseed, Poverty Dropseed) - Slimspike Three-awn - Wiry Panicgrass - Witchgrass Grassland

Common Name: Limestone Annual Grass Glade

Description: This annual herbaceous community is a zonal component restricted to the limestone cedar glades of the Nashville Basin in Tennessee and Kentucky and the Moulton Valley in Alabama. The vegetation is largely a mixture of annual grasses and perennial forbs, with enormous seasonal variation in dominance. Examples are dominated by various grasses, most notably barrens dropseed (*Sporobolus neglectus*), poverty dropseed (*Sporobolus vaginiflorus*), and/or Ozark dropseed (*Sporobolus ozarkanus*). Some co-occurring forbs are the endemic or near-endemic Gattinger's prairie-clover (*Dalea gattingeri*) and southern scurfpea (*Pediomelum subacaule*), along with hogwort (*Croton capitatus*), narrowleaf gumweed (*Grindelia lanceolata*), narrowleaf summer bluet (*Hedyotis nigricans var. nigricans*), slender heliotrope (*Heliotropium tenellum*), false aloe (*Manfreda virginica*), and hairy wild petunia (*Ruellia humilis*). It may cover large parts of some glade sites. Succession is limited on the thin soils on which this type is found, so it is relatively stable. However, its overall coverage of the landscape is limited, and is threatened by development and land-use conversion in areas of rapidly increasing human population.

Distribution: Nashville Basin in central Tennessee and adjacent Kentucky, and the Moulton Valley in northwest Alabama.

NatureServe Conservation Rank: G3

Sporobolus vaginiflorus (var. ozarkanus, var. vaginiflorus) - Hypericum dolabriforme Grassland

Translated Name: (Ozark Dropseed, Poverty Dropseed) - Straggling St. John's-wort Grassland

Common Name: Southern Ridge and Valley Annual Grass Glade

Description: This association accommodates vegetation dominated by annual dropseed (*Sporobolus*) species for portions of the Cumberlands and Southern Ridge and Valley of

Georgia and possibly adjacent Tennessee. Stands are dominated by some combination of barrens dropseed (*Sporobolus neglectus*), poverty dropseed (*Sporobolus vaginiflorus*), and/or Ozark dropseed (*Sporobolus ozarkanus*). These are typically small-patch occurrences within limestone glade complexes and are located on thinner soils when compared to perennial grass-dominated glade vegetation.

Distribution: Northwest Georgia and possibly adjacent Tennessee.

NatureServe Conservation Rank: G2G3

Andropogon gerardii - (Andropogon glomeratus, Panicum virgatum, Sorghastrum nutans) Grassland

Translated Name: Big Bluestem - (Bushy Bluestem, Switchgrass, Indiangrass) Grassland

Common Name: Southeastern Highland Rim Barrens (Big Bluestem - Bushy Bluestem Wet-Mesic Type)

Description: This association covers wet-mesic to seasonally inundated perennial deep soil grasslands of the southeastern Highland Rim of Tennessee and possibly related areas of Kentucky. This vegetation is dominated by grasses, most notably bushy bluestem (*Andropogon glomeratus*), big bluestem (*Andropogon gerardii*), switchgrass (*Panicum virgatum*), Indiangrass (*Sorghastrum nutans*), and little bluestem (*Schizachyrium scoparium*), in patches of various combinations and percent covers depending on degree of wetness. Additional characteristic graminoid species include wand-like three-awn grass (*Aristida purpurascens var. virgata*), slender spikegrass (*Chasmanthium laxum*), forked panicgrass (*Dichanthelium dichotomum*), broom panicgrass (*Dichanthelium scoparium*), small-fruit spikerush (*Eleocharis microcarpa*), warty panicgrass (*Panicum verrucosum*), and clustered beakrush (*Rhynchospora glomerata*). Important non-graminoids include narrowleaf sunflower (*Helianthus angustifolius*), round-leaved thoroughwort (*Eupatorium rotundifolium*), round-head bushclover (*Lespedeza capitata),* groundnut (*Apios americana*), bushy aster (*Symphyotrichum dumosum*), glaucus greenbriar (*Smilax glauca*), sweet goldenrod (*Solidago odora*), rough-leaved goldenrod (*Solidago rugosa*), bracken fern (*Pteridium aquilinum*), and royal fern (*Osmunda regalis*). Also abundant are various mosses. This vegetation type has a very limited distribution and very few element occurrences, being restricted to a particular set of edaphic and hydrologic conditions in a limited geographic area.

Distribution: Highland Rim in Tennessee, potentially in Kentucky.

NatureServe Conservation Rank: G2

Schizachyrium scoparium - Andropogon gerardii - Silphium terebinthinaceum Coosa Valley Barren Grassland

Translated Name: Little Bluestem - Big Bluestem - Prairie Rosinweed Coosa Valley Barren Grassland

Common Name: Coosa Valley Wet Barrens

Description: This barrens vegetation occurs in the Coosa River valley of northwestern Georgia and northeastern Alabama. It represents the wetter end of a spectrum of small prairie-like openings in a mosaic of gently rolling terrain over a substrate of Conasauga Group geology, which includes calcareous shales and limestones. These small openings (generally less than 1 ha) are dominated by a mixture of perennial grasses and forbs, many of which are disjunct midwestern prairie species or narrowly distributed endemics adapted to the unique edaphic factors present at these sites. This mesic or wetter variant occurs in lower topographic situations over deep shrink-swell clays that are saturated for part of the year and dry and cracked like pavement during later portions of the growing season. Prairie-related grasses such as little bluestem (*Schizachyrium scoparium,* big bluestem (*Andropogon gerardii*), Indiangrass (*Sorghastrum nutans*), and switchgrass (*Panicum virgatum*) typically predominate along with prairie dock (*Silphium terebinthinaceum*). Prairie goldenrods such as stiff goldenrod (*Oligoneuron rigidum*)*,* prairie goldenrod (*Oligoneuron album*), and the remarkably disjunct Riddell's goldenrod (*Oligoneuron riddellii*) are also distinct components. This association is further characterized by the presence of narrow endemics such as whorled sunflower (*Helianthus verticillatus*) and Mohr's Barbara's-buttons (*Marshallia mohrii*), both federally listed species. Other characteristic herbaceous species found in this association include Virginia mountain-mint (*Pycnanthemum virginianum*)*,* mock bishopweed (*Ptilimnium costatum*)*,* small-fruit seedbox (*Ludwigia microcarpa*)*,* false dragonhead (*Physostegia virginiana*)*,* swamp thistle (*Cirsium muticum,* sneezeweed (*Helenium autumnale*)*,* marsh blazing-star (*Liatris spicata*)*,* nodding onion (*Allium cernuum*)*,* axil-flower (*Mecardonia acuminata*)*,* smooth blue aster (*Symphyotrichum concinnum*), and falling beakrush (*Rhynchospora caduca*). Very few examples remain of this once rather extensive community. Most of those that remain are highly degraded, because of agriculture, grazing, and fire exclusion.

Distribution: Northeast Alabama and northwest Georgia.

NatureServe Conservation Rank: G1

Andropogon gerardii - Panicum (anceps, virgatum) Grassland

Translated Name: Big Bluestem - (Beaked Panicgrass, Switchgrass) Grassland

Common Name: Southern Ridge and Valley Mesic Grassland

Description: These mesic deep-soil perennial grasslands of the southern Ridge and Valley of Tennessee are best developed along the margins of small streams and on lower, sheltered slopes. This vegetation is dominated by big bluestem (*Andropogon gerardii*)*,* switchgrass (*Panicum virgatum*), and beaked panicgrass (*Panicum anceps*), in patches of various combinations and percent covers depending on slope position. It also contains various panic grasses (*Dichanthelium* spp.) and a diverse assortment of forbs. Some examples are maintained by mechanical clearing of powerline rights-of-way. Poorly known, more information is needed on the detailed floristics of this type and its relation to similar vegetation in nearby ecoregions.

Distribution: Ridge and Valley physiographic province in Tennessee.

NatureServe Conservation Rank: G2?

Andropogon gerardii - Schizachyrium scoparium - (Calamagrostis coarctata, Panicum virgatum) Grassland

Translated Name: Big Bluestem - Little Bluestem - (Nuttall's Reedgrass, Switchgrass) Grassland

Common Name: Southeastern Highland Rim Barrens (Big Bluestem - Reedgrass Mesic Type)

Description: This association covers mesic perennial deep soil grasslands of the southeastern Highland Rim of Tennessee. The vegetation is dominated by big bluestem (*Andropogon gerardii*) and little bluestem (*Schizachyrium scoparium*), with a lesser prominence of other graminoid species including bushy bluestem (*Andropogon glomeratus*), Nuttall’s reedgrass (*Calamagrostis coarctata*), switchgrass (*Panicum virgatum*), Indiangrass (*Sorghastrum nutans*), and bracken fern (*Pteridium aquilinum*). Other dominants may include Tennessee aster (*Eurybia hemispherica*), bushy aster (*Symphyotrichum dumosum*), narrowleaf sunflower (*Helianthus angustifolius*), sweet goldenrod (*Solidago odora*), and rough-leaved goldenrod (*Solidago rugosa*); found to a lesser extent are wand-like three-awn grass (*Aristida purpurascens var. virgata*), slender spikegrass (*Chasmanthium laxum*), forked panicgrass (*Dichanthelium dichotomum*), beaked panicgrass (*Panicum anceps*), redtop panicgrass (*Panicum rigidulum*), and warty panicgrass (*Panicum verrucosum*). Woody vegetation is generally present and often includes red maple (*Acer rubrum*), winged sumac (*Rhus copallinum*), Florida blackberry (*Rubus argutus*), and glaucus greenbrier (*Smilax glauca*). This vegetation type has a very limited known range and very few element occurrences, being apparently confined to mesic deep soil perennial grassland habitats of the southeastern Highland Rim of Tennessee. This association is restricted to a particular set of edaphic and hydrologic conditions in a limited geographic area.

Distribution: Southeastern Highland Rim of Tennessee.

NatureServe Conservation Rank: G2

***Andropogon gerardii - Schizachyrium scoparium - Dichanthelium scoparium - Rhynchospora glomerata* Grassland**

Translated Name: Big Bluestem - Little Bluestem - Broom Witchgrass - Clustered Beaksedge Grassland

Common Name: Highland Rim Wet-Mesic Prairie

Description: This is a wet-mesic phase of prairies of the Eastern Highland Rim of south-central Tennessee with May Prairie in Coffee County, Tennessee, serving as the only remaining high-quality example of this vegetation type. This community is distinguished from most other prairie communities by its strong representation of a southern, Coastal Plain component in its flora, including various beakrushes (*Rhynchospora* spp.), panic grasses (*Dichanthelium* spp.), and others. Big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), broom panicgrass (*Dichanthelium scoparium*), and clustered beakrush (*Rhynchospora glomerata*) are dominant, accented with beakrushes and panicgrasses, in addition to blue coyote-thistle (*Eryngium integrifolium*), prairie rose (*Rosa setigera*), and low nutrush (*Scleria verticillata*). This prairie-like community is restricted to the barrens of Tennessee's southeastern Highland Rim, where it develops in shallow upland flats and depressions over loess where hardpans have formed in the soil. It occurs in a flat to gently sloping landscape that was probably affected by frequent fire, which would have carried through these shallow upland wetland depressions.

Distribution: Eastern Highland Rim of south-central Tennessee.

NatureServe Conservation Rank: G1

Schizachyrium scoparium - Andropogon (gyrans, ternarius, virginicus) Grassland

Translated Name: Little Bluestem - (Elliott's Bluestem, Splitbeard Bluestem, Broomsedge Bluestem) Grassland

Common Name: Little Bluestem - Bluestem Grassland

Description: This is a mixed-grass association that represents a variety of essentially native perennial grasslands which are (or have been) human-maintained to some extent and contain a variable mix of little bluestem (*Schizachyrium scoparium*) and various broomsedges (*Andropogon* spp). It may occur on annually mowed powerline rights-of-way, mowed successional or abandoned agricultural fields, pastures, etc. Examples are known from the Eastern and Western Highland Rim of Tennessee, related areas of Kentucky, as well as possibly Alabama. It is described and documented from the Cumberland Plateau and Interior Low Plateau, but it could range into the adjacent Upper East Gulf Coastal Plain. On the Western Highland Rim of middle Tennessee, these barrens occur on winter-wet, summer-dry loessal soils, which are generally deep, with chert fragments; rock outcrops are absent. The presence of this vegetation may be related to remnant surficial deposits of Cretaceous gravels which remain on some of the high flat ridges in this landscape. Characteristic forbs found in these examples include clasping milkweed (*Asclepias amplexicaulis*), linear-leaved aster (*Sericocarpus linifolius*), bastard toadflax (*Comandra umbellata*), white thoroughwort (*Eupatorium album*), late-flowering thoroughwort (*Eupatorium serotinum*), hairy bedstraw (*Galium pilosum*), purple disk sunflower (*Helianthus atrorubens*), ashy sunflower (*Helianthus mollis*), littleleaf sensitive-briar (*Mimosa microphylla*), wild bergamot (*Monarda fistulosa*), wild quinine (*Parthenium integrifolium*), slender mountain-mint (*Pycnanthemum tenuifolium*), black-eyed Susan (*Rudbeckia hirta*), rose-pink (*Sabatia angularis*), and goat's-rue (*Tephrosia virginiana*). This perennial grassland type may have been distributed widely in the Cumberland Plateau, Interior Low Plateau and adjacent Upper East Gulf Coastal Plain at one time, but its frequency of occurrence has declined. The combination of fire exclusion and changing agricultural patterns with more recent land conversion from agriculture to either forestry or suburban development has altered or destroyed many sites. Even though there are very few examples remaining, this may not reflect its true distribution or rarity. Some of the sites where this vegetation type is found have particular soil characteristics (hardpans, surficial gravels) which have promoted its persistence. While moderately restricted in environmental preferences, this perennial grassland type requires management (fire and/or mowing) for its maintenance. Existing examples are representative of a savanna-woodland mosaic that existed in parts of the southern Interior Low Plateau (and possibly adjacent Upper East Gulf Coastal Plain) before and shortly after settlement.

Distribution: Kentucky, Tennessee, and possibly Alabama.

NatureServe Conservation Rank: G3

Schizachyrium scoparium - (Helianthus mollis, Helianthus occidentalis, Silphium trifoliatum) Grassland

Translated Name: Little Bluestem - (Ashy Sunflower, Fewleaf Sunflower, Whorled Rosinweed) Grassland

Common Name: Kentucky-Tennessee Big Barrens

Description: This open, prairie-like community of the northern Highland Rim of Tennessee and adjacent Kentucky is dominated by grasses and forbs with scattered shrubby vegetation and occasionally small trees. Little bluestem (*Schizachyrium scoparium*) is a strong dominant with some Indiangrass (*Sorghastrum nutans*) present, typically occurring as secondary importance. Other herbaceous components may include big bluestem (*Andropogon gerardii*), Elliott's beardgrass (*Andropogon gyrans*), silver bluestem (*Andropogon ternarius*), round-headed bushclover (*Lespedeza capitata*), slender bushclover (*Lespedeza virginica*), New England aster (*Symphyotrichum novae-angliae*), linear-leaved aster (*Sericocarpus linifolius*), whorled tickseed (*Coreopsis major*), tall tickseed (*Coreopsis tripteris*), narrowleaf sunflower (*Helianthus angustifolius*), hairy sunflower (*Helianthus hirsutus*), early goldenrod (*Solidago juncea*), slender mountain-mint (*Pycnanthemum tenuifolium*), and downy lobelia (*Lobelia puberula*). Sweet coneflower (*Rudbeckia subtomentosa*), barbed rattlesnake-root (*Nabalus barbata*), and eared false-foxglove (*Agalinis auriculata*) are rare plants found in some examples. Typical woody species include southern red oak (*Quercus falcata*), shingle oak (*Quercus imbricaria*), flowering dogwood (*Cornus florida*), redbud (*Cercis Canadensis*), Chickasaw plum (*Prunus angustifolia*), winged sumac (*Rhus copallinum*), Carolina rose (*Rosa carolina*), and coralberry (*Symphoricarpos orbiculatus*). This prairie-like association is restricted to the flat landforms of the 'Kentucky Barrens' of the northern Highland Rim of Tennessee and adjacent Kentucky. These soils potentially support forests (in the absence of fire), and succession has eliminated most, if not all, examples except for those on Fort Campbell, where ecological burning and fires from live-fire munitions use result in open herbaceous-dominated landscapes. Fire was presumably an important factor in maintaining this community; in the absence of fire, this vegetation would convert to forest.

Distribution: Highland Rim in Tennessee and adjacent Kentucky.

NatureServe Conservation Rank: G2

Schizachyrium scoparium - Sorghastrum nutans - Silphium spp. Grassland

Translated Name: Little Bluestem - Indiangrass - Rosinweed species Grassland

Common Name: Southern Ridge and Valley Dry-Mesic Grassland
Description: A mesic to dry-mesic perennial grassland type of the southern Ridge and Valley of Tennessee, this natural community is dominated by little bluestem (*Schizachyrium scoparium*) and Indiangrass (*Sorghastrum nutans*) in patches of various combinations and percent covers depending on slope position. The community also contains various broomsedges (*Andropogon* spp.), panicgrasses (*Dichanthelium* spp.), and a rich diversity of forbs that attain their best development on mid to lower slopes where soils are deep enough to support perennial grasses. Prairie dock (*Silphium terebinthinaceum*) can be a prominent component of this vegetation type; other representative taxa include straggling St. John's-wort (*Hypericum dolabriforme*), false aloe (*Manfreda virginica*), starry rosinweed (*Silphium asteriscus*), and whorled rosinweed (*Silphium trifoliatum*). Some examples of this vegetation type are partially maintained by mechanical clearing of powerline rights-of-way. Under conditions of fire suppression, eastern red cedar (*Juniperus virginiana*) may invade examples forming dense stands, gradually eliminating the herbaceous component.

Distribution: Southern Ridge and Valley physiographic province in Tennessee.

NatureServe Conservation Rank: G2

***Schizachyrium scoparium - Sorghastrum nutans - Dalea candida - Liatris squarrosa - (Silphium terebinthinaceum)* Black Belt Grassland**

Translated Name: Little Bluestem - Indiangrass - White Prairie-clover - Scaly Blazingstar - (Prairie Dock) Black Belt Grassland

Common Name: Black Belt Prairie

Description: This herbaceous association includes tallgrass prairies in the Black Belt of Alabama, Mississippi, and southern Tennessee (McNairy County), with outlying occurrences southwards in the Chunnenuggee Hills, Red Hills, and Lime Hills of southern Alabama. This community occurs on calcareous soils of the Sumter and Binnsville series, described as beds of marly clay over Selma Chalk. In Alabama, the formations on which this system primarily occurs are the Demopolis Chalk and the Mooreville Chalk; in Tennessee, only the Demopolis chalk is mapped. This prairie association is dominated by little bluestem (*Schizachyrium scoparium*), Indiangrass (*Sorghastrum nutans*), Virginia broomsedge (*Andropogon virginicus*), side-oats grama (*Bouteloua curtipendula*), and switchgrass (*Panicum virgatum*), with lesser amounts of brushy bluestem (*Andropogon glomeratus*), Florida paspalum (*Paspalum floridanum*), bristly foxtail (*Setaria parviflora*), and occasionally big bluestem (*Andropogon gerardii*). Eastern red cedar (*Juniperus virginiana var. virginiana*) is a ubiquitous woody component, having invaded examples as a result of fire exclusion. Moist, seepy inclusions within this herbaceous matrix are often dominated by narrowleaf whitetop sedge (*Rhynchospora colorata*), spreading beakrush (*Rhynchospora divergens*), low nutrush (*Scleria verticillata*), and winged loosestrife (*Lythrum alatum var. lanceolatum*).

Distribution: Central Alabama, northeast Mississippi, and McNairy County, Tennessee.

NatureServe Conservation Rank: G1

***Schizachyrium scoparium - Sorghastrum nutans - Dalea purpurea - Silphium integrifolium* Jackson Prairie Grassland**

Translated Name: Little Bluestem - Indiangrass - Purple Prairie-clover - Wholeleaf Rosinweed Jackson Prairie Grassland

Common Name: Jackson Prairie Calcareous Clay Prairie

Description: This association includes remnants of prairie vegetation in the Jackson Prairie region of the upper Coastal Plain of Mississippi and adjacent Alabama. Examples occur on calcareous clay islands consisting of gently sloping uplands surrounded by pine-hardwood forests on acidic soils. The most prominent tall grasses of this association are big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), Indiangrass (*Sorghastrum nutans*), and switchgrass (*Panicum virgatum*). Additional tall grasses occurring in lesser abundance are eastern gamagrass (*Tripsacum dactyloides*), bushy bluestem (*Andropogon glomeratus*), and Florida paspalum (*Paspalum floridanum*). This community type has an extremely limited natural range and was likely historically rare, becoming considerably more so today through detrimental land use.

Distribution: Coastal Plain of Mississippi and Alabama.

NatureServe Conservation Rank: G1

Appendix J – List of Threatened and Endangered Species and Critical Habitat

USFWS Information for Planning and Consultation (IPaC) Data

IPaC Information for Planning and Consultation **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Project information

NAME

Tennessee Valley Authority ROW Vegetation Maintenance

LOCATION

Alabama, Georgia, Kentucky, Mississippi, North Carolina, Tennessee and Virginia

DESCRIPTION

Programmatic
consultation addressing TVA Transmission Right of Way (ROW) Vegetation
Management across the seven state TVA Power Service Area (PSA)

Local offices

Alabama Ecological Services Field Office

(251) 441-5181
(251) 441-6222

1208 B Main Street
Daphne, AL 36526-4419

Asheville Ecological Services Field Office

(828) 258-3939
(828) 258-5330

160 Zillicoa Street
Asheville, NC 28801-1082

http://www.fws.gov/nc-es/es/countyfr.html

Georgia Ecological Services Field Office

(706) 613-9493
(706) 613-6059

105 Westpark Drive
Westpark Center Suite D
Athens, GA 30606-3175

Kentucky Ecological Services Field Office

(502) 695-0468
(502) 695-1024

J C Watts Federal Building, Room 265
330 West Broadway
Frankfort, KY 40601-8670

http://www.fws.gov/frankfort/

Mississippi Ecological Services Field Office

(601) 965-4900
(601) 965-4340

6578 Dogwood View Parkway, Suite A
Jackson, MS 39213-7856

http://www.fws.gov/mississippiES/endsp.html

Tennessee Ecological Services Field Office

(931) 528-6481
(931) 528-7075

446 Neal Street
Cookeville, TN 38501-4027

Virginia Ecological Services Field Office

(804) 693-6694
(804) 693-9032

6669 Short Lane
Gloucester, VA 23061-4410

http://www.fws.gov/northeast/virginiafield/

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Log in to IPaC.
2. Go to your My Projects list.
3. Click PROJECT HOME for this project.
4. Click REQUEST SPECIES LIST.

Listed species

[1] are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Carolina Northern Flying Squirrel Glaucomys sabrinus coloratus No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/2657	Endangered
Gray Bat Myotis grisescens No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6329	Endangered

Indiana Bat Myotis sodalis There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/5949	Endangered
Northern Long-eared Bat Myotis septentrionalis No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9045	Threatened
Virginia Big-eared Bat Corynorhinus (=Plecotus) townsendii virginianus There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/8369	Endangered

Birds

NAME	STATUS
Least Tern Sterna antillarum No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/8505	Endangered
Red-cockaded Woodpecker Picoides borealis No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/7614	Endangered
Wood Stork Mycteria americana No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/8477	Threatened

Reptiles

NAME	STATUS
Bog Turtle Clemmys muhlenbergii No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6962	SAT
Flattened Musk Turtle Sternotherus depressus No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6961	Threatened

Ringed Map Turtle Graptemys oculifera — Threatened

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/2664

Yellow-blotched Map Turtle Graptemys flavimaculata — Threatened

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/7730

Amphibians

NAME	STATUS
Black Warrior (=sipsey Fork) Waterdog Necturus alabamensis There is **proposed** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/5426	Proposed Endangered

Fishes

NAME	STATUS
Alabama Cavefish Speoplatyrhinus poulsoni There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/50	Endangered
Amber Darter Percina antesella There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/53	Endangered
Atlantic Sturgeon (gulf Subspecies) Acipenser oxyrinchus (=oxyrhynchus) desotoi There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/651	Threatened
Bayou Darter Etheostoma rubrum No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/5864	Threatened
Blackside Dace Phoxinus cumberlandensis No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4775	Threatened

Blue Shiner Cyprinella caerulea | Threatened

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/463

Bluemask Darter Etheostoma akatulo | Endangered

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/3969

Boulder Darter Etheostoma wapiti | Endangered

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/5398

Boulder Darter Etheostoma wapiti | EXPN

Shoal Creek

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/5398

Cahaba Shiner Notropis cahabae | Endangered

There is **proposed** critical habitat for this species. The location of the critical habitat is not available.

https://ecos.fws.gov/ecp/species/650

Cherokee Darter Etheostoma scotti | Threatened

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/2553

Chucky Madtom Noturus crypticus | Endangered

There is **final** critical habitat for this species. Your location overlaps the critical habitat.

https://ecos.fws.gov/ecp/species/7735

Conasauga Logperch Percina jenkinsi | Endangered

There is **final** critical habitat for this species. Your location overlaps the critical habitat.

https://ecos.fws.gov/ecp/species/8472

Cumberland Darter Etheostoma susanae | Endangered

There is **final** critical habitat for this species. The location of the critical habitat is not available.

https://ecos.fws.gov/ecp/species/1011

Duskytail Darter Etheostoma percnurum | EXPN

U.S.A. (TN - specified portions of the French Broad and Holston Rivers; see 17.84(q)(1)(ii))

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/891

Duskytail Darter Etheostoma percnurum | Endangered

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/891

Etowah Darter Etheostoma etowahae | Endangered

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/4123

Goldline Darter Percina aurolineata | Threatened

There is **proposed** critical habitat for this species. The location of the critical habitat is not available.

https://ecos.fws.gov/ecp/species/7005

Kentucky Arrow Darter Etheostoma spilotum | Threatened

There is **final** critical habitat for this species. Your location is outside the critical habitat.

https://ecos.fws.gov/ecp/species/9063

Laurel Dace Chrosomus saylori | Endangered

There is **final** critical habitat for this species. Your location overlaps the critical habitat.

https://ecos.fws.gov/ecp/species/1194

Palezone Shiner Notropis albizonatus | Endangered

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/6064

Pallid Sturgeon Scaphirhynchus albus | Endangered

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/7162

Pearl Darter Percina aurora | Threatened

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/3970

Pygmy Madtom Noturus stanauli — Endangered

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/7873

Pygmy Madtom Noturus stanauli — EXPN

U.S.A. (TN - specified portions of the French Broad and Holston Rivers; see 17.84(t)(1)(i))

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/7873

Pygmy Sculpin Cottus paulus (=pygmaeus) — Threatened

There is **proposed** critical habitat for this species. The location of the critical habitat is not available.

https://ecos.fws.gov/ecp/species/5631

Relict Darter Etheostoma chienense — Endangered

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/1979

Rush Darter Etheostoma phytophilum — Endangered

There is **final** critical habitat for this species. Your location overlaps the critical habitat.

https://ecos.fws.gov/ecp/species/2779

Slackwater Darter Etheostoma boschungi — Threatened

There is **final** critical habitat for this species. Your location overlaps the critical habitat.

https://ecos.fws.gov/ecp/species/8058

Slender Chub Erimystax cahni — Threatened

There is **final** critical habitat for this species. Your location overlaps the critical habitat.

https://ecos.fws.gov/ecp/species/6637

Snail Darter Percina tanasi — Threatened

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/5603

Spotfin Chub Erimonax monachus — Threatened

Wherever found, except where listed as an experimental population

There is **final** critical habitat for this species. Your location overlaps the critical habitat.

https://ecos.fws.gov/ecp/species/1521

Spotfin Chub Erimonax monachus | EXPN

U.S.A. (AL, TN-specified portions of Shoal Creek; see 17.84(m)(1)(ii))

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/1521

Spotfin Chub Erimonax monachus | EXPN

U.S.A. (TN-specified portions of the French Broad and Holston Rivers; see 17.84(m)(1)(iii))

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/1521

Spring Pygmy Sunfish Elassoma alabamae | Threatened

There is **proposed** critical habitat for this species. The location of the critical habitat is not available.

https://ecos.fws.gov/ecp/species/652

Trispot Darter Etheostoma trisella | Proposed Threatened

There is **proposed** critical habitat for this species. The location of the critical habitat is not available.

https://ecos.fws.gov/ecp/species/8219

Vermilion Darter Etheostoma chermocki | Endangered

There is **final** critical habitat for this species. Your location overlaps the critical habitat.

https://ecos.fws.gov/ecp/species/296

Watercress Darter Etheostoma nuchale | Endangered

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/1838

Yellowfin Madtom Noturus flavipinnis | Threatened

Wherever found, except where listed as an experimental population

There is **final** critical habitat for this species. Your location overlaps the critical habitat.

https://ecos.fws.gov/ecp/species/8565

Yellowfin Madtom Noturus flavipinnis | EXPN

U.S.A. (TN, VA-specified portions of the Holston River and watershed; see 17.84(e)(1)(i))

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/8565

Clams

NAME	STATUS
Alabama (=inflated) Heelsplitter Potamilus inflatus No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/7286	Threatened
Alabama Lampmussel Lampsilis virescens No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/916	Endangered
Alabama Moccasinshell Medionidus acutissimus There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/7287	Threatened
Appalachian Elktoe Alasmidonta raveneliana There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/5039	Endangered
Appalachian Monkeyface (pearlymussel) Quadrula sparsa USA (TN - specified portions of the French Broad and Holston Rivers; see 17.85(b)(1)) No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/7154	EXPN
Appalachian Monkeyface (pearlymussel) Quadrula sparsa No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/7154	Endangered
Birdwing Pearlymussel Lemiox rimosus No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6636	Endangered
Black Clubshell Pleurobema curtum No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/5429	Endangered
Clubshell Pleurobema clava No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/3789	Endangered

Coosa Moccasinshell Medionidus parvulus — Endangered

There is **final** critical habitat for this species. Your location overlaps the critical habitat.

https://ecos.fws.gov/ecp/species/2575

Cracking Pearlymussel Hemistena lata — EXPN

U.S.A. (TN - specified portions of the French Broad and Holston Rivers; see 17.85(b)(1))

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/4130

Cracking Pearlymussel Hemistena lata — Endangered

Wherever found; Except where listed as Experimental Populations

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/4130

Cumberland Bean (pearlymussel) Villosa trabalis — Endangered

Wherever found; Except where listed as Experimental Populations

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/6061

Cumberland Bean (pearlymussel) Villosa trabalis — EXPN

U.S.A. (TN - specified portions of the French Broad and Holston Rivers; see 17.85(b)(1))

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/6061

Cumberland Elktoe Alasmidonta atropurpurea — Endangered

There is **final** critical habitat for this species. Your location overlaps the critical habitat.

https://ecos.fws.gov/ecp/species/1248

Cumberland Monkeyface (pearlymussel) Quadrula intermedia — Endangered

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/6999

Cumberland Pigtoe Pleurobema gibberum — Endangered

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/1981

Cumberlandian Combshell Epioblasma brevidens EXPN
U.S.A. (TN - specified portions of the French Broad and Holston Rivers; see 17.85(b)(1))
No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/3119

Cumberlandian Combshell Epioblasma brevidens Endangered
Wherever found; Except where listed as Experimental Populations
There is **final** critical habitat for this species. Your location overlaps the critical habitat.

https://ecos.fws.gov/ecp/species/3119

Dark Pigtoe Pleurobema furvum Endangered
There is **final** critical habitat for this species. Your location overlaps the critical habitat.

https://ecos.fws.gov/ecp/species/1519

Dromedary Pearlymussel Dromus dromas Endangered
Wherever found; Except where listed as Experimental Populations
No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/6377

Dromedary Pearlymussel Dromus dromas EXPN
U.S.A. (TN - specified portions of the French Broad and Holston Rivers; see 17.85(b)(1))
No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/6377

Fanshell Cyprogenia stegaria Endangered
No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/4822

Fanshell Cyprogenia stegaria EXPN
U.S.A. (TN - specified portions of the French Broad and Holston Rivers; see 17.85(b)(1))
No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/4822

Fat Pocketbook Potamilus capax Endangered
No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/2780

Finelined Pocketbook Lampsilis altilis There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/1393	Threatened
Finerayed Pigtoe Fusconaia cuneolus Wherever found; Except where listed as Experimental Populations No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/3038	Endangered
Finerayed Pigtoe Fusconaia cuneolus U.S.A. (TN - specified portions of the French Broad and Holston Rivers; see 17.85(b)(1)) No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/3038	EXPN
Fluted Kidneyshell Ptychobranchus subtentum There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/1397	Endangered
Georgia Pigtoe Pleurobema hanleyianum There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/6494	Endangered
Green Blossom (pearlymussel) Epioblasma torulosa gubernaculum No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/2098	Endangered
Heavy Pigtoe Pleurobema taitianum No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/298	Endangered
Littlewing Pearlymussel Pegias fabula No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/2572	Endangered
Northern Riffleshell Epioblasma torulosa rangiana No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/527	Endangered

Orangefoot Pimpleback (pearlymussel) Plethobasus cooperianus Endangered

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/1132

Orangefoot Pimpleback (pearlymussel) Plethobasus cooperianus EXPN

U.S.A. (TN - specified portions of the French Broad and Holston Rivers; see 17.85(b)(1))

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/1132

Orangenacre Mucket Lampsilis perovalis Threatened

There is **final** critical habitat for this species. Your location overlaps the critical habitat.

https://ecos.fws.gov/ecp/species/1980

Ovate Clubshell Pleurobema perovatum Endangered

There is **final** critical habitat for this species. Your location overlaps the critical habitat.

https://ecos.fws.gov/ecp/species/5430

Oyster Mussel Epioblasma capsaeformis Endangered

Wherever found; Except where listed as Experimental Populations

There is **final** critical habitat for this species. Your location overlaps the critical habitat.

https://ecos.fws.gov/ecp/species/2099

Oyster Mussel Epioblasma capsaeformis EXPN

U.S.A. (TN - specified portions of the French Broad and Holston Rivers; see 17.85(b)(1))

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/2099

Pale Lilliput (pearlymussel) Toxolasma cylindrellus Endangered

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/3118

Pink Mucket (pearlymussel) Lampsilis abrupta Endangered

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/7829

Purple Bean Villosa perpurpurea | Endangered

There is **final** critical habitat for this species. Your location overlaps the critical habitat.

https://ecos.fws.gov/ecp/species/4125

Purple Cat's Paw (=purple Cat's Paw Pearlymussel) Epioblasma obliquata obliquata | Endangered

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/5602

Rabbitsfoot Quadrula cylindrica cylindrica | Threatened

There is **final** critical habitat for this species. Your location overlaps the critical habitat.

https://ecos.fws.gov/ecp/species/5165

Rayed Bean Villosa fabalis | Endangered

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/5862

Ring Pink (mussel) Obovaria retusa | EXPN

U.S.A. (TN - specified portions of the French Broad and Holston Rivers; see 17.85(b)(1))

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/4128

Ring Pink (mussel) Obovaria retusa | Endangered

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/4128

Rough Pigtoe Pleurobema plenum | Endangered

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/6894

Rough Pigtoe Pleurobema plenum | EXPN

U.S.A. (TN - specified portions of the French Broad and Holston Rivers; see 17.85(b)(1))

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/6894

Rough Rabbitsfoot Quadrula cylindrica strigillata | Endangered

There is **final** critical habitat for this species. Your location overlaps the critical habitat.

https://ecos.fws.gov/ecp/species/5629

Sheepnose Mussel Plethobasus cyphyus Endangered

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/6903

Shiny Pigtoe Fusconaia cor EXPN

U.S.A. (TN - specified portions of the French Broad and Holston Rivers; see 17.85(b)(1))

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/2573

Shiny Pigtoe Fusconaia cor Endangered

Wherever found; Except where listed as Experimental Populations

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/2573

Slabside Pearlymussel Pleuronaia dolabelloides Endangered

There is **final** critical habitat for this species. Your location overlaps the critical habitat.

https://ecos.fws.gov/ecp/species/1518

Snuffbox Mussel Epioblasma triquetra Endangered

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/4135

Southern Acornshell Epioblasma othcaloogensis Endangered

There is **final** critical habitat for this species. Your location overlaps the critical habitat.

https://ecos.fws.gov/ecp/species/8469

Southern Clubshell Pleurobema decisum Endangered

There is **final** critical habitat for this species. Your location overlaps the critical habitat.

https://ecos.fws.gov/ecp/species/6113

Southern Combshell Epioblasma penita Endangered

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/7285

Southern Pigtoe Pleurobema georgianum Endangered

There is **final** critical habitat for this species. Your location overlaps the critical habitat.

https://ecos.fws.gov/ecp/species/1520

Spectaclecase (mussel) Cumberlandia monodonta — Endangered

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/7867

Tan Riffleshell Epioblasma florentina walkeri (=E. walkeri) — Endangered

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/1247

Triangular Kidneyshell Ptychobranchus greenii — Endangered

There is **final** critical habitat for this species. Your location overlaps the critical habitat.

https://ecos.fws.gov/ecp/species/4396

Tubercled Blossom (pearlymussel) Epioblasma torulosa torulosa — Endangered

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/4126

Turgid Blossom (pearlymussel) Epioblasma turgidula — Endangered

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/7659

Upland Combshell Epioblasma metastriata — Endangered

There is **final** critical habitat for this species. Your location overlaps the critical habitat.

https://ecos.fws.gov/ecp/species/317

White Wartyback (pearlymussel) Plethobasus cicatricosus — EXPN

U.S.A. (TN - specified portions of the French Broad and Holston Rivers; see 17.85(b)(1))

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/2549

White Wartyback (pearlymussel) Plethobasus cicatricosus — Endangered

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/2549

Snails

NAME	STATUS
Anthony's Riversnail Athearnia anthonyi U.S.A. (TN - specified portions of the French Broad and Holston Rivers; see 17.85(b)(1)) No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4827	EXPN
Anthony's Riversnail Athearnia anthonyi Wherever found; Except where listed as Experimental Populations No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4827	Endangered
Armored Snail Pyrgulopsis (=Marstonia) pachyta No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/3972	Endangered
Cylindrical Lioplax (snail) Lioplax cyclostomaformis No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/2337	Endangered
Flat Pebblesnail Lepyrium showalteri No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/2338	Endangered
Interrupted (=georgia) Rocksnail Leptoxis foremani There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/7019	Endangered
Noonday Snail Mesodon clarki nantahala No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/322	Threatened
Painted Rocksnail Leptoxis taeniata No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/2999	Threatened
Painted Snake Coiled Forest Snail Anguispira picta No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/7835	Threatened

Plicate Rocksnail Leptoxis plicata — Endangered
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/5614

Round Rocksnail Leptoxis ampla — Threatened
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/470

Royal Marstonia (snail) Pyrgulopsis ogmorhaphe — Endangered
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/7836

Slender Campeloma Campeloma decampi — Endangered
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/7009

Insects

NAME	STATUS
Mitchell's Satyr Butterfly Neonympha mitchellii mitchellii No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/8062	Endangered
Rattlesnake-master Borer Moth Papaipema eryngii No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/7863	Candidate

Arachnids

NAME	STATUS
Spruce-fir Moss Spider Microhexura montivaga There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/4801	Endangered

Crustaceans

NAME	STATUS
Alabama Cave Shrimp Palaemonias alabamae No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/5307	Endangered

Kentucky Cave Shrimp Palaemonias ganteri There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/5008	Endangered
Lee County Cave Isopod Lirceus usdagalun No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1550	Endangered
Nashville Crayfish Orconectes shoupi No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/7181	Endangered

Flowering Plants

NAME	STATUS
Alabama Leather Flower Clematis socialis No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6300	Endangered
Blue Ridge Goldenrod Solidago spithamaea No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/5821	Threatened
Braun's Rock-cress Arabis perstellata There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/4704	Endangered
Cumberland Rosemary Conradina verticillata No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/3677	Threatened
Cumberland Sandwort Arenaria cumberlandensis No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/2514	Endangered
Dwarf-flowered Heartleaf Hexastylis naniflora No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/2458	Threatened

Fleshy-fruit Gladecress Leavenworthia crassa — Endangered
There is **final** critical habitat for this species. Your location overlaps the critical habitat.

https://ecos.fws.gov/ecp/species/1435

Gentian Pinkroot Spigelia gentianoides — Endangered
No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/4583

Georgia Rockcress Arabis georgiana — Threatened
There is **final** critical habitat for this species. Your location overlaps the critical habitat.

https://ecos.fws.gov/ecp/species/4535

Green Pitcher-plant Sarracenia oreophila — Endangered
No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/2896

Guthrie's (=pyne's) Ground-plum Astragalus bibullatus — Endangered
No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/1739

Harperella Ptilimnium nodosum — Endangered
No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/3739

Heller's Blazingstar Liatris helleri — Threatened
No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/5962

Kral's Water-plantain Sagittaria secundifolia — Threatened
No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/8235

Large-flowered Skullcap Scutellaria montana — Threatened
No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/4721

Leafy Prairie-clover Dalea foliosa — Endangered
No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/5498

Lyrate Bladderpod Lesquerella lyrata — Threatened

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/4654

Michaux's Sumac Rhus michauxii — Endangered

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/5217

Mohr's Barbara's Buttons Marshallia mohrii — Threatened

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/7610

Morefield's Leather Flower Clematis morefieldii — Endangered

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/133

Mountain Golden Heather Hudsonia montana — Threatened

There is **final** critical habitat for this species. Your location overlaps the critical habitat.

https://ecos.fws.gov/ecp/species/131

Pondberry Lindera melissifolia — Endangered

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/1279

Price's Potato-bean Apios priceana — Threatened

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/7422

Roan Mountain Bluet Hedyotis purpurea var. montana — Endangered

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/1087

Ruth's Golden Aster Pityopsis ruthii — Endangered

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/105

Short's Bladderpod Physaria globosa — Endangered

There is **final** critical habitat for this species. Your location overlaps the critical habitat.

https://ecos.fws.gov/ecp/species/7206

Small Whorled Pogonia Isotria medeoloides | Threatened
No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/1890

Smooth Coneflower Echinacea laevigata | Endangered
No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/3473

Spreading Avens Geum radiatum | Endangered
No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/6854

Spring Creek Bladderpod Lesquerella perforata | Endangered
No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/2012

Swamp Pink Helonias bullata | Threatened
No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/4333

Tennessee Yellow-eyed Grass Xyris tennesseensis | Endangered
No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/6010

Virginia Spiraea Spiraea virginiana | Threatened
No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/1728

White Fringeless Orchid Platanthera integrilabia | Threatened
No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/1889

White Irisette Sisyrinchium dichotomum | Endangered
No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/8097

Whorled Sunflower Helianthus verticillatus | Endangered
There is **final** critical habitat for this species. Your location overlaps the critical habitat.

https://ecos.fws.gov/ecp/species/3375

Ferns and Allies

NAME	STATUS
Alabama Streak-sorus Fern *Thelypteris pilosa var. alabamensis* No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/3604	Threatened
American Hart's-tongue Fern *Asplenium scolopendrium var. americanum* No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4232	Threatened

Lichens

NAME	STATUS
Rock Gnome Lichen *Gymnoderma lineare* No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/3933	Endangered

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

This location overlaps the critical habitat for the following species:

NAME	TYPE
Alabama Cavefish *Speoplatyrhinus poulsoni* https://ecos.fws.gov/ecp/species/50#crithab	Final
Alabama Moccasinshell *Medionidus acutissimus* https://ecos.fws.gov/ecp/species/7287#crithab	Final
Amber Darter *Percina antesella* https://ecos.fws.gov/ecp/species/53#crithab	Final
Appalachian Elktoe *Alasmidonta raveneliana* https://ecos.fws.gov/ecp/species/5039#crithab	Final
Black Warrior (=sipsey Fork) Waterdog *Necturus alabamensis* https://ecos.fws.gov/ecp/species/5426#crithab	Proposed
Braun's Rock-cress *Arabis perstellata* https://ecos.fws.gov/ecp/species/4704#crithab	Final

Chucky Madtom Noturus crypticus https://ecos.fws.gov/ecp/species/7735#crithab	Final
Conasauga Logperch Percina jenkinsi https://ecos.fws.gov/ecp/species/8472#crithab	Final
Coosa Moccasinshell Medionidus parvulus https://ecos.fws.gov/ecp/species/2575#crithab	Final
Cumberland Elktoe Alasmidonta atropurpurea https://ecos.fws.gov/ecp/species/1248#crithab	Final
Cumberlandian Combshell Epioblasma brevidens https://ecos.fws.gov/ecp/species/3119#crithab	Final
Dark Pigtoe Pleurobema furvum https://ecos.fws.gov/ecp/species/1519#crithab	Final
Diamond Darter Crystallaria cincotta For information on why this critical habitat appears for your project, even though Diamond Darter is not on the list of potentially affected species at this location, contact the local field office. https://ecos.fws.gov/ecp/species/6921#crithab	Final
Finelined Pocketbook Lampsilis altilis https://ecos.fws.gov/ecp/species/1393#crithab	Final
Fleshy-fruit Gladecress Leavenworthia crassa https://ecos.fws.gov/ecp/species/1435#crithab	Final
Fluted Kidneyshell Ptychobranchus subtentum https://ecos.fws.gov/ecp/species/1397#crithab	Final
Georgia Pigtoe Pleurobema hanleyianum https://ecos.fws.gov/ecp/species/6494#crithab	Final
Georgia Rockcress Arabis georgiana https://ecos.fws.gov/ecp/species/4535#crithab	Final
Indiana Bat Myotis sodalis https://ecos.fws.gov/ecp/species/5949#crithab	Final
Interrupted (=georgia) Rocksnail Leptoxis foremani https://ecos.fws.gov/ecp/species/7019#crithab	Final

Kentucky Cave Shrimp Palaemonias ganteri Final
https://ecos.fws.gov/ecp/species/5008#crithab

Laurel Dace Chrosomus saylori Final
https://ecos.fws.gov/ecp/species/1194#crithab

Mountain Golden Heather Hudsonia montana Final
https://ecos.fws.gov/ecp/species/131#crithab

Orangenacre Mucket Lampsilis perovalis Final
https://ecos.fws.gov/ecp/species/1980#crithab

Ovate Clubshell Pleurobema perovatum Final
https://ecos.fws.gov/ecp/species/5430#crithab

Oyster Mussel Epioblasma capsaeformis Final
https://ecos.fws.gov/ecp/species/2099#crithab

Purple Bean Villosa perpurpurea Final
https://ecos.fws.gov/ecp/species/4125#crithab

Rabbitsfoot Quadrula cylindrica cylindrica Final
https://ecos.fws.gov/ecp/species/5165#crithab

Rough Rabbitsfoot Quadrula cylindrica strigillata Final
https://ecos.fws.gov/ecp/species/5629#crithab

Rush Darter Etheostoma phytophilum Final
https://ecos.fws.gov/ecp/species/2779#crithab

Short's Bladderpod Physaria globosa Final
https://ecos.fws.gov/ecp/species/7206#crithab

Slabside Pearlymussel Pleuronaia dolabelloides Final
https://ecos.fws.gov/ecp/species/1518#crithab

Slackwater Darter Etheostoma boschungi Final
https://ecos.fws.gov/ecp/species/8058#crithab

Slender Chub Erimystax cahni Final
https://ecos.fws.gov/ecp/species/6637#crithab

Smoky Madtom Noturus baileyi For information on why this critical habitat appears for your project, even though Smoky Madtom is not on the list of potentially affected species at this location, contact the local field office. https://ecos.fws.gov/ecp/species/8211#crithab	Final
Southern Acornshell Epioblasma othcaloogensis https://ecos.fws.gov/ecp/species/8469#crithab	Final
Southern Clubshell Pleurobema decisum https://ecos.fws.gov/ecp/species/6113#crithab	Final
Southern Pigtoe Pleurobema georgianum https://ecos.fws.gov/ecp/species/1520#crithab	Final
Spotfin Chub Erimonax monachus https://ecos.fws.gov/ecp/species/1521#crithab	Final
Spruce-fir Moss Spider Microhexura montivaga https://ecos.fws.gov/ecp/species/4801#crithab	Final
Triangular Kidneyshell Ptychobranchus greenii https://ecos.fws.gov/ecp/species/4396#crithab	Final
Upland Combshell Epioblasma metastriata https://ecos.fws.gov/ecp/species/317#crithab	Final
Vermilion Darter Etheostoma chermocki https://ecos.fws.gov/ecp/species/296#crithab	Final
Whorled Sunflower Helianthus verticillatus https://ecos.fws.gov/ecp/species/3375#crithab	Final
Yellowfin Madtom Noturus flavipinnis https://ecos.fws.gov/ecp/species/8565#crithab	Final

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act [1] and the Bald and Golden Eagle Protection Act[2].

Any activity that results in the take (to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct) of migratory birds or eagles is prohibited unless authorized by the U.S. Fish and Wildlife Service

[3]. There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured. Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures, as described below.

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1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

MIGRATORY BIRD INFORMATION IS NOT AVAILABLE AT THIS TIME

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Such measures are particularly important when birds are most likely to occur in the project area. To see when birds are most likely to occur in your project area, view the Probability of Presence Summary. Special attention should be made to look for nests and avoid nest destruction during the breeding season. The best information about when birds are breeding can be found in Birds of North America (BNA) Online under the "Breeding Phenology" section of each species profile. Note that accessing this information may require a subscription. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) that might be affected by activities in your project location. These birds are of priority concern because it has been determined that without additional conservation actions, they are likely to become candidates for listing under the Endangered Species Act (ESA).

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets. The AKN list represents all birds reported to be occurring at some level throughout the year in the counties in which your project lies. That list is then narrowed to only the Birds of Conservation Concern for your project area.

Again, the Migratory Bird Resource list only includes species of particular priority concern, and is not representative of all birds that may occur in your project area. Although it is important to try to avoid and minimize impacts to all birds, special attention should be made to avoid and minimize impacts to birds of priority concern. To get a list of all birds potentially present in your project area, please visit the E-bird Explore Data Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird entry on your migratory bird species list indicates a breeding season, it is probable the bird breeds in your project's counties at some point within the time-frame specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

This location overlaps the following National Wildlife Refuge lands:

LAND	ACRES
Chickasaw National Wildlife Refuge	21,099.3 acres

(731) 635-7621
(731) 635-0178

MAILING ADDRESS
C/o West Tennessee Refuges
309 North Church Street Federal Building Room 201
Dyersburg, TN 38024-3014

PHYSICAL ADDRESS
C/o West Tennessee Refuges
309 North Church Street Federal Building Room 201
Dyersburg, TN 38024-3014

https://www.fws.gov/refuges/profiles/index.cfm?id=42526

Choctaw National Wildlife Refuge	514.04 acres

(662) 323-5548
(662) 323-6390

MAILING ADDRESS
13723 Bluff Lake Road
Brooksville,, MS 39739

PHYSICAL ADDRESS
509 Wildlife Road
Gilbertown, AL 36908

https://www.fws.gov/refuges/profiles/index.cfm?id=43535

Clarks River National Wildlife Refuge	9,377.89 acres

(270) 527-5770
(270) 527-5052

MAILING ADDRESS
Post Office Box 89
Benton, KY 42025-0089

PHYSICAL ADDRESS
91 Us Highway 641 North
Benton, KY 42025-0089

https://www.fws.gov/refuges/profiles/index.cfm?id=42622

Coldwater River National Wildlife Refuge 21,200.44 acres

(662) 226-8286
(662) 226-8488

MAILING ADDRESS
C/o North Mississippi Refuges
Post Office Box 1070
Grenada, MS 38902-1070

PHYSICAL ADDRESS
C/o North Mississippi Refuges
2776 Sunset Drive
Grenada, MS 38901-2848

https://www.fws.gov/refuges/profiles/index.cfm?id=43676

Cross Creeks National Wildlife Refuge 6,608.94 acres

(931) 232-7477
(931) 232-5958

643 Wildlife Road
Dover, TN 37058-6136

https://www.fws.gov/refuges/profiles/index.cfm?id=42515

Dahomey National Wildlife Refuge 2,652.72 acres

(662) 226-8286
(662) 226-8488

MAILING ADDRESS
C/o North Mississippi Refuges
Post Office Box 1070
Grenada, MS 38902-1070

PHYSICAL ADDRESS
C/o North Mississippi Refuges
2776 Sunset Drive
Grenada, MS 38901-2848

https://www.fws.gov/refuges/profiles/index.cfm?id=43635

Fern Cave National Wildlife Refuge 203.38 acres

(256) 353-7243
(256) 340-9728

C/o Wheeler Nwr
2700 Refuge Headquarters Road
Decatur, AL 35603-5202

https://www.fws.gov/refuges/profiles/index.cfm?id=43662

Hatchie National Wildlife Refuge 11,432.34 acres

(731) 772-0501
(731) 772-7839

6772 Highway 76 South
Stanton, TN 38069

https://www.fws.gov/refuges/profiles/index.cfm?id=42525

Key Cave National Wildlife Refuge 1,053.08 acres

(256) 353-7243
(256) 340-9728

C/o Wheeler Nwr
2700 Refuge Headquarters Road
Decatur, AL 35603-5202

https://www.fws.gov/refuges/profiles/index.cfm?id=43664

Lake Isom National Wildlife Refuge 1,816.37 acres

(731) 538-2481
(731) 286-0468

MAILING ADDRESS
C/o West Tennessee Refuges
309 North Church Street Federal Building Room 201
Dyersburg, TN 38024-3014

PHYSICAL ADDRESS
C/o West Tennessee Refuges
309 North Church Street Federal Building Room 201
Dyersburg, TN 38024-3014

https://www.fws.gov/refuges/profiles/index.cfm?id=42576

Lower Hatchie National Wildlife Refuge 12,280.44 acres

(731) 738-2296
(731) 738-2297

MAILING ADDRESS
C/o West Tennessee Refuges
309 North Church Street Federal Building Room 201
Dyersburg, TN 38024-3014

PHYSICAL ADDRESS
C/o West Tennessee Refuges
309 North Church Street Federal Building Room 201
Dyersburg, TN 38024-3014

https://www.fws.gov/refuges/profiles/index.cfm?id=42527

Mountain Longleaf National Wildlife Refuge 9,010.56 acres

(256) 848-6833
(256) 847-9089

MAILING ADDRESS
P.O. Box 5087
Fort Mcclellan, AL 36205-0087

PHYSICAL ADDRESS
407 Baby Bains Gap Road
Anniston, AL 36205

https://www.fws.gov/refuges/profiles/index.cfm?id=43666

Reelfoot National Wildlife Refuge 2,636.67 acres

(731) 538-2481
(731) 538-9760

MAILING ADDRESS
C/o West Tennessee Refuges
309 North Church Street Federal Building Room 201
Dyersburg, TN 38024-3014

PHYSICAL ADDRESS
C/o West Tennessee Refuges
309 North Church Street Federal Building Room 201
Dyersburg, TN 38024-3014

https://www.fws.gov/refuges/profiles/index.cfm?id=42577

Sam D. Hamilton Noxubee National Wildlife Refuge 48,121.56 acres

(662) 323-5548
(662) 323-6390

MAILING ADDRESS
13723 Bluff Lake Road
Brooksville, MS 39739-9328

PHYSICAL ADDRESS
13723 Bluff Lake Road
Brooksville, MS 39739-9328

https://www.fws.gov/refuges/profiles/index.cfm?id=43620

Sauta Cave National Wildlife Refuge 265.5 acres

(256) 353-7243
(256) 340-9728

C/o Wheeler Nwr
2700 Refuge Headquarters Road
Decatur, AL 35603-5202

https://www.fws.gov/refuges/profiles/index.cfm?id=43661

Tallahatchie National Wildlife Refuge 11,086.88 acres

(662) 226-8286
(662) 226-8488

MAILING ADDRESS
C/o North Mississippi Refuges
Post Office Box 1070
Grenada, MS 38902-1070

PHYSICAL ADDRESS
C/o North Mississippi Refuges
2776 Sunset Drive
Grenada, MS 38901-2848

https://www.fws.gov/refuges/profiles/index.cfm?id=43645

Tennessee National Wildlife Refuge 512.37 acres

(731) 642-2091
(731) 644-3351

1371 Wildlife Drive
Springville, TN 38256

https://www.fws.gov/refuges/profiles/index.cfm?id=42620

Watercress Darter National Wildlife Refuge 24.07 acres

(256) 848-6833
(256) 847-9089

MAILING ADDRESS
P.O. Box 5087
Fort Mcclellan, AL 36205-0087

PHYSICAL ADDRESS
407 Baby Bains Gap Road
Anniston, AL 36205-4419

https://www.fws.gov/refuges/profiles/index.cfm?id=43663

Wheeler National Wildlife Refuge 8,935.54 acres

(256) 353-7243
(256) 340-9728

2700 Refuge Headquarters Road
Decatur, AL 35603-5202

https://www.fws.gov/refuges/profiles/index.cfm?id=43660

Fish hatcheries

This location overlaps the following National Fish Hatcheries. Please contact them for further guidance.

HATCHERY	ACRES
Erwin National Fish Hatchery	31.33 acres

(423) 743-4712
(423) 743-9793

520 Federal Hatchery Road
Erwin, TN 37650-0548

https://www.fws.gov/offices/Directory/OfficeDetail.cfm?OrgCode=42225

Private John Allen National Fish Hatchery	30.63 acres

(662) 842-1341
(662) 842-3215

MAILING ADDRESS
Post Office Drawer 7317
Tupelo, MS 38804-4915

PHYSICAL ADDRESS
111 East Elizabeth Street
Tupelo, MS 38804-4915

https://www.fws.gov/offices/Directory/OfficeDetail.cfm?OrgCode=43290

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

WETLAND INFORMATION IS NOT AVAILABLE AT THIS TIME
This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the NWI map to view wetlands at this location.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

TVA Natural Heritage Database Species Listed within TVA Study Area by County

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
AL	Blount	Necturus alabamensis	Black Warrior Waterdog	S2	SP	PE
AL	Blount	Notropis cahabae	Cahaba Shiner	S2	SP	LE
AL	Blount	Myotis sodalis	Indiana Bat	S2	SP	LE
AL	Blount	Corynorhinus rafinesquii	Rafinesque’s Big-eared bat	S2	SP	
AL	Blount	Sternotherus depressus	Flattened Musk Turtle	S2	SP	LT
AL	Blount	Plestiodon anthracinus	Coal Skink	S3	SP	
AL	Blount	Gomphus consanguis	Cherokee Clubtail	S1S2	TRKD	
AL	Blount	Epioblasma metastriata	Upland Combshell			LE
AL	Blount	Ptychobranchus greenii	Triangular Kidneyshell	S1	SP	LE
AL	Blount	Pleurocera annulifera	Ringed Hornsnail	S3S4	TRKD	
AL	Blount	Rhodacme filosa	Wicker Ancylid	S1	HIST	
AL	Blount	Bigelowia nuttallii	Nuttall's Rayless Golden-rod	S3	SLNS	
AL	Blount	Helianthus eggertii	Eggert's Sunflower	S1	SLNS	DM
AL	Blount	Jamesianthus alabamensis	Alabama Jamesianthus	S3	SLNS	
AL	Blount	Rudbeckia auriculata	Eared Coneflower	S2	SLNS	
AL	Blount	Silphium brachiatum	Cumberland Rosinweed	S2	SLNS	
AL	Blount	Symphyotrichum georgianum	Georgia Aster	S3	SLNS	
AL	Blount	Leptopus phyllanthoides	Spurge	S2S3	SLNS	
AL	Blount	Frasera caroliniensis	American Columbo	S2	SLNS	
AL	Blount	Fothergilla major	Witch-alder	S2	SLNS	
AL	Blount	Scutellaria alabamensis	Alabama Skullcap	S2	SLNS	
AL	Blount	Orobanche uniflora	One-flowered Broomrape	S2	SLNS	
AL	Blount	Polygonella americana	Southern Jointweed	S1	SLNS	
AL	Blount	Delphinium alabamicum	Alabama Larkspur	S2	SLNS	
AL	Blount	Hydrastis canadensis	Goldenseal	S2	SLNS	
AL	Blount	Neviusia alabamensis	Alabama Snow-wreath	S2	SLNS	
AL	Blount	Stewartia malacodendron	Silky-camellia	S2S3	SLNS	
AL	Blount	Hymenocallis coronaria	Shoals Spider-lily	S2	SLNS	
AL	Blount	Schoenolirion croceum	Sunnybell	S2	SLNS	
AL	Blount	Trillium sessile	Sessile Trillium	S2	SLNS	
AL	Blount	Calamovilfa arcuata	Sandreed Grass	S1	SLNS	
AL	Calhoun	Etheostoma ditrema	Coldwater Darter	S2	SP	
AL	Calhoun	Triosteum angustifolium	Horse-gentian	S1	SLNS	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
AL	Calhoun	Viburnum bracteatum	Arrow-wood	S1	SLNS	
AL	Calhoun	Dicentra cucullaria	Dutchman's Breeches	S2	SLNS	
AL	Calhoun	Monarda clinopodia	Horsemint	S2	SLNS	
AL	Cherokee	Aneides aeneus	Green Salamander	S3	SP	
AL	Cherokee	Haliaeetus leucocephalus	Bald Eagle			DM
AL	Cherokee	Falco peregrinus	Peregrine Falcon	SHB,S3N	SP	
AL	Cherokee	Cyprinella caerulea	Blue Shiner	S1	SP	LT
AL	Cherokee	Etheostoma ditrema	Coldwater Darter	S2	SP	
AL	Cherokee	Etheostoma trisella	Trispot Darter	S1	SP	
AL	Cherokee	Sciurus niger	Eastern Fox Squirrel	S3S4	GA	
AL	Cherokee	Graptemys pulchra	Alabama Map Turtle	S3	SP	
AL	Cherokee	Masticophis flagellum	Coachwhip	S3	SP	
AL	Cherokee	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S3	SP	
AL	Cherokee	Epioblasma metastriata	Upland Combshell			LE
AL	Cherokee	Epioblasma othcaloogensis	Southern Acornshell			LE
AL	Cherokee	Lampsilis altilis	Fine-lined Pocketbook			LT
AL	Cherokee	Lasmigona holstonia	Tennessee Heelsplitter	S1	PSM	
AL	Cherokee	Medionidus acutissimus	Alabama Moccasinshell	S2	SP	LT
AL	Cherokee	Pleurobema decisum	Southern Clubshell	S2	SP	LE
AL	Cherokee	Pleurobema georgianum	Southern Pigtoe	S1	SP	LE
AL	Cherokee	Pleurobema rubellum	Warrior Pigtoe	S1	SP	PS
AL	Cherokee	Ptychobranchus greenii	Triangular Kidneyshell	S1	SP	LE
AL	Cherokee	Rhodacme filosa	Wicker Ancylid	S1	HIST	
AL	Cherokee	Rhodacme hinkleyi	Knobby Ancylid	S2	TRKD	
AL	Cherokee	Ptilimnium nodosum	Harperella	S1	SLNS	LE
AL	Cherokee	Bigelowia nuttallii	Nuttall's Rayless Golden-rod	S3	SLNS	
AL	Cherokee	Coreopsis pulchra	Woodland Tickseed	S2	SLNS	
AL	Cherokee	Helianthus longifolius	Longleaf Sunflower	S1S2	SLNS	
AL	Cherokee	Helianthus verticillatus	Whorled Sunflower	S1	SLNS	LE
AL	Cherokee	Marshallia mohrii	Mohr's Barbara's Buttons	S3	SLNS	LT
AL	Cherokee	Prenanthes barbata	Barbed Rattlesnake-root	S1S2	SLNS	
AL	Cherokee	Rudbeckia heliopsidis	Sun-facing Coneflower	S2	SLNS	
AL	Cherokee	Silphium mohrii	Mohr's Rosin-weed	S1	SLNS	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
AL	Cherokee	Pachysandra procumbens	Allegheny-spurge	S2S3	SLNS	
AL	Cherokee	Lobelia boykinii	Boykin's Lobelia	S1S2	SLNS	
AL	Cherokee	Cuscuta harperi	Harper's Dodder	S2	SLNS	
AL	Cherokee	Dalea gattingeri	Gattinger Prairie-clover	S3	SLNS	
AL	Cherokee	Lathyrus venosus	Smooth Veiny Peavine	S1	SLNS	
AL	Cherokee	Ribes cynosbati	Prickly Gooseberry	S1S2	SLNS	
AL	Cherokee	Fothergilla major	Witch-alder	S2	SLNS	
AL	Cherokee	Orobanche uniflora	One-flowered Broomrape	S2	SLNS	
AL	Cherokee	Oxalis grandis	Great Yellow Wood-sorrel	S1	SLNS	
AL	Cherokee	Polygonella americana	Southern Jointweed	S1	SLNS	
AL	Cherokee	Plantago cordata	Heartleaved Plantain	S2	SLNS	
AL	Cherokee	Lysimachia graminea	Grass-leaf Loosestrife	S1	SLNS	
AL	Cherokee	Clematis socialis	Alabama Leather Flower	S1	SLNS	LE
AL	Cherokee	Nestronia umbellula	Nestronia	S2	SLNS	
AL	Cherokee	Pyrularia pubera	Buffalo-nut	S2	SLNS	
AL	Cherokee	Sarracenia oreophila	Green Pitcher Plant	S2	SLNS	LE
AL	Cherokee	Aureolaria patula	Spreading False-foxglove	S1	SLNS	
AL	Cherokee	Sagittaria secundifolia	Arrowhead	S1	SLNS	LT
AL	Cherokee	Cyperus granitophilus	Granite-loving Flatsedge	S2	SLNS	
AL	Cherokee	Rhynchospora thornei	Thorne's Beakrush	S1	SLNS	
AL	Cherokee	Allium speculae	Little River Canyon Onion	S2	SLNS	
AL	Cherokee	Schoenolirion croceum	Sunnybell	S2	SLNS	
AL	Cherokee	Schoenolirion wrightii	Sunnybell	S1	SLNS	
AL	Cherokee	Trillium lancifolium	Lance-leaf Trillium	S2S3	SLNS	
AL	Cherokee	Isotria verticillata	Large Whorled Pogonia	S2	SLNS	
AL	Colbert	Cryptobranchus alleganiensis	Hellbender	S2	SP	PS
AL	Colbert	Aneides aeneus	Green Salamander	S3	SP	
AL	Colbert	Haliaeetus leucocephalus	Bald Eagle			DM
AL	Colbert	Accipiter cooperii	Cooper's Hawk	S3B,S4N	SP	
AL	Colbert	Picoides borealis	Red-cockaded Woodpecker	S2	SP	LE
AL	Colbert	Thryomanes bewickii	Bewick's Wren	SHB,S1N	SP	
AL	Colbert	Vireo gilvus	Warbling Vireo	S1B	SP	
AL	Colbert	Erimonax monachus	Spotfin Chub			LT

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AL	Colbert	Noturus miurus	Brindled Madtom	S1	CNGF	
AL	Colbert	Typhlichthys subterraneus	Southern Cavefish	S3	SP	
AL	Colbert	Elassoma alabamae	Spring Pygmy Sunfish	S1	SP	LT
AL	Colbert	Etheostoma rufilineatum	Redline Darter	S3	TRKD	
AL	Colbert	Etheostoma tuscumbia	Tuscumbia Darter	S2	SP	
AL	Colbert	Etheostoma wapiti	Boulder Darter	S1	SP	LE
AL	Colbert	Percina tanasi	Snail Darter	S1	SP	LT
AL	Colbert	Myotis grisescens	Gray Bat	S2	SP	LE
AL	Colbert	Perimyotis subflavus	Tricolored Bat	S3	NOST	
AL	Colbert	Corynorhinus rafinesquii	Rafinesque’s Big-eared bat	S2	SP	
AL	Colbert	Plestiodon anthracinus	Coal Skink	S3	SP	
AL	Colbert	Palaemonias alabamae	Alabama Blind Cave Shrimp	S1	SP	LE
AL	Colbert	Actinonaias ligamentina	Mucket	S2	PSM	
AL	Colbert	Alasmidonta marginata	Elktoe	S1	PSM	
AL	Colbert	Alasmidonta viridis	Slippershell Mussel	S1	SP	
AL	Colbert	Arcidens confragosus	Rock Pocketbook	S3	PSM	
AL	Colbert	Cumberlandia monodonta	Spectaclecase	S1	SP	LE
AL	Colbert	Cyprogenia stegaria	Fanshell	S1	SP	LE
AL	Colbert	Dromus dromas	Dromedary Pearlymussel	S1	SP	LE
AL	Colbert	Elliptio dilatata	Spike	S1	PSM	
AL	Colbert	Epioblasma brevidens	Cumberlandian Combshell	S1	SP	LE
AL	Colbert	Epioblasma capsaeformis	Oyster Mussel			LE
AL	Colbert	Epioblasma florentina florentina	Yellow-blossom Pearlymussel			LE
AL	Colbert	Epioblasma obliquata obliquata	Purple Catspaw			LE
AL	Colbert	Epioblasma torulosa torulosa	Tuberculed Blossom Pearlymussel			LE
AL	Colbert	Epioblasma triquetra	Snuffbox	S1	PSM	LE
AL	Colbert	Epioblasma turgidula	Turgid Blossom Pearlymussel			LE
AL	Colbert	Fusconaia barnesiana	Tennessee Pigtoe	S1	PSM	
AL	Colbert	Fusconaia cor	Shiny Pigtoe Pearlymussel	S1	SP	LE
AL	Colbert	Fusconaia cuneolus	Fine-rayed Pigtoe	S1	SP	LE
AL	Colbert	Fusconaia subrotunda	Longsolid	S1	PSM	
AL	Colbert	Hemistena lata	Cracking Pearlymussel	S1	SP	LE
AL	Colbert	Lampsilis fasciola	Wavy-rayed Lampmussel	S2	PSM	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
AL	Colbert	Lampsilis abrupta	Pink Mucket	S1	SP	LE
AL	Colbert	Lampsilis ovata	Pocketbook	S2	PSM	
AL	Colbert	Lampsilis virescens	Alabama Lampmussel	S1	SP	LE
AL	Colbert	Lasmigona complanata	White Heelsplitter	S2	PSM	
AL	Colbert	Lemiox rimosus	Birdwing Pearlymussel	S1	SP	LE
AL	Colbert	Leptodea leptodon	Scaleshell			LE
AL	Colbert	Pleuronaia dolabelloides	Slabside Pearlymussel	S1	SP	LE
AL	Colbert	Ligumia recta	Black Sandshell	S2	PSM	
AL	Colbert	Medionidus conradicus	Cumberland Moccasinshell	S1	SP	
AL	Colbert	Obovaria retusa	Ring Pink			LE
AL	Colbert	Obovaria subrotunda	Round Hickorynut	S2	PSM	
AL	Colbert	Plethobasus cicatricosus	White Wartyback	S1	SP	LE
AL	Colbert	Plethobasus cooperianus	Orange-foot Pimpleback			LE
AL	Colbert	Plethobasus cyphyus	Sheepnose	S1	SP	LE
AL	Colbert	Pleurobema clava	Clubshell			LE
AL	Colbert	Pleurobema sintoxia	Round Pigtoe	S1	SP	
AL	Colbert	Pleurobema cordatum	Ohio Pigtoe	S2	PSM	
AL	Colbert	Pleurobema oviforme	Tennessee Clubshell	S1	PSM	
AL	Colbert	Pleurobema plenum	Rough Pigtoe	S1	SP	LE
AL	Colbert	Pleurobema rubrum	Pyramid Pigtoe	S1	SP	
AL	Colbert	Potamilus ohiensis	Pink Papershell	S3	PSM	
AL	Colbert	Ptychobranchus fasciolaris	Kidneyshell	S2	PSM	
AL	Colbert	Ptychobranchus subtentum	Fluted Kidneyshell			LE
AL	Colbert	Quadrula cylindrica	Rabbitsfoot			LT
AL	Colbert	Quadrula cylindrica cylindrica	Smooth Rabbitsfoot	S1	SP	LT
AL	Colbert	Quadrula intermedia	Cumberland Monkeyface			LE
AL	Colbert	Quadrula metanevra	Monkeyface	S3	PSM	
AL	Colbert	Strophitus undulatus	Squawfoot	S1	PSM	
AL	Colbert	Toxolasma cylindrellus	Pale Lilliput	S1	SP	LE
AL	Colbert	Toxolasma lividus	Purple Lilliput	S2	PSM	
AL	Colbert	Truncilla truncata	Deertoe	S1	PSM	
AL	Colbert	Villosa fabalis	Rayed Bean			LE
AL	Colbert	Villosa taeniata	Painted Creekshell	S2	PSM	

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AL	Colbert	Villosa vanuxemensis	Mountain Creekshell	S3	PSM	
AL	Colbert	Elimia nassula	Round-rib Elimia	S1	TRKD	
AL	Colbert	Athearnia anthonyi	Anthony's River Snail	S1	SP	LE
AL	Colbert	Pleurocera brumbyi	Spiral Hornsnail	S2S3	TRKD	
AL	Colbert	Pleurocera corpulenta	Corpulent Hornsnail	S1	TRKD	
AL	Colbert	Pleurocera curta	Shortspire Hornsnail	S1S2	TRKD	
AL	Colbert	Jamesianthus alabamensis	Alabama Jamesianthus	S3	SLNS	
AL	Colbert	Silphium pinnatifidum	Prairie-dock	S1	SLNS	
AL	Colbert	Armoracia lacustris	Lake-cress	S1	SLNS	
AL	Colbert	Leavenworthia alabamica	Alabama Glade-cress	S2	SLNS	
AL	Colbert	Lesquerella lyrata	Lyre-leaf Bladderpod	S1	SLNS	LT
AL	Colbert	Pachysandra procumbens	Allegheny-spurge	S2S3	SLNS	
AL	Colbert	Triosteum angustifolium	Horse-gentian	S1	SLNS	
AL	Colbert	Astragalus tennesseensis	Tennessee Milk-vetch	S1S2	SLNS	
AL	Colbert	Dalea foliosa	Leafy Prairie-clover	S1	SLNS	LE
AL	Colbert	Dalea gattingeri	Gattinger Prairie-clover	S3	SLNS	
AL	Colbert	Pediomelum subacaule	Tuberous Scurfpea	S2	SLNS	
AL	Colbert	Dicentra cucullaria	Dutchman's Breeches	S2	SLNS	
AL	Colbert	Frasera caroliniensis	American Columbo	S2	SLNS	
AL	Colbert	Linum sulcatum var. harperi	Harper's Grooved-yellow Flax	S1	SLNS	
AL	Colbert	Oxalis grandis	Great Yellow Wood-sorrel	S1	SLNS	
AL	Colbert	Eriogonum harperi	Harper's Umbrella-plant	S1	SLNS	
AL	Colbert	Plantago cordata	Heartleaved Plantain	S2	SLNS	
AL	Colbert	Dodecatheon frenchii	French's Shootingstar	S1	SLNS	
AL	Colbert	Enemion biternatum	False Rue-anemone	S2	SLNS	
AL	Colbert	Thalictrum debile	Southern Meadow-rue	S2	SLNS	
AL	Colbert	Thalictrum mirabile	Little Mountain Meadow-rue	S2	SLNS	
AL	Colbert	Crataegus triflora	Three-flowered Hawthorn	S2	SLNS	
AL	Colbert	Comandra umbellata	Bastard Toad-flax	S1	SLNS	
AL	Colbert	Collinsia verna	Blue-eyed Mary	S1	SLNS	
AL	Colbert	Erythronium albidum	White Trout-lily	S1S2	SLNS	
AL	Colbert	Schoenolirion croceum	Sunnybell	S2	SLNS	
AL	Colbert	Trillium recurvatum	Prairie Trillium	S2	SLNS	

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AL	Colbert	Cypripedium candidum	White Lady-slipper	S1	SLNS	
AL	Colbert	Asplenium ruta-muraria	Wall-rue Spleenwort	S1	SLNS	
AL	Colbert	Ophioglossum engelmannii	Limestone Adder's-tongue	S2S3	SLNS	
AL	Cullman	Ambystoma tigrinum	Tiger Salamander	S3		PS
AL	Cullman	Sylvilagus obscurus	Appalachian Cottontail	S1	GA	
AL	Cullman	Sternotherus depressus	Flattened Musk Turtle	S2	SP	LT
AL	Cullman	Epioblasma metastriata	Upland Combshell			LE
AL	Cullman	Ptilimnium nodosum	Harperella	S1	SLNS	LE
AL	Cullman	Marshallia mohrii	Mohr's Barbara's Buttons	S3	SLNS	LT
AL	Cullman	Fothergilla major	Witch-alder	S2	SLNS	
AL	Cullman	Scutellaria alabamensis	Alabama Skullcap	S2	SLNS	
AL	Cullman	Monotropsis odorata var. odorata	Sweet Pinesap	S1	SLNS	
AL	Cullman	Orobanche uniflora	One-flowered Broomrape	S2	SLNS	
AL	Cullman	Polygonella americana	Southern Jointweed	S1	SLNS	
AL	Cullman	Stewartia malacodendron	Silky-camellia	S2S3	SLNS	
AL	Cullman	Stewartia ovata	Mountain Camellia	S2S3	SLNS	
AL	Cullman	Hymenocallis coronaria	Shoals Spider-lily	S2	SLNS	
AL	Cullman	Schoenolirion wrightii	Sunnybell	S1	SLNS	
AL	Cullman	Trillium recurvatum	Prairie Trillium	S2	SLNS	
AL	Cullman	Trillium sessile	Sessile Trillium	S2	SLNS	
AL	Cullman	Selaginella arenicola ssp. riddellii	Spikemoss	S2	SLNS	
AL	DeKalb	Aneides aeneus	Green Salamander	S3	SP	
AL	DeKalb	Falco peregrinus	Peregrine Falcon	SHB,S3N	SP	
AL	DeKalb	Cyprinella caerulea	Blue Shiner	S1	SP	LT
AL	DeKalb	Typhlichthys subterraneus	Southern Cavefish	S3	SP	
AL	DeKalb	Myotis grisescens	Gray Bat	S2	SP	LE
AL	DeKalb	Myotis sodalis	Indiana Bat	S2	SP	LE
AL	DeKalb	Myotis septentrionalis	Northern Long-eared Bat	S2	SP	LT
AL	DeKalb	Perimyotis subflavus	Tricolored Bat	S3	NOST	
AL	DeKalb	Lampropeltis triangulum triangulum	Eastern Milk Snake	S2	TRKD	
AL	DeKalb	Masticophis flagellum	Coachwhip	S3	SP	
AL	DeKalb	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S3	SP	
AL	DeKalb	Cotinus obovatus	American Smoke-tree	S2	SLNS	

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AL	DeKalb	Ptilimnium nodosum	Harperella	S1	SLNS	LE
AL	DeKalb	Bigelowia nuttallii	Nuttall's Rayless Golden-rod	S3	SLNS	
AL	DeKalb	Coreopsis pulchra	Woodland Tickseed	S2	SLNS	
AL	DeKalb	Helianthus longifolius	Longleaf Sunflower	S1S2	SLNS	
AL	DeKalb	Rudbeckia heliopsidis	Sun-facing Coneflower	S2	SLNS	
AL	DeKalb	Silphium mohrii	Mohr's Rosin-weed	S1	SLNS	
AL	DeKalb	Eurybia spectabilis	Showy Aster	S1	SLNS	
AL	DeKalb	Lobelia boykinii	Boykin's Lobelia	S1S2	SLNS	
AL	DeKalb	Silene caroliniana ssp. wherryi	Wherry's Catchfly	S2	SLNS	
AL	DeKalb	Celastrus scandens	climbing bittersweet	S2	SLNS	
AL	DeKalb	Cuscuta harperi	Harper's Dodder	S2	SLNS	
AL	DeKalb	Lathyrus venosus	Smooth Veiny Peavine	S1	SLNS	
AL	DeKalb	Sabatia capitata	Rose-gentian	S2	SLNS	
AL	DeKalb	Ribes curvatum	Granite Gooseberry	S2	SLNS	
AL	DeKalb	Ribes cynosbati	Prickly Gooseberry	S1S2	SLNS	
AL	DeKalb	Fothergilla major	Witch-alder	S2	SLNS	
AL	DeKalb	Juglans cinerea	Butternut	S1	SLNS	
AL	DeKalb	Orobanche uniflora	One-flowered Broomrape	S2	SLNS	
AL	DeKalb	Polygonella americana	Southern Jointweed	S1	SLNS	
AL	DeKalb	Salix humilis	Pussy Willow	S2S3	SLNS	
AL	DeKalb	Comandra umbellata	Bastard Toad-flax	S1	SLNS	
AL	DeKalb	Nestronia umbellula	Nestronia	S2	SLNS	
AL	DeKalb	Pyrularia pubera	Buffalo-nut	S2	SLNS	
AL	DeKalb	Sarracenia oreophila	Green Pitcher Plant	S2	SLNS	LE
AL	DeKalb	Castilleja coccinea	Scarlet Indian-paintbrush	S1	SLNS	
AL	DeKalb	Stewartia malacodendron	Silky-camellia	S2S3	SLNS	
AL	DeKalb	Stewartia ovata	Mountain Camellia	S2S3	SLNS	
AL	DeKalb	Viola canadensis	Canada Violet	S2	SLNS	
AL	DeKalb	Sagittaria secundifolia	Arrowhead	S1	SLNS	LT
AL	DeKalb	Carex purpurifera	Sedge	S2	SLNS	
AL	DeKalb	Fimbristylis brevivaginata	Glade Fimbristylis	S1	SLNS	
AL	DeKalb	Allium speculae	Little River Canyon Onion	S2	SLNS	
AL	DeKalb	Melanthium parviflorum	False Helleborne	S1S2	SLNS	

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AL	DeKalb	Schoenolirion croceum	Sunnybell	S2	SLNS	
AL	DeKalb	Trillium sulcatum	Southern Red Trillium	S1	SLNS	
AL	DeKalb	Isotria verticillata	Large Whorled Pogonia	S2	SLNS	
AL	DeKalb	Platanthera integrilabia	White Fringeless Orchid	S2	SLNS	LT
AL	DeKalb	Panicum lithophilum	Swallen's Panic-grass	S1	SLNS	
AL	DeKalb	Croomia pauciflora	Croomia	S2	SLNS	
AL	DeKalb	Asplenium bradleyi	Bradley's Spleenwort	S2	SLNS	
AL	DeKalb	Trichomanes petersii	Dwarf Filmy-fern	S2	SLNS	
AL	Etowah	Vermivora bachmanii	Bachman's Warbler			LE
AL	Etowah	Etheostoma ditrema	Coldwater Darter	S2	SP	
AL	Etowah	Etheostoma trisella	Trispot Darter	S1	SP	
AL	Etowah	Graptemys pulchra	Alabama Map Turtle	S3	SP	
AL	Etowah	Epioblasma metastriata	Upland Combshell			LE
AL	Etowah	Epioblasma othcaloogensis	Southern Acornshell			LE
AL	Etowah	Epioblasma penita	Southern Combshell	S1	SP	LE
AL	Etowah	Lampsilis altilis	Fine-lined Pocketbook			LT
AL	Etowah	Lasmigona holstonia	Tennessee Heelsplitter	S1	PSM	
AL	Etowah	Medionidus acutissimus	Alabama Moccasinshell	S2	SP	LT
AL	Etowah	Pleurobema decisum	Southern Clubshell	S2	SP	LE
AL	Etowah	Pleurobema georgianum	Southern Pigtoe	S1	SP	LE
AL	Etowah	Pleurobema perovatum	Ovate Clubshell	S1	SP	LE
AL	Etowah	Ptychobranchus greenii	Triangular Kidneyshell	S1	SP	LE
AL	Etowah	Lioplax cyclostomaformis	Cylindrical Lioplax	S1	SP	LE
AL	Etowah	Aralia racemosa	American Spikenard	S1	SLNS	
AL	Etowah	Bigelowia nuttallii	Nuttall's Rayless Golden-rod	S3	SLNS	
AL	Etowah	Coreopsis pulchra	Woodland Tickseed	S2	SLNS	
AL	Etowah	Polymnia laevigata	Tennessee Leafcup	S2S3	SLNS	
AL	Etowah	Symphyotrichum georgianum	Georgia Aster	S3	SLNS	
AL	Etowah	Pachysandra procumbens	Allegheny-spurge	S2S3	SLNS	
AL	Etowah	Celastrus scandens	climbing bittersweet	S2	SLNS	
AL	Etowah	Triosteum angustifolium	Horse-gentian	S1	SLNS	
AL	Etowah	Viburnum bracteatum	Arrow-wood	S1	SLNS	
AL	Etowah	Cuscuta harperi	Harper's Dodder	S2	SLNS	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
AL	Etowah	Dicentra cucullaria	Dutchman's Breeches	S2	SLNS	
AL	Etowah	Monarda clinopodia	Horsemint	S2	SLNS	
AL	Etowah	Orobanche uniflora	One-flowered Broomrape	S2	SLNS	
AL	Etowah	Clematis socialis	Alabama Leather Flower	S1	SLNS	LE
AL	Etowah	Sarracenia oreophila	Green Pitcher Plant	S2	SLNS	LE
AL	Etowah	Stewartia malacodendron	Silky-camellia	S2S3	SLNS	
AL	Etowah	Schoenolirion wrightii	Sunnybell	S1	SLNS	
AL	Etowah	Trillium flexipes	Nodding Trillium	S2S3	SLNS	
AL	Etowah	Aplectrum hyemale	Puttyroot	S2	SLNS	
AL	Etowah	Isotria verticillata	Large Whorled Pogonia	S2	SLNS	
AL	Etowah	Croomia pauciflora	Croomia	S2	SLNS	
AL	Etowah	Asplenium bradleyi	Bradley's Spleenwort	S2	SLNS	
AL	Etowah	Asplenium ruta-muraria	Wall-rue Spleenwort	S1	SLNS	
AL	Etowah	Asplenium trichomanes	Maidenhair Spleenwort	S2S3	SLNS	
AL	Etowah	Trichomanes petersii	Dwarf Filmy-fern	S2	SLNS	
AL	Franklin	Cryptobranchus alleganiensis	Hellbender	S2	SP	PS
AL	Franklin	Aneides aeneus	Green Salamander	S3	SP	
AL	Franklin	Haliaeetus leucocephalus	Bald Eagle			DM
AL	Franklin	Tyto alba	Common Barn-owl	S3	SP	
AL	Franklin	Myotis grisescens	Gray Bat	S2	SP	LE
AL	Franklin	Myotis septentrionalis	Northern Long-eared Bat	S2	SP	LT
AL	Franklin	Macrochelys temminckii	Alligator Snapping Turtle	S3	SP	
AL	Franklin	Alasmidonta marginata	Elktoe	S1	PSM	
AL	Franklin	Epioblasma brevidens	Cumberlandian Combshell	S1	SP	LE
AL	Franklin	Epioblasma triquetra	Snuffbox	S1	PSM	LE
AL	Franklin	Epioblasma turgidula	Turgid Blossom Pearlymussel			LE
AL	Franklin	Fusconaia barnesiana	Tennessee Pigtoe	S1	PSM	
AL	Franklin	Fusconaia cuneolus	Fine-rayed Pigtoe	S1	SP	LE
AL	Franklin	Lampsilis ovata	Pocketbook	S2	PSM	
AL	Franklin	Lampsilis virescens	Alabama Lampmussel	S1	SP	LE
AL	Franklin	Pleuronaia dolabelloides	Slabside Pearlymussel	S1	SP	LE
AL	Franklin	Obovaria subrotunda	Round Hickorynut	S2	PSM	
AL	Franklin	Pleurobema oviforme	Tennessee Clubshell	S1	PSM	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
AL	Franklin	Ptychobranchus fasciolaris	Kidneyshell	S2	PSM	
AL	Franklin	Quadrula cylindrica	Rabbitsfoot			LT
AL	Franklin	Quadrula cylindrica cylindrica	Smooth Rabbitsfoot	S1	SP	LT
AL	Franklin	Toxolasma lividus	Purple Lilliput	S2	PSM	
AL	Franklin	Truncilla truncata	Deertoe	S1	PSM	
AL	Franklin	Bryoxiphium norvegicum	Sword Moss	S1	SLNS	
AL	Franklin	Helianthus eggertii	Eggert's Sunflower	S1	SLNS	DM
AL	Franklin	Jamesianthus alabamensis	Alabama Jamesianthus	S3	SLNS	
AL	Franklin	Onosmodium molle ssp. molle	Soft False Gromwell	S2	SLNS	
AL	Franklin	Leavenworthia alabamica	Alabama Glade-cress	S2	SLNS	
AL	Franklin	Lesquerella lyrata	Lyre-leaf Bladderpod	S1	SLNS	LT
AL	Franklin	Pachysandra procumbens	Allegheny-spurge	S2S3	SLNS	
AL	Franklin	Triosteum angustifolium	Horse-gentian	S1	SLNS	
AL	Franklin	Cuscuta harperi	Harper's Dodder	S2	SLNS	
AL	Franklin	Dalea foliosa	Leafy Prairie-clover	S1	SLNS	LE
AL	Franklin	Dalea gattingeri	Gattinger Prairie-clover	S3	SLNS	
AL	Franklin	Pediomelum subacaule	Tuberous Scurfpea	S2	SLNS	
AL	Franklin	Frasera caroliniensis	American Columbo	S2	SLNS	
AL	Franklin	Fothergilla major	Witch-alder	S2	SLNS	
AL	Franklin	Linum sulcatum var. harperi	Harper's Grooved-yellow Flax	S1	SLNS	
AL	Franklin	Mirabilis albida	Pale Umbrella-wort	S2	SLNS	
AL	Franklin	Polygala senega var. latifolia	Seneca Snakeroot	S1	SLNS	
AL	Franklin	Eriogonum harperi	Harper's Umbrella-plant	S1	SLNS	
AL	Franklin	Plantago cordata	Heartleaved Plantain	S2	SLNS	
AL	Franklin	Phemeranthus calcaricus	Limestone Fame-flower	S2	SLNS	
AL	Franklin	Delphinium alabamicum	Alabama Larkspur	S2	SLNS	
AL	Franklin	Hydrastis canadensis	Goldenseal	S2	SLNS	
AL	Franklin	Thalictrum mirabile	Little Mountain Meadow-rue	S2	SLNS	
AL	Franklin	Crataegus triflora	Three-flowered Hawthorn	S2	SLNS	
AL	Franklin	Boykinia aconitifolia	Brook Saxifrage	S1	SLNS	
AL	Franklin	Stewartia ovata	Mountain Camellia	S2S3	SLNS	
AL	Franklin	Viola egglestonii	Eggleston's Violet	S1	SLNS	
AL	Franklin	Erythronium albidum	White Trout-lily	S1S2	SLNS	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
AL	Franklin	Schoenolirion croceum	Sunnybell	S2	SLNS	
AL	Franklin	Trillium recurvatum	Prairie Trillium	S2	SLNS	
AL	Franklin	Muhlenbergia sobolifera	Muhly Grass	S1	SLNS	
AL	Franklin	Xyris tennesseensis	Yellow-eyed-grass	S1	SLNS	LE
AL	Franklin	Hymenophyllum tayloriae	Gorge Filmy Fern	S1	SLNS	
AL	Franklin	Trichomanes petersii	Dwarf Filmy-fern	S2	SLNS	
AL	Franklin	Isoetes butleri	Butler's Quillwort	S2	SLNS	
AL	Franklin	Huperzia lucidula	Shining Clubmoss	S2	SLNS	
AL	Franklin	Huperzia porophila	Rock Clubmoss	S1	SLNS	
AL	Franklin	Ophioglossum engelmannii	Limestone Adder's-tongue	S2S3	SLNS	
AL	Franklin	Selaginella arenicola ssp. riddellii	Spikemoss	S2	SLNS	
AL	Franklin	Selaginella rupestris	Spikemoss	S2	SLNS	
AL	Jackson	Aneides aeneus	Green Salamander	S3	SP	
AL	Jackson	Haliaeetus leucocephalus	Bald Eagle			DM
AL	Jackson	Bonasa umbellus	Ruffed Grouse	S1	GBNOS	
AL	Jackson	Picoides borealis	Red-cockaded Woodpecker	S2	SP	LE
AL	Jackson	Peucaea aestivalis	Bachman's Sparrow	S3	SP	
AL	Jackson	Notropis albizonatus	Palezone Shiner	S1	SP	LE
AL	Jackson	Typhlichthys subterraneus	Southern Cavefish	S3	SP	
AL	Jackson	Percina burtoni	Blotchside Logperch	S1	SP	
AL	Jackson	Percina tanasi	Snail Darter	S1	SP	LT
AL	Jackson	Myotis grisescens	Gray Bat	S2	SP	LE
AL	Jackson	Myotis sodalis	Indiana Bat	S2	SP	LE
AL	Jackson	Myotis septentrionalis	Northern Long-eared Bat	S2	SP	LT
AL	Jackson	Perimyotis subflavus	Tricolored Bat	S3	NOST	
AL	Jackson	Corynorhinus rafinesquii	Rafinesque’s Big-eared bat	S2	SP	
AL	Jackson	Lampropeltis triangulum triangulum	Eastern Milk Snake	S2	TRKD	
AL	Jackson	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S3	SP	
AL	Jackson	Actinonaias ligamentina	Mucket	S2	PSM	
AL	Jackson	Alasmidonta marginata	Elktoe	S1	PSM	
AL	Jackson	Alasmidonta viridis	Slippershell Mussel	S1	SP	
AL	Jackson	Dromus dromas	Dromedary Pearlymussel	S1	SP	LE
AL	Jackson	Elliptio dilatata	Spike	S1	PSM	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
AL	Jackson	Epioblasma triquetra	Snuffbox	S1	PSM	LE
AL	Jackson	Fusconaia barnesiana	Tennessee Pigtoe	S1	PSM	
AL	Jackson	Fusconaia cor	Shiny Pigtoe Pearlymussel	S1	SP	LE
AL	Jackson	Fusconaia cuneolus	Fine-rayed Pigtoe	S1	SP	LE
AL	Jackson	Fusconaia subrotunda	Longsolid	S1	PSM	
AL	Jackson	Lampsilis fasciola	Wavy-rayed Lampmussel	S2	PSM	
AL	Jackson	Lampsilis abrupta	Pink Mucket	S1	SP	LE
AL	Jackson	Lampsilis ovata	Pocketbook	S2	PSM	
AL	Jackson	Lampsilis virescens	Alabama Lampmussel	S1	SP	LE
AL	Jackson	Lasmigona complanata	White Heelsplitter	S2	PSM	
AL	Jackson	Lasmigona costata	Flutedshell	S2	PSM	
AL	Jackson	Lasmigona holstonia	Tennessee Heelsplitter	S1	PSM	
AL	Jackson	Pleuronaia dolabelloides	Slabside Pearlymussel	S1	SP	LE
AL	Jackson	Ligumia recta	Black Sandshell	S2	PSM	
AL	Jackson	Medionidus conradicus	Cumberland Moccasinshell	S1	SP	
AL	Jackson	Obovaria retusa	Ring Pink			LE
AL	Jackson	Obovaria subrotunda	Round Hickorynut	S2	PSM	
AL	Jackson	Plethobasus cooperianus	Orange-foot Pimpleback			LE
AL	Jackson	Plethobasus cyphyus	Sheepnose	S1	SP	LE
AL	Jackson	Pleurobema cordatum	Ohio Pigtoe	S2	PSM	
AL	Jackson	Pleurobema oviforme	Tennessee Clubshell	S1	PSM	
AL	Jackson	Pleurobema plenum	Rough Pigtoe	S1	SP	LE
AL	Jackson	Pleurobema rubrum	Pyramid Pigtoe	S1	SP	
AL	Jackson	Ptychobranchus fasciolaris	Kidneyshell	S2	PSM	
AL	Jackson	Quadrula cylindrica	Rabbitsfoot			LT
AL	Jackson	Quadrula cylindrica cylindrica	Smooth Rabbitsfoot	S1	SP	LT
AL	Jackson	Quadrula fragosa	Winged Mapleleaf			LE
AL	Jackson	Quadrula intermedia	Cumberland Monkeyface			LE
AL	Jackson	Quadrula metanevra	Monkeyface	S3	PSM	
AL	Jackson	Toxolasma cylindrellus	Pale Lilliput	S1	SP	LE
AL	Jackson	Toxolasma lividus	Purple Lilliput	S2	PSM	
AL	Jackson	Truncilla truncata	Deertoe	S1	PSM	
AL	Jackson	Villosa iris	Rainbow Mussel	S3	PSM	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
AL	Jackson	Villosa nebulosa	Alabama Rainbow	S3	PSM	
AL	Jackson	Villosa taeniata	Painted Creekshell	S2	PSM	
AL	Jackson	Villosa trabalis	Cumberland Bean			LE
AL	Jackson	Villosa vanuxemensis	Mountain Creekshell	S3	PSM	
AL	Jackson	Athearnia anthonyi	Anthony's River Snail	S1	SP	LE
AL	Jackson	Pleurocera corpulenta	Corpulent Hornsnail	S1	TRKD	
AL	Jackson	Cololejeunea ornata	Liverwort	S1	SLNS	
AL	Jackson	Frullania riparia	Liverwort	S1?	SLNS	
AL	Jackson	Plagiochila invisus	Liverwort	S1	SLNS	
AL	Jackson	Schistidium rivulare	Rock Moss	S2?	SLNS	
AL	Jackson	Cotinus obovatus	American Smoke-tree	S2	SLNS	
AL	Jackson	Aralia racemosa	American Spikenard	S1	SLNS	
AL	Jackson	Bigelowia nuttallii	Nuttall's Rayless Golden-rod	S3	SLNS	
AL	Jackson	Coreopsis pulchra	Woodland Tickseed	S2	SLNS	
AL	Jackson	Helianthus longifolius	Longleaf Sunflower	S1S2	SLNS	
AL	Jackson	Polymnia laevigata	Tennessee Leafcup	S2S3	SLNS	
AL	Jackson	Silphium brachiatum	Cumberland Rosinweed	S2	SLNS	
AL	Jackson	Silphium mohrii	Mohr's Rosin-weed	S1	SLNS	
AL	Jackson	Eurybia surculosa	Creeping Aster	S1	SLNS	
AL	Jackson	Jeffersonia diphylla	Twinleaf	S2	SLNS	
AL	Jackson	Leavenworthia uniflora	Michaux Leavenworthia	S2	SLNS	
AL	Jackson	Silene rotundifolia	Roundleaf Catchfly	S1S2	SLNS	
AL	Jackson	Triosteum angustifolium	Horse-gentian	S1	SLNS	
AL	Jackson	Viburnum bracteatum	Arrow-wood	S1	SLNS	
AL	Jackson	Cuscuta harperi	Harper's Dodder	S2	SLNS	
AL	Jackson	Rhododendron minus	Carolina Rhododendron	S2	SLNS	
AL	Jackson	Apios priceana	Price's Potato-bean	S2	SLNS	LT
AL	Jackson	Desmodium ochroleucum	Creamflower Tick-trefoil	S1S2	SLNS	
AL	Jackson	Thermopsis mollis	Soft-haired Thermopsis	S1	SLNS	
AL	Jackson	Dicentra cucullaria	Dutchman's Breeches	S2	SLNS	
AL	Jackson	Frasera caroliniensis	American Columbo	S2	SLNS	
AL	Jackson	Ribes curvatum	Granite Gooseberry	S2	SLNS	
AL	Jackson	Ribes cynosbati	Prickly Gooseberry	S1S2	SLNS	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
AL	Jackson	Fothergilla major	Witch-alder	S2	SLNS	
AL	Jackson	Hydrophyllum appendiculatum	Waterleaf	S2?	SLNS	
AL	Jackson	Juglans cinerea	Butternut	S1	SLNS	
AL	Jackson	Agastache nepetoides	Yellow Giant-hyssop	S1	SLNS	
AL	Jackson	Blephilia subnuda	Smooth Blephilia	S1S2	SLNS	
AL	Jackson	Monarda clinopodia	Horsemint	S2	SLNS	
AL	Jackson	Synandra hispidula	Guyandotte Beauty	S1	SLNS	
AL	Jackson	Orobanche uniflora	One-flowered Broomrape	S2	SLNS	
AL	Jackson	Oxalis grandis	Great Yellow Wood-sorrel	S1	SLNS	
AL	Jackson	Stylophorum diphyllum	Celandine Poppy	S1	SLNS	
AL	Jackson	Polygala senega var. latifolia	Seneca Snakeroot	S1	SLNS	
AL	Jackson	Hottonia inflata	Featherfoil	S2	SLNS	
AL	Jackson	Clematis morefieldii	Morefield's Leather-flower	S2	SLNS	LE
AL	Jackson	Hydrastis canadensis	Goldenseal	S2	SLNS	
AL	Jackson	Enemion biternatum	False Rue-anemone	S2	SLNS	
AL	Jackson	Geum virginianum	Pale Avens	S2	SLNS	
AL	Jackson	Neviusia alabamensis	Alabama Snow-wreath	S2	SLNS	
AL	Jackson	Salix humilis	Pussy Willow	S2S3	SLNS	
AL	Jackson	Comandra umbellata	Bastard Toad-flax	S1	SLNS	
AL	Jackson	Sarracenia oreophila	Green Pitcher Plant	S2	SLNS	LE
AL	Jackson	Parnassia asarifolia	Kidneyleaf Grass-of-parnassus	S2	SLNS	
AL	Jackson	Castilleja coccinea	Scarlet Indian-paintbrush	S1	SLNS	
AL	Jackson	Chelone lyonii	Pink Turtlehead	S1	SLNS	
AL	Jackson	Stewartia malacodendron	Silky-camellia	S2S3	SLNS	
AL	Jackson	Stewartia ovata	Mountain Camellia	S2S3	SLNS	
AL	Jackson	Valeriana pauciflora	Valerian	S1	SLNS	
AL	Jackson	Viola canadensis	Canada Violet	S2	SLNS	
AL	Jackson	Carex austrocaroliniana	South Carolina Sedge	S2?	SLNS	
AL	Jackson	Carex purpurifera	Sedge	S2	SLNS	
AL	Jackson	Allium speculae	Little River Canyon Onion	S2	SLNS	
AL	Jackson	Prosartes maculata	Spotted Mandarin	S1	SLNS	
AL	Jackson	Lilium canadense	Canada Lily	S2	SLNS	
AL	Jackson	Lilium superbum	Turk's Cap Lily	S2	SLNS	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
AL	Jackson	Melanthium parviflorum	False Helleborne	S1S2	SLNS	
AL	Jackson	Schoenolirion croceum	Sunnybell	S2	SLNS	
AL	Jackson	Trillium flexipes	Nodding Trillium	S2S3	SLNS	
AL	Jackson	Trillium pusillum var. 1	Interior Least Trillium	S2	SLNS	
AL	Jackson	Trillium sessile	Sessile Trillium	S2	SLNS	
AL	Jackson	Trillium sulcatum	Southern Red Trillium	S1	SLNS	
AL	Jackson	Corallorhiza wisteriana	Wister Coral-root	S2	SLNS	
AL	Jackson	Isotria verticillata	Large Whorled Pogonia	S2	SLNS	
AL	Jackson	Platanthera integrilabia	White Fringeless Orchid	S2	SLNS	LT
AL	Jackson	Spiranthes lucida	Shining Ladies'-tresses	S1	SLNS	
AL	Jackson	Diarrhena americana	American Beakgrain	S2	SLNS	
AL	Jackson	Asplenium bradleyi	Bradley's Spleenwort	S2	SLNS	
AL	Jackson	Asplenium ruta-muraria	Wall-rue Spleenwort	S1	SLNS	
AL	Jackson	Asplenium scolopendrium var. americanum	American Hart's-tongue Fern	S1	SLNS	LT
AL	Jackson	Asplenium trichomanes	Maidenhair Spleenwort	S2S3	SLNS	
AL	Jackson	Cystopteris tennesseensis	Tennessee Bladderfern	S2	SLNS	
AL	Jackson	Equisetum arvense	Common Horsetail	S2	SLNS	
AL	Jackson	Trichomanes petersii	Dwarf Filmy-fern	S2	SLNS	
AL	Jackson	Isoetes butleri	Butler's Quillwort	S2	SLNS	
AL	Jackson	Diphasiastrum tristachyum	Deep-root Clubmoss	S1	SLNS	
AL	Jackson	Selaginella arenicola ssp. riddellii	Spikemoss	S2	SLNS	
AL	Jefferson	Notropis cahabae	Cahaba Shiner	S2	SP	LE
AL	Jefferson	Myotis sodalis	Indiana Bat	S2	SP	LE
AL	Jefferson	Leptoxis plicata	Plicate Rocksnail	S1	SP	LE
AL	Jefferson	Marshallia mohrii	Mohr's Barbara's Buttons	S3	SLNS	LT
AL	Jefferson	Symphyotrichum georgianum	Georgia Aster	S3	SLNS	
AL	Jefferson	Lathyrus venosus	Smooth Veiny Peavine	S1	SLNS	
AL	Lamar	Plestiodon anthracinus	Coal Skink	S3	SP	
AL	Lamar	Lampsilis straminea straminea	Rough Fatmucket	S2	TRKD	
AL	Lamar	Pleurobema perovatum	Ovate Clubshell	S1	SP	LE
AL	Lauderdale	Cryptobranchus alleganiensis	Hellbender	S2	SP	PS
AL	Lauderdale	Haliaeetus leucocephalus	Bald Eagle			DM
AL	Lauderdale	Thryomanes bewickii	Bewick's Wren	SHB,S1N	SP	

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AL	Lauderdale	Vireo gilvus	Warbling Vireo	S1B	SP	
AL	Lauderdale	Polyodon spathula	Paddlefish	S3	SP, CNGF	
AL	Lauderdale	Hybopsis amblops	Bigeye Chub	S3	TRKD	
AL	Lauderdale	Notropis micropteryx	Highland Shiner	S2	TRKD	
AL	Lauderdale	Notropis sp. 4	Sawfin Shiner	S2	TRKD	
AL	Lauderdale	Chrosomus erythrogaster	Southern Redbelly Dace	S3	TRKD	
AL	Lauderdale	Erimonax monachus	Spotfin Chub			LT
AL	Lauderdale	Noturus flavus	Stonecat	S1	CNGF	
AL	Lauderdale	Noturus exilis	Slender Madtom	S3	CNGF	
AL	Lauderdale	Speoplatyrhinus poulsoni	Alabama Cavefish	S1	SP	LE
AL	Lauderdale	Typhlichthys subterraneus	Southern Cavefish	S3	SP	
AL	Lauderdale	Elassoma alabamae	Spring Pygmy Sunfish	S1	SP	LT
AL	Lauderdale	Etheostoma blennioides	Greenside Darter	S3	TRKD	
AL	Lauderdale	Etheostoma boschungi	Slackwater Darter	S1	SP	LT
AL	Lauderdale	Etheostoma flabellare	Fantail Darter	S3	TRKD	
AL	Lauderdale	Etheostoma neopterum	Lollipop Darter	S1	SP	
AL	Lauderdale	Etheostoma rufilineatum	Redline Darter	S3	TRKD	
AL	Lauderdale	Etheostoma tuscumbia	Tuscumbia Darter	S2	SP	
AL	Lauderdale	Etheostoma wapiti	Boulder Darter	S1	SP	LE
AL	Lauderdale	Percina evides	Gilt Darter	S2	TRKD	
AL	Lauderdale	Myotis grisescens	Gray Bat	S2	SP	LE
AL	Lauderdale	Myotis sodalis	Indiana Bat	S2	SP	LE
AL	Lauderdale	Perimyotis subflavus	Tricolored Bat	S3	NOST	
AL	Lauderdale	Mustela frenata	Long-tailed Weasel	S3	SP	
AL	Lauderdale	Macrochelys temminckii	Alligator Snapping Turtle	S3	SP	
AL	Lauderdale	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S3	SP	
AL	Lauderdale	Palaemonias alabamae	Alabama Blind Cave Shrimp	S1	SP	LE
AL	Lauderdale	Actinonaias ligamentina	Mucket	S2	PSM	
AL	Lauderdale	Alasmidonta marginata	Elktoe	S1	PSM	
AL	Lauderdale	Alasmidonta viridis	Slippershell Mussel	S1	SP	
AL	Lauderdale	Arcidens confragosus	Rock Pocketbook	S3	PSM	
AL	Lauderdale	Cumberlandia monodonta	Spectaclecase	S1	SP	LE
AL	Lauderdale	Cyprogenia stegaria	Fanshell	S1	SP	LE

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AL	Lauderdale	Dromus dromas	Dromedary Pearlymussel	S1	SP	LE
AL	Lauderdale	Elliptio dilatata	Spike	S1	PSM	
AL	Lauderdale	Epioblasma brevidens	Cumberlandian Combshell	S1	SP	LE
AL	Lauderdale	Epioblasma capsaeformis	Oyster Mussel			LE
AL	Lauderdale	Epioblasma florentina florentina	Yellow-blossom Pearlymussel			LE
AL	Lauderdale	Epioblasma obliquata obliquata	Purple Catspaw			LE
AL	Lauderdale	Epioblasma torulosa torulosa	Tuberculed Blossom Pearlymussel			LE
AL	Lauderdale	Epioblasma triquetra	Snuffbox	S1	PSM	LE
AL	Lauderdale	Epioblasma turgidula	Turgid Blossom Pearlymussel			LE
AL	Lauderdale	Fusconaia barnesiana	Tennessee Pigtoe	S1	PSM	
AL	Lauderdale	Fusconaia cor	Shiny Pigtoe Pearlymussel	S1	SP	LE
AL	Lauderdale	Fusconaia cuneolus	Fine-rayed Pigtoe	S1	SP	LE
AL	Lauderdale	Fusconaia subrotunda	Longsolid	S1	PSM	
AL	Lauderdale	Hemistena lata	Cracking Pearlymussel	S1	SP	LE
AL	Lauderdale	Lampsilis fasciola	Wavy-rayed Lampmussel	S2	PSM	
AL	Lauderdale	Lampsilis abrupta	Pink Mucket	S1	SP	LE
AL	Lauderdale	Lampsilis ovata	Pocketbook	S2	PSM	
AL	Lauderdale	Lampsilis virescens	Alabama Lampmussel	S1	SP	LE
AL	Lauderdale	Lemiox rimosus	Birdwing Pearlymussel	S1	SP	LE
AL	Lauderdale	Leptodea leptodon	Scaleshell			LE
AL	Lauderdale	Pleuronaia dolabelloides	Slabside Pearlymussel	S1	SP	LE
AL	Lauderdale	Ligumia recta	Black Sandshell	S2	PSM	
AL	Lauderdale	Medionidus conradicus	Cumberland Moccasinshell	S1	SP	
AL	Lauderdale	Obovaria retusa	Ring Pink			LE
AL	Lauderdale	Obovaria subrotunda	Round Hickorynut	S2	PSM	
AL	Lauderdale	Pegias fabula	Little-wing Pearlymussel			LE
AL	Lauderdale	Plethobasus cicatricosus	White Wartyback	S1	SP	LE
AL	Lauderdale	Plethobasus cooperianus	Orange-foot Pimpleback			LE
AL	Lauderdale	Plethobasus cyphyus	Sheepnose	S1	SP	LE
AL	Lauderdale	Pleurobema clava	Clubshell			LE
AL	Lauderdale	Pleurobema sintoxia	Round Pigtoe	S1	SP	
AL	Lauderdale	Pleurobema cordatum	Ohio Pigtoe	S2	PSM	
AL	Lauderdale	Pleurobema oviforme	Tennessee Clubshell	S1	PSM	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
AL	Lauderdale	Pleurobema plenum	Rough Pigtoe	S1	SP	LE
AL	Lauderdale	Pleurobema rubrum	Pyramid Pigtoe	S1	SP	
AL	Lauderdale	Potamilus ohiensis	Pink Papershell	S3	PSM	
AL	Lauderdale	Ptychobranchus fasciolaris	Kidneyshell	S2	PSM	
AL	Lauderdale	Ptychobranchus subtentum	Fluted Kidneyshell			LE
AL	Lauderdale	Quadrula cylindrica cylindrica	Smooth Rabbitsfoot	S1	SP	LT
AL	Lauderdale	Quadrula intermedia	Cumberland Monkeyface			LE
AL	Lauderdale	Quadrula metanevra	Monkeyface	S3	PSM	
AL	Lauderdale	Strophitus undulatus	Squawfoot	S1	PSM	
AL	Lauderdale	Toxolasma cylindrellus	Pale Lilliput	S1	SP	LE
AL	Lauderdale	Toxolasma lividus	Purple Lilliput	S2	PSM	
AL	Lauderdale	Truncilla truncata	Deertoe	S1	PSM	
AL	Lauderdale	Villosa fabalis	Rayed Bean			LE
AL	Lauderdale	Villosa taeniata	Painted Creekshell	S2	PSM	
AL	Lauderdale	Villosa vanuxemensis	Mountain Creekshell	S3	PSM	
AL	Lauderdale	Athearnia anthonyi	Anthony's River Snail	S1	SP	LE
AL	Lauderdale	Pleurocera corpulenta	Corpulent Hornsnail	S1	TRKD	
AL	Lauderdale	Pleurocera curta	Shortspire Hornsnail	S1S2	TRKD	
AL	Lauderdale	Arabis georgiana	Georgia Rockcress	S1	SLNS	LT
AL	Lauderdale	Leavenworthia crassa	Fleshy-fruit Gladecress	S2	SLNS	LE
AL	Lauderdale	Pachysandra procumbens	Allegheny-spurge	S2S3	SLNS	
AL	Lauderdale	Celastrus scandens	climbing bittersweet	S2	SLNS	
AL	Lauderdale	Astragalus canadensis	Canadian Milkvetch	S1	SLNS	
AL	Lauderdale	Dicentra cucullaria	Dutchman's Breeches	S2	SLNS	
AL	Lauderdale	Hydrophyllum appendiculatum	Waterleaf	S2?	SLNS	
AL	Lauderdale	Monarda clinopodia	Horsemint	S2	SLNS	
AL	Lauderdale	Enemion biternatum	False Rue-anemone	S2	SLNS	
AL	Lauderdale	Neviusia alabamensis	Alabama Snow-wreath	S2	SLNS	
AL	Lauderdale	Tradescantia ernestiana	Ernest's Spider-wort	S1	SLNS	
AL	Lauderdale	Erythronium albidum	White Trout-lily	S1S2	SLNS	
AL	Lauderdale	Trillium flexipes	Nodding Trillium	S2S3	SLNS	
AL	Lauderdale	Muhlenbergia sobolifera	Muhly Grass	S1	SLNS	
AL	Lauderdale	Asplenium ruta-muraria	Wall-rue Spleenwort	S1	SLNS	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
AL	Lawrence	Aneides aeneus	Green Salamander	S3	SP	
AL	Lawrence	Necturus alabamensis	Black Warrior Waterdog			PE
AL	Lawrence	Haliaeetus leucocephalus	Bald Eagle			DM
AL	Lawrence	Picoides borealis	Red-cockaded Woodpecker	S2	SP	LE
AL	Lawrence	Thryomanes bewickii	Bewick's Wren	SHB,S1N	SP	
AL	Lawrence	Setophaga cerulea	Cerulean Warbler	S1B	SP	
AL	Lawrence	Typhlichthys subterraneus	Southern Cavefish	S3	SP	
AL	Lawrence	Etheostoma tuscumbia	Tuscumbia Darter	S2	SP	
AL	Lawrence	Percina sipsi	Bankhead Darter	S1	SP	
AL	Lawrence	Myotis austroriparius	Southeastern Bat	S2	SP	
AL	Lawrence	Myotis grisescens	Gray Bat	S2	SP	LE
AL	Lawrence	Myotis sodalis	Indiana Bat	S2	SP	LE
AL	Lawrence	Myotis septentrionalis	Northern Long-eared Bat	S2	SP	LT
AL	Lawrence	Perimyotis subflavus	Tricolored Bat	S3	NOST	
AL	Lawrence	Corynorhinus rafinesquii	Rafinesque’s Big-eared bat	S2	SP	
AL	Lawrence	Sylvilagus obscurus	Appalachian Cottontail	S1	GA	
AL	Lawrence	Sternotherus depressus	Flattened Musk Turtle	S2	SP	LT
AL	Lawrence	Plestiodon anthracinus	Coal Skink	S3	SP	
AL	Lawrence	Actinonaias ligamentina	Mucket	S2	PSM	
AL	Lawrence	Cumberlandia monodonta	Spectaclecase	S1	SP	LE
AL	Lawrence	Dromus dromas	Dromedary Pearlymussel	S1	SP	LE
AL	Lawrence	Elliptio dilatata	Spike	S1	PSM	
AL	Lawrence	Epioblasma brevidens	Cumberlandian Combshell	S1	SP	LE
AL	Lawrence	Hemistena lata	Cracking Pearlymussel	S1	SP	LE
AL	Lawrence	Lampsilis abrupta	Pink Mucket	S1	SP	LE
AL	Lawrence	Lampsilis perovalis	Orange-nacre Mucket			LT
AL	Lawrence	Lasmigona complanata	White Heelsplitter	S2	PSM	
AL	Lawrence	Lemiox rimosus	Birdwing Pearlymussel	S1	SP	LE
AL	Lawrence	Ligumia recta	Black Sandshell	S2	PSM	
AL	Lawrence	Medionidus conradicus	Cumberland Moccasinshell	S1	SP	
AL	Lawrence	Plethobasus cyphyus	Sheepnose	S1	SP	LE
AL	Lawrence	Pleurobema cordatum	Ohio Pigtoe	S2	PSM	
AL	Lawrence	Ptychobranchus subtentum	Fluted Kidneyshell			LE

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
AL	Lawrence	Quadrula metanevra	Monkeyface	S3	PSM	
AL	Lawrence	Toxolasma lividus	Purple Lilliput	S2	PSM	
AL	Lawrence	Toxolasma parvum	Lilliput	S3	PSM	
AL	Lawrence	Elimia nassula	Round-rib Elimia	S1	TRKD	
AL	Lawrence	Pleurocera brumbyi	Spiral Hornsnail	S2S3	TRKD	
AL	Lawrence	Silphium brachiatum	Cumberland Rosinweed	S2	SLNS	
AL	Lawrence	Silphium pinnatifidum	Prairie-dock	S1	SLNS	
AL	Lawrence	Onosmodium molle ssp. molle	Soft False Gromwell	S2	SLNS	
AL	Lawrence	Leavenworthia alabamica	Alabama Glade-cress	S2	SLNS	
AL	Lawrence	Leavenworthia crassa	Fleshy-fruit Gladecress	S2	SLNS	LE
AL	Lawrence	Leavenworthia uniflora	Michaux Leavenworthia	S2	SLNS	
AL	Lawrence	Paysonia densipila	Duck River Bladderpod	S1	SLNS	
AL	Lawrence	Lesquerella lyrata	Lyre-leaf Bladderpod	S1	SLNS	LT
AL	Lawrence	Pachysandra procumbens	Allegheny-spurge	S2S3	SLNS	
AL	Lawrence	Silene rotundifolia	Roundleaf Catchfly	S1S2	SLNS	
AL	Lawrence	Stellaria fontinalis	Water Stitchwort	S1	SLNS	
AL	Lawrence	Celastrus scandens	climbing bittersweet	S2	SLNS	
AL	Lawrence	Drosera rotundifolia	Roundleaf Sundew	S1	SLNS	
AL	Lawrence	Apios priceana	Price's Potato-bean	S2	SLNS	LT
AL	Lawrence	Astragalus tennesseensis	Tennessee Milk-vetch	S1S2	SLNS	
AL	Lawrence	Dalea foliosa	Leafy Prairie-clover	S1	SLNS	LE
AL	Lawrence	Dalea gattingeri	Gattinger Prairie-clover	S3	SLNS	
AL	Lawrence	Pediomelum subacaule	Tuberous Scurfpea	S2	SLNS	
AL	Lawrence	Dicentra cucullaria	Dutchman's Breeches	S2	SLNS	
AL	Lawrence	Frasera caroliniensis	American Columbo	S2	SLNS	
AL	Lawrence	Juglans cinerea	Butternut	S1	SLNS	
AL	Lawrence	Linum sulcatum var. harperi	Harper's Grooved-yellow Flax	S1	SLNS	
AL	Lawrence	Monotropsis odorata var. odorata	Sweet Pinesap	S1	SLNS	
AL	Lawrence	Eriogonum harperi	Harper's Umbrella-plant	S1	SLNS	
AL	Lawrence	Phlox pulchra	Wherry's Phlox	S2	SLNS	
AL	Lawrence	Phemeranthus calcaricus	Limestone Fame-flower	S2	SLNS	
AL	Lawrence	Delphinium alabamicum	Alabama Larkspur	S2	SLNS	
AL	Lawrence	Hydrastis canadensis	Goldenseal	S2	SLNS	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
AL	Lawrence	Thalictrum debile	Southern Meadow-rue	S2	SLNS	
AL	Lawrence	Thalictrum mirabile	Little Mountain Meadow-rue	S2	SLNS	
AL	Lawrence	Comandra umbellata	Bastard Toad-flax	S1	SLNS	
AL	Lawrence	Nestronia umbellula	Nestronia	S2	SLNS	
AL	Lawrence	Stewartia ovata	Mountain Camellia	S2S3	SLNS	
AL	Lawrence	Viola egglestonii	Eggleston's Violet	S1	SLNS	
AL	Lawrence	Erythronium albidum	White Trout-lily	S1S2	SLNS	
AL	Lawrence	Lilium canadense	Canada Lily	S2	SLNS	
AL	Lawrence	Schoenolirion croceum	Sunnybell	S2	SLNS	
AL	Lawrence	Trillium flexipes	Nodding Trillium	S2S3	SLNS	
AL	Lawrence	Trillium recurvatum	Prairie Trillium	S2	SLNS	
AL	Lawrence	Aplectrum hyemale	Puttyroot	S2	SLNS	
AL	Lawrence	Isotria verticillata	Large Whorled Pogonia	S2	SLNS	
AL	Lawrence	Asplenium bradleyi	Bradley's Spleenwort	S2	SLNS	
AL	Lawrence	Hymenophyllum tayloriae	Gorge Filmy Fern	S1	SLNS	
AL	Lawrence	Trichomanes petersii	Dwarf Filmy-fern	S2	SLNS	
AL	Lawrence	Isoetes butleri	Butler's Quillwort	S2	SLNS	
AL	Lawrence	Huperzia lucidula	Shining Clubmoss	S2	SLNS	
AL	Lawrence	Huperzia porophila	Rock Clubmoss	S1	SLNS	
AL	Lawrence	Ophioglossum engelmannii	Limestone Adder's-tongue	S2S3	SLNS	
AL	Limestone	Cryptobranchus alleganiensis	Hellbender	S2	SP	PS
AL	Limestone	Haliaeetus leucocephalus	Bald Eagle			DM
AL	Limestone	Chondestes grammacus	Lark Sparrow	S3B	SP	
AL	Limestone	Polyodon spathula	Paddlefish	S3	SP, CNGF	
AL	Limestone	Hybopsis amblops	Bigeye Chub	S3	TRKD	
AL	Limestone	Notropis photogenis	Silver Shiner	S1	TRKD	
AL	Limestone	Notropis micropteryx	Highland Shiner	S2	TRKD	
AL	Limestone	Chrosomus erythrogaster	Southern Redbelly Dace	S3	TRKD	
AL	Limestone	Carpiodes carpio	River Carpsucker	S2	CNGF	
AL	Limestone	Moxostoma anisurum	Silver Redhorse	S2	CNGF	
AL	Limestone	Noturus eleutherus	Mountain Madtom	S1	CNGF	
AL	Limestone	Noturus flavus	Stonecat	S1	CNGF	
AL	Limestone	Noturus exilis	Slender Madtom	S3	CNGF	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
AL	Limestone	Typhlichthys subterraneus	Southern Cavefish	S3	SP	
AL	Limestone	Elassoma alabamae	Spring Pygmy Sunfish	S1	SP	LT
AL	Limestone	Etheostoma boschungi	Slackwater Darter	S1	SP	LT
AL	Limestone	Etheostoma flabellare	Fantail Darter	S3	TRKD	
AL	Limestone	Etheostoma jessiae	Blueside Darter	S3	TRKD	
AL	Limestone	Etheostoma kennicotti	Stripetail Darter	S3	TRKD	
AL	Limestone	Etheostoma rufilineatum	Redline Darter	S3	TRKD	
AL	Limestone	Etheostoma simoterum	Snubnose Darter	S3	TRKD	
AL	Limestone	Etheostoma tuscumbia	Tuscumbia Darter	S2	SP	
AL	Limestone	Etheostoma wapiti	Boulder Darter	S1	SP	LE
AL	Limestone	Percina evides	Gilt Darter	S2	TRKD	
AL	Limestone	Percina shumardi	River Darter	S3	TRKD	
AL	Limestone	Myotis grisescens	Gray Bat	S2	SP	LE
AL	Limestone	Myotis sodalis	Indiana Bat	S2	SP	LE
AL	Limestone	Perimyotis subflavus	Tricolored Bat	S3	NOST	
AL	Limestone	Zapus hudsonius	Meadow Jumping Mouse	S1	SP	
AL	Limestone	Actinonaias ligamentina	Mucket	S2	PSM	
AL	Limestone	Cumberlandia monodonta	Spectaclecase	S1	SP	LE
AL	Limestone	Dromus dromas	Dromedary Pearlymussel	S1	SP	LE
AL	Limestone	Elliptio dilatata	Spike	S1	PSM	
AL	Limestone	Epioblasma brevidens	Cumberlandian Combshell	S1	SP	LE
AL	Limestone	Epioblasma florentina walkeri	Tan Riffleshell			LE
AL	Limestone	Epioblasma torulosa torulosa	Tuberculed Blossom Pearlymussel			LE
AL	Limestone	Fusconaia barnesiana	Tennessee Pigtoe	S1	PSM	
AL	Limestone	Fusconaia cuneolus	Fine-rayed Pigtoe	S1	SP	LE
AL	Limestone	Hemistena lata	Cracking Pearlymussel	S1	SP	LE
AL	Limestone	Lampsilis fasciola	Wavy-rayed Lampmussel	S2	PSM	
AL	Limestone	Lampsilis abrupta	Pink Mucket	S1	SP	LE
AL	Limestone	Lampsilis ovata	Pocketbook	S2	PSM	
AL	Limestone	Lasmigona complanata	White Heelsplitter	S2	PSM	
AL	Limestone	Lemiox rimosus	Birdwing Pearlymussel	S1	SP	LE
AL	Limestone	Pleuronaia dolabelloides	Slabside Pearlymussel	S1	SP	LE
AL	Limestone	Ligumia recta	Black Sandshell	S2	PSM	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
AL	Limestone	Obovaria retusa	Ring Pink			LE
AL	Limestone	Plethobasus cooperianus	Orange-foot Pimpleback			LE
AL	Limestone	Plethobasus cyphyus	Sheepnose	S1	SP	LE
AL	Limestone	Pleurobema cordatum	Ohio Pigtoe	S2	PSM	
AL	Limestone	Pleurobema oviforme	Tennessee Clubshell	S1	PSM	
AL	Limestone	Pleurobema plenum	Rough Pigtoe	S1	SP	LE
AL	Limestone	Potamilus ohiensis	Pink Papershell	S3	PSM	
AL	Limestone	Ptychobranchus fasciolaris	Kidneyshell	S2	PSM	
AL	Limestone	Ptychobranchus subtentum	Fluted Kidneyshell			LE
AL	Limestone	Quadrula intermedia	Cumberland Monkeyface			LE
AL	Limestone	Quadrula metanevra	Monkeyface	S3	PSM	
AL	Limestone	Toxolasma lividus	Purple Lilliput	S2	PSM	
AL	Limestone	Truncilla truncata	Deertoe	S1	PSM	
AL	Limestone	Villosa taeniata	Painted Creekshell	S2	PSM	
AL	Limestone	Villosa vanuxemensis	Mountain Creekshell	S3	PSM	
AL	Limestone	Campeloma decampi	Slender Campeloma	S1	SP	LE
AL	Limestone	Marstonia pachyta	Armored marstonia	S1	SP	LE
AL	Limestone	Athearnia anthonyi	Anthony's River Snail	S1	SP	LE
AL	Limestone	Pleurocera brumbyi	Spiral Hornsnail	S2S3	TRKD	
AL	Limestone	Pleurocera pyrenella	Skirted Hornsnail	S2	TRKD	
AL	Limestone	Silphium mohrii	Mohr's Rosin-weed	S1	SLNS	
AL	Limestone	Armoracia lacustris	Lake-cress	S1	SLNS	
AL	Limestone	Paysonia densipila	Duck River Bladderpod	S1	SLNS	
AL	Limestone	Ranunculus flabellaris	Yellow Water-crowfoot	S1	SLNS	
AL	Limestone	Neviusia alabamensis	Alabama Snow-wreath	S2	SLNS	
AL	Limestone	Elodea canadensis	Waterweed	S1	SLNS	
AL	Limestone	Trillium pusillum var. 1	Interior Least Trillium	S2	SLNS	
AL	Limestone	Trillium sessile	Sessile Trillium	S2	SLNS	
AL	Limestone	Platanthera lacera	Ragged Fringe Orchid	S2	SLNS	
AL	Madison	Cryptobranchus alleganiensis	Hellbender	S2	SP	PS
AL	Madison	Aneides aeneus	Green Salamander	S3	SP	
AL	Madison	Haliaeetus leucocephalus	Bald Eagle			DM
AL	Madison	Falco peregrinus	Peregrine Falcon	SHB,S3N	SP	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
AL	Madison	Tyto alba	Common Barn-owl	S3	SP	
AL	Madison	Typhlichthys subterraneus	Southern Cavefish	S3	SP	
AL	Madison	Etheostoma boschungi	Slackwater Darter	S1	SP	LT
AL	Madison	Etheostoma tuscumbia	Tuscumbia Darter	S2	SP	
AL	Madison	Percina tanasi	Snail Darter	S1	SP	LT
AL	Madison	Myotis lucifugus	Little Brown Bat	S3	SP	
AL	Madison	Myotis grisescens	Gray Bat	S2	SP	LE
AL	Madison	Myotis septentrionalis	Northern Long-eared Bat	S2	SP	LT
AL	Madison	Perimyotis subflavus	Tricolored Bat	S3	NOST	
AL	Madison	Corynorhinus rafinesquii	Rafinesque's Big-eared bat	S2	SP	
AL	Madison	Palaemonias alabamae	Alabama Blind Cave Shrimp	S1	SP	LE
AL	Madison	Actinonaias ligamentina	Mucket	S2	PSM	
AL	Madison	Alasmidonta marginata	Elktoe	S1	PSM	
AL	Madison	Alasmidonta viridis	Slippershell Mussel	S1	SP	
AL	Madison	Cumberlandia monodonta	Spectaclecase	S1	SP	LE
AL	Madison	Cyprogenia stegaria	Fanshell	S1	SP	LE
AL	Madison	Dromus dromas	Dromedary Pearlymussel	S1	SP	LE
AL	Madison	Elliptio dilatata	Spike	S1	PSM	
AL	Madison	Epioblasma florentina walkeri	Tan Riffleshell			LE
AL	Madison	Epioblasma torulosa torulosa	Tuberculed Blossom Pearlymussel			LE
AL	Madison	Epioblasma triquetra	Snuffbox	S1	PSM	LE
AL	Madison	Fusconaia barnesiana	Tennessee Pigtoe	S1	PSM	
AL	Madison	Fusconaia cor	Shiny Pigtoe Pearlymussel	S1	SP	LE
AL	Madison	Fusconaia cuneolus	Fine-rayed Pigtoe	S1	SP	LE
AL	Madison	Fusconaia subrotunda	Longsolid	S1	PSM	
AL	Madison	Lampsilis fasciola	Wavy-rayed Lampmussel	S2	PSM	
AL	Madison	Lampsilis abrupta	Pink Mucket	S1	SP	LE
AL	Madison	Lampsilis ovata	Pocketbook	S2	PSM	
AL	Madison	Lasmigona complanata	White Heelsplitter	S2	PSM	
AL	Madison	Pleuronaia dolabelloides	Slabside Pearlymussel	S1	SP	LE
AL	Madison	Ligumia recta	Black Sandshell	S2	PSM	
AL	Madison	Medionidus conradicus	Cumberland Moccasinshell	S1	SP	
AL	Madison	Obovaria retusa	Ring Pink			LE

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
AL	Madison	Obovaria subrotunda	Round Hickorynut	S2	PSM	
AL	Madison	Plethobasus cyphyus	Sheepnose	S1	SP	LE
AL	Madison	Pleurobema sintoxia	Round Pigtoe	S1	SP	
AL	Madison	Pleurobema cordatum	Ohio Pigtoe	S2	PSM	
AL	Madison	Pleurobema oviforme	Tennessee Clubshell	S1	PSM	
AL	Madison	Pleurobema plenum	Rough Pigtoe	S1	SP	LE
AL	Madison	Pleurobema rubrum	Pyramid Pigtoe	S1	SP	
AL	Madison	Ptychobranchus fasciolaris	Kidneyshell	S2	PSM	
AL	Madison	Ptychobranchus subtentum	Fluted Kidneyshell			LE
AL	Madison	Quadrula cylindrica	Rabbitsfoot			LT
AL	Madison	Quadrula cylindrica cylindrica	Smooth Rabbitsfoot	S1	SP	LT
AL	Madison	Quadrula metanevra	Monkeyface	S3	PSM	
AL	Madison	Toxolasma cylindrellus	Pale Lilliput	S1	SP	LE
AL	Madison	Toxolasma lividus	Purple Lilliput	S2	PSM	
AL	Madison	Truncilla truncata	Deertoe	S1	PSM	
AL	Madison	Villosa iris	Rainbow Mussel	S3	PSM	
AL	Madison	Villosa taeniata	Painted Creekshell	S2	PSM	
AL	Madison	Villosa vanuxemensis	Mountain Creekshell	S3	PSM	
AL	Madison	Campeloma decampi	Slender Campeloma	S1	SP	LE
AL	Madison	Marstonia pachyta	Armored marstonia	S1	SP	LE
AL	Madison	Pleurocera nobilis	Noble Hornsnail	S2	TRKD	
AL	Madison	Cotinus obovatus	American Smoke-tree	S2	SLNS	
AL	Madison	Silphium brachiatum	Cumberland Rosinweed	S2	SLNS	
AL	Madison	Silphium mohrii	Mohr's Rosin-weed	S1	SLNS	
AL	Madison	Jeffersonia diphylla	Twinleaf	S2	SLNS	
AL	Madison	Onosmodium molle ssp. subsetosum	False Gromwell	S1	SLNS	
AL	Madison	Draba cuneifolia	Wedge-leaf Whitlow-grass	S1	SLNS	
AL	Madison	Leavenworthia uniflora	Michaux Leavenworthia	S2	SLNS	
AL	Madison	Pachysandra procumbens	Allegheny-spurge	S2S3	SLNS	
AL	Madison	Silene ovata	Ovate Catchfly	S2	SLNS	
AL	Madison	Hypericum nudiflorum	St. John's-wort	S2	SLNS	
AL	Madison	Viburnum bracteatum	Arrow-wood	S1	SLNS	
AL	Madison	Apios priceana	Price's Potato-bean	S2	SLNS	LT

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
AL	Madison	Astragalus canadensis	Canadian Milkvetch	S1	SLNS	
AL	Madison	Desmodium ochroleucum	Creamflower Tick-trefoil	S1S2	SLNS	
AL	Madison	Dicentra cucullaria	Dutchman's Breeches	S2	SLNS	
AL	Madison	Frasera caroliniensis	American Columbo	S2	SLNS	
AL	Madison	Blephilia subnuda	Smooth Blephilia	S1S2	SLNS	
AL	Madison	Monarda clinopodia	Horsemint	S2	SLNS	
AL	Madison	Pycnanthemum curvipes	Mountain-mint	S1?	SLNS	
AL	Madison	Oxalis grandis	Great Yellow Wood-sorrel	S1	SLNS	
AL	Madison	Eriogonum harperi	Harper's Umbrella-plant	S1	SLNS	
AL	Madison	Hottonia inflata	Featherfoil	S2	SLNS	
AL	Madison	Clematis morefieldii	Morefield's Leather-flower	S2	SLNS	LE
AL	Madison	Enemion biternatum	False Rue-anemone	S2	SLNS	
AL	Madison	Ranunculus flabellaris	Yellow Water-crowfoot	S1	SLNS	
AL	Madison	Thalictrum debile	Southern Meadow-rue	S2	SLNS	
AL	Madison	Neviusia alabamensis	Alabama Snow-wreath	S2	SLNS	
AL	Madison	Rubus allegheniensis	Allegheny Blackberry	S1	SLNS	
AL	Madison	Castilleja coccinea	Scarlet Indian-paintbrush	S1	SLNS	
AL	Madison	Valeriana pauciflora	Valerian	S1	SLNS	
AL	Madison	Carex decomposita	Epiphytic Sedge	S1	SLNS	
AL	Madison	Carex purpurifera	Sedge	S2	SLNS	
AL	Madison	Lilium canadense	Canada Lily	S2	SLNS	
AL	Madison	Lilium superbum	Turk's Cap Lily	S2	SLNS	
AL	Madison	Trillium pusillum var. 1	Interior Least Trillium	S2	SLNS	
AL	Madison	Isotria verticillata	Large Whorled Pogonia	S2	SLNS	
AL	Madison	Diarrhena americana	American Beakgrain	S2	SLNS	
AL	Madison	Elymus churchii	Church's Wildrye	S1	SLNS	
AL	Madison	Muhlenbergia sobolifera	Muhly Grass	S1	SLNS	
AL	Madison	Ophioglossum engelmannii	Limestone Adder's-tongue	S2S3	SLNS	
AL	Marion	Cryptobranchus alleganiensis	Hellbender	S2	SP	PS
AL	Marion	Aneides aeneus	Green Salamander	S3	SP	
AL	Marion	Plestiodon anthracinus	Coal Skink	S3	SP	
AL	Marion	Anodontoides radiatus	Rayed Creekshell	S3	PSM	
AL	Marion	Lampsilis ovata	Pocketbook	S2	PSM	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
AL	Marion	Lampsilis perovalis	Orange-nacre Mucket			LT
AL	Marion	Lampsilis straminea straminea	Rough Fatmucket	S2	TRKD	
AL	Marion	Strophitus subvexus	Southern Creekmussel	S3	PSM	
AL	Marion	Pachysandra procumbens	Allegheny-spurge	S2S3	SLNS	
AL	Marion	Cuscuta harperi	Harper's Dodder	S2	SLNS	
AL	Marion	Phemeranthus teretifolius	Roundleaf Fameflower	S1	SLNS	
AL	Marion	Boykinia aconitifolia	Brook Saxifrage	S1	SLNS	
AL	Marion	Stewartia ovata	Mountain Camellia	S2S3	SLNS	
AL	Marion	Platanthera integrilabia	White Fringeless Orchid	S2	SLNS	LT
AL	Marion	Trichomanes petersii	Dwarf Filmy-fern	S2	SLNS	
AL	Marion	Huperzia porophila	Rock Clubmoss	S1	SLNS	
AL	Marion	Selaginella arenicola ssp. riddellii	Spikemoss	S2	SLNS	
AL	Marion	Selaginella rupestris	Spikemoss	S2	SLNS	
AL	Marshall	Cryptobranchus alleganiensis	Hellbender	S2	SP	PS
AL	Marshall	Aneides aeneus	Green Salamander	S3	SP	
AL	Marshall	Haliaeetus leucocephalus	Bald Eagle			DM
AL	Marshall	Falco peregrinus	Peregrine Falcon	SHB,S3N	SP	
AL	Marshall	Picoides borealis	Red-cockaded Woodpecker	S2	SP	LE
AL	Marshall	Thryomanes bewickii	Bewick's Wren	SHB,S1N	SP	
AL	Marshall	Typhlichthys subterraneus	Southern Cavefish	S3	SP	
AL	Marshall	Percina tanasi	Snail Darter	S1	SP	LT
AL	Marshall	Myotis grisescens	Gray Bat	S2	SP	LE
AL	Marshall	Myotis sodalis	Indiana Bat	S2	SP	LE
AL	Marshall	Perimyotis subflavus	Tricolored Bat	S3	NOST	
AL	Marshall	Corynorhinus rafinesquii	Rafinesque’s Big-eared bat	S2	SP	
AL	Marshall	Macrochelys temminckii	Alligator Snapping Turtle	S3	SP	
AL	Marshall	Cambarus cracens	Slenderclaw	S1	TRKD	
AL	Marshall	Actinonaias ligamentina	Mucket	S2	PSM	
AL	Marshall	Cumberlandia monodonta	Spectaclecase	S1	SP	LE
AL	Marshall	Cyprogenia stegaria	Fanshell	S1	SP	LE
AL	Marshall	Dromus dromas	Dromedary Pearlymussel	S1	SP	LE
AL	Marshall	Elliptio dilatata	Spike	S1	PSM	
AL	Marshall	Epioblasma torulosa torulosa	Tuberculed Blossom Pearlymussel			LE

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
AL	Marshall	Epioblasma triquetra	Snuffbox	S1	PSM	LE
AL	Marshall	Fusconaia barnesiana	Tennessee Pigtoe	S1	PSM	
AL	Marshall	Fusconaia cor	Shiny Pigtoe Pearlymussel	S1	SP	LE
AL	Marshall	Fusconaia cuneolus	Fine-rayed Pigtoe	S1	SP	LE
AL	Marshall	Fusconaia subrotunda	Longsolid	S1	PSM	
AL	Marshall	Lampsilis fasciola	Wavy-rayed Lampmussel	S2	PSM	
AL	Marshall	Lampsilis abrupta	Pink Mucket	S1	SP	LE
AL	Marshall	Lampsilis ovata	Pocketbook	S2	PSM	
AL	Marshall	Pleuronaia dolabelloides	Slabside Pearlymussel	S1	SP	LE
AL	Marshall	Ligumia recta	Black Sandshell	S2	PSM	
AL	Marshall	Obovaria retusa	Ring Pink			LE
AL	Marshall	Obovaria subrotunda	Round Hickorynut	S2	PSM	
AL	Marshall	Plethobasus cooperianus	Orange-foot Pimpleback			LE
AL	Marshall	Plethobasus cyphyus	Sheepnose	S1	SP	LE
AL	Marshall	Pleurobema sintoxia	Round Pigtoe	S1	SP	
AL	Marshall	Pleurobema cordatum	Ohio Pigtoe	S2	PSM	
AL	Marshall	Pleurobema oviforme	Tennessee Clubshell	S1	PSM	
AL	Marshall	Pleurobema plenum	Rough Pigtoe	S1	SP	LE
AL	Marshall	Pleurobema rubrum	Pyramid Pigtoe	S1	SP	
AL	Marshall	Ptychobranchus fasciolaris	Kidneyshell	S2	PSM	
AL	Marshall	Quadrula cylindrica	Rabbitsfoot			LT
AL	Marshall	Quadrula cylindrica cylindrica	Smooth Rabbitsfoot	S1	SP	LT
AL	Marshall	Quadrula metanevra	Monkeyface	S3	PSM	
AL	Marshall	Toxolasma lividus	Purple Lilliput	S2	PSM	
AL	Marshall	Truncilla truncata	Deertoe	S1	PSM	
AL	Marshall	Villosa iris	Rainbow Mussel	S3	PSM	
AL	Marshall	Villosa taeniata	Painted Creekshell	S2	PSM	
AL	Marshall	Villosa vanuxemensis	Mountain Creekshell	S3	PSM	
AL	Marshall	Pleurocera curta	Shortspire Hornsnail	S1S2	TRKD	
AL	Marshall	Cotinus obovatus	American Smoke-tree	S2	SLNS	
AL	Marshall	Bigelowia nuttallii	Nuttall's Rayless Golden-rod	S3	SLNS	
AL	Marshall	Silphium brachiatum	Cumberland Rosinweed	S2	SLNS	
AL	Marshall	Silphium mohrii	Mohr's Rosin-weed	S1	SLNS	

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AL	Marshall	Jeffersonia diphylla	Twinleaf	S2	SLNS	
AL	Marshall	Draba ramosissima	Branching Whitlow-wort	S1	SLNS	
AL	Marshall	Leavenworthia exigua var. lutea	Pasture Glade-cress	S1	SLNS	
AL	Marshall	Leavenworthia uniflora	Michaux Leavenworthia	S2	SLNS	
AL	Marshall	Silene caroliniana ssp. wherryi	Wherry's Catchfly	S2	SLNS	
AL	Marshall	Silene ovata	Ovate Catchfly	S2	SLNS	
AL	Marshall	Cuscuta harperi	Harper's Dodder	S2	SLNS	
AL	Marshall	Apios priceana	Price's Potato-bean	S2	SLNS	LT
AL	Marshall	Dicentra cucullaria	Dutchman's Breeches	S2	SLNS	
AL	Marshall	Ribes curvatum	Granite Gooseberry	S2	SLNS	
AL	Marshall	Fothergilla major	Witch-alder	S2	SLNS	
AL	Marshall	Agastache nepetoides	Yellow Giant-hyssop	S1	SLNS	
AL	Marshall	Blephilia subnuda	Smooth Blephilia	S1S2	SLNS	
AL	Marshall	Orobanche uniflora	One-flowered Broomrape	S2	SLNS	
AL	Marshall	Claytonia caroliniana	Carolina Spring-beauty	S1	SLNS	
AL	Marshall	Hydrastis canadensis	Goldenseal	S2	SLNS	
AL	Marshall	Neviusia alabamensis	Alabama Snow-wreath	S2	SLNS	
AL	Marshall	Nestronia umbellula	Nestronia	S2	SLNS	
AL	Marshall	Sarracenia oreophila	Green Pitcher Plant	S2	SLNS	LE
AL	Marshall	Castilleja coccinea	Scarlet Indian-paintbrush	S1	SLNS	
AL	Marshall	Chelone lyonii	Pink Turtlehead	S1	SLNS	
AL	Marshall	Stewartia malacodendron	Silky-camellia	S2S3	SLNS	
AL	Marshall	Carex purpurifera	Sedge	S2	SLNS	
AL	Marshall	Elodea canadensis	Waterweed	S1	SLNS	
AL	Marshall	Allium speculae	Little River Canyon Onion	S2	SLNS	
AL	Marshall	Allium tricoccum	Small White Leek	S1	SLNS	
AL	Marshall	Melanthium parviflorum	False Helleborne	S1S2	SLNS	
AL	Marshall	Schoenolirion croceum	Sunnybell	S2	SLNS	
AL	Marshall	Schoenolirion wrightii	Sunnybell	S1	SLNS	
AL	Marshall	Trillium pusillum var. 1	Interior Least Trillium	S2	SLNS	
AL	Marshall	Trillium sessile	Sessile Trillium	S2	SLNS	
AL	Marshall	Trillium sulcatum	Southern Red Trillium	S1	SLNS	
AL	Marshall	Diarrhena americana	American Beakgrain	S2	SLNS	

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AL	Marshall	Elymus churchii	Church's Wildrye	S1	SLNS	
AL	Marshall	Equisetum arvense	Common Horsetail	S2	SLNS	
AL	Marshall	Trichomanes petersii	Dwarf Filmy-fern	S2	SLNS	
AL	Marshall	Isoetes butleri	Butler's Quillwort	S2	SLNS	
AL	Marshall	Ophioglossum engelmannii	Limestone Adder's-tongue	S2S3	SLNS	
AL	Morgan	Cryptobranchus alleganiensis	Hellbender	S2	SP	PS
AL	Morgan	Haliaeetus leucocephalus	Bald Eagle			DM
AL	Morgan	Typhlichthys subterraneus	Southern Cavefish	S3	SP	
AL	Morgan	Etheostoma tuscumbia	Tuscumbia Darter	S2	SP	
AL	Morgan	Myotis austroriparius	Southeastern Bat	S2	SP	
AL	Morgan	Myotis grisescens	Gray Bat	S2	SP	LE
AL	Morgan	Myotis sodalis	Indiana Bat	S2	SP	LE
AL	Morgan	Perimyotis subflavus	Tricolored Bat	S3	NOST	
AL	Morgan	Actinonaias ligamentina	Mucket	S2	PSM	
AL	Morgan	Cumberlandia monodonta	Spectaclecase	S1	SP	LE
AL	Morgan	Dromus dromas	Dromedary Pearlymussel	S1	SP	LE
AL	Morgan	Elliptio dilatata	Spike	S1	PSM	
AL	Morgan	Epioblasma torulosa torulosa	Tuberculed Blossom Pearlymussel			LE
AL	Morgan	Lampsilis abrupta	Pink Mucket	S1	SP	LE
AL	Morgan	Lampsilis ovata	Pocketbook	S2	PSM	
AL	Morgan	Ligumia recta	Black Sandshell	S2	PSM	
AL	Morgan	Medionidus conradicus	Cumberland Moccasinshell	S1	SP	
AL	Morgan	Obovaria retusa	Ring Pink			LE
AL	Morgan	Plethobasus cyphyus	Sheepnose	S1	SP	LE
AL	Morgan	Pleurobema sintoxia	Round Pigtoe	S1	SP	
AL	Morgan	Pleurobema cordatum	Ohio Pigtoe	S2	PSM	
AL	Morgan	Quadrula metanevra	Monkeyface	S3	PSM	
AL	Morgan	Villosa trabalis	Cumberland Bean			LE
AL	Morgan	Trichostomum crispulum	Moss	S2	SLNS	
AL	Morgan	Cotinus obovatus	American Smoke-tree	S2	SLNS	
AL	Morgan	Silphium brachiatum	Cumberland Rosinweed	S2	SLNS	
AL	Morgan	Leavenworthia alabamica	Alabama Glade-cress	S2	SLNS	
AL	Morgan	Leavenworthia crassa	Fleshy-fruit Gladecress	S2	SLNS	LE

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AL	Morgan	Paysonia densipila	Duck River Bladderpod	S1	SLNS	
AL	Morgan	Pachysandra procumbens	Allegheny-spurge	S2S3	SLNS	
AL	Morgan	Triosteum angustifolium	Horse-gentian	S1	SLNS	
AL	Morgan	Astragalus tennesseensis	Tennessee Milk-vetch	S1S2	SLNS	
AL	Morgan	Dalea foliosa	Leafy Prairie-clover	S1	SLNS	LE
AL	Morgan	Dalea gattingeri	Gattinger Prairie-clover	S3	SLNS	
AL	Morgan	Callirhoe alcaeoides	Clustered Poppy-mallow	S2	SLNS	
AL	Morgan	Enemion biternatum	False Rue-anemone	S2	SLNS	
AL	Morgan	Mitella diphylla	Two-leaf Bishop's-cap	S1	SLNS	
AL	Morgan	Lilium canadense	Canada Lily	S2	SLNS	
AL	Morgan	Schoenolirion croceum	Sunnybell	S2	SLNS	
AL	Morgan	Trillium flexipes	Nodding Trillium	S2S3	SLNS	
AL	Morgan	Trillium recurvatum	Prairie Trillium	S2	SLNS	
AL	Morgan	Asplenium scolopendrium var. americanum	American Hart's-tongue Fern	S1	SLNS	LT
AL	Morgan	Cystopteris tennesseensis	Tennessee Bladderfern	S2	SLNS	
AL	Morgan	Equisetum arvense	Common Horsetail	S2	SLNS	
AL	Morgan	Isoetes butleri	Butler's Quillwort	S2	SLNS	
AL	Morgan	Ophioglossum engelmannii	Limestone Adder's-tongue	S2S3	SLNS	
AL	Walker	Aneides aeneus	Green Salamander	S3	SP	
AL	Walker	Elliptio arctata	Delicate Spike	S2	PSM	
AL	Walker	Strophitus subvexus	Southern Creekmussel	S3	PSM	
AL	Winston	Aneides aeneus	Green Salamander	S3	SP	
AL	Winston	Necturus alabamensis	Black Warrior Waterdog	S2	SP	PE
AL	Winston	Haliaeetus leucocephalus	Bald Eagle			DM
AL	Winston	Picoides borealis	Red-cockaded Woodpecker	S2	SP	LE
AL	Winston	Percina shumardi	River Darter	S3	TRKD	
AL	Winston	Percina sipsi	Bankhead Darter	S1	SP	
AL	Winston	Sylvilagus obscurus	Appalachian Cottontail	S1	GA	
AL	Winston	Sternotherus depressus	Flattened Musk Turtle	S2	SP	LT
AL	Winston	Elliptio arctata	Delicate Spike	S2	PSM	
AL	Winston	Lampsilis altilis	Fine-lined Pocketbook			LT
AL	Winston	Lampsilis perovalis	Orange-nacre Mucket			LT
AL	Winston	Medionidus acutissimus	Alabama Moccasinshell	S2	SP	LT

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
AL	Winston	Pleurobema furvum	Dark Pigtoe	S1	SP	LE
AL	Winston	Pleurobema perovatum	Ovate Clubshell	S1	SP	LE
AL	Winston	Pleurobema rubellum	Warrior Pigtoe	S1	SP	PS
AL	Winston	Ptychobranchus greenii	Triangular Kidneyshell	S1	SP	LE
AL	Winston	Strophitus subvexus	Southern Creekmussel	S3	PSM	
AL	Winston	Asclepias exaltata	Poke Milkweed	S1	SLNS	
AL	Winston	Helianthus eggertii	Eggert's Sunflower	S1	SLNS	DM
AL	Winston	Jamesianthus alabamensis	Alabama Jamesianthus	S3	SLNS	
AL	Winston	Silene rotundifolia	Roundleaf Catchfly	S1S2	SLNS	
AL	Winston	Cuscuta harperi	Harper's Dodder	S2	SLNS	
AL	Winston	Juglans cinerea	Butternut	S1	SLNS	
AL	Winston	Enemion biternatum	False Rue-anemone	S2	SLNS	
AL	Winston	Thalictrum mirabile	Little Mountain Meadow-rue	S2	SLNS	
AL	Winston	Nestronia umbellula	Nestronia	S2	SLNS	
AL	Winston	Stewartia ovata	Mountain Camellia	S2S3	SLNS	
AL	Winston	Sagittaria secundifolia	Arrowhead	S1	SLNS	LT
AL	Winston	Carex brysonii	Bryson's Sedge	S1	SLNS	
AL	Winston	Trillium flexipes	Nodding Trillium	S2S3	SLNS	
AL	Winston	Platanthera integrilabia	White Fringeless Orchid	S2	SLNS	LT
AL	Winston	Asplenium ruta-muraria	Wall-rue Spleenwort	S1	SLNS	
AL	Winston	Hymenophyllum tayloriae	Gorge Filmy Fern	S1	SLNS	
AL	Winston	Trichomanes petersii	Dwarf Filmy-fern	S2	SLNS	
AL	Winston	Huperzia lucidula	Shining Clubmoss	S2	SLNS	
AL	Winston	Huperzia porophila	Rock Clubmoss	S1	SLNS	
AL	Winston	Selaginella arenicola ssp. riddellii	Spikemoss	S2	SLNS	
AL	Winston	Thelypteris pilosa var. alabamensis	Alabama Streak-sorus Fern	S1	SLNS	LT
GA	Catoosa	Cryptobranchus alleganiensis	Hellbender	S2	R	PS
GA	Catoosa	Picoides borealis	Red-cockaded Woodpecker	S2	E	LE
GA	Catoosa	Ichthyomyzon bdellium	Ohio Lamprey	S1	R	
GA	Catoosa	Hemitremia flammea	Flame Chub	S1	E	
GA	Catoosa	Hybopsis amblops	Bigeye Chub	S1S2	R	
GA	Catoosa	Notropis ariommus	Popeye Shiner	S1	E	
GA	Catoosa	Phenacobius uranops	Stargazing Minnow	S1	T	

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GA	Catoosa	Cyprinella galactura	Whitetail Shiner	S3	TRKD	
GA	Catoosa	Erimonax monachus	Spotfin Chub	SX	EXTI	LT
GA	Catoosa	Luxilus chrysocephalus	Striped Shiner	S3	TRKD	
GA	Catoosa	Lythrurus fasciolaris	Rosefin Shiner	S2	TRKD	
GA	Catoosa	Noturus flavipinnis	Yellowfin Madtom	SX	EXTI	LT
GA	Catoosa	Etheostoma cinereum	Ashy Darter	SX	TRKD	
GA	Catoosa	Etheostoma rufilineatum	Redline Darter	S2	TRKD	
GA	Catoosa	Etheostoma simoterum	Snubnose Darter	S1	TRKD	
GA	Catoosa	Percina sciera	Dusky Darter	S3	R	
GA	Catoosa	Percina tanasi	Snail Darter	S1	E	LT
GA	Catoosa	Cambarus extraneus	Chickamauga Crayfish	S2	T	
GA	Catoosa	Villosa trabalis	Cumberland Bean	SH	HIST	LE
GA	Catoosa	Pleurocera pyrenella	Skirted Hornsnail	S2	HIST	
GA	Catoosa	Leavenworthia exigua var. exigua	Glade Cress	S2	T	
GA	Catoosa	Hypericum dolabriforme	Straggling St. John's-wort	S3	SPCO	
GA	Catoosa	Dalea gattingeri	Gattinger Prairie-clover	S2S3	SPCO	
GA	Catoosa	Scutellaria montana	Large-flowered Skullcap	S3	T	LT
GA	Catoosa	Trillium lancifolium	Lance-leaf Trillium	S3	SPCO	
GA	Catoosa	Spiranthes magnicamporum	Great Plains Ladies'-tresses	S1	E	
GA	Chattooga	Aneides aeneus	Green Salamander	S3	R	
GA	Chattooga	Plethodon petraeus	Pigeon Mountain Salamander	S2	R	
GA	Chattooga	Etheostoma ditrema	Coldwater Darter	S1	E	
GA	Chattooga	Myotis grisescens	Gray Bat	S1	E	LE
GA	Chattooga	Epioblasma metastriata	Upland Combshell	SX	E	LE
GA	Chattooga	Epioblasma othcaloogensis	Southern Acornshell	SX	E	LE
GA	Chattooga	Epioblasma penita	Southern Combshell	SX	E	LE
GA	Chattooga	Lampsilis altilis	Fine-lined Pocketbook	S2	T	LT
GA	Chattooga	Medionidus acutissimus	Alabama Moccasinshell	S1	T	LT
GA	Chattooga	Medionidus parvulus	Coosa Moccasinshell	S1	E	LE
GA	Chattooga	Pleurobema georgianum	Southern Pigtoe	S1	E	LE
GA	Chattooga	Ptychobranchus greenii	Triangular Kidneyshell	S1	E	LE
GA	Chattooga	Symphyotrichum georgianum	Georgia Aster	S3	T	
GA	Chattooga	Scutellaria montana	Large-flowered Skullcap	S3	T	LT

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
GA	Chattooga	Sagittaria secundifolia	Arrowhead	S3	T	LT
GA	Chattooga	Carex purpurifera	Sedge	S2	SPCO	
GA	Chattooga	Platanthera integrilabia	White Fringeless Orchid	S1S2	T	LT
GA	Dade	Cryptobranchus alleganiensis	Hellbender	S2	R	PS
GA	Dade	Aneides aeneus	Green Salamander	S3	R	
GA	Dade	Falco peregrinus	Peregrine Falcon	S1	R	
GA	Dade	Hemitremia flammea	Flame Chub	S1	E	
GA	Dade	Notropis ariommus	Popeye Shiner	S1	E	
GA	Dade	Typhlichthys subterraneus	Southern Cavefish	S1	E	
GA	Dade	Myotis grisescens	Gray Bat	S1	E	LE
GA	Dade	Myotis sodalis	Indiana Bat	S1	E	LE
GA	Dade	Myotis leibii	eastern small-footed bat	S2	TRKD	
GA	Dade	Graptemys geographica	Map Turtle	S1	R	
GA	Dade	Lampropeltis triangulum triangulum	Eastern Milk Snake	S2	TRKD	
GA	Dade	Silene regia	Royal Catchfly	S1	E	
GA	Dade	Hypericum sphaerocarpum	Barrens St. Johnswort	S1	SPCO	
GA	Dade	Sabatia capitata	Rose-gentian	S2	R	
GA	Dade	Agastache nepetoides	Yellow Giant-hyssop	S1	SPCO	
GA	Dade	Scutellaria montana	Large-flowered Skullcap	S3	T	LT
GA	Dade	Polemonium reptans	Greek Valerian	S1S2	SPCO	
GA	Dade	Spiraea virginiana	Virginia Spiraea	S1	T	LT
GA	Dade	Viola egglestonii	Eggleston's Violet	S2	SPCO	
GA	Dade	Carex purpurifera	Sedge	S2	SPCO	
GA	Dade	Cypripedium parviflorum	Small Yellow Lady's-slipper	S3	R	
GA	Dade	Ophioglossum engelmannii	Limestone Adder's-tongue	S2S3	SPCO	
GA	Fannin	Cryptobranchus alleganiensis	Hellbender	S2	R	PS
GA	Fannin	Erimystax insignis	Blotched Chub	S2	E	
GA	Fannin	Moxostoma carinatum	River Redhorse	S3	R	
GA	Fannin	Etheostoma vulneratum	Wounded Darter	S1	E	
GA	Fannin	Percina aurantiaca	Tangerine Darter	S2	E	
GA	Fannin	Percina sciera	Dusky Darter	S3	R	
GA	Fannin	Percina squamata	Olive Darter	S1	E	
GA	Fannin	Corynorhinus rafinesquii	Rafinesque’s Big-eared bat	S3	R	

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GA	Fannin	Sylvilagus obscurus	Appalachian Cottontail	S1S2	R	
GA	Fannin	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S2	TRKD	
GA	Fannin	Carex purpurifera	Sedge	S2	SPCO	
GA	Fannin	Cymophyllus fraserianus	Fraser's Sedge	S1	T	
GA	Fannin	Cypripedium acaule	Pink Lady's-slipper	S4	U	
GA	Fannin	Cypripedium parviflorum	Small Yellow Lady's-slipper	S3	R	
GA	Fannin	Isotria medeoloides	Small Whorled Pogonia	S2	T	LT
GA	Floyd	Etheostoma trisella	Trispot Darter	S1	E	
GA	Floyd	Pachysandra procumbens	Allegheny-spurge	S1S2	R	
GA	Floyd	Calystegia catesbeiana ssp. sericata	Blue Ridge Bindweed	S2S3	SPCO	
GA	Floyd	Scutellaria montana	Large-flowered Skullcap	S3	T	LT
GA	Gordon	Falco peregrinus	Peregrine Falcon	S1	R	
GA	Gordon	Moxostoma carinatum	River Redhorse	S3	R	
GA	Gordon	Etheostoma trisella	Trispot Darter	S1	E	
GA	Gordon	Percina aurolineata	Goldline Darter	S2	E	LT
GA	Gordon	Graptemys pulchra	Alabama Map Turtle	S3	R	
GA	Gordon	Epioblasma metastriata	Upland Combshell	SX	E	LE
GA	Gordon	Epioblasma othcaloogensis	Southern Acornshell	SX	E	LE
GA	Gordon	Medionidus acutissimus	Alabama Moccasinshell	S1	T	LT
GA	Gordon	Medionidus parvulus	Coosa Moccasinshell	S1	E	LE
GA	Gordon	Pleurobema decisum	Southern Clubshell	S1	E	LE
GA	Gordon	Pleurobema georgianum	Southern Pigtoe	S1	E	LE
GA	Gordon	Ptychobranchus greenii	Triangular Kidneyshell	S1	E	LE
GA	Gordon	Arabis georgiana	Georgia Rockcress	S1	T	LT
GA	Gordon	Sabatia capitata	Rose-gentian	S2	R	
GA	Gordon	Scutellaria montana	Large-flowered Skullcap	S3	T	LT
GA	Gordon	Thalictrum debile	Southern Meadow-rue	S1	T	
GA	Gordon	Carex grayi	Asa Gray Sedge	S2?	SPCO	
GA	Gordon	Carex purpurifera	Sedge	S2	SPCO	
GA	Gordon	Xyris tennesseensis	Yellow-eyed-grass	S1	E	LE
GA	Murray	Ichthyomyzon gagei	Southern Brook Lamprey	S3	TRKD	
GA	Murray	Notropis lineapunctata	Lined Chub	S2	R	
GA	Murray	Notropis asperifrons	Burrhead Shiner	S2	T	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
GA	Murray	Cyprinella caerulea	Blue Shiner	S2	E	LT
GA	Murray	Luxilus chrysocephalus	Striped Shiner	S3	TRKD	
GA	Murray	Moxostoma carinatum	River Redhorse	S3	R	
GA	Murray	Noturus munitus	Frecklebelly Madtom	S1	E	
GA	Murray	Etheostoma ditrema	Coldwater Darter	S1	E	
GA	Murray	Etheostoma trisella	Trispot Darter	S1	E	
GA	Murray	Etheostoma brevirostrum	Holiday Darter	S1	E	
GA	Murray	Percina antesella	Amber Darter	S1	E	LE
GA	Murray	Percina aurolineata	Goldline Darter	S2	E	LT
GA	Murray	Percina lenticula	Freckled Darter	S2	E	
GA	Murray	Percina jenkinsi	Conasauga Logperch	S1	E	LE
GA	Murray	Percina kusha	Bridled Darter	S1	E	
GA	Murray	Neotoma floridana haematoreia	Southern Appalachian Woodrat	S3	TRKD	
GA	Murray	Graptemys geographica	Map Turtle	S1	R	
GA	Murray	Graptemys pulchra	Alabama Map Turtle	S3	R	
GA	Murray	Epioblasma metastriata	Upland Combshell	SX	E	LE
GA	Murray	Epioblasma othcaloogensis	Southern Acornshell	SX	E	LE
GA	Murray	Lampsilis altilis	Fine-lined Pocketbook	S2	T	LT
GA	Murray	Medionidus acutissimus	Alabama Moccasinshell	S1	T	LT
GA	Murray	Medionidus parvulus	Coosa Moccasinshell	S1	E	LE
GA	Murray	Pleurobema chattanoogaense	Painted Clubshell	S1	TRKD	
GA	Murray	Pleurobema decisum	Southern Clubshell	S1	E	LE
GA	Murray	Pleurobema georgianum	Southern Pigtoe	S1	E	LE
GA	Murray	Pleurobema hanleyianum	Georgia Pigtoe	S1	E	LE
GA	Murray	Pleurobema perovatum	Ovate Clubshell	SH	E	LE
GA	Murray	Ptychobranchus greenii	Triangular Kidneyshell	S1	E	LE
GA	Murray	Ptychobranchus foremanianus	Rayed Kidneyshell	S1	E	LE
GA	Murray	Strophitus connasaugaensis	Alabama Creekmussel	S1	E	
GA	Murray	Panax quinquefolius	American ginseng	S3	SPCO	
GA	Murray	Symphyotrichum georgianum	Georgia Aster	S3	T	
GA	Murray	Sabatia capitata	Rose-gentian	S2	R	
GA	Murray	Scutellaria montana	Large-flowered Skullcap	S3	T	LT
GA	Murray	Hydrastis canadensis	Goldenseal	S2	E	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
GA	Murray	Carex purpurifera	Sedge	S2	SPCO	
GA	Murray	Xerophyllum asphodeloides	Eastern Turkeybeard	S1	R	
GA	Murray	Cypripedium parviflorum	Small Yellow Lady's-slipper	S3	R	
GA	Murray	Platanthera peramoena	Purple Fringeless Orchid	S1	SPCO	
GA	Murray	Xyris tennesseensis	Yellow-eyed-grass	S1	E	LE
GA	Murray	Dryopteris celsa	Log Fern	S2	SPCO	
GA	Towns	Cryptobranchus alleganiensis	Hellbender	S2	R	PS
GA	Towns	Notropis ariommus	Popeye Shiner	S1	E	
GA	Towns	Notropis photogenis	Silver Shiner	S1	E	
GA	Towns	Moxostoma carinatum	River Redhorse	S3	R	
GA	Towns	Moxostoma sp. 2	Sicklefin Redhorse	S1	E	
GA	Towns	Parascalops breweri	Hairy-tailed Mole	S1	TRKD	
GA	Towns	Myotis leibii	eastern small-footed bat	S2	TRKD	
GA	Towns	Corynorhinus rafinesquii	Rafinesque’s Big-eared bat	S3	R	
GA	Towns	Sylvilagus obscurus	Appalachian Cottontail	S1S2	R	
GA	Towns	Glyptemys muhlenbergii	Bog Turtle	S2	E	LT(SA)
GA	Towns	Cambarus hiwasseensis	Hiwassee Crayfish	S3	TRKD	
GA	Towns	Cambarus parrishi	Hiwassee Headwaters Crayfish	S1	E	
GA	Towns	Trientalis borealis	Northern Starflower	S1S2	E	
GA	Towns	Hydrastis canadensis	Goldenseal	S2	E	
GA	Towns	Potentilla tridentata	Three-toothed Cinquefoil	S1	E	
GA	Towns	Sarracenia oreophila	Green Pitcher Plant	S1	E	LE
GA	Towns	Carex biltmoreana	Biltmore Sedge	S1	T	
GA	Towns	Carex manhartii	Manhart's Sedge	S2S3	SPCO	
GA	Towns	Cypripedium acaule	Pink Lady's-slipper	S4	U	
GA	Towns	Cypripedium parviflorum	Small Yellow Lady's-slipper	S3	R	
GA	Towns	Isotria medeoloides	Small Whorled Pogonia	S2	T	LT
GA	Union	Cryptobranchus alleganiensis	Hellbender	S2	R	PS
GA	Union	Erimystax insignis	Blotched Chub	S2	E	
GA	Union	Moxostoma carinatum	River Redhorse	S3	R	
GA	Union	Percina squamata	Olive Darter	S1	E	
GA	Union	Myotis leibii	eastern small-footed bat	S2	TRKD	
GA	Union	Corynorhinus rafinesquii	Rafinesque’s Big-eared bat	S3	R	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
GA	Union	Sylvilagus obscurus	Appalachian Cottontail	S1S2	R	
GA	Union	Neotoma floridana haematoreia	Southern Appalachian Woodrat	S3	TRKD	
GA	Union	Mustela nivalis	Least Weasel	S1	TRKD	
GA	Union	Glyptemys muhlenbergii	Bog Turtle	S2	E	LT(SA)
GA	Union	Gentianopsis crinita	Fringed Gentian	S1	T	
GA	Union	Trientalis borealis	Northern Starflower	S1S2	E	
GA	Union	Hydrastis canadensis	Goldenseal	S2	E	
GA	Union	Potentilla tridentata	Three-toothed Cinquefoil	S1	E	
GA	Union	Carex purpurifera	Sedge	S2	SPCO	
GA	Union	Carex manhartii	Manhart's Sedge	S2S3	SPCO	
GA	Union	Cypripedium acaule	Pink Lady's-slipper	S4	U	
GA	Union	Cypripedium parviflorum	Small Yellow Lady's-slipper	S3	R	
GA	Union	Isotria medeoloides	Small Whorled Pogonia	S2	T	LT
GA	Walker	Aneides aeneus	Green Salamander	S3	R	
GA	Walker	Plethodon petraeus	Pigeon Mountain Salamander	S2	R	
GA	Walker	Falco peregrinus	Peregrine Falcon	S1	R	
GA	Walker	Picoides borealis	Red-cockaded Woodpecker	S2	E	LE
GA	Walker	Peucaea aestivalis	Bachman's Sparrow	S2	R	
GA	Walker	Hemitremia flammea	Flame Chub	S1	E	
GA	Walker	Hybopsis amblops	Bigeye Chub	S1S2	R	
GA	Walker	Notropis ariommus	Popeye Shiner	S1	E	
GA	Walker	Cyprinella spiloptera	Spotfin Shiner	S2	TRKD	
GA	Walker	Luxilus chrysocephalus	Striped Shiner	S3	TRKD	
GA	Walker	Noturus flavipinnis	Yellowfin Madtom	SX	EXTI	LT
GA	Walker	Fundulus catenatus	Northern Studfish	S2	R	
GA	Walker	Etheostoma rufilineatum	Redline Darter	S2	TRKD	
GA	Walker	Etheostoma simoterum	Snubnose Darter	S1	TRKD	
GA	Walker	Percina sciera	Dusky Darter	S3	R	
GA	Walker	Myotis grisescens	Gray Bat	S1	E	LE
GA	Walker	Myotis sodalis	Indiana Bat	S1	E	LE
GA	Walker	Myotis leibii	eastern small-footed bat	S2	TRKD	
GA	Walker	Neotoma floridana haematoreia	Southern Appalachian Woodrat	S3	TRKD	
GA	Walker	Lampsilis altilis	Fine-lined Pocketbook	S2	T	LT

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
GA	Walker	Medionidus acutissimus	Alabama Moccasinshell	S1	T	LT
GA	Walker	Pleurobema georgianum	Southern Pigtoe	S1	E	LE
GA	Walker	Erigeron strigosus var. calcicola		S1	SPCO	
GA	Walker	Marshallia mohrii	Mohr's Barbara's Buttons	S2	T	LT
GA	Walker	Jeffersonia diphylla	Twinleaf	S1	R	
GA	Walker	Leavenworthia exigua var. exigua	Glade Cress	S2	T	
GA	Walker	Silene rotundifolia	Roundleaf Catchfly	S1	SPCO	
GA	Walker	Hypericum dolabriforme	Straggling St. John's-wort	S3	SPCO	
GA	Walker	Viburnum bracteatum	Arrow-wood	S1	E	
GA	Walker	Baptisia australis var. aberrans	Tall Blue Wild Indigo	S2	SPCO	
GA	Walker	Sabatia capitata	Rose-gentian	S2	R	
GA	Walker	Scutellaria montana	Large-flowered Skullcap	S3	T	LT
GA	Walker	Lysimachia fraseri	Fraser Loosestrife	S2	R	
GA	Walker	Hydrastis canadensis	Goldenseal	S2	E	
GA	Walker	Neviusia alabamensis	Alabama Snow-wreath	S1	T	
GA	Walker	Spiraea virginiana	Virginia Spiraea	S1	T	LT
GA	Walker	Carex purpurifera	Sedge	S2	SPCO	
GA	Walker	Cypripedium acaule	Pink Lady's-slipper	S4	U	
GA	Walker	Cypripedium parviflorum	Small Yellow Lady's-slipper	S3	R	
GA	Whitfield	Thryomanes bewickii	Bewick's Wren	SH	R	
GA	Whitfield	Hemitremia flammea	Flame Chub	S1	E	
GA	Whitfield	Hybopsis amblops	Bigeye Chub	S1S2	R	
GA	Whitfield	Notropis lineapunctata	Lined Chub	S2	R	
GA	Whitfield	Cyprinella caerulea	Blue Shiner	S2	E	LT
GA	Whitfield	Moxostoma carinatum	River Redhorse	S3	R	
GA	Whitfield	Noturus munitus	Frecklebelly Madtom	S1	E	
GA	Whitfield	Etheostoma ditrema	Coldwater Darter	S1	E	
GA	Whitfield	Etheostoma trisella	Trispot Darter	S1	E	
GA	Whitfield	Etheostoma brevirostrum	Holiday Darter	S1	E	
GA	Whitfield	Percina antesella	Amber Darter	S1	E	LE
GA	Whitfield	Percina aurolineata	Goldline Darter	S2	E	LT
GA	Whitfield	Percina lenticula	Freckled Darter	S2	E	
GA	Whitfield	Percina jenkinsi	Conasauga Logperch	S1	E	LE

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
GA	Whitfield	Percina kusha	Bridled Darter	S1	E	
GA	Whitfield	Graptemys geographica	Map Turtle	S1	R	
GA	Whitfield	Graptemys pulchra	Alabama Map Turtle	S3	R	
GA	Whitfield	Epioblasma metastriata	Upland Combshell	SX	E	LE
GA	Whitfield	Epioblasma othcaloogensis	Southern Acornshell	SX	E	LE
GA	Whitfield	Lampsilis altilis	Fine-lined Pocketbook	S2	T	LT
GA	Whitfield	Medionidus acutissimus	Alabama Moccasinshell	S1	T	LT
GA	Whitfield	Medionidus parvulus	Coosa Moccasinshell	S1	E	LE
GA	Whitfield	Pleurobema chattanoogaense	Painted Clubshell	S1	TRKD	
GA	Whitfield	Pleurobema decisum	Southern Clubshell	S1	E	LE
GA	Whitfield	Pleurobema georgianum	Southern Pigtoe	S1	E	LE
GA	Whitfield	Pleurobema hanleyianum	Georgia Pigtoe	S1	E	LE
GA	Whitfield	Pleurobema perovatum	Ovate Clubshell	SH	E	LE
GA	Whitfield	Ptychobranchus greenii	Triangular Kidneyshell	S1	E	LE
GA	Whitfield	Strophitus connasaugaensis	Alabama Creekmussel	S1	E	
GA	Whitfield	Toxolasma cylindrellus	Pale Lilliput	SX		LE
GA	Whitfield	Lioplax cyclostomaformis	Cylindrical Lioplax			LE
GA	Whitfield	Mertensia virginica	Virginia Bluebells	S2	SPCO	
GA	Whitfield	Scutellaria montana	Large-flowered Skullcap	S3	T	LT
GA	Whitfield	Polemonium reptans	Greek Valerian	S1S2	SPCO	
GA	Whitfield	Lysimachia fraseri	Fraser Loosestrife	S2	R	
GA	Whitfield	Lilium michiganense	Michigan Lily	S1	R	
GA	Whitfield	Trillium lancifolium	Lance-leaf Trillium	S3	SPCO	
GA	Whitfield	Trillium pusillum	Least Trillium	S1	E	
GA	Whitfield	Spiranthes ovalis var. erostellata	Lesser Ladies'-tresses	S2S3	SPCO	
GA	Whitfield	Xyris tennesseensis	Yellow-eyed-grass	S1	E	LE
KY	Adair	Matelea carolinensis	Carolina Anglepod	S1?	E	
KY	Allen	Accipiter striatus	Sharp-shinned Hawk	S3B	S	
KY	Allen	Thryomanes bewickii	Bewick's Wren	S3	S	
KY	Allen	Lampetra appendix	American Brook Lamprey	S2	T	
KY	Allen	Phenacobius uranops	Stargazing Minnow	S2S3	S	
KY	Allen	Thoburnia atripinnis	Blackfin Sucker	S2	S	
KY	Allen	Noturus exilis	Slender Madtom	S1	E	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
KY	Allen	Percopsis omiscomaycus	Trout-perch	S3	S	
KY	Allen	Percina macrocephala	Longhead Darter	S1	E	
KY	Allen	Myotis grisescens	Gray Bat	S2	T	LE
KY	Allen	Myotis sodalis	Indiana Bat	S1S2	E	LE
KY	Allen	Barbicambarus cornutus	Bottlebrush Crayfish	S2	S	
KY	Allen	Pseudanophthalmus pubescens intrepidus	A Cave Beetle	S2	T	
KY	Allen	Villosa lienosa	Little Spectaclecase	S3S4	S	
KY	Allen	Villosa ortmanni	Kentucky Creekshell	S2	T	
KY	Barren	Cistothorus platensis	Sedge Wren	S3B	S	
KY	Barren	Myotis grisescens	Gray Bat	S2	T	LE
KY	Barren	Corynorhinus rafinesquii	Rafinesque’s Big-eared bat	S3	S	
KY	Barren	Elaphe guttata	Corn Snake	S3	S	
KY	Barren	Orconectes pellucidus	Mammoth Cave Crayfish	S3	S	
KY	Barren	Helianthus eggertii	Eggert's Sunflower	S2	T	DM
KY	Barren	Helianthemum bicknellii	Plains Frostweed	S1S2	E	
KY	Bell	Myotis sodalis	Indiana Bat	S1S2	E	LE
KY	Bell	Myotis leibii	eastern small-footed bat	S2	T	
KY	Bell	Silene ovata	Ovate Catchfly	S1	E	
KY	Butler	Hyla avivoca	Bird-voiced Treefrog	S3	S	
KY	Butler	Ammodramus henslowii	Henslow's Sparrow	S3	S	
KY	Butler	Lepomis miniatus	Redspotted Sunfish	S2	T	
KY	Butler	Percina macrocephala	Longhead Darter	S1	E	
KY	Butler	Nerodia erythrogaster neglecta	Copperbelly Water Snake			LT
KY	Butler	Thamnophis sauritus	Eastern Ribbon Snake	S3	S	
KY	Butler	Stylurus notatus	Elusive Clubtail	S1	E	
KY	Butler	Cumberlandia monodonta	Spectaclecase	S1	E	LE
KY	Butler	Cyprogenia stegaria	Fanshell	S1	E	LE
KY	Butler	Epioblasma obliquata obliquata	Purple Catspaw	S3	E	LE
KY	Butler	Fusconaia subrotunda	Longsolid	S3	S	
KY	Butler	Fusconaia subrotunda subrotunda	Long-solid	S3	S	
KY	Butler	Lampsilis abrupta	Pink Mucket	S1	E	LE
KY	Butler	Lampsilis ovata	Pocketbook	S1	E	
KY	Butler	Plethobasus cyphyus	Sheepnose	S1	E	LE

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
KY	Butler	Pleurobema clava	Clubshell	S1	E	LE
KY	Butler	Pleurobema plenum	Rough Pigtoe	S1	E	LE
KY	Butler	Pleurobema rubrum	Pyramid Pigtoe	S1	E	
KY	Butler	Villosa lienosa	Little Spectaclecase	S3S4	S	
KY	Butler	Leavenworthia torulosa	Necklace Glade-cress	S2	T	
KY	Caldwell	Thamnophis sauritus	Eastern Ribbon Snake	S3	S	
KY	Calloway	Eurycea guttolineata	Three-lined Salamander	S2	T	
KY	Calloway	Hyla cinerea	Green Treefrog	S3	S	
KY	Calloway	Rana areolata circulosa	Northern Crawfish Frog	S3	S	
KY	Calloway	Nyctanassa violacea	Yellow-crowned Night-heron	S2	T	
KY	Calloway	Pandion haliaetus	Osprey	S2	T	
KY	Calloway	Haliaeetus leucocephalus	Bald Eagle	S2	T	DM
KY	Calloway	Accipiter striatus	Sharp-shinned Hawk	S3B	S	
KY	Calloway	Thryomanes bewickii	Bewick's Wren	S3	S	
KY	Calloway	Peucaea aestivalis	Bachman's Sparrow	S1	E	
KY	Calloway	Chondestes grammacus	Lark Sparrow	S2S3	T	
KY	Calloway	Ichthyomyzon gagei	Southern Brook Lamprey	SH	H	
KY	Calloway	Atractosteus spatula	Alligator Gar	S1	E	
KY	Calloway	Esox niger	Chain Pickerel	S3	S	
KY	Calloway	Erimystax insignis	Blotched Chub	S1	E	
KY	Calloway	Noturus hildebrandi	Least Madtom	S1	E	
KY	Calloway	Noturus phaeus	Brown Madtom	S1	E	
KY	Calloway	Lepomis marginatus	Dollar Sunfish	S1	E	
KY	Calloway	Lepomis miniatus	Redspotted Sunfish	S2	T	
KY	Calloway	Etheostoma parvipinne	Goldstripe Darter	S1	E	
KY	Calloway	Etheostoma proeliare	Cypress Darter	S2	T	
KY	Calloway	Etheostoma swaini	Gulf Darter	S1	E	
KY	Calloway	Etheostoma lynceum	Brighteye Darter	S1	E	
KY	Calloway	Etheostoma pyrrhogaster	Firebelly Darter	S1	E	
KY	Calloway	Myotis grisescens	Gray Bat	S2	T	LE
KY	Calloway	Myotis sodalis	Indiana Bat	S1S2	E	LE
KY	Calloway	Nycticeius humeralis	Evening Bat	S3	S	
KY	Calloway	Macrochelys temminckii	Alligator Snapping Turtle	S2	T	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
KY	Calloway	Apalone mutica mutica	Midland Smooth Softshell	S3	S	
KY	Calloway	Plestiodon anthracinus	Coal Skink	S2	T	
KY	Calloway	Eumeces inexpectatus	Southeastern Five-lined Skink	S3	S	
KY	Calloway	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S2	T	
KY	Calloway	Thamnophis proximus	Western Ribbon Snake	S1S2	T	
KY	Calloway	Thamnophis sauritus	Eastern Ribbon Snake	S3	S	
KY	Calloway	Sistrurus miliarius streckeri	Western Pigmy Rattlesnake	S2	T	
KY	Calloway	Lampsilis abrupta	Pink Mucket	S1	E	LE
KY	Calloway	Eryngium integrifolium	Button Snakeroot	S1	E	
KY	Calloway	Ptilimnium capillaceum	Hair-like Mock Bishop-weed	S1S2	T	
KY	Calloway	Ptilimnium nuttallii	Nuttall's Mock Bishop's-weed	S1S2	E	
KY	Calloway	Trepocarpus aethusae	Trepocarpus	S3	S	
KY	Calloway	Stellaria longifolia	Longleaf Stitchwort	S2S3	S	
KY	Calloway	Viburnum nudum	Possum-haw Viburnum	S1	E	
KY	Calloway	Rhododendron canescens	Hoary Azalea	S1	E	
KY	Calloway	Apios priceana	Price's Potato-bean	S1	E	LT
KY	Calloway	Baptisia bracteata var. leucophaea	Cream Wild Indigo	S3	S	
KY	Calloway	Quercus texana	Nuttall's Oak	S2S3	T	
KY	Calloway	Bartonia virginica	Screwstem	S2	T	
KY	Calloway	Oenothera linifolia	Sundrops	S1S2	E	
KY	Calloway	Oenothera perennis	Small Sundrops	S1S2	E	
KY	Calloway	Oldenlandia uniflora	Oldenlandia	S1	E	
KY	Calloway	Halesia carolina	Common Silverbell	S1S2	E	
KY	Calloway	Lilium superbum	Turk's Cap Lily	S1S2	T	
KY	Calloway	Melanthium virginicum	Bunchflower	S1	E	
KY	Calloway	Muhlenbergia glabrifloris	Muhly	S2S3	S	
KY	Calloway	Paspalum boscianum	Bull-grass	S2S3	S	
KY	Calloway	Sphenopholis pensylvanica	Swamp Wedgescale	S1S2	S	
KY	Calloway	Lycopodiella appressa	Southern Bog Clubmoss	S1	E	
KY	Carlisle	Hyla cinerea	Green Treefrog	S3	S	
KY	Carlisle	Rana areolata circulosa	Northern Crawfish Frog	S3	S	
KY	Carlisle	Ardea alba	Great Egret	S1B	E	
KY	Carlisle	Ictinia mississippiensis	Mississippi Kite	S2	S	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
KY	Carlisle	Haliaeetus leucocephalus	Bald Eagle	S2	T	DM
KY	Carlisle	Sterna antillarum athalassos	Interior Least Tern	S2B	E	LE
KY	Carlisle	Tyto alba	Common Barn-owl	S3	S	
KY	Carlisle	Corvus ossifragus	Fish Crow	S3B	S	
KY	Carlisle	Acipenser fulvescens	Lake Sturgeon	S1	E	
KY	Carlisle	Esox niger	Chain Pickerel	S3	S	
KY	Carlisle	Hybognathus hayi	Cypress Minnow	S1	E	
KY	Carlisle	Lepomis miniatus	Redspotted Sunfish	S2	T	
KY	Carlisle	Myotis austroriparius	Southeastern Bat	S1S2	E	
KY	Carlisle	Myotis sodalis	Indiana Bat	S1S2	E	LE
KY	Carlisle	Nycticeius humeralis	Evening Bat	S3	S	
KY	Carlisle	Corynorhinus rafinesquii	Rafinesque’s Big-eared bat	S3	S	
KY	Carlisle	Peromyscus gossypinus	Cotton Mouse	S2	T	
KY	Carlisle	Macrochelys temminckii	Alligator Snapping Turtle	S2	T	
KY	Carlisle	Chrysemys picta dorsalis	Southern Painted Turtle	S2	T	
KY	Carlisle	Apalone mutica mutica	Midland Smooth Softshell	S3	S	
KY	Carlisle	Nerodia fasciata confluens	Broad-banded Water Snake	S1	E	
KY	Carlisle	Cambarellus shufeldtii	Cajun Dwarf Crayfish	S2	S	
KY	Carlisle	Orconectes lancifer	Shrimp Crayfish	S1	E	
KY	Carlisle	Potamilus capax	Fat Pocketbook	S1	E	LE
KY	Carlisle	Cabomba caroliniana	Carolina Fanwort	S2	T	
KY	Carlisle	Utricularia macrorhiza	Greater Bladder-wort	S1	E	
KY	Carlisle	Didiplis diandra	Water-purslane	S1S2	E	
KY	Carlisle	Clematis crispa	Blue Jasmine Leather-flower	S2	T	
KY	Christian	Hyla gratiosa	Barking Treefrog	S3	S	
KY	Christian	Anas discors	Blue-winged Teal	S1S2	T	
KY	Christian	Thryomanes bewickii	Bewick's Wren	S3	S	
KY	Christian	Chondestes grammacus	Lark Sparrow	S2S3	T	
KY	Christian	Typhlichthys subterraneus	Southern Cavefish	S2S3	S	
KY	Christian	Etheostoma microlepidum	Smallscale Darter	S1	E	
KY	Christian	Sorex cinereus	Common Shrew	S3	S	
KY	Christian	Myotis austroriparius	Southeastern Bat	S1S2	E	
KY	Christian	Myotis grisescens	Gray Bat	S2	T	LE

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
KY	Christian	Myotis sodalis	Indiana Bat	S1S2	E	LE
KY	Christian	Nerodia erythrogaster neglecta	Copperbelly Water Snake			LT
KY	Christian	Orconectes pellucidus	Mammoth Cave Crayfish	S3	S	
KY	Christian	Epioblasma florentina walkeri	Tan Riffleshell	S1	E	LE
KY	Christian	Pegias fabula	Little-wing Pearlymussel	S1	E	LE
KY	Christian	Villosa lienosa	Little Spectaclecase	S3S4	S	
KY	Christian	Villosa vanuxemensis	Mountain Creekshell	S2	T	
KY	Christian	Rudbeckia subtomentosa	Sweet Coneflower	S1	E	
KY	Christian	Silphium laciniatum	Compass-plant	S2	T	
KY	Christian	Onosmodium hispidissimum	Hairy False Gromwell	S1	E	
KY	Christian	Phacelia ranunculacea	Blue Scorpion-weed	S3	S	
KY	Christian	Oenothera linifolia	Sundrops	S1S2	E	
KY	Christian	Carex alata	Broadwing Sedge	S1S2	T	
KY	Christian	Schoenoplectus hallii	Hall's Bulrush	S1	E	
KY	Christian	Trillium pusillum	Least Trillium	S1	E	
KY	Christian	Muhlenbergia glabrifloris	Muhly	S2S3	S	
KY	Clinton	Lithasia armigera	Armored Rocksnail	S3S4	S	
KY	Clinton	Lithasia geniculata	Ornate Rocksnail	S1	S	
KY	Clinton	Matelea carolinensis	Carolina Anglepod	S1?	E	
KY	Clinton	Aureolaria patula	Spreading False-foxglove	S3	S	
KY	Cumberland	Notropis albizonatus	Palezone Shiner	S1	E	LE
KY	Cumberland	Phenacobius uranops	Stargazing Minnow	S2S3	S	
KY	Cumberland	Stylurus notatus	Elusive Clubtail	S1	E	
KY	Cumberland	Cumberlandia monodonta	Spectaclecase	S1	E	LE
KY	Cumberland	Cyprogenia stegaria	Fanshell	S1	E	LE
KY	Cumberland	Dromus dromas	Dromedary Pearlymussel	S1	X	LE
KY	Cumberland	Epioblasma florentina florentina	Yellow-blossom Pearlymussel	SX	X	LE
KY	Cumberland	Epioblasma obliquata obliquata	Purple Catspaw	S3	E	LE
KY	Cumberland	Epioblasma triquetra	Snuffbox	S1	E	LE
KY	Cumberland	Hemistena lata	Cracking Pearlymussel	S1	X	LE
KY	Cumberland	Lampsilis abrupta	Pink Mucket	S1	E	LE
KY	Cumberland	Lampsilis ovata	Pocketbook	S1	E	
KY	Cumberland	Obovaria retusa	Ring Pink	S1	E	LE

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
KY	Cumberland	Plethobasus cooperianus	Orange-foot Pimpleback	S1	E	LE
KY	Cumberland	Pleurobema plenum	Rough Pigtoe	S1	E	LE
KY	Cumberland	Pleurobema rubrum	Pyramid Pigtoe	S1	E	
KY	Cumberland	Quadrula cylindrica cylindrica	Smooth Rabbitsfoot	S2	T	LT
KY	Cumberland	Quadrula sparsa	Appalachian Monkeyface			LE
KY	Cumberland	Villosa trabalis	Cumberland Bean	S1	E	LE
KY	Cumberland	Lithasia armigera	Armored Rocksnail	S3S4	S	
KY	Cumberland	Lithasia geniculata	Ornate Rocksnail	S1	S	
KY	Cumberland	Matelea carolinensis	Carolina Anglepod	S1?	E	
KY	Cumberland	Juglans cinerea	Butternut	S2S3	T	
KY	Edmonson	Hyla cinerea	Green Treefrog	S3	S	
KY	Edmonson	Thryomanes bewickii	Bewick's Wren	S3	S	
KY	Edmonson	Cistothorus platensis	Sedge Wren	S3B	S	
KY	Edmonson	Amblyopsis spelaea	Northern Cavefish	S3	S	
KY	Edmonson	Typhlichthys subterraneus	Southern Cavefish	S2S3	S	
KY	Edmonson	Crystallaria asprella	Crystal Darter	SX	X	
KY	Edmonson	Myotis austroriparius	Southeastern Bat	S1S2	E	
KY	Edmonson	Myotis grisescens	Gray Bat	S2	T	LE
KY	Edmonson	Myotis sodalis	Indiana Bat	S1S2	E	LE
KY	Edmonson	Myotis leibii	eastern small-footed bat	S2	T	
KY	Edmonson	Nycticeius humeralis	Evening Bat	S3	S	
KY	Edmonson	Corynorhinus rafinesquii	Rafinesque’s Big-eared bat	S3	S	
KY	Edmonson	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	S2	T	
KY	Edmonson	Plestiodon anthracinus	Coal Skink	S2	T	
KY	Edmonson	Eumeces inexpectatus	Southeastern Five-lined Skink	S3	S	
KY	Edmonson	Elaphe guttata	Corn Snake	S3	S	
KY	Edmonson	Lampropeltis triangulum elapsoides	Scarlet Kingsnake	S3	S	
KY	Edmonson	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S2	T	
KY	Edmonson	Stygobromus vitreus	An Amphipod	S1	S	
KY	Edmonson	Orconectes pellucidus	Mammoth Cave Crayfish	S3	S	
KY	Edmonson	Palaemonias ganteri	Mammoth Cave Shrimp	S1	E	LE
KY	Edmonson	Barbicambarus cornutus	Bottlebrush Crayfish	S2	S	
KY	Edmonson	Pseudanophthalmus audax	Bold Cave Beetle	S1	T	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
KY	Edmonson	Pseudanophthalmus inexpectatus	A Cave Beetle	S2	T	
KY	Edmonson	Lytrosis permagnaria	A Geometrid Moth	S1	E	
KY	Edmonson	Stylurus notatus	Elusive Clubtail	S1	E	
KY	Edmonson	Cumberlandia monodonta	Spectaclecase	S1	E	LE
KY	Edmonson	Cyprogenia stegaria	Fanshell	S1	E	LE
KY	Edmonson	Epioblasma obliquata obliquata	Purple Catspaw	S3	E	LE
KY	Edmonson	Epioblasma torulosa rangiana	Northern Riffleshell	S1	E	LE
KY	Edmonson	Epioblasma triquetra	Snuffbox	S1	E	LE
KY	Edmonson	Fusconaia subrotunda subrotunda	Long-solid	S3	S	
KY	Edmonson	Lampsilis ovata	Pocketbook	S1	E	
KY	Edmonson	Obovaria retusa	Ring Pink	S1	E	LE
KY	Edmonson	Plethobasus cyphyus	Sheepnose	S1	E	LE
KY	Edmonson	Pleurobema clava	Clubshell	S1	E	LE
KY	Edmonson	Pleurobema plenum	Rough Pigtoe	S1	E	LE
KY	Edmonson	Pleurobema rubrum	Pyramid Pigtoe	S1	E	
KY	Edmonson	Quadrula cylindrica	Rabbitsfoot			LT
KY	Edmonson	Quadrula cylindrica cylindrica	Smooth Rabbitsfoot	S2	T	LT
KY	Edmonson	Villosa lienosa	Little Spectaclecase	S3S4	S	
KY	Edmonson	Villosa ortmanni	Kentucky Creekshell	S2	T	
KY	Edmonson	Helianthus eggertii	Eggert's Sunflower	S2	T	DM
KY	Edmonson	Symphyotrichum pratense	Barrens Silky Aster	S3	S	
KY	Edmonson	Helianthemum bicknellii	Plains Frostweed	S1S2	E	
KY	Edmonson	Apios priceana	Price's Potato-bean	S1	E	LT
KY	Edmonson	Trifolium reflexum	Buffalo Clover	S1S2	E	
KY	Edmonson	Gentiana puberulenta	Downy Gentian	S1	E	
KY	Edmonson	Ludwigia hirtella	False Looestrife	S1	E	
KY	Edmonson	Polygala cruciata	Crossleaf Milkwort	S1	E	
KY	Edmonson	Dodecatheon frenchii	French's Shootingstar	S3	S	
KY	Edmonson	Aureolaria patula	Spreading False-foxglove	S3	S	
KY	Edmonson	Glandularia canadensis	Rose Vervain	S1?	E	
KY	Edmonson	Sagittaria graminea	Grassleaf Arrowhead	S1S2	T	
KY	Edmonson	Sagittaria rigida	Sessile-fruited Arrowhead	S1	E	
KY	Edmonson	Carex decomposita	Epiphytic Sedge	S2	T	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
KY	Edmonson	Veratrum woodii	Ozark Bunchflower	S2	T	
KY	Edmonson	Potamogeton pulcher	Spotted Pondweed	S1S2	T	
KY	Fulton	Hyla avivoca	Bird-voiced Treefrog	S3	S	
KY	Fulton	Hyla cinerea	Green Treefrog	S3	S	
KY	Fulton	Podilymbus podiceps	Pied-billed Grebe	S1	E	
KY	Fulton	Phalacrocorax auritus	Double-crested Cormorant	S1	E	
KY	Fulton	Ardea alba	Great Egret	S1B	E	
KY	Fulton	Bubulcus ibis	Cattle Egret	S1S2	S	
KY	Fulton	Anas discors	Blue-winged Teal	S1S2	T	
KY	Fulton	Lophodytes cucullatus	Hooded Merganser	S1S2	T	
KY	Fulton	Ictinia mississippiensis	Mississippi Kite	S2	S	
KY	Fulton	Haliaeetus leucocephalus	Bald Eagle	S2	T	DM
KY	Fulton	Falco peregrinus	Peregrine Falcon	S1	E	
KY	Fulton	Rallus elegans	King Rail	S1B	E	
KY	Fulton	Sterna antillarum athalassos	Interior Least Tern	S2B	E	LE
KY	Fulton	Riparia riparia	Bank Swallow	S3	S	
KY	Fulton	Corvus ossifragus	Fish Crow	S3B	S	
KY	Fulton	Cistothorus platensis	Sedge Wren	S3B	S	
KY	Fulton	Peucaea aestivalis	Bachman's Sparrow	S1	E	
KY	Fulton	Chondestes grammacus	Lark Sparrow	S2S3	T	
KY	Fulton	Ichthyomyzon castaneus	Chestnut Lamprey	S2	S	
KY	Fulton	Acipenser fulvescens	Lake Sturgeon	S1	E	
KY	Fulton	Scaphirhynchus albus	Pallid Sturgeon	S1	E	LE
KY	Fulton	Atractosteus spatula	Alligator Gar	S1	E	
KY	Fulton	Umbra limi	Central Mudminnow	S2S3	T	
KY	Fulton	Notropis maculatus	Taillight Shiner	S2S3	T	
KY	Fulton	Ictiobus niger	Black Buffalo	S3	S	
KY	Fulton	Fundulus chrysotus	Golden Topminnow	S1	E	
KY	Fulton	Fundulus dispar	Starhead Topminnow	S1	E	
KY	Fulton	Lepomis miniatus	Redspotted Sunfish	S2	T	
KY	Fulton	Etheostoma fusiforme	Swamp Darter	S1	E	
KY	Fulton	Etheostoma proeliare	Cypress Darter	S2	T	
KY	Fulton	Etheostoma chienense	Relict Darter	S1	E	LE

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
KY	Fulton	Nycticeius humeralis	Evening Bat	S3	S	
KY	Fulton	Chrysemys picta dorsalis	Southern Painted Turtle	S2	T	
KY	Fulton	Apalone mutica mutica	Midland Smooth Softshell	S3	S	
KY	Fulton	Farancia abacura reinwardtii	Western Mud Snake	S3	S	
KY	Fulton	Nerodia cyclopion	Mississippi Green Water Snake	S1	E	
KY	Fulton	Nerodia fasciata confluens	Broad-banded Water Snake	S1	E	
KY	Fulton	Thamnophis proximus	Western Ribbon Snake	S1S2	T	
KY	Fulton	Thamnophis sauritus	Eastern Ribbon Snake	S3	S	
KY	Fulton	Cambarellus shufeldtii	Cajun Dwarf Crayfish	S2	S	
KY	Fulton	Trepocarpus aethusae	Trepocarpus	S3	S	
KY	Fulton	Heterotheca subaxillaris var. latifolia	Broad-leaf Golden-aster	S2	T	
KY	Fulton	Polymnia laevigata	Tennessee Leafcup	S1S2	E	
KY	Fulton	Armoracia lacustris	Lake-cress	S1S2	T	
KY	Fulton	Myriophyllum heterophyllum	Broadleaf Water Milfoil	S3?	S	
KY	Fulton	Nemophila aphylla	Nemophila	S2?	T	
KY	Fulton	Phacelia ranunculacea	Blue Scorpion-weed	S3	S	
KY	Fulton	Utricularia macrorhiza	Greater Bladder-wort	S1	E	
KY	Fulton	Clematis crispa	Blue Jasmine Leather-flower	S2	T	
KY	Fulton	Berchemia scandens	Supple-jack	S1S2	T	
KY	Fulton	Sagittaria graminea	Grassleaf Arrowhead	S1S2	T	
KY	Fulton	Limnobium spongia	American Frog's-bit	S2S3	T	
KY	Fulton	Iris fulva	Red Iris	S1	E	
KY	Fulton	Heteranthera limosa	Smaller Mud-plantain	S2S3	S	
KY	Graves	Eurycea guttolineata	Three-lined Salamander	S2	T	
KY	Graves	Rana areolata circulosa	Northern Crawfish Frog	S3	S	
KY	Graves	Ictinia mississippiensis	Mississippi Kite	S2	S	
KY	Graves	Tyto alba	Common Barn-owl	S3	S	
KY	Graves	Corvus ossifragus	Fish Crow	S3B	S	
KY	Graves	Peucaea aestivalis	Bachman's Sparrow	S1	E	
KY	Graves	Umbra limi	Central Mudminnow	S2S3	T	
KY	Graves	Cyprinella camura	Bluntface Shiner	S1	E	
KY	Graves	Cyprinella venusta	Blacktail Shiner	S3	S	
KY	Graves	Erimyzon sucetta	Lake Chubsucker	S2	T	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
KY	Graves	Moxostoma poecilurum	Blacktail Redhorse	S1	E	
KY	Graves	Noturus hildebrandi	Least Madtom	S1	E	
KY	Graves	Noturus phaeus	Brown Madtom	S1	E	
KY	Graves	Lepomis marginatus	Dollar Sunfish	S1	E	
KY	Graves	Lepomis miniatus	Redspotted Sunfish	S2	T	
KY	Graves	Etheostoma fusiforme	Swamp Darter	S1	E	
KY	Graves	Etheostoma parvipinne	Goldstripe Darter	S1	E	
KY	Graves	Etheostoma swaini	Gulf Darter	S1	E	
KY	Graves	Etheostoma lynceum	Brighteye Darter	S1	E	
KY	Graves	Etheostoma pyrrhogaster	Firebelly Darter	S1	E	
KY	Graves	Etheostoma chienense	Relict Darter	S1	E	LE
KY	Graves	Myotis austroriparius	Southeastern Bat	S1S2	E	
KY	Graves	Farancia abacura reinwardtii	Western Mud Snake	S3	S	
KY	Graves	Thamnophis proximus	Western Ribbon Snake	S1S2	T	
KY	Graves	Villosa lienosa	Little Spectaclecase	S3S4	S	
KY	Graves	Rudbeckia subtomentosa	Sweet Coneflower	S1	E	
KY	Grayson	Thryomanes bewickii	Bewick's Wren	S3	S	
KY	Grayson	Ammodramus henslowii	Henslow's Sparrow	S3	S	
KY	Grayson	Myotis grisescens	Gray Bat	S2	T	LE
KY	Grayson	Myotis sodalis	Indiana Bat	S1S2	E	LE
KY	Grayson	Elaphe guttata	Corn Snake	S3	S	
KY	Grayson	Barbicambarus cornutus	Bottlebrush Crayfish	S2	S	
KY	Grayson	Epioblasma torulosa rangiana	Northern Riffleshell	S1	E	LE
KY	Grayson	Epioblasma triquetra	Snuffbox	S1	E	LE
KY	Grayson	Fusconaia subrotunda subrotunda	Long-solid	S3	S	
KY	Grayson	Pleurobema clava	Clubshell	S1	E	LE
KY	Grayson	Quadrula cylindrica cylindrica	Smooth Rabbitsfoot	S2	T	LT
KY	Grayson	Villosa lienosa	Little Spectaclecase	S3S4	S	
KY	Grayson	Villosa ortmanni	Kentucky Creekshell	S2	T	
KY	Grayson	Helianthus eggertii	Eggert's Sunflower	S2	T	DM
KY	Green	Quadrula cylindrica	Rabbitsfoot			LT
KY	Hart	Amblyopsis spelaea	Northern Cavefish	S3	S	
KY	Hart	Typhlichthys subterraneus	Southern Cavefish	S2S3	S	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
KY	Hart	Eumeces inexpectatus	Southeastern Five-lined Skink	S3	S	
KY	Hart	Orconectes pellucidus	Mammoth Cave Crayfish	S3	S	
KY	Hart	Barbicambarus cornutus	Bottlebrush Crayfish	S2	S	
KY	Hart	Cyprogenia stegaria	Fanshell	S1	E	LE
KY	Hart	Epioblasma torulosa rangiana	Northern Riffleshell	S1	E	LE
KY	Hart	Epioblasma triquetra	Snuffbox	S1	E	LE
KY	Hart	Fusconaia subrotunda subrotunda	Long-solid	S3	S	
KY	Hart	Lampsilis ovata	Pocketbook	S1	E	
KY	Hart	Obovaria retusa	Ring Pink	S1	E	LE
KY	Hart	Plethobasus cyphyus	Sheepnose	S1	E	LE
KY	Hart	Pleurobema clava	Clubshell	S1	E	LE
KY	Hart	Pleurobema plenum	Rough Pigtoe	S1	E	LE
KY	Hart	Pleurobema rubrum	Pyramid Pigtoe	S1	E	
KY	Hart	Quadrula cylindrica	Rabbitsfoot			LT
KY	Hart	Villosa lienosa	Little Spectaclecase	S3S4	S	
KY	Hart	Villosa ortmanni	Kentucky Creekshell	S2	T	
KY	Hart	Gentiana puberulenta	Downy Gentian	S1	E	
KY	Hart	Carex decomposita	Epiphytic Sedge	S2	T	
KY	Hart	Pontederia cordata	Pickerel Weed	S1S2	T	
KY	Hart	Potamogeton pulcher	Spotted Pondweed	S1S2	T	
KY	Hickman	Hyla avivoca	Bird-voiced Treefrog	S3	S	
KY	Hickman	Hyla cinerea	Green Treefrog	S3	S	
KY	Hickman	Rana areolata circulosa	Northern Crawfish Frog	S3	S	
KY	Hickman	Ardea alba	Great Egret	S1B	E	
KY	Hickman	Nyctanassa violacea	Yellow-crowned Night-heron	S2	T	
KY	Hickman	Ictinia mississippiensis	Mississippi Kite	S2	S	
KY	Hickman	Haliaeetus leucocephalus	Bald Eagle	S2	T	DM
KY	Hickman	Sterna antillarum athalassos	Interior Least Tern	S2B	E	LE
KY	Hickman	Riparia riparia	Bank Swallow	S3	S	
KY	Hickman	Corvus ossifragus	Fish Crow	S3B	S	
KY	Hickman	Peucaea aestivalis	Bachman's Sparrow	S1	E	
KY	Hickman	Acipenser fulvescens	Lake Sturgeon	S1	E	
KY	Hickman	Scaphirhynchus albus	Pallid Sturgeon	S1	E	LE

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
KY	Hickman	Esox niger	Chain Pickerel	S3	S	
KY	Hickman	Hybognathus hayi	Cypress Minnow	S1	E	
KY	Hickman	Cyprinella venusta	Blacktail Shiner	S3	S	
KY	Hickman	Erimyzon sucetta	Lake Chubsucker	S2	T	
KY	Hickman	Ictiobus niger	Black Buffalo	S3	S	
KY	Hickman	Fundulus dispar	Starhead Topminnow	S1	E	
KY	Hickman	Lepomis marginatus	Dollar Sunfish	S1	E	
KY	Hickman	Lepomis miniatus	Redspotted Sunfish	S2	T	
KY	Hickman	Etheostoma fusiforme	Swamp Darter	S1	E	
KY	Hickman	Etheostoma chienense	Relict Darter	S1	E	LE
KY	Hickman	Myotis austroriparius	Southeastern Bat	S1S2	E	
KY	Hickman	Myotis sodalis	Indiana Bat	S1S2	E	LE
KY	Hickman	Nycticeius humeralis	Evening Bat	S3	S	
KY	Hickman	Chrysemys picta dorsalis	Southern Painted Turtle	S2	T	
KY	Hickman	Apalone mutica mutica	Midland Smooth Softshell	S3	S	
KY	Hickman	Farancia abacura reinwardtii	Western Mud Snake	S3	S	
KY	Hickman	Nerodia cyclopion	Mississippi Green Water Snake	S1	E	
KY	Hickman	Thamnophis proximus	Western Ribbon Snake	S1S2	T	
KY	Hickman	Thamnophis sauritus	Eastern Ribbon Snake	S3	S	
KY	Hickman	Cambarellus shufeldtii	Cajun Dwarf Crayfish	S2	S	
KY	Hickman	Orconectes lancifer	Shrimp Crayfish	S1	E	
KY	Hickman	Ptilimnium capillaceum	Hair-like Mock Bishop-weed	S1S2	T	
KY	Hickman	Ptilimnium nuttallii	Nuttall's Mock Bishop's-weed	S1S2	E	
KY	Hickman	Polymnia laevigata	Tennessee Leafcup	S1S2	E	
KY	Hickman	Nemophila aphylla	Nemophila	S2?	T	
KY	Hickman	Phacelia ranunculacea	Blue Scorpion-weed	S3	S	
KY	Hickman	Hedeoma hispida	Rough Pennyroyal	S2	T	
KY	Hickman	Utricularia macrorhiza	Greater Bladder-wort	S1	E	
KY	Hickman	Oldenlandia uniflora	Oldenlandia	S1	E	
KY	Hickman	Paspalum boscianum	Bull-grass	S2S3	S	
KY	Hickman	Zizaniopsis miliacea	Southern Wildrice	S1S2	T	
KY	Livingston	Hyla avivoca	Bird-voiced Treefrog	S3	S	
KY	Livingston	Rana areolata circulosa	Northern Crawfish Frog	S3	S	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
KY	Livingston	Pandion haliaetus	Osprey	S2	T	
KY	Livingston	Sterna antillarum athalassos	Interior Least Tern	S2B	E	LE
KY	Livingston	Tyto alba	Common Barn-owl	S3	S	
KY	Livingston	Riparia riparia	Bank Swallow	S3	S	
KY	Livingston	Corvus ossifragus	Fish Crow	S3B	S	
KY	Livingston	Thryomanes bewickii	Bewick's Wren	S3	S	
KY	Livingston	Cistothorus platensis	Sedge Wren	S3B	S	
KY	Livingston	Ichthyomyzon castaneus	Chestnut Lamprey	S2	S	
KY	Livingston	Lampetra appendix	American Brook Lamprey	S2	T	
KY	Livingston	Acipenser fulvescens	Lake Sturgeon	S1	E	
KY	Livingston	Atractosteus spatula	Alligator Gar	S1	E	
KY	Livingston	Alosa alabamae	Alabama Shad	S1	E	
KY	Livingston	Erimyzon sucetta	Lake Chubsucker	S2	T	
KY	Livingston	Myotis austroriparius	Southeastern Bat	S1S2	E	
KY	Livingston	Myotis grisescens	Gray Bat	S2	T	LE
KY	Livingston	Myotis sodalis	Indiana Bat	S1S2	E	LE
KY	Livingston	Farancia abacura reinwardtii	Western Mud Snake	S3	S	
KY	Livingston	Nerodia erythrogaster neglecta	Copperbelly Water Snake			LT
KY	Livingston	Cyprogenia stegaria	Fanshell	S1	E	LE
KY	Livingston	Fusconaia subrotunda	Longsolid	S3	S	
KY	Livingston	Fusconaia subrotunda subrotunda	Long-solid	S3	S	
KY	Livingston	Lampsilis abrupta	Pink Mucket	S1	E	LE
KY	Livingston	Lampsilis ovata	Pocketbook	S1	E	
KY	Livingston	Obovaria retusa	Ring Pink	S1	E	LE
KY	Livingston	Plethobasus cooperianus	Orange-foot Pimpleback	S1	E	LE
KY	Livingston	Plethobasus cyphyus	Sheepnose	S1	E	LE
KY	Livingston	Pleurobema rubrum	Pyramid Pigtoe	S1	E	
KY	Livingston	Potamilus capax	Fat Pocketbook	S1	E	LE
KY	Livingston	Quadrula cylindrica	Rabbitsfoot			LT
KY	Livingston	Quadrula cylindrica cylindrica	Smooth Rabbitsfoot	S2	T	LT
KY	Livingston	Lithasia armigera	Armored Rocksnail	S3S4	S	
KY	Livingston	Lithasia geniculata	Ornate Rocksnail	S1	S	
KY	Livingston	Lithasia salebrosa	Muddy Rocksnail	S3/S4	TRKD	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
KY	Livingston	Lithasia verrucosa	Varicose Rocksnail	S3S4	S	
KY	Livingston	Pleurocera curta	Shortspire Hornsnail	S2	S	
KY	Livingston	Trepocarpus aethusae	Trepocarpus	S3	S	
KY	Livingston	Sedum telephioides	Allegheny Stonecrop	S2	T	
KY	Livingston	Apios priceana	Price's Potato-bean	S1	E	LT
KY	Livingston	Carya aquatica	Water Hickory	S2S3	T	
KY	Livingston	Halesia carolina	Carolina Silverbell	S1S2	E	
KY	Livingston	Halesia carolina	Common Silverbell	S1S2	E	
KY	Livingston	Koeleria macrantha	Prairie Junegrass	S1	E	
KY	Livingston	Sporobolus clandestinus	Rough Dropseed	S2S3	T	
KY	Livingston	Sporobolus heterolepis	Northern Dropseed	S1	E	
KY	Logan	Hyla avivoca	Bird-voiced Treefrog	S3	S	
KY	Logan	Hyla gratiosa	Barking Treefrog	S3	S	
KY	Logan	Circus cyaneus	Northern Harrier	S1S2	T	
KY	Logan	Vermivora bachmanii	Bachman's Warbler			LE
KY	Logan	Notropis amnis	Pallid Shiner	SH	H	
KY	Logan	Erimystax insignis	Blotched Chub	S1	E	
KY	Logan	Lepomis miniatus	Redspotted Sunfish	S2	T	
KY	Logan	Myotis grisescens	Gray Bat	S2	T	LE
KY	Logan	Myotis sodalis	Indiana Bat	S1S2	E	LE
KY	Logan	Nerodia erythrogaster neglecta	Copperbelly Water Snake			LT
KY	Logan	Thamnophis sauritus	Eastern Ribbon Snake	S3	S	
KY	Logan	Orconectes pellucidus	Mammoth Cave Crayfish	S3	S	
KY	Logan	Alasmidonta marginata	Elktoe	S2	T	
KY	Logan	Epioblasma triquetra	Snuffbox	S1	E	LE
KY	Logan	Pleuronaia dolabelloides	Slabside Pearlymussel	SX	X	LE
KY	Logan	Pegias fabula	Little-wing Pearlymussel	S1	E	LE
KY	Logan	Pleurobema oviforme	Tennessee Clubshell	S1	E	
KY	Logan	Quadrula cylindrica	Rabbitsfoot			LT
KY	Logan	Quadrula cylindrica cylindrica	Smooth Rabbitsfoot	S2	T	LT
KY	Logan	Toxolasma lividus	Purple Lilliput	S1	E	
KY	Logan	Villosa lienosa	Little Spectaclecase	S3S4	S	
KY	Logan	Villosa ortmanni	Kentucky Creekshell	S2	T	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
KY	Logan	Villosa vanuxemensis	Mountain Creekshell	S2	T	
KY	Logan	Symphyotrichum priceae	White Heath Aster	S1	E	
KY	Logan	Symphyotrichum pratense	Barrens Silky Aster	S3	S	
KY	Logan	Leavenworthia torulosa	Necklace Glade-cress	S2	T	
KY	Logan	Gentiana puberulenta	Downy Gentian	S1	E	
KY	Logan	Forestiera ligustrina	Upland Swamp Privet	S2S3	T	
KY	Logan	Phemeranthus calcaricus	Limestone Fame-flower	S1	E	
KY	Logan	Dodecatheon frenchii	French's Shootingstar	S3	S	
KY	Logan	Delphinium carolinianum	Carolina Larkspur	S1S2	T	
KY	Logan	Viola egglestonii	Eggleston's Violet	S3	S	
KY	Logan	Echinodorus tenellus var. parvulus	Dwarf Burhead	S1	E	
KY	Logan	Fimbristylis puberula	Hairy Fimbristylis	S2	T	
KY	Logan	Schoenoplectus hallii	Hall's Bulrush	S1	E	
KY	Logan	Juncus filipendulus	Plain's Rush	S2?	T	
KY	Lyon	Hyla gratiosa	Barking Treefrog	S3	S	
KY	Lyon	Pandion haliaetus	Osprey	S2	T	
KY	Lyon	Haliaeetus leucocephalus	Bald Eagle	S2	T	DM
KY	Lyon	Thryomanes bewickii	Bewick's Wren	S3	S	
KY	Lyon	Ichthyomyzon castaneus	Chestnut Lamprey	S2	S	
KY	Lyon	Acipenser fulvescens	Lake Sturgeon	S1	E	
KY	Lyon	Atractosteus spatula	Alligator Gar	S1	E	
KY	Lyon	Ictiobus niger	Black Buffalo	S3	S	
KY	Lyon	Eumeces inexpectatus	Southeastern Five-lined Skink	S3	S	
KY	Lyon	Lampropeltis triangulum elapsoides	Scarlet Kingsnake	S3	S	
KY	Lyon	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S2	T	
KY	Lyon	Thamnophis sauritus	Eastern Ribbon Snake	S3	S	
KY	Lyon	Nicrophorus americanus	American Burying Beetle	SH	H	LE
KY	Lyon	Ptilimnium capillaceum	Hair-like Mock Bishop-weed	S1S2	T	
KY	Lyon	Ptilimnium nuttallii	Nuttall's Mock Bishop's-weed	S1S2	E	
KY	Lyon	Trepocarpus aethusae	Trepocarpus	S3	S	
KY	Lyon	Solidago buckleyi	Buckley's Goldenrod	S2S3	S	
KY	Lyon	Armoracia lacustris	Lake-cress	S1S2	T	
KY	Lyon	Apios priceana	Price's Potato-bean	S1	E	LT

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
KY	Lyon	Baptisia bracteata var. leucophaea	Cream Wild Indigo	S3	S	
KY	Lyon	Philadelphus inodorus	Mock-orange	S1S2	T	
KY	Lyon	Juglans cinerea	Butternut	S2S3	T	
KY	Lyon	Hedeoma hispida	Rough Pennyroyal	S2	T	
KY	Lyon	Oenothera perennis	Small Sundrops	S1S2	E	
KY	Lyon	Ceanothus herbaceus	Prairie Redroot	S2	T	
KY	Lyon	Halesia carolina	Common Silverbell	S1S2	E	
KY	Lyon	Ulmus serotina	September Elm	S3	S	
KY	Lyon	Muhlenbergia glabrifloris	Muhly	S2S3	S	
KY	Lyon	Heteranthera dubia	Grassleaf Mud-plantain	S3	S	
KY	Marshall	Hyla avivoca	Bird-voiced Treefrog	S3	S	
KY	Marshall	Rana areolata circulosa	Northern Crawfish Frog	S3	S	
KY	Marshall	Ardea alba	Great Egret	S1B	E	
KY	Marshall	Haliaeetus leucocephalus	Bald Eagle	S2	T	DM
KY	Marshall	Corvus ossifragus	Fish Crow	S3B	S	
KY	Marshall	Certhia americana	Brown Creeper	S1S2	E	
KY	Marshall	Thryomanes bewickii	Bewick's Wren	S3	S	
KY	Marshall	Alosa alabamae	Alabama Shad	S1	E	
KY	Marshall	Umbra limi	Central Mudminnow	S2S3	T	
KY	Marshall	Notropis amnis	Pallid Shiner	SH	H	
KY	Marshall	Lepomis miniatus	Redspotted Sunfish	S2	T	
KY	Marshall	Ammocrypta vivax	Scaly Sand Darter	SX	X	
KY	Marshall	Myotis austroriparius	Southeastern Bat	S1S2	E	
KY	Marshall	Apalone mutica mutica	Midland Smooth Softshell	S3	S	
KY	Marshall	Eumeces inexpectatus	Southeastern Five-lined Skink	S3	S	
KY	Marshall	Farancia abacura reinwardtii	Western Mud Snake	S3	S	
KY	Marshall	Nerodia erythrogaster neglecta	Copperbelly Water Snake			LT
KY	Marshall	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S2	T	
KY	Marshall	Thamnophis sauritus	Eastern Ribbon Snake	S3	S	
KY	Marshall	Sistrurus miliarius streckeri	Western Pigmy Rattlesnake	S2	T	
KY	Marshall	Fusconaia subrotunda	Longsolid	S3	S	
KY	Marshall	Lampsilis abrupta	Pink Mucket	S1	E	LE
KY	Marshall	Lampsilis ovata	Pocketbook	S1	E	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
KY	Marshall	Obovaria retusa	Ring Pink	S1	E	LE
KY	Marshall	Plethobasus cooperianus	Orange-foot Pimpleback	S1	E	LE
KY	Marshall	Plethobasus cyphyus	Sheepnose	S1	E	LE
KY	Marshall	Pleurobema rubrum	Pyramid Pigtoe	S1	E	
KY	Marshall	Quadrula cylindrica cylindrica	Smooth Rabbitsfoot	S2	T	LT
KY	Marshall	Lithasia verrucosa	Varicose Rocksnail	S3S4	S	
KY	Marshall	Trepocarpus aethusae	Trepocarpus	S3	S	
KY	Marshall	Apios priceana	Price's Potato-bean	S1	E	LT
KY	Marshall	Baptisia bracteata var. leucophaea	Cream Wild Indigo	S3	S	
KY	Marshall	Hydrolea ovata	Hydrolea	S1	E	
KY	Marshall	Carya aquatica	Water Hickory	S2S3	T	
KY	Marshall	Oenothera perennis	Small Sundrops	S1S2	E	
KY	Marshall	Oldenlandia uniflora	Oldenlandia	S1	E	
KY	Marshall	Halesia carolina	Common Silverbell	S1S2	E	
KY	Marshall	Carex decomposita	Epiphytic Sedge	S2	T	
KY	McCracken	Hyla cinerea	Green Treefrog	S3	S	
KY	McCracken	Rana areolata circulosa	Northern Crawfish Frog	S3	S	
KY	McCracken	Lophodytes cucullatus	Hooded Merganser	S1S2	T	
KY	McCracken	Ictinia mississippiensis	Mississippi Kite	S2	S	
KY	McCracken	Accipiter striatus	Sharp-shinned Hawk	S3B	S	
KY	McCracken	Tyto alba	Common Barn-owl	S3	S	
KY	McCracken	Riparia riparia	Bank Swallow	S3	S	
KY	McCracken	Corvus ossifragus	Fish Crow	S3B	S	
KY	McCracken	Vireo bellii	Bell's Vireo	S2S3B	S	
KY	McCracken	Peucaea aestivalis	Bachman's Sparrow	S1	E	
KY	McCracken	Ichthyomyzon greeleyi	Mountain Brook Lamprey	S2	T	
KY	McCracken	Atractosteus spatula	Alligator Gar	S1	E	
KY	McCracken	Esox niger	Chain Pickerel	S3	S	
KY	McCracken	Hybognathus hayi	Cypress Minnow	S1	E	
KY	McCracken	Notropis maculatus	Taillight Shiner	S2S3	T	
KY	McCracken	Erimyzon sucetta	Lake Chubsucker	S2	T	
KY	McCracken	Ictiobus niger	Black Buffalo	S3	S	
KY	McCracken	Noturus stigmosus	Northern Madtom	S2S3	S	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
KY	McCracken	Menidia beryllina	Inland Silverside	S2	T	
KY	McCracken	Lepomis miniatus	Redspotted Sunfish	S2	T	
KY	McCracken	Myotis sodalis	Indiana Bat	S1S2	E	LE
KY	McCracken	Nycticeius humeralis	Evening Bat	S3	S	
KY	McCracken	Macrochelys temminckii	Alligator Snapping Turtle	S2	T	
KY	McCracken	Apalone mutica mutica	Midland Smooth Softshell	S3	S	
KY	McCracken	Farancia abacura reinwardtii	Western Mud Snake	S3	S	
KY	McCracken	Thamnophis sauritus	Eastern Ribbon Snake	S3	S	
KY	McCracken	Lampsilis abrupta	Pink Mucket	S1	E	LE
KY	McCracken	Lampsilis ovata	Pocketbook	S1	E	
KY	McCracken	Plethobasus cooperianus	Orange-foot Pimpleback	S1	E	LE
KY	McCracken	Plethobasus cyphyus	Sheepnose	S1	E	LE
KY	McCracken	Potamilus capax	Fat Pocketbook	S1	E	LE
KY	McCracken	Quadrula cylindrica	Rabbitsfoot			LT
KY	McCracken	Toxolasma lividus	Purple Lilliput	S1	E	
KY	McCracken	Lithasia geniculata	Ornate Rocksnail	S1	S	
KY	McCracken	Lithasia verrucosa	Varicose Rocksnail	S3S4	S	
KY	McCracken	Coreopsis pubescens	Downy Coreopsis	S2S3	S	
KY	McCracken	Silphium laciniatum	Compass-plant	S2	T	
KY	McCracken	Carya aquatica	Water Hickory	S2S3	T	
KY	McCracken	Halesia carolina	Common Silverbell	S1S2	E	
KY	McCreary	Etheostoma lemniscatum	Tuxedo Darter	S1	E	LE
KY	McCreary	Corynorhinus rafinesquii	Rafinesque’s Big-eared bat	S3	S	
KY	McCreary	Alasmidonta atropurpurea	Cumberland Elktoe	S1	E	LE
KY	McCreary	Epioblasma brevidens	Cumberlandian Combshell	S1	E	LE
KY	McCreary	Epioblasma florentina walkeri	Tan Riffleshell	S1	E	LE
KY	McCreary	Pegias fabula	Little-wing Pearlymussel	S1	E	LE
KY	McCreary	Villosa trabalis	Cumberland Bean	S1	E	LE
KY	McCreary	Bartonia virginica	Screwstem	S2	T	
KY	Monroe	Accipiter striatus	Sharp-shinned Hawk	S3B	S	
KY	Monroe	Chondestes grammacus	Lark Sparrow	S2S3	T	
KY	Monroe	Thoburnia atripinnis	Blackfin Sucker	S2	S	
KY	Monroe	Etheostoma maculatum	Spotted Darter	S2	T	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
KY	Monroe	Percina macrocephala	Longhead Darter	S1	E	
KY	Monroe	Myotis grisescens	Gray Bat	S2	T	LE
KY	Monroe	Stylurus notatus	Elusive Clubtail	S1	E	
KY	Muhlenberg	Hyla avivoca	Bird-voiced Treefrog	S3	S	
KY	Muhlenberg	Ichthyomyzon castaneus	Chestnut Lamprey	S2	S	
KY	Muhlenberg	Lepomis miniatus	Redspotted Sunfish	S2	T	
KY	Muhlenberg	Myotis austroriparius	Southeastern Bat	S1S2	E	
KY	Muhlenberg	Nerodia erythrogaster neglecta	Copperbelly Water Snake			LT
KY	Muhlenberg	Cyprogenia stegaria	Fanshell	S1	E	LE
KY	Muhlenberg	Epioblasma obliquata obliquata	Purple Catspaw	S3	E	LE
KY	Muhlenberg	Fusconaia subrotunda	Longsolid	S3	S	
KY	Muhlenberg	Lampsilis abrupta	Pink Mucket	S1	E	LE
KY	Muhlenberg	Lampsilis ovata	Pocketbook	S1	E	
KY	Muhlenberg	Pleurobema plenum	Rough Pigtoe	S1	E	LE
KY	Muhlenberg	Pleurobema rubrum	Pyramid Pigtoe	S1	E	
KY	Muhlenberg	Toxolasma lividus	Purple Lilliput	S1	E	
KY	Muhlenberg	Villosa lienosa	Little Spectaclecase	S3S4	S	
KY	Muhlenberg	Didiplis diandra	Water-purslane	S1S2	E	
KY	Muhlenberg	Dodecatheon frenchii	French's Shootingstar	S3	S	
KY	Ohio	Cyprogenia stegaria	Fanshell	S1	E	LE
KY	Ohio	Epioblasma obliquata obliquata	Purple Catspaw	S3	E	LE
KY	Ohio	Fusconaia subrotunda	Longsolid	S3	S	
KY	Ohio	Fusconaia subrotunda subrotunda	Long-solid	S3	S	
KY	Ohio	Pleurobema rubrum	Pyramid Pigtoe	S1	E	
KY	Simpson	Anas discors	Blue-winged Teal	S1S2	T	
KY	Simpson	Thryomanes bewickii	Bewick's Wren	S3	S	
KY	Simpson	Cistothorus platensis	Sedge Wren	S3B	S	
KY	Simpson	Typhlichthys subterraneus	Southern Cavefish	S2S3	S	
KY	Simpson	Myotis grisescens	Gray Bat	S2	T	LE
KY	Simpson	Orconectes pellucidus	Mammoth Cave Crayfish	S3	S	
KY	Simpson	Villosa ortmanni	Kentucky Creekshell	S2	T	
KY	Simpson	Villosa vanuxemensis	Mountain Creekshell	S2	T	
KY	Simpson	Perideridia americana	Perideridia	S2	T	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
KY	Simpson	Leavenworthia torulosa	Necklace Glade-cress	S2	T	
KY	Simpson	Forestiera ligustrina	Upland Swamp Privet	S2S3	T	
KY	Simpson	Oenothera triloba	Sundrops	S1S2	T	
KY	Simpson	Sporobolus clandestinus	Rough Dropseed	S2S3	T	
KY	Simpson	Isoetes butleri	Butler's Quillwort	S1	E	
KY	Todd	Hyla gratiosa	Barking Treefrog	S3	S	
KY	Todd	Thryomanes bewickii	Bewick's Wren	S3	S	
KY	Todd	Chondestes grammacus	Lark Sparrow	S2S3	T	
KY	Todd	Myotis grisescens	Gray Bat	S2	T	LE
KY	Todd	Epioblasma florentina walkeri	Tan Riffleshell	S1	E	LE
KY	Todd	Pegias fabula	Little-wing Pearlymussel	S1	E	LE
KY	Todd	Villosa vanuxemensis	Mountain Creekshell	S2	T	
KY	Todd	Hydrocotyle ranunculoides	Floating Pennywort	S1S2	E	
KY	Todd	Perideridia americana	Perideridia	S2	T	
KY	Todd	Ptilimnium capillaceum	Hair-like Mock Bishop-weed	S1S2	T	
KY	Todd	Onosmodium hispidissimum	Hairy False Gromwell	S1	E	
KY	Todd	Leavenworthia torulosa	Necklace Glade-cress	S2	T	
KY	Todd	Baptisia australis var. minor	Blue Wild-indigo	S2S3	S	
KY	Todd	Baptisia tinctoria	Yellow Wild-indigo	S1S2	T	
KY	Todd	Gentiana puberulenta	Downy Gentian	S1	E	
KY	Todd	Oenothera linifolia	Sundrops	S1S2	E	
KY	Todd	Dodecatheon frenchii	French's Shootingstar	S3	S	
KY	Todd	Delphinium carolinianum	Carolina Larkspur	S1S2	T	
KY	Todd	Carex alata	Broadwing Sedge	S1S2	T	
KY	Todd	Amianthium muscitoxicum	Fly Poison	S1	E	
KY	Todd	Veratrum woodii	Ozark Bunchflower	S2	T	
KY	Trigg	Hyla avivoca	Bird-voiced Treefrog	S3	S	
KY	Trigg	Hyla cinerea	Green Treefrog	S3	S	
KY	Trigg	Hyla gratiosa	Barking Treefrog	S3	S	
KY	Trigg	Podilymbus podiceps	Pied-billed Grebe	S1	E	
KY	Trigg	Botaurus lentiginosus	American Bittern	SHB	H	
KY	Trigg	Ardea alba	Great Egret	S1B	E	
KY	Trigg	Egretta caerulea	Little Blue Heron	S1	E	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
KY	Trigg	Bubulcus ibis	Cattle Egret	S1S2	S	
KY	Trigg	Nycticorax nycticorax	Black-crowned Night-heron	S1S2	T	
KY	Trigg	Anas discors	Blue-winged Teal	S1S2	T	
KY	Trigg	Pandion haliaetus	Osprey	S2	T	
KY	Trigg	Haliaeetus leucocephalus	Bald Eagle	S2	T	DM
KY	Trigg	Accipiter striatus	Sharp-shinned Hawk	S3B	S	
KY	Trigg	Tyto alba	Common Barn-owl	S3	S	
KY	Trigg	Thryomanes bewickii	Bewick's Wren	S3	S	
KY	Trigg	Peucaea aestivalis	Bachman's Sparrow	S1	E	
KY	Trigg	Ictiobus niger	Black Buffalo	S3	S	
KY	Trigg	Typhlichthys subterraneus	Southern Cavefish	S2S3	S	
KY	Trigg	Lepomis miniatus	Redspotted Sunfish	S2	T	
KY	Trigg	Etheostoma microlepidum	Smallscale Darter	S1	E	
KY	Trigg	Etheostoma proeliare	Cypress Darter	S2	T	
KY	Trigg	Myotis austroriparius	Southeastern Bat	S1S2	E	
KY	Trigg	Myotis grisescens	Gray Bat	S2	T	LE
KY	Trigg	Myotis sodalis	Indiana Bat	S1S2	E	LE
KY	Trigg	Eumeces inexpectatus	Southeastern Five-lined Skink	S3	S	
KY	Trigg	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S2	T	
KY	Trigg	Thamnophis sauritus	Eastern Ribbon Snake	S3	S	
KY	Trigg	Sistrurus miliarius streckeri	Western Pigmy Rattlesnake	S2	T	
KY	Trigg	Orconectes pellucidus	Mammoth Cave Crayfish	S3	S	
KY	Trigg	Nicrophorus americanus	American Burying Beetle	SH	H	LE
KY	Trigg	Villosa lienosa	Little Spectaclecase	S3S4	S	
KY	Trigg	Lithasia armigera	Armored Rocksnail	S3S4	S	
KY	Trigg	Lithasia salebrosa	Muddy Rocksnail	S3/S4	TRKD	
KY	Trigg	Ptilimnium capillaceum	Hair-like Mock Bishop-weed	S1S2	T	
KY	Trigg	Ptilimnium nuttallii	Nuttall's Mock Bishop's-weed	S1S2	E	
KY	Trigg	Trepocarpus aethusae	Trepocarpus	S3	S	
KY	Trigg	Matelea carolinensis	Carolina Anglepod	S1?	E	
KY	Trigg	Hieracium longipilum	Hairy Hawkweed	S2	T	
KY	Trigg	Prenanthes aspera	Rough Rattlesnake-root	S1	E	
KY	Trigg	Rudbeckia subtomentosa	Sweet Coneflower	S1	E	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
KY	Trigg	Armoracia lacustris	Lake-cress	S1S2	T	
KY	Trigg	Apios priceana	Price's Potato-bean	S1	E	LT
KY	Trigg	Baptisia bracteata var. leucophaea	Cream Wild Indigo	S3	S	
KY	Trigg	Juglans cinerea	Butternut	S2S3	T	
KY	Trigg	Oenothera linifolia	Sundrops	S1S2	E	
KY	Trigg	Oenothera perennis	Small Sundrops	S1S2	E	
KY	Trigg	Oldenlandia uniflora	Oldenlandia	S1	E	
KY	Trigg	Halesia carolina	Common Silverbell	S1S2	E	
KY	Trigg	Sagittaria graminea	Grassleaf Arrowhead	S1S2	T	
KY	Trigg	Najas gracillima	Naiad	S2S3	S	
KY	Trigg	Muhlenbergia glabrifloris	Muhly	S2S3	S	
KY	Trigg	Heteranthera dubia	Grassleaf Mud-plantain	S3	S	
KY	Trigg	Heteranthera limosa	Smaller Mud-plantain	S2S3	S	
KY	Warren	Hyla cinerea	Green Treefrog	S3	S	
KY	Warren	Hyla versicolor	Gray Treefrog	S2S3	S	
KY	Warren	Podilymbus podiceps	Pied-billed Grebe	S1	E	
KY	Warren	Nyctanassa violacea	Yellow-crowned Night-heron	S2	T	
KY	Warren	Anas discors	Blue-winged Teal	S1S2	T	
KY	Warren	Lophodytes cucullatus	Hooded Merganser	S1S2	T	
KY	Warren	Fulica americana	American Coot	S1	E	
KY	Warren	Tyto alba	Common Barn-owl	S3	S	
KY	Warren	Thryomanes bewickii	Bewick's Wren	S3	S	
KY	Warren	Cistothorus platensis	Sedge Wren	S3B	S	
KY	Warren	Peucaea aestivalis	Bachman's Sparrow	S1	E	
KY	Warren	Chondestes grammacus	Lark Sparrow	S2S3	T	
KY	Warren	Ammodramus henslowii	Henslow's Sparrow	S3	S	
KY	Warren	Ichthyomyzon greeleyi	Mountain Brook Lamprey	S2	T	
KY	Warren	Notropis amnis	Pallid Shiner	SH	H	
KY	Warren	Phenacobius uranops	Stargazing Minnow	S2S3	S	
KY	Warren	Erimystax insignis	Blotched Chub	S1	E	
KY	Warren	Typhlichthys subterraneus	Southern Cavefish	S2S3	S	
KY	Warren	Etheostoma maculatum	Spotted Darter	S2	T	
KY	Warren	Etheostoma tippecanoe	Tippecanoe Darter	S2	TRKD	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
KY	Warren	Percina macrocephala	Longhead Darter	S1	E	
KY	Warren	Myotis grisescens	Gray Bat	S2	T	LE
KY	Warren	Myotis sodalis	Indiana Bat	S1S2	E	LE
KY	Warren	Corynorhinus rafinesquii	Rafinesque’s Big-eared bat	S3	S	
KY	Warren	Orconectes pellucidus	Mammoth Cave Crayfish	S3	S	
KY	Warren	Barbicambarus cornutus	Bottlebrush Crayfish	S2	S	
KY	Warren	Alasmidonta marginata	Elktoe	S2	T	
KY	Warren	Cyprogenia stegaria	Fanshell	S1	E	LE
KY	Warren	Epioblasma obliquata obliquata	Purple Catspaw	S3	E	LE
KY	Warren	Epioblasma torulosa rangiana	Northern Riffleshell	S1	E	LE
KY	Warren	Epioblasma triquetra	Snuffbox	S1	E	LE
KY	Warren	Fusconaia subrotunda	Longsolid	S3	S	
KY	Warren	Fusconaia subrotunda subrotunda	Long-solid	S3	S	
KY	Warren	Lampsilis abrupta	Pink Mucket	S1	E	LE
KY	Warren	Lampsilis ovata	Pocketbook	S1	E	
KY	Warren	Obovaria retusa	Ring Pink	S1	E	LE
KY	Warren	Plethobasus cooperianus	Orange-foot Pimpleback	S1	E	LE
KY	Warren	Plethobasus cyphyus	Sheepnose	S1	E	LE
KY	Warren	Pleurobema clava	Clubshell	S1	E	LE
KY	Warren	Pleurobema plenum	Rough Pigtoe	S1	E	LE
KY	Warren	Pleurobema rubrum	Pyramid Pigtoe	S1	E	
KY	Warren	Quadrula cylindrica cylindrica	Smooth Rabbitsfoot	S2	T	LT
KY	Warren	Villosa lienosa	Little Spectaclecase	S3S4	S	
KY	Warren	Villosa ortmanni	Kentucky Creekshell	S2	T	
KY	Warren	Perideridia americana	Perideridia	S2	T	
KY	Warren	Leavenworthia torulosa	Necklace Glade-cress	S2	T	
KY	Warren	Silene ovata	Ovate Catchfly	S1	E	
KY	Warren	Apios priceana	Price's Potato-bean	S1	E	LT
KY	Warren	Forestiera ligustrina	Upland Swamp Privet	S2S3	T	
KY	Warren	Dodecatheon frenchii	French's Shootingstar	S3	S	
KY	Warren	Delphinium carolinianum	Carolina Larkspur	S1S2	T	
KY	Warren	Trillium pusillum	Least Trillium	S1	E	
KY	Wayne	Myotis sodalis	Indiana Bat	S1S2	E	LE

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
KY	Wayne	Matelea carolinensis	Carolina Anglepod	S1?	E	
KY	Wayne	Euphorbia mercurialina	Mercury Spurge	S1S2	T	
KY	Wayne	Adiantum capillus-veneris	Southern Maidenhair Fern	S2S3	T	
KY	Whitley	Falco peregrinus	Peregrine Falcon	S1	E	
KY	Whitley	Chrosomus cumberlandensis	Blackside Dace	S2	T	LT
KY	Whitley	Corydalis sempervirens	Pale Corydalis	S3?	S	
MS	Alcorn	Peucaea aestivalis	Bachman's Sparrow	S3B,S3S4N	TRKD	
MS	Alcorn	Phenacobius mirabilis	Suckermouth Minnow	S1	E	
MS	Alcorn	Noturus stigmosus	Northern Madtom	S1	E	
MS	Alcorn	Silene ovata	Ovate Catchfly	S1S2	SLNS	
MS	Alcorn	Chelone glabra	White Turtlehead	S3	SLNS	
MS	Alcorn	Platanthera integrilabia	White Fringeless Orchid	S1	SLNS	LT
MS	Alcorn	Platanthera peramoena	Purple Fringeless Orchid	S2S3	SLNS	
MS	Attala	Panax quinquefolius	American ginseng	S3	SLNS	
MS	Attala	Matelea carolinensis	Carolina Anglepod	S3	SLNS	
MS	Attala	Triosteum angustifolium	Horse-gentian	S3	SLNS	
MS	Attala	Philadelphus inodorus	Mock-orange	S2	SLNS	
MS	Attala	Carya glabra var. hirsuta	Swamp Hickory	S3	SLNS	
MS	Attala	Schisandra glabra	Bay Starvine	S3	SLNS	
MS	Attala	Chelone glabra	White Turtlehead	S3	SLNS	
MS	Attala	Luzula acuminata	Woodrush	S3	SLNS	
MS	Attala	Lilium superbum	Turk's Cap Lily	S3S4	SLNS	
MS	Attala	Platanthera cristata	Yellow-crested Orchid	S3S4	SLNS	
MS	Attala	Platanthera lacera	Ragged Fringe Orchid	S1S2	SLNS	
MS	Attala	Platanthera peramoena	Purple Fringeless Orchid	S2S3	SLNS	
MS	Attala	Spiranthes ovalis	Lesser Ladies'-tresses	S2S3	SLNS	
MS	Benton	Peucaea aestivalis	Bachman's Sparrow	S3B,S3S4N	TRKD	
MS	Benton	Myotis sodalis	Indiana Bat	S1B	E	LE
MS	Benton	Rudbeckia grandiflora	Rough Coneflower	S1	SLNS	
MS	Benton	Pachysandra procumbens	Allegheny-spurge	S3	SLNS	
MS	Benton	Pycnanthemum verticillatum var. pilosum	Mountain-mint	S1	SLNS	
MS	Benton	Mimulus ringens	Monkey-flower	S1	SLNS	
MS	Calhoun	Panax quinquefolius	American ginseng	S3	SLNS	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
MS	Calhoun	Hieracium venosum	Rattlesnake Hawkweed	S1	SLNS	
MS	Calhoun	Sedum ternatum	Stonecrop	S1	SLNS	
MS	Calhoun	Lilium superbum	Turk's Cap Lily	S3S4	SLNS	
MS	Calhoun	Platanthera peramoena	Purple Fringeless Orchid	S2S3	SLNS	
MS	Chickasaw	Thryomanes bewickii	Bewick's Wren	S2B,S3N	E	
MS	Chickasaw	Osmorhiza longistylis	Smoother Sweet-cicely	S3	SLNS	
MS	Chickasaw	Perideridia americana	Perideridia	S1S2	SLNS	
MS	Chickasaw	Polytaenia nuttallii	Prairie Parsley	S2	SLNS	
MS	Chickasaw	Panax quinquefolius	American ginseng	S3	SLNS	
MS	Chickasaw	Asarum canadense	Canada Wild-ginger	S3	SLNS	
MS	Chickasaw	Echinacea purpurea	Eastern Purple Coneflower	S3	SLNS	
MS	Chickasaw	Cacalia muehlenbergii	Great Indian-plantain	S1	SLNS	
MS	Chickasaw	Cardamine angustata	Slender Toothwort	S2	SLNS	
MS	Chickasaw	Lesquerella gracilis	Bladderpod	S1	SLNS	
MS	Chickasaw	Silene ovata	Ovate Catchfly	S1S2	SLNS	
MS	Chickasaw	Stellaria pubera	Giant Chickweed	S2	SLNS	
MS	Chickasaw	Celastrus scandens	climbing bittersweet	S3	SLNS	
MS	Chickasaw	Euonymus atropurpureus	Wahoo	S2S3	SLNS	
MS	Chickasaw	Triosteum angustifolium	Horse-gentian	S3	SLNS	
MS	Chickasaw	Apios priceana	Price's Potato-bean	S1	SLNS	LT
MS	Chickasaw	Desmodium ochroleucum	Creamflower Tick-trefoil	S1	SLNS	
MS	Chickasaw	Gymnocladus dioicus	Kentucky Coffee-tree	S1S2	SLNS	
MS	Chickasaw	Quercus macrocarpa	Bur Oak	S2	SLNS	
MS	Chickasaw	Frasera caroliniensis	American Columbo	S2S3	SLNS	
MS	Chickasaw	Juglans cinerea	Butternut	S2	SLNS	
MS	Chickasaw	Menispermum canadense	Canada Moonseed	S3	SLNS	
MS	Chickasaw	Oenothera triloba	Sundrops	S1	SLNS	
MS	Chickasaw	Polemonium reptans	Greek Valerian	S2S3	SLNS	
MS	Chickasaw	Dodecatheon meadia	Shooting Star	S2	SLNS	
MS	Chickasaw	Delphinium tricorne	Dwarf Larkspur	S2	SLNS	
MS	Chickasaw	Hydrastis canadensis	Goldenseal	S1	SLNS	
MS	Chickasaw	Penstemon tenuiflorus	Beard-tongue	S3	SLNS	
MS	Chickasaw	Staphylea trifolia	American Bladdernut	S3	SLNS	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
MS	Chickasaw	Hybanthus concolor	Green Violet	S3	SLNS	
MS	Chickasaw	Carex microdonta	Small-toothed Sedge	S3	SLNS	
MS	Chickasaw	Camassia scilloides	Wild Hyacinth	S2	SLNS	
MS	Chickasaw	Erythronium albidum	White Trout-lily	S2	SLNS	
MS	Chickasaw	Lilium michiganense	Michigan Lily	S1	SLNS	
MS	Chickasaw	Eulophia ecristata	Crested Fringed Orchid	S1	SLNS	
MS	Chickasaw	Spiranthes magnicamporum	Great Plains Ladies'-tresses	S2	SLNS	
MS	Chickasaw	Triphora trianthophora	Three-birds-orchids	S2	SLNS	
MS	Choctaw	Picoides borealis	Red-cockaded Woodpecker	S1	E	LE
MS	Choctaw	Panax quinquefolius	American ginseng	S3	SLNS	
MS	Choctaw	Matelea carolinensis	Carolina Anglepod	S3	SLNS	
MS	Choctaw	Philadelphus inodorus	Mock-orange	S2	SLNS	
MS	Choctaw	Carya glabra var. hirsuta	Swamp Hickory	S3	SLNS	
MS	Choctaw	Tiarella cordifolia	Heart-leaved Foam-flower	S2	SLNS	
MS	Choctaw	Chelone glabra	White Turtlehead	S3	SLNS	
MS	Choctaw	Mimulus ringens	Monkey-flower	S1	SLNS	
MS	Choctaw	Staphylea trifolia	American Bladdernut	S3	SLNS	
MS	Choctaw	Lilium superbum	Turk's Cap Lily	S3S4	SLNS	
MS	Choctaw	Melanthium virginicum	Bunchflower	S3	SLNS	
MS	Choctaw	Cypripedium parviflorum var. pubescens	Large Yellow Lady's-slipper	S2S3	SLNS	
MS	Choctaw	Hexalectris spicata	Crested Coralroot	S2	SLNS	
MS	Choctaw	Platanthera lacera	Ragged Fringe Orchid	S1S2	SLNS	
MS	Choctaw	Platanthera peramoena	Purple Fringeless Orchid	S2S3	SLNS	
MS	Clay	Haliaeetus leucocephalus	Bald Eagle	S2B,S2N		DM
MS	Clay	Peucaea aestivalis	Bachman's Sparrow	S3B,S3S4N	TRKD	
MS	Clay	Noturus munitus	Frecklebelly Madtom	S2	E	
MS	Clay	Crystallaria asprella	Crystal Darter	S1	E	
MS	Clay	Graptemys nigrinoda	Black-knobbed Map Turtle	S2	E	
MS	Clay	Epioblasma penita	Southern Combshell	S1	E	LE
MS	Clay	Pleurobema decisum	Southern Clubshell	S1	E	LE
MS	Clay	Pleurobema marshalli	Flat Pigtoe	SX	E	LE
MS	Clay	Pleurobema perovatum	Ovate Clubshell	S1	E	LE
MS	Clay	Pleurobema taitianum	Heavy Pigtoe	SX	E	LE

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
MS	Clay	Quadrula stapes	Stirrupshell	SX	E	LE
MS	Clay	Osmorhiza longistylis	Smoother Sweet-cicely	S3	SLNS	
MS	Clay	Polytaenia nuttallii	Prairie Parsley	S2	SLNS	
MS	Clay	Taenidia integerrima	Yellow Pimpernel	S1	SLNS	
MS	Clay	Panax quinquefolius	American ginseng	S3	SLNS	
MS	Clay	Asarum canadense	Canada Wild-ginger	S3	SLNS	
MS	Clay	Matelea carolinensis	Carolina Anglepod	S3	SLNS	
MS	Clay	Coreopsis auriculata	Lobed Tickseed	S2S3	SLNS	
MS	Clay	Echinacea purpurea	Eastern Purple Coneflower	S3	SLNS	
MS	Clay	Palafoxia callosa	Small Palafoxia	S1	SLNS	
MS	Clay	Prenanthes aspera	Rough Rattlesnake-root	S2	SLNS	
MS	Clay	Thelesperma filifolium	Stiff-greenthread	S1	SLNS	
MS	Clay	Symphyotrichum ericoides	White Heath Aster	S2	SLNS	
MS	Clay	Cardamine angustata	Slender Toothwort	S2	SLNS	
MS	Clay	Pachysandra procumbens	Allegheny-spurge	S3	SLNS	
MS	Clay	Silene ovata	Ovate Catchfly	S1S2	SLNS	
MS	Clay	Stellaria pubera	Giant Chickweed	S2	SLNS	
MS	Clay	Euonymus atropurpureus	Wahoo	S2S3	SLNS	
MS	Clay	Triosteum angustifolium	Horse-gentian	S3	SLNS	
MS	Clay	Apios priceana	Price's Potato-bean	S1	SLNS	LT
MS	Clay	Astragalus canadensis	Canadian Milkvetch	S2	SLNS	
MS	Clay	Quercus macrocarpa	Bur Oak	S2	SLNS	
MS	Clay	Frasera caroliniensis	American Columbo	S2S3	SLNS	
MS	Clay	Juglans cinerea	Butternut	S2	SLNS	
MS	Clay	Salvia urticifolia	Nettle-leaf Sage	S2	SLNS	
MS	Clay	Linum sulcatum	Grooved Yellow Flax	S3	SLNS	
MS	Clay	Menispermum canadense	Canada Moonseed	S3	SLNS	
MS	Clay	Oenothera grandiflora	Large-flowered Evening-primrose	S1	SLNS	
MS	Clay	Delphinium tricorne	Dwarf Larkspur	S2	SLNS	
MS	Clay	Rhamnus lanceolata	Lance-leaved Buckthorn	S2	SLNS	
MS	Clay	Crataegus ashei	Ash's Hawthorn	S1	SLNS	
MS	Clay	Agalinis auriculata	Earleaf Foxglove	S2	SLNS	
MS	Clay	Chelone glabra	White Turtlehead	S3	SLNS	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
MS	Clay	Penstemon tenuiflorus	Beard-tongue	S3	SLNS	
MS	Clay	Staphylea trifolia	American Bladdernut	S3	SLNS	
MS	Clay	Hybanthus concolor	Green Violet	S3	SLNS	
MS	Clay	Carex grayi	Asa Gray Sedge	S2	SLNS	
MS	Clay	Carex picta	Sedge	S3	SLNS	
MS	Clay	Nemastylis geminiflora	Prairie Pleatleaf	S2	SLNS	
MS	Clay	Luzula acuminata	Woodrush	S3	SLNS	
MS	Clay	Camassia scilloides	Wild Hyacinth	S2	SLNS	
MS	Clay	Erythronium albidum	White Trout-lily	S2	SLNS	
MS	Clay	Lilium superbum	Turk's Cap Lily	S3S4	SLNS	
MS	Clay	Cypripedium parviflorum var. pubescens	Large Yellow Lady's-slipper	S2S3	SLNS	
MS	Clay	Hexalectris spicata	Crested Coralroot	S2	SLNS	
MS	Clay	Platanthera cristata	Yellow-crested Orchid	S3S4	SLNS	
MS	Clay	Spiranthes magnicamporum	Great Plains Ladies'-tresses	S2	SLNS	
MS	Clay	Spiranthes ovalis	Lesser Ladies'-tresses	S2S3	SLNS	
MS	Clay	Triphora trianthophora	Three-birds-orchids	S2	SLNS	
MS	Clay	Botrychium jenmanii	Alabama Grapefern	S1S2	SLNS	
MS	DeSoto	Sterna antillarum athalassos	Interior Least Tern	S2B	E	LE
MS	DeSoto	Osmorhiza longistylis	Smoother Sweet-cicely	S3	SLNS	
MS	DeSoto	Panax quinquefolius	American ginseng	S3	SLNS	
MS	DeSoto	Hydrastis canadensis	Goldenseal	S1	SLNS	
MS	Itawamba	Haliaeetus leucocephalus	Bald Eagle	S2B,S2N		DM
MS	Itawamba	Noturus munitus	Frecklebelly Madtom	S2	E	
MS	Itawamba	Crystallaria asprella	Crystal Darter	S1	E	
MS	Itawamba	Etheostoma rupestre	Rock Darter	S3	TRKD	
MS	Itawamba	Graptemys nigrinoda	Black-knobbed Map Turtle	S2	E	
MS	Itawamba	Neonympha mitchellii	Mitchell's Satyr	S1		LE
MS	Itawamba	Epioblasma penita	Southern Combshell	S1	E	LE
MS	Itawamba	Lampsilis perovalis	Orange-nacre Mucket	S1	E	LT
MS	Itawamba	Lasmigona complanata	White Heelsplitter	S3	TRKD	
MS	Itawamba	Pleurobema decisum	Southern Clubshell	S1	E	LE
MS	Itawamba	Pleurobema perovatum	Ovate Clubshell	S1	E	LE
MS	Itawamba	Pleurobema taitianum	Heavy Pigtoe	SX	E	LE

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
MS	Itawamba	Osmorhiza longistylis	Smoother Sweet-cicely	S3	SLNS	
MS	Itawamba	Panax quinquefolius	American ginseng	S3	SLNS	
MS	Itawamba	Hexastylis shuttleworthii	Large-flowered Heartleaf	S1	SLNS	
MS	Itawamba	Matelea obliqua	Climbing Milkweed	S2	SLNS	
MS	Itawamba	Coreopsis auriculata	Lobed Tickseed	S2S3	SLNS	
MS	Itawamba	Rhododendron arborescens	Smooth Azalea	S1S2	SLNS	
MS	Itawamba	Salvia urticifolia	Nettle-leaf Sage	S2	SLNS	
MS	Itawamba	Chimaphila maculata	Spotted Wintergreen	S2	SLNS	
MS	Itawamba	Tiarella cordifolia	Heart-leaved Foam-flower	S2	SLNS	
MS	Itawamba	Chelone glabra	White Turtlehead	S3	SLNS	
MS	Itawamba	Erythronium americanum	Yellow Trout-lily	S1S2	SLNS	
MS	Itawamba	Melanthium virginicum	Bunchflower	S3	SLNS	
MS	Itawamba	Cypripedium parviflorum var. pubescens	Large Yellow Lady's-slipper	S2S3	SLNS	
MS	Itawamba	Goodyera pubescens	Downy Rattlesnake-plantain	S1	SLNS	
MS	Itawamba	Platanthera cristata	Yellow-crested Orchid	S3S4	SLNS	
MS	Itawamba	Spiranthes ovalis	Lesser Ladies'-tresses	S2S3	SLNS	
MS	Itawamba	Isoetes engelmannii	Appalachian Quillwort	S1S2	SLNS	
MS	Kemper	Panax quinquefolius	American ginseng	S3	SLNS	
MS	Kemper	Echinacea purpurea	Eastern Purple Coneflower	S3	SLNS	
MS	Kemper	Symphyotrichum ericoides	White Heath Aster	S2	SLNS	
MS	Kemper	Viburnum acerifolium	Mapleleaf Viburnum	S1	SLNS	
MS	Kemper	Apios priceana	Price's Potato-bean	S1	SLNS	LT
MS	Kemper	Astragalus canadensis	Canadian Milkvetch	S2	SLNS	
MS	Kemper	Desmodium ochroleucum	Creamflower Tick-trefoil	S1	SLNS	
MS	Kemper	Carya glabra var. hirsuta	Swamp Hickory	S3	SLNS	
MS	Kemper	Dracocephalum parviflorum	American Dragonhead	S1	SLNS	
MS	Kemper	Cuphea viscosissima	Blue Waxweed	S1	SLNS	
MS	Kemper	Forestiera ligustrina	Upland Swamp Privet	S1S2	SLNS	
MS	Kemper	Agalinis auriculata	Earleaf Foxglove	S2	SLNS	
MS	Kemper	Penstemon tenuiflorus	Beard-tongue	S3	SLNS	
MS	Kemper	Hybanthus concolor	Green Violet	S3	SLNS	
MS	Kemper	Goodyera pubescens	Downy Rattlesnake-plantain	S1	SLNS	
MS	Kemper	Ponthieva racemosa	Shadow-witch Orchid	S2	SLNS	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
MS	Kemper	Ophioglossum engelmannii	Limestone Adder's-tongue	S2	SLNS	
MS	Lafayette	Haliaeetus leucocephalus	Bald Eagle	S2B,S2N		DM
MS	Lafayette	Picoides borealis	Red-cockaded Woodpecker	S1	E	LE
MS	Lafayette	Peucaea aestivalis	Bachman's Sparrow	S3B,S3S4N	TRKD	
MS	Lafayette	Polytaenia nuttallii	Prairie Parsley	S2	SLNS	
MS	Lafayette	Echinacea purpurea	Eastern Purple Coneflower	S3	SLNS	
MS	Lafayette	Solidago flaccidifolia	Appalachian Golden-rod	S1	SLNS	
MS	Lafayette	Symphyotrichum ericoides	White Heath Aster	S2	SLNS	
MS	Lafayette	Arabis lyrata	Lyre-leaf Rockcress	SH	SLNS	
MS	Lafayette	Triosteum angustifolium	Horse-gentian	S3	SLNS	
MS	Lafayette	Carya glabra var. hirsuta	Swamp Hickory	S3	SLNS	
MS	Lafayette	Pycnanthemum verticillatum var. pilosum	Mountain-mint	S1	SLNS	
MS	Lafayette	Salvia urticifolia	Nettle-leaf Sage	S2	SLNS	
MS	Lafayette	Chelone glabra	White Turtlehead	S3	SLNS	
MS	Lafayette	Carex scoparia var. scoparia	Broom Sedge	S2	SLNS	
MS	Lafayette	Carex stricta	Sedge	S2	SLNS	
MS	Lafayette	Lilium superbum	Turk's Cap Lily	S3S4	SLNS	
MS	Lafayette	Cypripedium parviflorum var. pubescens	Large Yellow Lady's-slipper	S2S3	SLNS	
MS	Lafayette	Hexalectris spicata	Crested Coralroot	S2	SLNS	
MS	Lafayette	Platanthera peramoena	Purple Fringeless Orchid	S2S3	SLNS	
MS	Lafayette	Cheilanthes lanosa	Hairy Lipfern	S1S2	SLNS	
MS	Leake	Graptemys oculifera	Ringed Map Turtle	S2	E	LT
MS	Leake	Epigaea repens	Trailing Arbutus	S3	SLNS	
MS	Leake	Cuphea viscosissima	Blue Waxweed	S1	SLNS	
MS	Leake	Lilium superbum	Turk's Cap Lily	S3S4	SLNS	
MS	Lee	Peucaea aestivalis	Bachman's Sparrow	S3B,S3S4N	TRKD	
MS	Lee	Noturus munitus	Frecklebelly Madtom	S2	E	
MS	Lee	Polytaenia nuttallii	Prairie Parsley	S2	SLNS	
MS	Lee	Echinacea purpurea	Eastern Purple Coneflower	S3	SLNS	
MS	Lee	Cacalia muehlenbergii	Great Indian-plantain	S1	SLNS	
MS	Lee	Symphyotrichum ericoides	White Heath Aster	S2	SLNS	
MS	Lee	Arabis canadensis	Sicklepod	S2	SLNS	
MS	Lee	Lesquerella gracilis	Bladderpod	S1	SLNS	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
MS	Lee	Euonymus atropurpureus	Wahoo	S2S3	SLNS	
MS	Lee	Triosteum angustifolium	Horse-gentian	S3	SLNS	
MS	Lee	Apios priceana	Price's Potato-bean	S1	SLNS	LT
MS	Lee	Frasera caroliniensis	American Columbo	S2S3	SLNS	
MS	Lee	Menispermum canadense	Canada Moonseed	S3	SLNS	
MS	Lee	Fraxinus quadrangulata	Blue Ash	S1	SLNS	
MS	Lee	Oenothera triloba	Sundrops	S1	SLNS	
MS	Lee	Dodecatheon meadia	Shooting Star	S2	SLNS	
MS	Lee	Delphinium tricorne	Dwarf Larkspur	S2	SLNS	
MS	Lee	Rhamnus lanceolata	Lance-leaved Buckthorn	S2	SLNS	
MS	Lee	Crataegus ashei	Ash's Hawthorn	S1	SLNS	
MS	Lee	Agalinis auriculata	Earleaf Foxglove	S2	SLNS	
MS	Lee	Chelone obliqua	Red Turtlehead	SH	SLNS	
MS	Lee	Penstemon tenuiflorus	Beard-tongue	S3	SLNS	
MS	Lee	Staphylea trifolia	American Bladdernut	S3	SLNS	
MS	Lee	Hybanthus concolor	Green Violet	S3	SLNS	
MS	Lee	Carex stricta	Sedge	S2	SLNS	
MS	Lee	Nemastylis geminiflora	Prairie Pleatleaf	S2	SLNS	
MS	Lee	Erythronium albidum	White Trout-lily	S2	SLNS	
MS	Lee	Cypripedium parviflorum var. pubescens	Large Yellow Lady's-slipper	S2S3	SLNS	
MS	Lee	Muhlenbergia sylvatica	Muhly	S2	SLNS	
MS	Lowndes	Haliaeetus leucocephalus	Bald Eagle	S2B,S2N		DM
MS	Lowndes	Scaphirhynchus suttkusi	Alabama Sturgeon	S1	E	LE
MS	Lowndes	Noturus munitus	Frecklebelly Madtom	S2	E	
MS	Lowndes	Morone saxatilis	Striped Bass	SH	TRKD	
MS	Lowndes	Crystallaria asprella	Crystal Darter	S1	E	
MS	Lowndes	Etheostoma rupestre	Rock Darter	S3	TRKD	
MS	Lowndes	Graptemys nigrinoda	Black-knobbed Map Turtle	S2	E	
MS	Lowndes	Farancia erytrogramma	Rainbow Snake	S2	E	
MS	Lowndes	Epioblasma penita	Southern Combshell	S1	E	LE
MS	Lowndes	Lampsilis perovalis	Orange-nacre Mucket	S1	E	LT
MS	Lowndes	Lasmigona complanata	White Heelsplitter	S3	TRKD	
MS	Lowndes	Medionidus acutissimus	Alabama Moccasinshell	S1	E	LT

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
MS	Lowndes	Pleurobema decisum	Southern Clubshell	S1	E	LE
MS	Lowndes	Pleurobema marshalli	Flat Pigtoe	SX	E	LE
MS	Lowndes	Pleurobema perovatum	Ovate Clubshell	S1	E	LE
MS	Lowndes	Pleurobema taitianum	Heavy Pigtoe	SX	E	LE
MS	Lowndes	Quadrula stapes	Stirrupshell	SX	E	LE
MS	Lowndes	Osmorhiza longistylis	Smoother Sweet-cicely	S3	SLNS	
MS	Lowndes	Perideridia americana	Perideridia	S1S2	SLNS	
MS	Lowndes	Polytaenia nuttallii	Prairie Parsley	S2	SLNS	
MS	Lowndes	Coreopsis auriculata	Lobed Tickseed	S2S3	SLNS	
MS	Lowndes	Prenanthes aspera	Rough Rattlesnake-root	S2	SLNS	
MS	Lowndes	Prenanthes barbata	Barbed Rattlesnake-root	S1	SLNS	
MS	Lowndes	Thelesperma filifolium	Stiff-greenthread	S1	SLNS	
MS	Lowndes	Symphyotrichum ericoides	White Heath Aster	S2	SLNS	
MS	Lowndes	Lesquerella gracilis	Bladderpod	S1	SLNS	
MS	Lowndes	Triosteum angustifolium	Horse-gentian	S3	SLNS	
MS	Lowndes	Quercus macrocarpa	Bur Oak	S2	SLNS	
MS	Lowndes	Frasera caroliniensis	American Columbo	S2S3	SLNS	
MS	Lowndes	Aesculus glabra	Ohio Buckeye	S2	SLNS	
MS	Lowndes	Phacelia strictiflora	Prairie Scorpion-weed	S1	SLNS	
MS	Lowndes	Carya glabra var. hirsuta	Swamp Hickory	S3	SLNS	
MS	Lowndes	Carya laciniosa	Big Shellbark Hickory	S2	SLNS	
MS	Lowndes	Callirhoe triangulata	Poppy-mallow	S1	SLNS	
MS	Lowndes	Menispermum canadense	Canada Moonseed	S3	SLNS	
MS	Lowndes	Fraxinus profunda	Pumpkin Ash	S3	SLNS	
MS	Lowndes	Fraxinus quadrangulata	Blue Ash	S1	SLNS	
MS	Lowndes	Oenothera grandiflora	Large-flowered Evening-primrose	S1	SLNS	
MS	Lowndes	Dodecatheon meadia	Shooting Star	S2	SLNS	
MS	Lowndes	Clematis beadlei	Leather-flower	SNR	SLNS	
MS	Lowndes	Thalictrum debile	Southern Meadow-rue	S1S2	SLNS	
MS	Lowndes	Rhamnus lanceolata	Lance-leaved Buckthorn	S2	SLNS	
MS	Lowndes	Agalinis oligophylla	Ridge-stem False-foxglove	S2	SLNS	
MS	Lowndes	Castilleja coccinea	Scarlet Indian-paintbrush	S1	SLNS	
MS	Lowndes	Penstemon tenuiflorus	Beard-tongue	S3	SLNS	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
MS	Lowndes	Penstemon tenuis	Beard-tongue	S2	SLNS	
MS	Lowndes	Carex gracilescens	Slender Sedge	S1	SLNS	
MS	Lowndes	Carex jamesii	Sedge	S1S2	SLNS	
MS	Lowndes	Carex microdonta	Small-toothed Sedge	S3	SLNS	
MS	Lowndes	Nemastylis geminiflora	Prairie Pleatleaf	S2	SLNS	
MS	Lowndes	Camassia scilloides	Wild Hyacinth	S2	SLNS	
MS	Lowndes	Erythronium albidum	White Trout-lily	S2	SLNS	
MS	Lowndes	Lilium superbum	Turk's Cap Lily	S3S4	SLNS	
MS	Lowndes	Cypripedium parviflorum var. pubescens	Large Yellow Lady's-slipper	S2S3	SLNS	
MS	Lowndes	Ophioglossum engelmannii	Limestone Adder's-tongue	S2	SLNS	
MS	Marshall	Noturus stigmosus	Northern Madtom	S1	E	
MS	Marshall	Nicrophorus americanus	American Burying Beetle	SX	E	LE
MS	Marshall	Ligusticum canadense	Lovage	S1	SLNS	
MS	Marshall	Polytaenia nuttallii	Prairie Parsley	S2	SLNS	
MS	Marshall	Panax quinquefolius	American ginseng	S3	SLNS	
MS	Marshall	Arabis canadensis	Sicklepod	S2	SLNS	
MS	Marshall	Triosteum angustifolium	Horse-gentian	S3	SLNS	
MS	Marshall	Juglans cinerea	Butternut	S2	SLNS	
MS	Marshall	Salvia urticifolia	Nettle-leaf Sage	S2	SLNS	
MS	Marshall	Chelone glabra	White Turtlehead	S3	SLNS	
MS	Marshall	Mimulus ringens	Monkey-flower	S1	SLNS	
MS	Marshall	Erythronium albidum	White Trout-lily	S2	SLNS	
MS	Marshall	Platanthera peramoena	Purple Fringeless Orchid	S2S3	SLNS	
MS	Monroe	Haliaeetus leucocephalus	Bald Eagle	S2B,S2N		DM
MS	Monroe	Noturus munitus	Frecklebelly Madtom	S2	E	
MS	Monroe	Morone saxatilis	Striped Bass	SH	TRKD	
MS	Monroe	Crystallaria asprella	Crystal Darter	S1	E	
MS	Monroe	Etheostoma rupestre	Rock Darter	S3	TRKD	
MS	Monroe	Graptemys nigrinoda	Black-knobbed Map Turtle	S2	E	
MS	Monroe	Neonympha mitchellii	Mitchell's Satyr	S1		LE
MS	Monroe	Epioblasma penita	Southern Combshell	S1	E	LE
MS	Monroe	Lampsilis perovalis	Orange-nacre Mucket	S1	E	LT
MS	Monroe	Lasmigona complanata	White Heelsplitter	S3	TRKD	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
MS	Monroe	Medionidus acutissimus	Alabama Moccasinshell	S1	E	LT
MS	Monroe	Pleurobema curtum	Black Clubshell	SX	E	LE
MS	Monroe	Pleurobema decisum	Southern Clubshell	S1	E	LE
MS	Monroe	Pleurobema perovatum	Ovate Clubshell	S1	E	LE
MS	Monroe	Pleurobema taitianum	Heavy Pigtoe	SX	E	LE
MS	Monroe	Osmorhiza longistylis	Smoother Sweet-cicely	S3	SLNS	
MS	Monroe	Polytaenia nuttallii	Prairie Parsley	S2	SLNS	
MS	Monroe	Panax quinquefolius	American ginseng	S3	SLNS	
MS	Monroe	Asarum canadense	Canada Wild-ginger	S3	SLNS	
MS	Monroe	Hexastylis shuttleworthii	Large-flowered Heartleaf	S1	SLNS	
MS	Monroe	Coreopsis auriculata	Lobed Tickseed	S2S3	SLNS	
MS	Monroe	Cacalia muehlenbergii	Great Indian-plantain	S1	SLNS	
MS	Monroe	Arabis canadensis	Sicklepod	S2	SLNS	
MS	Monroe	Cardamine angustata	Slender Toothwort	S2	SLNS	
MS	Monroe	Lobelia appendiculata	Ear-flower Lobelia	S2S3	SLNS	
MS	Monroe	Euonymus atropurpureus	Wahoo	S2S3	SLNS	
MS	Monroe	Frasera caroliniensis	American Columbo	S2S3	SLNS	
MS	Monroe	Gentianella quinquefolia	Stiff Gentian	S1	SLNS	
MS	Monroe	Carya glabra var. hirsuta	Swamp Hickory	S3	SLNS	
MS	Monroe	Salvia urticifolia	Nettle-leaf Sage	S2	SLNS	
MS	Monroe	Menispermum canadense	Canada Moonseed	S3	SLNS	
MS	Monroe	Oenothera triloba	Sundrops	S1	SLNS	
MS	Monroe	Chimaphila maculata	Spotted Wintergreen	S2	SLNS	
MS	Monroe	Crataegus ashei	Ash's Hawthorn	S1	SLNS	
MS	Monroe	Tiarella cordifolia	Heart-leaved Foam-flower	S2	SLNS	
MS	Monroe	Chelone glabra	White Turtlehead	S3	SLNS	
MS	Monroe	Penstemon tenuiflorus	Beard-tongue	S3	SLNS	
MS	Monroe	Staphylea trifolia	American Bladdernut	S3	SLNS	
MS	Monroe	Ulmus serotina	September Elm	S2	SLNS	
MS	Monroe	Hybanthus concolor	Green Violet	S3	SLNS	
MS	Monroe	Carex communis	Fibrous-root Sedge	S1	SLNS	
MS	Monroe	Carex gracilescens	Slender Sedge	S1	SLNS	
MS	Monroe	Carex picta	Sedge	S3	SLNS	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
MS	Monroe	Carex prasina	Sedge	S1	SLNS	
MS	Monroe	Carex stricta	Sedge	S2	SLNS	
MS	Monroe	Iris brevicaulis	Lamance Iris	S1	SLNS	
MS	Monroe	Luzula acuminata	Woodrush	S3	SLNS	
MS	Monroe	Camassia scilloides	Wild Hyacinth	S2	SLNS	
MS	Monroe	Lilium michiganense	Michigan Lily	S1	SLNS	
MS	Monroe	Lilium superbum	Turk's Cap Lily	S3S4	SLNS	
MS	Monroe	Melanthium virginicum	Bunchflower	S3	SLNS	
MS	Monroe	Stenanthium gramineum	Eastern Featherbells	S1	SLNS	
MS	Monroe	Cypripedium parviflorum var. pubescens	Large Yellow Lady's-slipper	S2S3	SLNS	
MS	Monroe	Spiranthes magnicamporum	Great Plains Ladies'-tresses	S2	SLNS	
MS	Monroe	Triphora trianthophora	Three-birds-orchids	S2	SLNS	
MS	Monroe	Coelorachis cylindrica	Pitted Jointgrass	S1	SLNS	
MS	Monroe	Muhlenbergia glabrifloris	Muhly	S1	SLNS	
MS	Monroe	Muhlenbergia sylvatica	Muhly	S2	SLNS	
MS	Monroe	Trichomanes boschianum	Appalachian Bristle Fern	S1	SLNS	
MS	Monroe	Isoetes engelmannii	Appalachian Quillwort	S1S2	SLNS	
MS	Monroe	Ophioglossum engelmannii	Limestone Adder's-tongue	S2	SLNS	
MS	Neshoba	Peucaea aestivalis	Bachman's Sparrow	S3B,S3S4N	TRKD	
MS	Neshoba	Ursus americanus luteolus	Louisiana Black Bear	S1	E	
MS	Neshoba	Graptemys oculifera	Ringed Map Turtle	S2	E	LT
MS	Neshoba	Rhododendron arborescens	Smooth Azalea	S1S2	SLNS	
MS	Neshoba	Carya glabra var. hirsuta	Swamp Hickory	S3	SLNS	
MS	Neshoba	Pycnanthemum muticum	Mountain-mint	S2S3	SLNS	
MS	Neshoba	Cuphea viscosissima	Blue Waxweed	S1	SLNS	
MS	Neshoba	Nestronia umbellula	Nestronia	S1	SLNS	
MS	Newton	Isoetes melanopoda	Blackfoot Quillwort	S2	SLNS	
MS	Noxubee	Gyrinophilus porphyriticus	Spring Salamander	S1	E	
MS	Noxubee	Haliaeetus leucocephalus	Bald Eagle	S2B,S2N		DM
MS	Noxubee	Picoides borealis	Red-cockaded Woodpecker	S1	E	LE
MS	Noxubee	Noturus munitus	Frecklebelly Madtom	S2	E	
MS	Noxubee	Graptemys nigrinoda	Black-knobbed Map Turtle	S2	E	
MS	Noxubee	Panax quinquefolius	American ginseng	S3	SLNS	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
MS	Noxubee	Asarum canadense	Canada Wild-ginger	S3	SLNS	
MS	Noxubee	Coreopsis auriculata	Lobed Tickseed	S2S3	SLNS	
MS	Noxubee	Echinacea purpurea	Eastern Purple Coneflower	S3	SLNS	
MS	Noxubee	Prenanthes aspera	Rough Rattlesnake-root	S2	SLNS	
MS	Noxubee	Symphyotrichum pratense	Barrens Silky Aster	S1	SLNS	
MS	Noxubee	Arabis patens	Spreading Rockcress	S1	SLNS	
MS	Noxubee	Lesquerella gracilis	Bladderpod	S1	SLNS	
MS	Noxubee	Pachysandra procumbens	Allegheny-spurge	S3	SLNS	
MS	Noxubee	Lobelia appendiculata	Ear-flower Lobelia	S2S3	SLNS	
MS	Noxubee	Euonymus atropurpureus	Wahoo	S2S3	SLNS	
MS	Noxubee	Triosteum angustifolium	Horse-gentian	S3	SLNS	
MS	Noxubee	Astragalus canadensis	Canadian Milkvetch	S2	SLNS	
MS	Noxubee	Cladrastis kentukea	Yellowwood	S2	SLNS	
MS	Noxubee	Frasera caroliniensis	American Columbo	S2S3	SLNS	
MS	Noxubee	Philadelphus inodorus	Mock-orange	S2	SLNS	
MS	Noxubee	Carya glabra var. hirsuta	Swamp Hickory	S3	SLNS	
MS	Noxubee	Carya laciniosa	Big Shellbark Hickory	S2	SLNS	
MS	Noxubee	Hedeoma drummondii	Drummond Pennyroyal	S1	SLNS	
MS	Noxubee	Pycnanthemum muticum	Mountain-mint	S2S3	SLNS	
MS	Noxubee	Cuphea viscosissima	Blue Waxweed	S1	SLNS	
MS	Noxubee	Callirhoe triangulata	Poppy-mallow	S1	SLNS	
MS	Noxubee	Menispermum canadense	Canada Moonseed	S3	SLNS	
MS	Noxubee	Forestiera ligustrina	Upland Swamp Privet	S1S2	SLNS	
MS	Noxubee	Fraxinus quadrangulata	Blue Ash	S1	SLNS	
MS	Noxubee	Oenothera grandiflora	Large-flowered Evening-primrose	S1	SLNS	
MS	Noxubee	Thalictrum debile	Southern Meadow-rue	S1S2	SLNS	
MS	Noxubee	Agalinis oligophylla	Ridge-stem False-foxglove	S2	SLNS	
MS	Noxubee	Penstemon tenuiflorus	Beard-tongue	S3	SLNS	
MS	Noxubee	Staphylea trifolia	American Bladdernut	S3	SLNS	
MS	Noxubee	Hybanthus concolor	Green Violet	S3	SLNS	
MS	Noxubee	Carex gracilescens	Slender Sedge	S1	SLNS	
MS	Noxubee	Carex microdonta	Small-toothed Sedge	S3	SLNS	
MS	Noxubee	Nemastylis geminiflora	Prairie Pleatleaf	S2	SLNS	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
MS	Noxubee	Camassia scilloides	Wild Hyacinth	S2	SLNS	
MS	Noxubee	Erythronium albidum	White Trout-lily	S2	SLNS	
MS	Noxubee	Lilium superbum	Turk's Cap Lily	S3S4	SLNS	
MS	Noxubee	Platanthera peramoena	Purple Fringeless Orchid	S2S3	SLNS	
MS	Noxubee	Muhlenbergia sylvatica	Muhly	S2	SLNS	
MS	Oktibbeha	Picoides borealis	Red-cockaded Woodpecker	S1	E	LE
MS	Oktibbeha	Peucaea aestivalis	Bachman's Sparrow	S3B,S3S4N	TRKD	
MS	Oktibbeha	Crystallaria asprella	Crystal Darter	S1	E	
MS	Oktibbeha	Farancia erytrogramma	Rainbow Snake	S2	E	
MS	Oktibbeha	Osmorhiza longistylis	Smoother Sweet-cicely	S3	SLNS	
MS	Oktibbeha	Perideridia americana	Perideridia	S1S2	SLNS	
MS	Oktibbeha	Polytaenia nuttallii	Prairie Parsley	S2	SLNS	
MS	Oktibbeha	Panax quinquefolius	American ginseng	S3	SLNS	
MS	Oktibbeha	Asarum canadense	Canada Wild-ginger	S3	SLNS	
MS	Oktibbeha	Asclepias hirtella	Green Milkweed	S2	SLNS	
MS	Oktibbeha	Matelea carolinensis	Carolina Anglepod	S3	SLNS	
MS	Oktibbeha	Matelea obliqua	Climbing Milkweed	S2	SLNS	
MS	Oktibbeha	Amphiachyris dracunculoides	Broom-snakeroot	SNA	SLNS	
MS	Oktibbeha	Coreopsis auriculata	Lobed Tickseed	S2S3	SLNS	
MS	Oktibbeha	Echinacea purpurea	Eastern Purple Coneflower	S3	SLNS	
MS	Oktibbeha	Evax prolifera	Big-head Evax	S1	SLNS	
MS	Oktibbeha	Prenanthes aspera	Rough Rattlesnake-root	S2	SLNS	
MS	Oktibbeha	Symphyotrichum ericoides	White Heath Aster	S2	SLNS	
MS	Oktibbeha	Symphyotrichum pratense	Barrens Silky Aster	S1	SLNS	
MS	Oktibbeha	Armoracia lacustris	Lake-cress	S1	SLNS	
MS	Oktibbeha	Pachysandra procumbens	Allegheny-spurge	S3	SLNS	
MS	Oktibbeha	Lobelia appendiculata	Ear-flower Lobelia	S2S3	SLNS	
MS	Oktibbeha	Euonymus atropurpureus	Wahoo	S2S3	SLNS	
MS	Oktibbeha	Triosteum angustifolium	Horse-gentian	S3	SLNS	
MS	Oktibbeha	Sedum pulchellum	Rock Stonecrop	S1	SLNS	
MS	Oktibbeha	Apios priceana	Price's Potato-bean	S1	SLNS	LT
MS	Oktibbeha	Astragalus canadensis	Canadian Milkvetch	S2	SLNS	
MS	Oktibbeha	Quercus macrocarpa	Bur Oak	S2	SLNS	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
MS	Oktibbeha	Frasera caroliniensis	American Columbo	S2S3	SLNS	
MS	Oktibbeha	Aesculus glabra	Ohio Buckeye	S2	SLNS	
MS	Oktibbeha	Hydrophyllum appendiculatum	Waterleaf	S1	SLNS	
MS	Oktibbeha	Carya glabra var. hirsuta	Swamp Hickory	S3	SLNS	
MS	Oktibbeha	Carya laciniosa	Big Shellbark Hickory	S2	SLNS	
MS	Oktibbeha	Menispermum canadense	Canada Moonseed	S3	SLNS	
MS	Oktibbeha	Fraxinus profunda	Pumpkin Ash	S3	SLNS	
MS	Oktibbeha	Fraxinus quadrangulata	Blue Ash	S1	SLNS	
MS	Oktibbeha	Oenothera triloba	Sundrops	S1	SLNS	
MS	Oktibbeha	Dodecatheon meadia	Shooting Star	S2	SLNS	
MS	Oktibbeha	Hottonia inflata	Featherfoil	S1	SLNS	
MS	Oktibbeha	Delphinium tricorne	Dwarf Larkspur	S2	SLNS	
MS	Oktibbeha	Thalictrum debile	Southern Meadow-rue	S1S2	SLNS	
MS	Oktibbeha	Rhamnus lanceolata	Lance-leaved Buckthorn	S2	SLNS	
MS	Oktibbeha	Agalinis oligophylla	Ridge-stem False-foxglove	S2	SLNS	
MS	Oktibbeha	Agalinis auriculata	Earleaf Foxglove	S2	SLNS	
MS	Oktibbeha	Castilleja coccinea	Scarlet Indian-paintbrush	S1	SLNS	
MS	Oktibbeha	Penstemon tenuiflorus	Beard-tongue	S3	SLNS	
MS	Oktibbeha	Staphylea trifolia	American Bladdernut	S3	SLNS	
MS	Oktibbeha	Ulmus serotina	September Elm	S2	SLNS	
MS	Oktibbeha	Hybanthus concolor	Green Violet	S3	SLNS	
MS	Oktibbeha	Alisma subcordatum	Broad-leaved Water-plantain	S1	SLNS	
MS	Oktibbeha	Carex gracilescens	Slender Sedge	S1	SLNS	
MS	Oktibbeha	Carex jamesii	Sedge	S1S2	SLNS	
MS	Oktibbeha	Carex microdonta	Small-toothed Sedge	S3	SLNS	
MS	Oktibbeha	Carex stricta	Sedge	S2	SLNS	
MS	Oktibbeha	Eleocharis erythropoda	Bald Spikerush	SNR	SLNS	
MS	Oktibbeha	Nemastylis geminiflora	Prairie Pleatleaf	S2	SLNS	
MS	Oktibbeha	Camassia scilloides	Wild Hyacinth	S2	SLNS	
MS	Oktibbeha	Erythronium albidum	White Trout-lily	S2	SLNS	
MS	Oktibbeha	Hexalectris spicata	Crested Coralroot	S2	SLNS	
MS	Oktibbeha	Platanthera cristata	Yellow-crested Orchid	S3S4	SLNS	
MS	Oktibbeha	Ponthieva racemosa	Shadow-witch Orchid	S2	SLNS	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
MS	Oktibbeha	Spiranthes magnicamporum	Great Plains Ladies'-tresses	S2	SLNS	
MS	Oktibbeha	Spiranthes ovalis	Lesser Ladies'-tresses	S2S3	SLNS	
MS	Oktibbeha	Triphora trianthophora	Three-birds-orchids	S2	SLNS	
MS	Panola	Haliaeetus leucocephalus	Bald Eagle	S2B,S2N		DM
MS	Panola	Osmorhiza longistylis	Smoother Sweet-cicely	S3	SLNS	
MS	Panola	Panax quinquefolius	American ginseng	S3	SLNS	
MS	Panola	Pachysandra procumbens	Allegheny-spurge	S3	SLNS	
MS	Panola	Pycnanthemum verticillatum var. pilosum	Mountain-mint	S1	SLNS	
MS	Panola	Chelone glabra	White Turtlehead	S3	SLNS	
MS	Panola	Chelone obliqua	Red Turtlehead	SH	SLNS	
MS	Panola	Camassia scilloides	Wild Hyacinth	S2	SLNS	
MS	Pontotoc	Panax quinquefolius	American ginseng	S3	SLNS	
MS	Pontotoc	Asarum canadense	Canada Wild-ginger	S3	SLNS	
MS	Pontotoc	Matelea obliqua	Climbing Milkweed	S2	SLNS	
MS	Pontotoc	Echinacea purpurea	Eastern Purple Coneflower	S3	SLNS	
MS	Pontotoc	Triosteum angustifolium	Horse-gentian	S3	SLNS	
MS	Pontotoc	Astragalus canadensis	Canadian Milkvetch	S2	SLNS	
MS	Pontotoc	Quercus macrocarpa	Bur Oak	S2	SLNS	
MS	Pontotoc	Frasera caroliniensis	American Columbo	S2S3	SLNS	
MS	Pontotoc	Carya laciniosa	Big Shellbark Hickory	S2	SLNS	
MS	Pontotoc	Juglans cinerea	Butternut	S2	SLNS	
MS	Pontotoc	Salvia urticifolia	Nettle-leaf Sage	S2	SLNS	
MS	Pontotoc	Polemonium reptans	Greek Valerian	S2S3	SLNS	
MS	Pontotoc	Delphinium tricorne	Dwarf Larkspur	S2	SLNS	
MS	Pontotoc	Rhamnus lanceolata	Lance-leaved Buckthorn	S2	SLNS	
MS	Pontotoc	Penstemon tenuiflorus	Beard-tongue	S3	SLNS	
MS	Pontotoc	Staphylea trifolia	American Bladdernut	S3	SLNS	
MS	Pontotoc	Hybanthus concolor	Green Violet	S3	SLNS	
MS	Pontotoc	Nemastylis geminiflora	Prairie Pleatleaf	S2	SLNS	
MS	Pontotoc	Platanthera peramoena	Purple Fringeless Orchid	S2S3	SLNS	
MS	Prentiss	Panax quinquefolius	American ginseng	S3	SLNS	
MS	Prentiss	Hexastylis shuttleworthii	Large-flowered Heartleaf	S1	SLNS	
MS	Prentiss	Coreopsis auriculata	Lobed Tickseed	S2S3	SLNS	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
MS	Prentiss	Echinacea purpurea	Eastern Purple Coneflower	S3	SLNS	
MS	Prentiss	Sabatia campestris	Sabatia	S2	SLNS	
MS	Prentiss	Juglans cinerea	Butternut	S2	SLNS	
MS	Prentiss	Oenothera triloba	Sundrops	S1	SLNS	
MS	Prentiss	Carex picta	Sedge	S3	SLNS	
MS	Prentiss	Carex seorsa	Weak Stellate Sedge	S1S2	SLNS	
MS	Prentiss	Cypripedium parviflorum var. pubescens	Large Yellow Lady's-slipper	S2S3	SLNS	
MS	Prentiss	Triphora trianthophora	Three-birds-orchids	S2	SLNS	
MS	Scott	Picoides borealis	Red-cockaded Woodpecker	S1	E	LE
MS	Scott	Ursus americanus luteolus	Louisiana Black Bear	S1	E	
MS	Scott	Asclepias hirtella	Green Milkweed	S2	SLNS	
MS	Scott	Echinacea purpurea	Eastern Purple Coneflower	S3	SLNS	
MS	Scott	Prenanthes aspera	Rough Rattlesnake-root	S2	SLNS	
MS	Scott	Lobelia appendiculata	Ear-flower Lobelia	S2S3	SLNS	
MS	Scott	Quercus oglethorpensis	Oglethorpe's Oak	S2	SLNS	
MS	Scott	Crataegus triflora	Three-flowered Hawthorn	S1S2	SLNS	
MS	Scott	Crataegus ashei	Ash's Hawthorn	S1	SLNS	
MS	Scott	Pinus virginiana	Virginia Pine	S2	SLNS	
MS	Scott	Platanthera cristata	Yellow-crested Orchid	S3S4	SLNS	
MS	Scott	Platanthera peramoena	Purple Fringeless Orchid	S2S3	SLNS	
MS	Scott	Spiranthes magnicamporum	Great Plains Ladies'-tresses	S2	SLNS	
MS	Scott	Spiranthes ovalis	Lesser Ladies'-tresses	S2S3	SLNS	
MS	Scott	Isoetes melanopoda	Blackfoot Quillwort	S2	SLNS	
MS	Tallahatchie	Chrosomus erythrogaster	Southern Redbelly Dace	S2	E	
MS	Tallahatchie	Osmorhiza longistylis	Smoother Sweet-cicely	S3	SLNS	
MS	Tallahatchie	Aralia racemosa	American Spikenard	S1	SLNS	
MS	Tallahatchie	Panax quinquefolius	American ginseng	S3	SLNS	
MS	Tallahatchie	Pachysandra procumbens	Allegheny-spurge	S3	SLNS	
MS	Tallahatchie	Celastrus scandens	climbing bittersweet	S3	SLNS	
MS	Tallahatchie	Triosteum angustifolium	Horse-gentian	S3	SLNS	
MS	Tallahatchie	Cladrastis kentukea	Yellowwood	S2	SLNS	
MS	Tallahatchie	Lindera melissifolia	Pondberry	S2	SLNS	LE
MS	Tallahatchie	Schisandra glabra	Bay Starvine	S3	SLNS	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
MS	Tallahatchie	Penstemon tenuis	Beard-tongue	S2	SLNS	
MS	Tallahatchie	Carex oxylepis var. pubescens	Hairy sharp-scaled Sedge	S2S3	SLNS	
MS	Tallahatchie	Iris fulva	Red Iris	S3	SLNS	
MS	Tallahatchie	Glyceria arkansana	Manna-grass	S2S3	SLNS	
MS	Tate	Osmorhiza longistylis	Smoother Sweet-cicely	S3	SLNS	
MS	Tate	Panax quinquefolius	American ginseng	S3	SLNS	
MS	Tate	Triosteum angustifolium	Horse-gentian	S3	SLNS	
MS	Tate	Hydrastis canadensis	Goldenseal	S1	SLNS	
MS	Tippah	Ligusticum canadense	Lovage	S1	SLNS	
MS	Tippah	Panax quinquefolius	American ginseng	S3	SLNS	
MS	Tippah	Asarum canadense	Canada Wild-ginger	S3	SLNS	
MS	Tippah	Pachysandra procumbens	Allegheny-spurge	S3	SLNS	
MS	Tippah	Silene ovata	Ovate Catchfly	S1S2	SLNS	
MS	Tippah	Triosteum angustifolium	Horse-gentian	S3	SLNS	
MS	Tippah	Philadelphus inodorus	Mock-orange	S2	SLNS	
MS	Tippah	Juglans cinerea	Butternut	S2	SLNS	
MS	Tippah	Agalinis oligophylla	Ridge-stem False-foxglove	S2	SLNS	
MS	Tippah	Chelone glabra	White Turtlehead	S3	SLNS	
MS	Tippah	Hybanthus concolor	Green Violet	S3	SLNS	
MS	Tippah	Carex picta	Sedge	S3	SLNS	
MS	Tippah	Cypripedium parviflorum var. pubescens	Large Yellow Lady's-slipper	S2S3	SLNS	
MS	Tippah	Galearis spectabilis	Showy Orchis	S1	SLNS	
MS	Tippah	Goodyera pubescens	Downy Rattlesnake-plantain	S1	SLNS	
MS	Tippah	Platanthera peramoena	Purple Fringeless Orchid	S2S3	SLNS	
MS	Tippah	Adiantum capillus-veneris	Southern Maidenhair Fern	S2	SLNS	
MS	Tippah	Asplenium rhizophyllum	Walking Fern	S1	SLNS	
MS	Tippah	Diplazium pycnocarpon	glade fern	S2S3	SLNS	
MS	Tishomingo	Cryptobranchus alleganiensis	Hellbender	S1		PS
MS	Tishomingo	Aneides aeneus	Green Salamander	S1	E	
MS	Tishomingo	Eurycea lucifuga	Cave Salamander	S1	E	
MS	Tishomingo	Gyrinophilus porphyriticus	Spring Salamander	S1	E	
MS	Tishomingo	Haliaeetus leucocephalus	Bald Eagle	S2B,S2N		DM
MS	Tishomingo	Accipiter striatus	Sharp-shinned Hawk	S1?B	E	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
MS	Tishomingo	Picoides borealis	Red-cockaded Woodpecker	S1	E	LE
MS	Tishomingo	Thryomanes bewickii	Bewick's Wren	S2B,S3N	E	
MS	Tishomingo	Peucaea aestivalis	Bachman's Sparrow	S3B,S3S4N	TRKD	
MS	Tishomingo	Notropis boops	Bigeye Shiner	S1	E	
MS	Tishomingo	Phenacobius mirabilis	Suckermouth Minnow	S1	E	
MS	Tishomingo	Moxostoma macrolepidotum	Shorthead Redhorse	S1	TRKD	
MS	Tishomingo	Percina tanasi	Snail Darter	S1		LT
MS	Tishomingo	Myotis grisescens	Gray Bat	S1	E	LE
MS	Tishomingo	Myotis sodalis	Indiana Bat	S1B	E	LE
MS	Tishomingo	Myotis septentrionalis	Northern Long-eared Bat	S1N		LT
MS	Tishomingo	Neonympha mitchellii	Mitchell's Satyr	S1		LE
MS	Tishomingo	Actinonaias ligamentina	Mucket	S1	E	
MS	Tishomingo	Cyclonaias tuberculata	Purple Wartyback	S1	E	
MS	Tishomingo	Cyprogenia stegaria	Fanshell			LE
MS	Tishomingo	Dromus dromas	Dromedary Pearlymussel	SNR		LE
MS	Tishomingo	Elliptio dilatata	Spike	S1	E	
MS	Tishomingo	Epioblasma brevidens	Cumberlandian Combshell	S1	E	LE
MS	Tishomingo	Epioblasma capsaeformis	Oyster Mussel			LE
MS	Tishomingo	Epioblasma florentina florentina	Yellow-blossom Pearlymussel			LE
MS	Tishomingo	Epioblasma torulosa torulosa	Tuberculed Blossom Pearlymussel			LE
MS	Tishomingo	Fusconaia cor	Shiny Pigtoe Pearlymussel			LE
MS	Tishomingo	Lasmigona complanata	White Heelsplitter	S3	TRKD	
MS	Tishomingo	Lemiox rimosus	Birdwing Pearlymussel			LE
MS	Tishomingo	Pleuronaia dolabelloides	Slabside Pearlymussel	S1	E	LE
MS	Tishomingo	Obovaria retusa	Ring Pink			LE
MS	Tishomingo	Pleurobema clava	Clubshell			LE
MS	Tishomingo	Pleurobema plenum	Rough Pigtoe			LE
MS	Tishomingo	Pleurobema rubrum	Pyramid Pigtoe	S1	E	
MS	Tishomingo	Ptychobranchus fasciolaris	Kidneyshell	S1	E	
MS	Tishomingo	Ptychobranchus subtentum	Fluted Kidneyshell			LE
MS	Tishomingo	Quadrula cylindrica	Rabbitsfoot	S1	LE	LT
MS	Tishomingo	Quadrula cylindrica cylindrica	Smooth Rabbitsfoot	S1	E	LT
MS	Tishomingo	Quadrula intermedia	Cumberland Monkeyface			LE

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
MS	Tishomingo	Quadrula metanevra	Monkeyface	SX	E	
MS	Tishomingo	Toxolasma cylindrellus	Pale Lilliput			LE
MS	Tishomingo	Athearnia anthonyi	Anthony's River Snail			LE
MS	Tishomingo	Ligusticum canadense	Lovage	S1	SLNS	
MS	Tishomingo	Osmorhiza longistylis	Smoother Sweet-cicely	S3	SLNS	
MS	Tishomingo	Perideridia americana	Perideridia	S1S2	SLNS	
MS	Tishomingo	Panax quinquefolius	American ginseng	S3	SLNS	
MS	Tishomingo	Asarum canadense	Canada Wild-ginger	S3	SLNS	
MS	Tishomingo	Antennaria solitaria	Single-head Pussytoes	S3S4	SLNS	
MS	Tishomingo	Coreopsis auriculata	Lobed Tickseed	S2S3	SLNS	
MS	Tishomingo	Echinacea purpurea	Eastern Purple Coneflower	S3	SLNS	
MS	Tishomingo	Solidago sphacelata	Autumn Goldenrod	S1	SLNS	
MS	Tishomingo	Solidago flaccidifolia	Appalachian Golden-rod	S1	SLNS	
MS	Tishomingo	Cacalia muehlenbergii	Great Indian-plantain	S1	SLNS	
MS	Tishomingo	Mertensia virginica	Virginia Bluebells	S1	SLNS	
MS	Tishomingo	Arabis canadensis	Sicklepod	S2	SLNS	
MS	Tishomingo	Cardamine angustata	Slender Toothwort	S2	SLNS	
MS	Tishomingo	Cardamine diphylla	Two-leaf Toothwort	S1S2	SLNS	
MS	Tishomingo	Pachysandra procumbens	Allegheny-spurge	S3	SLNS	
MS	Tishomingo	Stellaria pubera	Giant Chickweed	S2	SLNS	
MS	Tishomingo	Euonymus atropurpureus	Wahoo	S2S3	SLNS	
MS	Tishomingo	Triosteum angustifolium	Horse-gentian	S3	SLNS	
MS	Tishomingo	Sedum ternatum	Stonecrop	S1	SLNS	
MS	Tishomingo	Rhododendron arborescens	Smooth Azalea	S1S2	SLNS	
MS	Tishomingo	Astragalus canadensis	Canadian Milkvetch	S2	SLNS	
MS	Tishomingo	Cladrastis kentukea	Yellowwood	S2	SLNS	
MS	Tishomingo	Gymnocladus dioicus	Kentucky Coffee-tree	S1S2	SLNS	
MS	Tishomingo	Quercus macrocarpa	Bur Oak	S2	SLNS	
MS	Tishomingo	Dicentra cucullaria	Dutchman's Breeches	S1	SLNS	
MS	Tishomingo	Sabatia campestris	Sabatia	S2	SLNS	
MS	Tishomingo	Philadelphus hirsutus	streambank mock orange	S1	SLNS	
MS	Tishomingo	Hydrophyllum appendiculatum	Waterleaf	S1	SLNS	
MS	Tishomingo	Hydrophyllum macrophyllum	largeleaf waterleaf	S1	SLNS	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
MS	Tishomingo	Phacelia bipinnatifida	Phacelia	S1	SLNS	
MS	Tishomingo	Carya glabra var. hirsuta	Swamp Hickory	S3	SLNS	
MS	Tishomingo	Carya laciniosa	Big Shellbark Hickory	S2	SLNS	
MS	Tishomingo	Pycnanthemum muticum	Mountain-mint	S2S3	SLNS	
MS	Tishomingo	Salvia urticifolia	Nettle-leaf Sage	S2	SLNS	
MS	Tishomingo	Decodon verticillatus	Water-willow	S2	SLNS	
MS	Tishomingo	Callirhoe triangulata	Poppy-mallow	S1	SLNS	
MS	Tishomingo	Menispermum canadense	Canada Moonseed	S3	SLNS	
MS	Tishomingo	Fraxinus quadrangulata	Blue Ash	S1	SLNS	
MS	Tishomingo	Polemonium reptans	Greek Valerian	S2S3	SLNS	
MS	Tishomingo	Dodecatheon meadia	Shooting Star	S2	SLNS	
MS	Tishomingo	Chimaphila maculata	Spotted Wintergreen	S2	SLNS	
MS	Tishomingo	Actaea racemosa	Black Bugbane	S1S2	SLNS	
MS	Tishomingo	Anemone quinquefolia	Wood Anemone	S1	SLNS	
MS	Tishomingo	Aquilegia canadensis	Wild Columbine	S1	SLNS	
MS	Tishomingo	Clematis beadlei	Leather-flower	SNR	SLNS	
MS	Tishomingo	Delphinium tricorne	Dwarf Larkspur	S2	SLNS	
MS	Tishomingo	Trautvetteria caroliniensis	Carolina Tassel-rue	S1	SLNS	
MS	Tishomingo	Neviusia alabamensis	Alabama Snow-wreath	S1	SLNS	
MS	Tishomingo	Spiraea tomentosa	Steeple-bush	SH	SLNS	
MS	Tishomingo	Salix caroliniana	Carolina Willow	S1	SLNS	
MS	Tishomingo	Heuchera parviflora	Little Flowered Alumroot	S1	SLNS	
MS	Tishomingo	Heuchera villosa var. macrorhiza	Giant Alumroot	S1	SLNS	
MS	Tishomingo	Tiarella cordifolia	Heart-leaved Foam-flower	S2	SLNS	
MS	Tishomingo	Chelone glabra	White Turtlehead	S3	SLNS	
MS	Tishomingo	Chelone lyonii	Pink Turtlehead	S1	SLNS	
MS	Tishomingo	Staphylea trifolia	American Bladdernut	S3	SLNS	
MS	Tishomingo	Stewartia ovata	Mountain Camellia	S1	SLNS	
MS	Tishomingo	Dirca palustris	Eastern Leatherwood	S2	SLNS	
MS	Tishomingo	Hybanthus concolor	Green Violet	S3	SLNS	
MS	Tishomingo	Pinus virginiana	Virginia Pine	S2	SLNS	
MS	Tishomingo	Tradescantia ernestiana	Ernest's Spider-wort	S1	SLNS	
MS	Tishomingo	Carex jamesii	Sedge	S1S2	SLNS	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
MS	Tishomingo	Carex oligocarpa	Eastern Few-fruit Sedge	S1	SLNS	
MS	Tishomingo	Carex picta	Sedge	S3	SLNS	
MS	Tishomingo	Carex prasina	Sedge	S1	SLNS	
MS	Tishomingo	Carex seorsa	Weak Stellate Sedge	S1S2	SLNS	
MS	Tishomingo	Carex stricta	Sedge	S2	SLNS	
MS	Tishomingo	Carex virescens	Ribbed Sedge	S1	SLNS	
MS	Tishomingo	Luzula acuminata	Woodrush	S3	SLNS	
MS	Tishomingo	Camassia scilloides	Wild Hyacinth	S2	SLNS	
MS	Tishomingo	Lilium superbum	Turk's Cap Lily	S3S4	SLNS	
MS	Tishomingo	Trillium flexipes	Nodding Trillium	S1	SLNS	
MS	Tishomingo	Aplectrum hyemale	Puttyroot	S1	SLNS	
MS	Tishomingo	Cypripedium parviflorum var. pubescens	Large Yellow Lady's-slipper	S2S3	SLNS	
MS	Tishomingo	Hexalectris spicata	Crested Coralroot	S2	SLNS	
MS	Tishomingo	Platanthera cristata	Yellow-crested Orchid	S3S4	SLNS	
MS	Tishomingo	Platanthera integrilabia	White Fringeless Orchid	S1	SLNS	LT
MS	Tishomingo	Platanthera lacera	Ragged Fringe Orchid	S1S2	SLNS	
MS	Tishomingo	Platanthera peramoena	Purple Fringeless Orchid	S2S3	SLNS	
MS	Tishomingo	Spiranthes ovalis	Lesser Ladies'-tresses	S2S3	SLNS	
MS	Tishomingo	Triphora trianthophora	Three-birds-orchids	S2	SLNS	
MS	Tishomingo	Muhlenbergia tenuiflora	Muhly	S1S2	SLNS	
MS	Tishomingo	Cheilanthes lanosa	Hairy Lipfern	S1S2	SLNS	
MS	Tishomingo	Pellaea atropurpurea	Purple Cliff-brake	S1	SLNS	
MS	Tishomingo	Asplenium pinnatifidum	Pinnatifid Spleenwort	S1	SLNS	
MS	Tishomingo	Asplenium resiliens	Black-stem Spleenwort	S1	SLNS	
MS	Tishomingo	Asplenium rhizophyllum	Walking Fern	S1	SLNS	
MS	Tishomingo	Asplenium trichomanes	Maidenhair Spleenwort	S1	SLNS	
MS	Tishomingo	Deparia acrostichoides	Silvery Glade Fern	S1S2	SLNS	
MS	Tishomingo	Diplazium pycnocarpon	glade fern	S2S3	SLNS	
MS	Tishomingo	Trichomanes boschianum	Appalachian Bristle Fern	S1	SLNS	
MS	Tishomingo	Isoetes engelmannii	Appalachian Quillwort	S1S2	SLNS	
MS	Union	Peucaea aestivalis	Bachman's Sparrow	S3B,S3S4N	TRKD	
MS	Union	Osmorhiza longistylis	Smoother Sweet-cicely	S3	SLNS	
MS	Union	Panax quinquefolius	American ginseng	S3	SLNS	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
MS	Union	Asarum canadense	Canada Wild-ginger	S3	SLNS	
MS	Union	Echinacea purpurea	Eastern Purple Coneflower	S3	SLNS	
MS	Union	Symphyotrichum ericoides	White Heath Aster	S2	SLNS	
MS	Union	Pachysandra procumbens	Allegheny-spurge	S3	SLNS	
MS	Union	Triosteum angustifolium	Horse-gentian	S3	SLNS	
MS	Union	Frasera caroliniensis	American Columbo	S2S3	SLNS	
MS	Union	Philadelphus inodorus	Mock-orange	S2	SLNS	
MS	Union	Juglans cinerea	Butternut	S2	SLNS	
MS	Union	Polemonium reptans	Greek Valerian	S2S3	SLNS	
MS	Union	Staphylea trifolia	American Bladdernut	S3	SLNS	
MS	Union	Hybanthus concolor	Green Violet	S3	SLNS	
MS	Union	Aplectrum hyemale	Puttyroot	S1	SLNS	
MS	Union	Hexalectris spicata	Crested Coralroot	S2	SLNS	
MS	Union	Asplenium rhizophyllum	Walking Fern	S1	SLNS	
MS	Webster	Panax quinquefolius	American ginseng	S3	SLNS	
MS	Webster	Matelea carolinensis	Carolina Anglepod	S3	SLNS	
MS	Webster	Antennaria solitaria	Single-head Pussytoes	S3S4	SLNS	
MS	Webster	Viburnum acerifolium	Mapleleaf Viburnum	S1	SLNS	
MS	Webster	Schisandra glabra	Bay Starvine	S3	SLNS	
MS	Webster	Chelone glabra	White Turtlehead	S3	SLNS	
MS	Webster	Luzula acuminata	Woodrush	S3	SLNS	
MS	Webster	Lilium superbum	Turk's Cap Lily	S3S4	SLNS	
MS	Webster	Cypripedium parviflorum var. pubescens	Large Yellow Lady's-slipper	S2S3	SLNS	
MS	Webster	Platanthera lacera	Ragged Fringe Orchid	S1S2	SLNS	
MS	Winston	Picoides borealis	Red-cockaded Woodpecker	S1	E	LE
MS	Winston	Peucaea aestivalis	Bachman's Sparrow	S3B,S3S4N	TRKD	
MS	Winston	Osmorhiza longistylis	Smoother Sweet-cicely	S3	SLNS	
MS	Winston	Panax quinquefolius	American ginseng	S3	SLNS	
MS	Winston	Asarum canadense	Canada Wild-ginger	S3	SLNS	
MS	Winston	Antennaria solitaria	Single-head Pussytoes	S3S4	SLNS	
MS	Winston	Pachysandra procumbens	Allegheny-spurge	S3	SLNS	
MS	Winston	Frasera caroliniensis	American Columbo	S2S3	SLNS	
MS	Winston	Carya glabra var. hirsuta	Swamp Hickory	S3	SLNS	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
MS	Winston	Nestronia umbellula	Nestronia	S1	SLNS	
MS	Winston	Schisandra glabra	Bay Starvine	S3	SLNS	
MS	Winston	Chelone glabra	White Turtlehead	S3	SLNS	
MS	Winston	Carex picta	Sedge	S3	SLNS	
MS	Winston	Carex impressinervia	Impressed-nerved Sedge	S1	SLNS	
MS	Winston	Lilium superbum	Turk's Cap Lily	S3S4	SLNS	
MS	Winston	Cypripedium parviflorum var. pubescens	Large Yellow Lady's-slipper	S2S3	SLNS	
MS	Winston	Platanthera cristata	Yellow-crested Orchid	S3S4	SLNS	
MS	Winston	Triphora trianthophora	Three-birds-orchids	S2	SLNS	
MS	Winston	Isoetes valida	True Quillwort	S1	SLNS	
NC	Avery	Cryptobranchus alleganiensis	Hellbender	S3	SC	PS
NC	Avery	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	S3	SC	
NC	Avery	Desmognathus organi	Northern Pygmy Salamander	S2	SR	
NC	Avery	Hemidactylium scutatum	Four-toed Salamander	S3	SC	
NC	Avery	Plethodon welleri	Weller's Salamander	S2	SC	
NC	Avery	Accipiter striatus	Sharp-shinned Hawk	S2B,S4N	SR	
NC	Avery	Falco peregrinus	Peregrine Falcon	S1B,S2N	E	
NC	Avery	Coccyzus erythropthalmus	Black-billed Cuckoo	S2B	SR	
NC	Avery	Aegolius acadicus	Northern Saw-whet Owl	S2B,S2N	T	
NC	Avery	Sphyrapicus varius	Yellow-bellied Sapsucker	S2S3B,S5N	SC	
NC	Avery	Empidonax alnorum	Alder Flycatcher	S2B	SR	
NC	Avery	Riparia riparia	Bank Swallow	S1B	SR	
NC	Avery	Poecile atricapilla	Black-capped Chickadee	S3	SC	
NC	Avery	Certhia americana	Brown Creeper	S3B,S5N	SC	
NC	Avery	Thryomanes bewickii altus	Appalachian Bewick's Wren	SXB	E	
NC	Avery	Catharus guttatus	Hermit Thrush	S2B,S5N	SR	
NC	Avery	Vireo gilvus	Warbling Vireo	S2B	SR	
NC	Avery	Vermivora chrysoptera	Golden-winged Warbler	S2S3B	SC	
NC	Avery	Setophaga magnolia	Magnolia Warbler	S2B	SR	
NC	Avery	Pooecetes gramineus	Vesper Sparrow	S2B,S2N	SC	
NC	Avery	Loxia curvirostra	Red Crossbill	S3B,S3N	SC	
NC	Avery	Cottus carolinae	Banded Sculpin	S1	T	
NC	Avery	Etheostoma simoterum	Snubnose Darter	S1	SC	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
NC	Avery	Sorex palustris punctulatus	Southern Water Shrew	S3	SC	
NC	Avery	Myotis sodalis	Indiana Bat	S1S2	E	LE
NC	Avery	Myotis leibii	eastern small-footed bat	S2	SC	
NC	Avery	Myotis septentrionalis	Northern Long-eared Bat	S2	SR	LT
NC	Avery	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	S1	E	LE
NC	Avery	Sylvilagus obscurus	Appalachian Cottontail	S3	SR-G	
NC	Avery	Glaucomys sabrinus coloratus	Carolina Northern Flying Squirrel	S2	E	LE
NC	Avery	Neotoma magister	Allegheny Woodrat	S2S3	SC	
NC	Avery	Microtus chrotorrhinus carolinensis	Southern Rock Vole	S3	SC	
NC	Avery	Synaptomys cooperi	Southern Bog Lemming	S3S4	TRKD	
NC	Avery	Mustela nivalis	Least Weasel	S2	SR-G	
NC	Avery	Glyptemys muhlenbergii	Bog Turtle	S2	T	LT(SA)
NC	Avery	Crotalus horridus	Timber Rattlesnake	S3	SC	
NC	Avery	Cambarus eeseeohensis	Grandfather Mountain Crayfish	S1	E	
NC	Avery	Erora laeta	Early Hairstreak	S2S3	SR	
NC	Avery	Speyeria idalia	Regal Fritillary Butterfly	SX	SR	
NC	Avery	Euphydryas phaeton	Baltimore	S2	SR	
NC	Avery	Polygonia faunus	Green Comma	S1S2	SR	
NC	Avery	Polygonia faunus smythi	Smyth's Green Coma	S1S2	RARE	
NC	Avery	Polygonia progne	Gray Comma	S1	SR	
NC	Avery	Gomphus descriptus	Harpoon Clubtail	S1	SR	
NC	Avery	Microhexura montivaga	Spruce-fir Moss Spider	S1	SR	LE
NC	Avery	Glyphyalinia vanattai	Honey Glyph	S1	SC	
NC	Avery	Paravitrea andrewsae	High Mountain Supercoil	S2	SC	
NC	Avery	Ventridens coelaxis	Bidentate Dome	S3?	SC	
NC	Avery	Barbilophozia hatcheri	Liverwort	S1	SR-D	
NC	Avery	Bazzania nudicaulis	Liverwort	S2	SR-T	
NC	Avery	Sphenolobopsis pearsonii	Liverwort	S2	SR-O	
NC	Avery	Homalia trichomanoides	Lime Homalia	S1	SR-P	
NC	Avery	Leptodontium viticulosoides var. sulphureum	Grandfather Mountain Leptodontium	S1	SR-L	
NC	Avery	Gymnoderma lineare	Rock Gnome Lichen	S3	E	LE
NC	Avery	Hydrothyria venosa	Aquatic Lichen	S3	W1	
NC	Avery	Conioselinum chinense	Hemlock Parsley	S1	T	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
NC	Avery	Liatris helleri	Heller's Blazing Star	S2	T	LT
NC	Avery	Solidago spithamaea	Blue Ridge Goldenrod	S2	T	LT
NC	Avery	Alnus viridis ssp. crispa	Green Alder	S1	SC-V	
NC	Avery	Turritis glabra	Tower-mustard	S1	E	
NC	Avery	Cardamine clematitis	mountain bittercress	S2S3	SR-T	
NC	Avery	Helianthemum propinquum	Low Frostweed	S1	T	
NC	Avery	Rhodiola rosea	Roseroot Stonecrop	SH	E	
NC	Avery	Shortia galacifolia var. galacifolia	Southern Shortia	S2	SC-V	
NC	Avery	Vaccinium macrocarpon	Large Cranberry	S2	T	
NC	Avery	Delphinium exaltatum	Tall Larkspur	S2	E	
NC	Avery	Geum aleppicum	Yellow Avens	S1	E	
NC	Avery	Geum geniculatum	Bent Avens	S1S2	SC-V	
NC	Avery	Geum laciniatum	Rough Avens	S1	E	
NC	Avery	Geum radiatum	Spreading Avens	S2	E	LE
NC	Avery	Hedyotis purpurea var. montana	Mountain Bluet	S2	E	LE
NC	Avery	Saxifraga caroliniana	Carolina saxifrage	S3	SR-T	
NC	Avery	Abies fraseri	Fraser Fir	S2	W5	
NC	Avery	Carex leptonervia	Sedge	S3	W1	
NC	Avery	Carex oligosperma	Few-seeded Sedge	S1	E	
NC	Avery	Carex projecta	Sedge	S1	SR-P	
NC	Avery	Trichophorum cespitosum	Tufted Clubrush	S2S3	SR-D	
NC	Avery	Lilium grayi	Gray's Lily	S3	T	
NC	Avery	Zigadenus leimanthoides	Death-camas	S1	T	
NC	Avery	Arethusa bulbosa	Bog-rose	S1	E	
NC	Avery	Coeloglossum viride var. virescens	American Frog Orchid	S1	E	
NC	Avery	Agrostis mertensii	Arctic Bentgrass	S1	E	
NC	Avery	Glyceria nubigena	Smoky Mountain Manna-grass	S2	SR-L	
NC	Avery	Dryopteris cristata	crested woodfern	S3	W1	
NC	Avery	Huperzia appalachiana	Appalachian Fir-clubmoss	S3	W1	
NC	Avery	Botrychium oneidense	Blunt-lobe Grapefern	S2	SR-P	
NC	Burke	Vireo gilvus	Warbling Vireo	S2B	SR	
NC	Burke	Loxia curvirostra	Red Crossbill	S3B,S3N	SC	
NC	Burke	Myotis septentrionalis	Northern Long-eared Bat	S2	SR	LT

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
NC	Burke	Neotoma magister	Allegheny Woodrat	S2S3	SC	
NC	Burke	Glyptemys muhlenbergii	Bog Turtle	S2	T	LT(SA)
NC	Burke	Macromia margarita	Margaret's River Cruiser	S2?	SR	
NC	Burke	Gymnoderma lineare	Rock Gnome Lichen	S3	E	LE
NC	Cherokee	Ambystoma talpoideum	Mole Salamander	S2S3	SC	
NC	Cherokee	Cryptobranchus alleganiensis	Hellbender	S3	SC	PS
NC	Cherokee	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	S3	SC	
NC	Cherokee	Desmognathus aeneus	Seepage Salamander	S3	W2	
NC	Cherokee	Eurycea junaluska	Junaluska Salamander	S1S2	T	
NC	Cherokee	Hemidactylium scutatum	Four-toed Salamander	S3	SC	
NC	Cherokee	Plethodon aureolus	Tellico Salamander	S2?	SR	
NC	Cherokee	Pseudacris brachyphona	Mountain Chorus Frog	S2	SC	
NC	Cherokee	Haliaeetus leucocephalus	Bald Eagle	S3B,S3N	T	DM
NC	Cherokee	Aquila chrysaetos	Golden Eagle	SXB,S1N	SR	
NC	Cherokee	Aegolius acadicus	Northern Saw-whet Owl	S2B,S2N	T	
NC	Cherokee	Sphyrapicus varius	Yellow-bellied Sapsucker	S2S3B,S5N	SC	
NC	Cherokee	Corvus corax	Common Raven	S3	W2	
NC	Cherokee	Vermivora pinus	Blue Winged Warbler	S2B	SR	
NC	Cherokee	Clinostomus funduloides ssp. 1	Smoky Dace	S2	SC	
NC	Cherokee	Erimystax insignis	Blotched Chub	S2	SR	
NC	Cherokee	Moxostoma sp. 2	Sicklefin Redhorse	S2	T	
NC	Cherokee	Percina squamata	Olive Darter	S2	SC	
NC	Cherokee	Sorex palustris punctulatus	Southern Water Shrew	S3	SC	
NC	Cherokee	Sorex hoyi winnemana	Southern Pygmy Shrew	S3	TRKD	
NC	Cherokee	Myotis sodalis	Indiana Bat	S1S2	E	LE
NC	Cherokee	Myotis septentrionalis	Northern Long-eared Bat	S2	SR	LT
NC	Cherokee	Corynorhinus rafinesquii	Rafinesque’s Big-eared bat	S3	T	
NC	Cherokee	Glyptemys muhlenbergii	Bog Turtle	S2	T	LT(SA)
NC	Cherokee	Sternotherus minor	Stripeneck Musk Turtle	S1	SC	
NC	Cherokee	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S2	SC	
NC	Cherokee	Cambarus hiwasseensis	Hiwassee Crayfish	S3S4	W2	
NC	Cherokee	Cambarus parrishi	Hiwassee Headwaters Crayfish	S1	SC	
NC	Cherokee	Papilio cresphontes	Giant Swallowtail	S2S3	SR	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
NC	Cherokee	Vaejovis carolinianus	Carolina Scorpion	S2?	W2,W3	
NC	Cherokee	Elliptio dilatata	Spike	S2	SC	
NC	Cherokee	Fusconaia barnesiana	Tennessee Pigtoe	S1	E	
NC	Cherokee	Fusconaia subrotunda	Longsolid	S1	SR	
NC	Cherokee	Lampsilis fasciola	Wavy-rayed Lampmussel	S2	SC	
NC	Cherokee	Lasmigona holstonia	Tennessee Heelsplitter	SH	E	
NC	Cherokee	Pegias fabula	Little-wing Pearlymussel	S1	E	LE
NC	Cherokee	Pleurobema oviforme	Tennessee Clubshell	S1	E	
NC	Cherokee	Villosa iris	Rainbow Mussel	S2	SC	
NC	Cherokee	Villosa trabalis	Cumberland Bean	SH	SR	LE
NC	Cherokee	Glyphyalinia junaluskana	Dark Glyph	S2	SC	
NC	Cherokee	Elimia interrupta	Knotty Elimia	SNA	E	
NC	Cherokee	Hydrothyria venosa	Aquatic Lichen	S3	W1	
NC	Cherokee	Thermopsis fraxinifolia	Ash-leaved Bush-pea	S2?	SC-V	
NC	Cherokee	Stachys clingmanii	Clingman's Hedge-nettle	S2?	W2	
NC	Cherokee	Stewartia ovata	Mountain Camellia	S2	SR-P	
NC	Cherokee	Carex projecta	Sedge	S1	SR-P	
NC	Cherokee	Carex purpurifera	Sedge	S3	SC-V	
NC	Cherokee	Carex manhartii	Manhart's Sedge	S3	W1	
NC	Cherokee	Eriophorum virginicum	Tawny Cotton-grass	S3	W1	
NC	Cherokee	Platanthera integrilabia	White Fringeless Orchid	SH	SC-H	LT
NC	Cherokee	Calamagrostis porteri ssp. porteri	Porter's Reedgrass	S1	SR-P	
NC	Clay	Ambystoma talpoideum	Mole Salamander	S2S3	SC	
NC	Clay	Cryptobranchus alleganiensis	Hellbender	S3	SC	PS
NC	Clay	Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	S3	SC	
NC	Clay	Desmognathus aeneus	Seepage Salamander	S3	W2	
NC	Clay	Eurycea junaluska	Junaluska Salamander	S1S2	T	
NC	Clay	Hemidactylium scutatum	Four-toed Salamander	S3	SC	
NC	Clay	Haliaeetus leucocephalus	Bald Eagle	S3B,S3N	T	DM
NC	Clay	Sphyrapicus varius	Yellow-bellied Sapsucker	S2S3B,S5N	SC	
NC	Clay	Vermivora chrysoptera	Golden-winged Warbler	S2S3B	SC	
NC	Clay	Setophaga cerulea	Cerulean Warbler	S2B	SC	
NC	Clay	Clinostomus funduloides ssp. 1	Smoky Dace	S2	SC	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
NC	Clay	Erimystax insignis	Blotched Chub	S2	SR	
NC	Clay	Moxostoma sp. 2	Sicklefin Redhorse	S2	T	
NC	Clay	Sorex palustris punctulatus	Southern Water Shrew	S3	SC	
NC	Clay	Sorex hoyi winnemana	Southern Pygmy Shrew	S3	TRKD	
NC	Clay	Myotis septentrionalis	Northern Long-eared Bat	S2	SR	LT
NC	Clay	Sylvilagus obscurus	Appalachian Cottontail	S3	SR-G	
NC	Clay	Glyptemys muhlenbergii	Bog Turtle	S2	T	LT(SA)
NC	Clay	Cambarus hiwasseensis	Hiwassee Crayfish	S3S4	W2	
NC	Clay	Cambarus parrishi	Hiwassee Headwaters Crayfish	S1	SC	
NC	Clay	Cambarus brimleyorum	Valley River Crayfish	S3	E	
NC	Clay	Bombus affinis	Rusty-patched Bumble Bee			LE
NC	Clay	Erora laeta	Early Hairstreak	S2S3	SR	
NC	Clay	Elliptio dilatata	Spike	S2	SC	
NC	Clay	Fusconaia subrotunda	Longsolid	S1	SR	
NC	Clay	Lampsilis fasciola	Wavy-rayed Lampmussel	S2	SC	
NC	Clay	Pleurobema oviforme	Tennessee Clubshell	S1	E	
NC	Clay	Villosa iris	Rainbow Mussel	S2	SC	
NC	Clay	Villosa vanuxemensis	Mountain Creekshell	S1?	T	
NC	Clay	Hydrothyria venosa	Aquatic Lichen	S3	W1	
NC	Clay	Frasera caroliniensis	American Columbo	S2S3	SR-P	
NC	Clay	Sarracenia oreophila	Green Pitcher Plant	S1	E	LE
NC	Clay	Parnassia grandifolia	Large-leaved Grass-of-parnassus	S2	T	
NC	Clay	Carex biltmoreana	Biltmore Sedge	S3	W1	
NC	Clay	Juncus caesariensis	New Jersey Rush	S1	E	
NC	Clay	Isotria medeoloides	Small Whorled Pogonia	S1	T	LT
NC	Clay	Deschampsia cespitosa ssp. glauca	Tufted Hairgrass	S1	T	
NC	Clay	Elymus trachycaulus ssp. trachycaulus	Slender Wheatgrass	S1	T	
NC	Clay	Muhlenbergia glomerata	Muhly	S1	SC-V	
NC	Clay	Sporobolus heterolepis	Northern Dropseed	S1	T	
NC	Graham	Cryptobranchus alleganiensis	Hellbender	S3	SC	PS
NC	Graham	Desmognathus aeneus	Seepage Salamander	S3	W2	
NC	Graham	Desmognathus santeetlah	Santeetlah Dusky Salamander	S3S4	W2	
NC	Graham	Eurycea junaluska	Junaluska Salamander	S1S2	T	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
NC	Graham	Hemidactylium scutatum	Four-toed Salamander	S3	SC	
NC	Graham	Plethodon aureolus	Tellico Salamander	S2?	SR	
NC	Graham	Haliaeetus leucocephalus	Bald Eagle	S3B,S3N	T	DM
NC	Graham	Aegolius acadicus	Northern Saw-whet Owl	S2B,S2N	T	
NC	Graham	Sphyrapicus varius	Yellow-bellied Sapsucker	S2S3B,S5N	SC	
NC	Graham	Vermivora pinus	Blue Winged Warbler	S2B	SR	
NC	Graham	Setophaga magnolia	Magnolia Warbler	S2B	SR	
NC	Graham	Setophaga cerulea	Cerulean Warbler	S2B	SC	
NC	Graham	Moxostoma sp. 2	Sicklefin Redhorse	S2	T	
NC	Graham	Etheostoma vulneratum	Wounded Darter	S2	SC	
NC	Graham	Sorex hoyi winnemana	Southern Pygmy Shrew	S3	TRKD	
NC	Graham	Myotis sodalis	Indiana Bat	S1S2	E	LE
NC	Graham	Myotis leibii	eastern small-footed bat	S2	SC	
NC	Graham	Myotis septentrionalis	Northern Long-eared Bat	S2	SR	LT
NC	Graham	Corynorhinus rafinesquii	Rafinesque’s Big-eared bat	S3	T	
NC	Graham	Sylvilagus obscurus	Appalachian Cottontail	S3	SR-G	
NC	Graham	Glaucomys sabrinus coloratus	Carolina Northern Flying Squirrel	S2	E	LE
NC	Graham	Synaptomys cooperi	Southern Bog Lemming	S3S4	TRKD	
NC	Graham	Glyptemys muhlenbergii	Bog Turtle	S2	T	LT(SA)
NC	Graham	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S2	SC	
NC	Graham	Crotalus horridus	Timber Rattlesnake	S3	SC	
NC	Graham	Cambarus hiwasseensis	Hiwassee Crayfish	S3S4	W2	
NC	Graham	Autochton cellus	Golden-banded Skipper	S2	SR	
NC	Graham	Celastrina ebenina	Dusky Azure	S2	SR	
NC	Graham	Polygonia faunus smythi	Smyth's Green Coma	S1S2	RARE	
NC	Graham	Alasmidonta raveneliana	Appalachian Elktoe	S1	E	LE
NC	Graham	Helicodiscus bonamicus	Spiral Coil	S1	SC	
NC	Graham	Paravitrea umbilicaris	Open Supercoil	S2	SC	
NC	Graham	Paravitrea lacteodens	Ramp Cove Supercoil	SH	SC	
NC	Graham	Patera clarki nantahala	Noonday Globe	S1	T	LT
NC	Graham	Gymnoderma lineare	Rock Gnome Lichen	S3	E	LE
NC	Graham	Hydrothyria venosa	Aquatic Lichen	S3	W1	
NC	Graham	Cardamine clematitis	mountain bittercress	S2S3	SR-T	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
NC	Graham	Hypericum mitchellianum	Blue Ridge St. John's-wort	S2S3	W1	
NC	Graham	Euphorbia purpurea	Glade Spurge	S2	SR-T	
NC	Graham	Stachys clingmanii	Clingman's Hedge-nettle	S2?	W2	
NC	Graham	Spiraea virginiana	Virginia Spiraea	S2	T	LT
NC	Graham	Carex leptonervia	Sedge	S3	W1	
NC	Graham	Carex purpurifera	Sedge	S3	SC-V	
NC	Graham	Carex ruthii	Ruth's Sedge	S3	W1	
NC	Graham	Cymophyllus fraserianus	Fraser's Sedge	S3	W1	
NC	Graham	Glyceria nubigena	Smoky Mountain Manna-grass	S2	SR-L	
NC	Graham	Poa palustris	Fowl Bluegrass	S1	SR-P	
NC	Graham	Cystopteris tennesseensis	Tennessee Bladderfern	S1	E	
NC	Graham	Trichomanes boschianum	Appalachian Bristle Fern	S1	E	
NC	Graham	Trichomanes petersii	Dwarf Filmy-fern	S2	SR-T	
NC	Mitchell	Desmognathus organi	Northern Pygmy Salamander	S2	SR	
NC	Mitchell	Hemidactylium scutatum	Four-toed Salamander	S3	SC	
NC	Mitchell	Plethodon welleri	Weller's Salamander	S2	SC	
NC	Mitchell	Accipiter striatus	Sharp-shinned Hawk	S2B,S4N	SR	
NC	Mitchell	Falco peregrinus	Peregrine Falcon	S1B,S2N	E	
NC	Mitchell	Coccyzus erythropthalmus	Black-billed Cuckoo	S2B	SR	
NC	Mitchell	Aegolius acadicus	Northern Saw-whet Owl	S2B,S2N	T	
NC	Mitchell	Sphyrapicus varius	Yellow-bellied Sapsucker	S2S3B,S5N	SC	
NC	Mitchell	Contopus cooperi	Olive-sided Flycatcher	SNA	W3,SC	
NC	Mitchell	Empidonax alnorum	Alder Flycatcher	S2B	SR	
NC	Mitchell	Certhia americana	Brown Creeper	S3B,S5N	SC	
NC	Mitchell	Catharus guttatus	Hermit Thrush	S2B,S5N	SR	
NC	Mitchell	Setophaga magnolia	Magnolia Warbler	S2B	SR	
NC	Mitchell	Pooecetes gramineus	Vesper Sparrow	S2B,S2N	SC	
NC	Mitchell	Loxia curvirostra	Red Crossbill	S3B,S3N	SC	
NC	Mitchell	Erimystax insignis	Blotched Chub	S2	SR	
NC	Mitchell	Etheostoma simoterum	Snubnose Darter	S1	SC	
NC	Mitchell	Etheostoma acuticeps	Sharphead Darter	S1	T	
NC	Mitchell	Etheostoma vulneratum	Wounded Darter	S2	SC	
NC	Mitchell	Percina caprodes	Logperch	S1	T	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
NC	Mitchell	Percina squamata	Olive Darter	S2	SC	
NC	Mitchell	Myotis sodalis	Indiana Bat	S1S2	E	LE
NC	Mitchell	Myotis leibii	eastern small-footed bat	S2	SC	
NC	Mitchell	Myotis septentrionalis	Northern Long-eared Bat	S2	SR	LT
NC	Mitchell	Sylvilagus obscurus	Appalachian Cottontail	S3	SR-G	
NC	Mitchell	Glaucomys sabrinus coloratus	Carolina Northern Flying Squirrel	S2	E	LE
NC	Mitchell	Neotoma magister	Allegheny Woodrat	S2S3	SC	
NC	Mitchell	Synaptomys cooperi	Southern Bog Lemming	S3S4	TRKD	
NC	Mitchell	Zapus hudsonius	Meadow Jumping Mouse	S3	W2	
NC	Mitchell	Mustela nivalis	Least Weasel	S2	SR-G	
NC	Mitchell	Glyptemys muhlenbergii	Bog Turtle	S2	T	LT(SA)
NC	Mitchell	Crotalus horridus	Timber Rattlesnake	S3	SC	
NC	Mitchell	Trechus roanicus	A Carabid Beetle	SU	W3	
NC	Mitchell	Autochton cellus	Golden-banded Skipper	S2	SR	
NC	Mitchell	Hesperia sassacus	Indian Skipper	S3	W2	
NC	Mitchell	Erora laeta	Early Hairstreak	S2S3	SR	
NC	Mitchell	Celastrina ebenina	Dusky Azure	S2	SR	
NC	Mitchell	Euphydryas phaeton	Baltimore	S2	SR	
NC	Mitchell	Gomphus borealis	Beaverpond Clubtail	SH	SR	
NC	Mitchell	Microhexura montivaga	Spruce-fir Moss Spider	S1	SR	LE
NC	Mitchell	Hypochilus sheari	A Lampshade Spider	S2S3	SR	
NC	Mitchell	Alasmidonta raveneliana	Appalachian Elktoe	S1	E	LE
NC	Mitchell	Lampsilis fasciola	Wavy-rayed Lampmussel	S2	SC	
NC	Mitchell	Discus bryanti	Saw-tooth Disc	S2	SC	
NC	Mitchell	Glyphyalinia vanattai	Honey Glyph	S1	SC	
NC	Mitchell	Paravitrea andrewsae	High Mountain Supercoil	S2	SC	
NC	Mitchell	Paravitrea varidens	Roan Supercoil	S1S2	T	
NC	Mitchell	Paravitrea placentula	Glossy Supercoil	S2S3	SC	
NC	Mitchell	Anastrophyllum saxicola	Liverwort	S1	SR-D	
NC	Mitchell	Bazzania nudicaulis	Liverwort	S2	SR-T	
NC	Mitchell	Leptoscyphus cuneifolius	Liverwort	S2	SR-D	
NC	Mitchell	Plagiochila exigua	Liverwort	S2	SR-D	
NC	Mitchell	Sphenolobopsis pearsonii	Liverwort	S2	SR-O	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
NC	Mitchell	Leptodontium viticulosoides var. sulphureum	Grandfather Mountain Leptodontium	S1	SR-L	
NC	Mitchell	Gymnoderma lineare	Rock Gnome Lichen	S3	E	LE
NC	Mitchell	Liatris helleri	Heller's Blazing Star	S2	T	LT
NC	Mitchell	Packera schweinitziana	Schweinitz's Ragwort	S2	T	
NC	Mitchell	Solidago spithamaea	Blue Ridge Goldenrod	S2	T	LT
NC	Mitchell	Alnus viridis ssp. crispa	Green Alder	S1	SC-V	
NC	Mitchell	Cardamine clematitis	mountain bittercress	S2S3	SR-T	
NC	Mitchell	Cardamine rotundifolia	Roundleaf Water-cress	S2	T	
NC	Mitchell	Minuartia groenlandica	Mountain Sandwort	S2	T	
NC	Mitchell	Stellaria alsine	Trailing Stitchwort	S3?	W1	
NC	Mitchell	Hypericum graveolens	Mountain St. John's-wort	S2S3	W1	
NC	Mitchell	Hypericum mitchellianum	Blue Ridge St. John's-wort	S2S3	W1	
NC	Mitchell	Lonicera canadensis	American Fly-honeysuckle	S2	SR-P	
NC	Mitchell	Rhodiola rosea	Roseroot Stonecrop	SH	E	
NC	Mitchell	Gentiana austromontana	Appalachian Gentian	S2S3	W1	
NC	Mitchell	Stachys clingmanii	Clingman's Hedge-nettle	S2?	W2	
NC	Mitchell	Epilobium angustifolium	Fireweed	S1	E	
NC	Mitchell	Delphinium exaltatum	Tall Larkspur	S2	E	
NC	Mitchell	Geum geniculatum	Bent Avens	S1S2	SC-V	
NC	Mitchell	Geum radiatum	Spreading Avens	S2	E	LE
NC	Mitchell	Spiraea virginiana	Virginia Spiraea	S2	T	LT
NC	Mitchell	Hedyotis purpurea var. montana	Mountain Bluet	S2	E	LE
NC	Mitchell	Buckleya distichophylla	piratebush	S2	T	
NC	Mitchell	Abies fraseri	Fraser Fir	S2	W5	
NC	Mitchell	Carex argyrantha	Hay Sedge	S1	E	
NC	Mitchell	Carex echinata ssp. echinata	Little Prickly Sedge	S2S3	W1	
NC	Mitchell	Carex misera	Wretched Sedge	S3	W1	
NC	Mitchell	Carex projecta	Sedge	S1	SR-P	
NC	Mitchell	Carex roanensis	Sedge	S2	SR-T	
NC	Mitchell	Carex ruthii	Ruth's Sedge	S3	W1	
NC	Mitchell	Cymophyllus fraserianus	Fraser's Sedge	S3	W1	
NC	Mitchell	Trichophorum cespitosum	Tufted Clubrush	S2S3	SR-D	
NC	Mitchell	Lilium grayi	Gray's Lily	S3	T	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
NC	Mitchell	Streptopus amplexifolius	Clasping Twisted-stalk	S1	SC-V	
NC	Mitchell	Agrostis mertensii	Arctic Bentgrass	S1	E	
NC	Mitchell	Poa palustris	Fowl Bluegrass	S1	SR-P	
NC	Mitchell	Trisetum spicatum	Narrow False Oats	SH	SC-H	
NC	Mitchell	Cystopteris fragilis	Fragile Fern	S1	SR-P	
NC	Mitchell	Huperzia appalachiana	Appalachian Fir-clubmoss	S3	W1	
NC	Mitchell	Botrychium oneidense	Blunt-lobe Grapefern	S2	SR-P	
NC	Swain	Cryptobranchus alleganiensis	Hellbender	S3	SC	PS
NC	Swain	Desmognathus aeneus	Seepage Salamander	S3	W2	
NC	Swain	Desmognathus wrighti	Southern Pigmy Salamander	S2S3	SR	
NC	Swain	Desmognathus santeetlah	Santeetlah Dusky Salamander	S3S4	W2	
NC	Swain	Hemidactylium scutatum	Four-toed Salamander	S3	SC	
NC	Swain	Haliaeetus leucocephalus	Bald Eagle	S3B,S3N	T	DM
NC	Swain	Aegolius acadicus	Northern Saw-whet Owl	S2B,S2N	T	
NC	Swain	Sphyrapicus varius	Yellow-bellied Sapsucker	S2S3B,S5N	SC	
NC	Swain	Contopus cooperi	Olive-sided Flycatcher	SNA	W3,SC	
NC	Swain	Poecile atricapilla	Black-capped Chickadee	S3	SC	
NC	Swain	Certhia americana	Brown Creeper	S3B,S5N	SC	
NC	Swain	Thryomanes bewickii altus	Appalachian Bewick's Wren	SXB	E	
NC	Swain	Catharus guttatus	Hermit Thrush	S2B,S5N	SR	
NC	Swain	Vermivora pinus	Blue Winged Warbler	S2B	SR	
NC	Swain	Setophaga cerulea	Cerulean Warbler	S2B	SC	
NC	Swain	Loxia curvirostra	Red Crossbill	S3B,S3N	SC	
NC	Swain	Clinostomus funduloides ssp. 1	Smoky Dace	S2	SC	
NC	Swain	Erimonax monachus	Spotfin Chub	S1	T	LT
NC	Swain	Moxostoma sp. 2	Sicklefin Redhorse	S2	T	
NC	Swain	Noturus flavus	Stonecat	S1	E	
NC	Swain	Etheostoma vulneratum	Wounded Darter	S2	SC	
NC	Swain	Percina squamata	Olive Darter	S2	SC	
NC	Swain	Sorex palustris punctulatus	Southern Water Shrew	S3	SC	
NC	Swain	Sorex hoyi winnemana	Southern Pygmy Shrew	S3	TRKD	
NC	Swain	Myotis sodalis	Indiana Bat	S1S2	E	LE
NC	Swain	Myotis leibii	eastern small-footed bat	S2	SC	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
NC	Swain	Myotis septentrionalis	Northern Long-eared Bat	S2	SR	LT
NC	Swain	Corynorhinus rafinesquii	Rafinesque’s Big-eared bat	S3	T	
NC	Swain	Sylvilagus obscurus	Appalachian Cottontail	S3	SR-G	
NC	Swain	Glaucomys sabrinus coloratus	Carolina Northern Flying Squirrel	S2	E	LE
NC	Swain	Neotoma floridana haematoreia	Southern Appalachian Woodrat	S3S4	W2	
NC	Swain	Microtus chrotorrhinus carolinensis	Southern Rock Vole	S3	SC	
NC	Swain	Synaptomys cooperi	Southern Bog Lemming	S3S4	TRKD	
NC	Swain	Puma concolor couguar	Eastern Cougar	SX	W4,E	LE
NC	Swain	Glyptemys muhlenbergii	Bog Turtle	S2	T	LT(SA)
NC	Swain	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S2	SC	
NC	Swain	Crotalus horridus	Timber Rattlesnake	S3	SC	
NC	Swain	Trechus novaculosus	A Carabid Beetle	SU	W3	
NC	Swain	Eulonchus marialiciae	Mary Alice's Small-headed Fly	S3?	W3	
NC	Swain	Bombus affinis	Rusty-patched Bumble Bee			LE
NC	Swain	Autochton cellus	Golden-banded Skipper	S2	SR	
NC	Swain	Euchloe olympia	Olympia Marble	S1	SR	
NC	Swain	Erora laeta	Early Hairstreak	S2S3	SR	
NC	Swain	Celastrina ebenina	Dusky Azure	S2	SR	
NC	Swain	Polygonia faunus smythi	Smyth's Green Coma	S1S2	RARE	
NC	Swain	Polygonia progne	Gray Comma	S1	SR	
NC	Swain	Microhexura montivaga	Spruce-fir Moss Spider	S1	SR	LE
NC	Swain	Nesticus cooperi	Lost Nantahala Cave Spider	S1	SR	
NC	Swain	Alasmidonta raveneliana	Appalachian Elktoe	S1	E	LE
NC	Swain	Alasmidonta viridis	Slippershell Mussel	S1	E	
NC	Swain	Elliptio dilatata	Spike	S2	SC	
NC	Swain	Lampsilis fasciola	Wavy-rayed Lampmussel	S2	SC	
NC	Swain	Pegias fabula	Little-wing Pearlymussel	S1	E	LE
NC	Swain	Villosa iris	Rainbow Mussel	S2	SC	
NC	Swain	Helicodiscus bonamicus	Spiral Coil	S1	SC	
NC	Swain	Patera clarki nantahala	Noonday Globe	S1	T	LT
NC	Swain	Mesodon jonesianus	Big-tooth Covert	S1?	T	
NC	Swain	Anastrophyllum saxicola	Liverwort	S1	SR-D	
NC	Swain	Aneura sharpii	Liverwort	S1	SR-T	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
NC	Swain	Bazzania nudicaulis	Liverwort	S2	SR-T	
NC	Swain	Leptoscyphus cuneifolius	Liverwort	S2	SR-D	
NC	Swain	Sphenolobopsis pearsonii	Liverwort	S2	SR-O	
NC	Swain	Brachydontium trichodes	Peak Moss	S1	SR-D	
NC	Swain	Leptodontium viticulosoides var. sulphureum	Grandfather Mountain Leptodontium	S1	SR-L	
NC	Swain	Gymnoderma lineare	Rock Gnome Lichen	S3	E	LE
NC	Swain	Hydrothyria venosa	Aquatic Lichen	S3	W1	
NC	Swain	Rugelia nudicaulis	Rugel's Ragwort	S3	SR-L	
NC	Swain	Berberis canadensis	American barberry	S2	SC-V	
NC	Swain	Arabis patens	Spreading Rockcress	S1	SR-T	
NC	Swain	Cardamine clematitis	mountain bittercress	S2S3	SR-T	
NC	Swain	Helianthemum bicknellii	Plains Frostweed	S1	SC-V	
NC	Swain	Hypericum graveolens	Mountain St. John's-wort	S2S3	W1	
NC	Swain	Hypericum mitchellianum	Blue Ridge St. John's-wort	S2S3	W1	
NC	Swain	Lonicera canadensis	American Fly-honeysuckle	S2	SR-P	
NC	Swain	Shortia galacifolia var. galacifolia	Southern Shortia	S2	SC-V	
NC	Swain	Euphorbia purpurea	Glade Spurge	S2	SR-T	
NC	Swain	Stachys clingmanii	Clingman's Hedge-nettle	S2?	W2	
NC	Swain	Synandra hispidula	Guyandotte Beauty	S1	E	
NC	Swain	Monotropsis odorata	Sweet Pinesap	S3	SC-V	
NC	Swain	Hydrastis canadensis	Goldenseal	S3	SR-O	
NC	Swain	Geum aleppicum	Yellow Avens	S1	E	
NC	Swain	Geum radiatum	Spreading Avens	S2	E	LE
NC	Swain	Buckleya distichophylla	piratebush	S2	T	
NC	Swain	Saxifraga caroliniana	Carolina saxifrage	S3	SR-T	
NC	Swain	Abies fraseri	Fraser Fir	S2	W5	
NC	Swain	Carex leptonervia	Sedge	S3	W1	
NC	Swain	Carex misera	Wretched Sedge	S3	W1	
NC	Swain	Carex projecta	Sedge	S1	SR-P	
NC	Swain	Carex ruthii	Ruth's Sedge	S3	W1	
NC	Swain	Streptopus amplexifolius	Clasping Twisted-stalk	S1	SC-V	
NC	Swain	Platanthera peramoena	Purple Fringeless Orchid	S2	T	
NC	Swain	Calamagrostis cainii	Reedgrass	S1	E	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
NC	Swain	Glyceria nubigena	Smoky Mountain Manna-grass	S2	SR-L	
NC	Swain	Trichomanes boschianum	Appalachian Bristle Fern	S1	E	
NC	Swain	Trichomanes petersii	Dwarf Filmy-fern	S2	SR-T	
NC	Swain	Phegopteris connectilis	Northern Beechfern	S2	E	
NC	Watauga	Cryptobranchus alleganiensis	Hellbender	S3	SC	PS
NC	Watauga	Desmognathus organi	Northern Pygmy Salamander	S2	SR	
NC	Watauga	Plethodon welleri	Weller's Salamander	S2	SC	
NC	Watauga	Accipiter striatus	Sharp-shinned Hawk	S2B,S4N	SR	
NC	Watauga	Coccyzus erythropthalmus	Black-billed Cuckoo	S2B	SR	
NC	Watauga	Aegolius acadicus	Northern Saw-whet Owl	S2B,S2N	T	
NC	Watauga	Sphyrapicus varius	Yellow-bellied Sapsucker	S2S3B,S5N	SC	
NC	Watauga	Empidonax alnorum	Alder Flycatcher	S2B	SR	
NC	Watauga	Poecile atricapilla	Black-capped Chickadee	S3	SC	
NC	Watauga	Certhia americana	Brown Creeper	S3B,S5N	SC	
NC	Watauga	Thryomanes bewickii altus	Appalachian Bewick's Wren	SXB	E	
NC	Watauga	Vireo gilvus	Warbling Vireo	S2B	SR	
NC	Watauga	Vermivora chrysoptera	Golden-winged Warbler	S2S3B	SC	
NC	Watauga	Setophaga magnolia	Magnolia Warbler	S2B	SR	
NC	Watauga	Setophaga cerulea	Cerulean Warbler	S2B	SC	
NC	Watauga	Pooecetes gramineus	Vesper Sparrow	S2B,S2N	SC	
NC	Watauga	Passerculus sandwichensis	Savannah Sparrow	S2B,S5N	SR	
NC	Watauga	Loxia curvirostra	Red Crossbill	S3B,S3N	SC	
NC	Watauga	Phenacobius teretulus	Kanawha Minnow	S3	SC	
NC	Watauga	Sorex palustris punctulatus	Southern Water Shrew	S3	SC	
NC	Watauga	Myotis septentrionalis	Northern Long-eared Bat	S2	SR	LT
NC	Watauga	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	S1	E	LE
NC	Watauga	Sylvilagus obscurus	Appalachian Cottontail	S3	SR-G	
NC	Watauga	Glaucomys sabrinus coloratus	Carolina Northern Flying Squirrel	S2	E	LE
NC	Watauga	Neotoma magister	Allegheny Woodrat	S2S3	SC	
NC	Watauga	Glyptemys muhlenbergii	Bog Turtle	S2	T	LT(SA)
NC	Watauga	Satyrium edwardsii	Edwards' Hairstreak	S2	SR	
NC	Watauga	Satyrium caryaevorum	Hickory Hairstreak	S1	SR	
NC	Watauga	Euphydryas phaeton	Baltimore	S2	SR	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
NC	Watauga	Polygonia faunus	Green Comma	S1S2	SR	
NC	Watauga	Polygonia faunus smythi	Smyth's Green Coma	S1S2	RARE	
NC	Watauga	Ophiogomphus mainensis	Twin-horned Snaketail	S2S3	SR	
NC	Watauga	Sympetrum obtrusum	White-faced Meadowfly	S1	SR	
NC	Watauga	Microhexura montivaga	Spruce-fir Moss Spider	S1	SR	LE
NC	Watauga	Lasmigona subviridis	Green Floater	S2	E	
NC	Watauga	Paravitrea andrewsae	High Mountain Supercoil	S2	SC	
NC	Watauga	Leptoxis dilatata	Seep Mudalia	S3	T	
NC	Watauga	Barbilophozia hatcheri	Liverwort	S1	SR-D	
NC	Watauga	Bazzania nudicaulis	Liverwort	S2	SR-T	
NC	Watauga	Plagiochila sullivantii var. sullivantii	Liverwort	S2	SR-T	
NC	Watauga	Gymnoderma lineare	Rock Gnome Lichen	S3	E	LE
NC	Watauga	Liatris helleri	Heller's Blazing Star	S2	T	LT
NC	Watauga	Solidago spithamaea	Blue Ridge Goldenrod	S2	T	LT
NC	Watauga	Turritis glabra	Tower-mustard	S1	E	
NC	Watauga	Cardamine clematitis	mountain bittercress	S2S3	SR-T	
NC	Watauga	Cardamine rotundifolia	Roundleaf Water-cress	S2	T	
NC	Watauga	Helianthemum propinquum	Low Frostweed	S1	T	
NC	Watauga	Gentianopsis crinita	Fringed Gentian	S1	T	
NC	Watauga	Meehania cordata	Meehania Mint (Heart-leaf Meehania)	S2	SR-P	
NC	Watauga	Epilobium ciliatum	Willow-herb	S2	SR-P	
NC	Watauga	Delphinium exaltatum	Tall Larkspur	S2	E	
NC	Watauga	Filipendula rubra	Queen-of-the-prairie	S1	E	
NC	Watauga	Geum geniculatum	Bent Avens	S1S2	SC-V	
NC	Watauga	Geum radiatum	Spreading Avens	S2	E	LE
NC	Watauga	Hedyotis purpurea var. montana	Mountain Bluet	S2	E	LE
NC	Watauga	Saxifraga caroliniana	Carolina saxifrage	S3	SR-T	
NC	Watauga	Chelone cuthbertii	Cuthbert Turtlehead	S3?	SC-V	FSC
NC	Watauga	Veronica americana	American Speedwell	S2	T	
NC	Watauga	Carex buxbaumii	Buxbaum's Sedge	S2	SC-V	
NC	Watauga	Carex leptonervia	Sedge	S3	W1	
NC	Watauga	Carex oligosperma	Few-seeded Sedge	S1	E	
NC	Watauga	Trichophorum cespitosum	Tufted Clubrush	S2S3	SR-D	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
NC	Watauga	Lilium grayi	Gray's Lily	S3	T	
NC	Watauga	Cystopteris fragilis	Fragile Fern	S1	SR-P	
NC	Watauga	Huperzia appalachiana	Appalachian Fir-clubmoss	S3	W1	
TN	Anderson	Cryptobranchus alleganiensis	Hellbender	S3	D	PS
TN	Anderson	Desmognathus welteri	Black Mountain Salamander	S3	D	
TN	Anderson	Hemidactylium scutatum	Four-toed Salamander	S3	D	
TN	Anderson	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Anderson	Tyto alba	Common Barn-owl	S3	D	
TN	Anderson	Vermivora chrysoptera	Golden-winged Warbler	S3B	D	
TN	Anderson	Setophaga cerulea	Cerulean Warbler	S3B	D	
TN	Anderson	Limnothlypis swainsonii	Swainson's Warbler	S3	D	
TN	Anderson	Chrosomus tennesseensis	Tennessee Dace	S3	D	
TN	Anderson	Erimonax monachus	Spotfin Chub	S2	T	LT
TN	Anderson	Erimystax cahni	Slender Chub	S1	T	LT
TN	Anderson	Carpiodes velifer	Highfin Carpsucker	S2S3	D	
TN	Anderson	Cycleptus elongatus	Blue Sucker	S2	T	
TN	Anderson	Noturus flavipinnis	Yellowfin Madtom	S1	E	LT
TN	Anderson	Etheostoma cinereum	Ashy Darter	S2S3	T	
TN	Anderson	Etheostoma baileyi	Emerald Darter	S2	D	
TN	Anderson	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Anderson	Sorex fumeus	Smoky Shrew	S4	D	
TN	Anderson	Myotis grisescens	Gray Bat	S2	E	LE
TN	Anderson	Myotis sodalis	Indiana Bat	S1	E	LE
TN	Anderson	Myotis leibii	eastern small-footed bat	S2S3	D	
TN	Anderson	Neotoma magister	Allegheny Woodrat	S3	D	
TN	Anderson	Cumberlandia monodonta	Spectaclecase	S2S3		LE
TN	Anderson	Cyprogenia stegaria	Fanshell	S1	E	LE
TN	Anderson	Dromus dromas	Dromedary Pearlymussel	S1	E	LE
TN	Anderson	Epioblasma florentina walkeri	Tan Riffleshell	S1	E	LE
TN	Anderson	Epioblasma torulosa gubernaculum	Green Blossom Pearlymussel	SX	E	LE
TN	Anderson	Fusconaia cor	Shiny Pigtoe Pearlymussel	S1	E	LE
TN	Anderson	Fusconaia cuneolus	Fine-rayed Pigtoe	S1	E	LE
TN	Anderson	Hemistena lata	Cracking Pearlymussel	S1	E	LE

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Anderson	Lampsilis abrupta	Pink Mucket	S2	E	LE
TN	Anderson	Lampsilis virescens	Alabama Lampmussel	S1	E	LE
TN	Anderson	Lemiox rimosus	Birdwing Pearlymussel	S1	E	LE
TN	Anderson	Pleuronaia dolabelloides	Slabside Pearlymussel	S2		LE
TN	Anderson	Plethobasus cicatricosus	White Wartyback	S1	E	LE
TN	Anderson	Plethobasus cooperianus	Orange-foot Pimpleback	S1	E	LE
TN	Anderson	Pleurobema plenum	Rough Pigtoe	S1	E	LE
TN	Anderson	Athearnia anthonyi	Anthony's River Snail	S1	E	LE
TN	Anderson	Lejeunea sharpii	Sharp's Lejeunea	S1S2	E	
TN	Anderson	Homaliadelphus sharpii	Sharp's Homaliadelphus	S1	E	
TN	Anderson	Palamocladium leskeoides	Palamocladium	S1	T	
TN	Anderson	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Anderson	Helianthus occidentalis	naked-stem sunflower	S2	S	
TN	Anderson	Solidago ptarmicoides	Prairie Goldenrod	S1S2	E	
TN	Anderson	Berberis canadensis	American barberry	S2	S	
TN	Anderson	Draba ramosissima	Branching Whitlow-wort	S2	S	
TN	Anderson	Diervilla lonicera	Northern Bush-honeysuckle	S2	T	
TN	Anderson	Lathyrus palustris	Marsh Pea	S1	S	
TN	Anderson	Fothergilla major	Witch-alder	S2	T	
TN	Anderson	Juglans cinerea	Butternut	S3	T	
TN	Anderson	Meehania cordata	Meehania Mint (Heart-leaf Meehania)	S2	T	
TN	Anderson	Pycnanthemum torreyi	Torrey's Mountain Mint	S1	E	
TN	Anderson	Epilobium ciliatum	Willow-herb	S1	T	
TN	Anderson	Delphinium exaltatum	Tall Larkspur	S2	E	
TN	Anderson	Parnassia grandifolia	Large-leaved Grass-of-parnassus	S3	S	
TN	Anderson	Sullivantia sullivantii	Sullivantia	S1	E	
TN	Anderson	Aureolaria patula	Spreading False-foxglove	S3	S	
TN	Anderson	Thuja occidentalis	Northern White Cedar	S3	S	
TN	Anderson	Elodea nuttallii	Waterweed	S2	S	
TN	Anderson	Iris fulva	Red Iris	S2	T	
TN	Anderson	Platanthera flava var. herbiola	Pale Green Orchid	S2	T	
TN	Bedford	Ambystoma barbouri	Streamside Salamander	S2	D	
TN	Bedford	Cryptobranchus alleganiensis	Hellbender	S3	D	PS

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Bedford	Gyrinophilus palleucus	Tennessee Cave Salamander	S2	T	
TN	Bedford	Hemitremia flammea	Flame Chub	S3	D	
TN	Bedford	Notropis rupestris	Bedrock Shiner	S2	D	
TN	Bedford	Noturus fasciatus	Saddled Madtom	S2	T	
TN	Bedford	Etheostoma aquali	Coppercheek Darter	S2S3	T	
TN	Bedford	Etheostoma cinereum	Ashy Darter	S2S3	T	
TN	Bedford	Etheostoma luteovinctum	Redband Darter	S4	D	
TN	Bedford	Etheostoma striatulum	Striated Darter	S1	T	
TN	Bedford	Percina macrocephala	Longhead Darter	S2	T	
TN	Bedford	Percina phoxocephala	Slenderhead Darter	S3	D	
TN	Bedford	Myotis grisescens	Gray Bat	S2	E	LE
TN	Bedford	Myotis sodalis	Indiana Bat	S1	E	LE
TN	Bedford	Myotis septentrionalis	Northern Long-eared Bat	S1S2		LT
TN	Bedford	Neotoma magister	Allegheny Woodrat	S3	D	
TN	Bedford	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	S3	D	
TN	Bedford	Epioblasma florentina walkeri	Tan Riffleshell	S1	E	LE
TN	Bedford	Epioblasma torulosa torulosa	Tuberculed Blossom Pearlymussel	SX	E	LE
TN	Bedford	Epioblasma turgidula	Turgid Blossom Pearlymussel	SX	E	LE
TN	Bedford	Lemiox rimosus	Birdwing Pearlymussel	S1	E	LE
TN	Bedford	Pleuronaia dolabelloides	Slabside Pearlymussel	S2		LE
TN	Bedford	Ptychobranchus subtentum	Fluted Kidneyshell	S2		LE
TN	Bedford	Quadrula cylindrica cylindrica	Smooth Rabbitsfoot	S3		LT
TN	Bedford	Amsonia tabernaemontana var. gattingeri	A Blue-star	S3	S	
TN	Bedford	Arnoglossum plantagineum	Fen Indian-plantain	S2	T	
TN	Bedford	Paysonia densipila	Duck River Bladderpod	S3	S	
TN	Bedford	Astragalus tennesseensis	Tennessee Milk-vetch	S3	S	
TN	Bedford	Dalea foliosa	Leafy Prairie-clover	S2S3	E	LE
TN	Bedford	Trifolium calcaricum	Running Glade Clover	S1	E	
TN	Bedford	Oenothera macrocarpa ssp. macrocarpa	Missouri Evening-primrose	S2	T	
TN	Bedford	Polygala boykinii	Boykin's Milkwort	S2	T	
TN	Bedford	Phemeranthus calcaricus	Limestone Fame-flower	S3	S	
TN	Bedford	Anemone caroliniana	Carolina Anemone	S1S2	E	
TN	Bedford	Schoenolirion croceum	Sunnybell	S3	T	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Bedford	Zigadenus leimanthoides	Death-camas	S2	T	
TN	Benton	Anhinga anhinga	Anhinga	S1B	D	
TN	Benton	Egretta caerulea	Little Blue Heron	S2B,S3N	D	
TN	Benton	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Benton	Charadrius melodus	Piping Plover			LE
TN	Benton	Percina phoxocephala	Slenderhead Darter	S3	D	
TN	Benton	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Benton	Myotis grisescens	Gray Bat	S2	E	LE
TN	Benton	Myotis sodalis	Indiana Bat	S1	E	LE
TN	Benton	Zapus hudsonius	Meadow Jumping Mouse	S4	D	
TN	Benton	Macrochelys temminckii	Alligator Snapping Turtle	S2S3	D	
TN	Benton	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S3	T	
TN	Benton	Sistrurus miliarius streckeri	Western Pigmy Rattlesnake	S2S3	T	
TN	Benton	Nicrophorus americanus	American Burying Beetle	SH	TRKD	LE
TN	Benton	Lampsilis abrupta	Pink Mucket	S2	E	LE
TN	Benton	Obovaria retusa	Ring Pink	S1	E	LE
TN	Benton	Plethobasus cooperianus	Orange-foot Pimpleback	S1	E	LE
TN	Benton	Pleurobema plenum	Rough Pigtoe	S1	E	LE
TN	Benton	Eryngium integrifolium	Button Snakeroot	S1	T	
TN	Benton	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Benton	Phlox pilosa ssp. ozarkana	Downy Phlox	S1S2	S	
TN	Benton	Lysimachia fraseri	Fraser Loosestrife	S2	E	
TN	Benton	Fuirena squarrosa	Hairy Umbrella-sedge	S1	S	
TN	Benton	Iris brevicaulis	Lamance Iris	S1	E	
TN	Bledsoe	Hemidactylium scutatum	Four-toed Salamander	S3	D	
TN	Bledsoe	Accipiter striatus	Sharp-shinned Hawk	S3B,S4N	D	
TN	Bledsoe	Hemitremia flammea	Flame Chub	S3	D	
TN	Bledsoe	Chrosomus tennesseensis	Tennessee Dace	S3	D	
TN	Bledsoe	Chrosomus saylori	Laurel Dace	S1	E	LE
TN	Bledsoe	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Bledsoe	Sorex fumeus	Smoky Shrew	S4	D	
TN	Bledsoe	Myotis grisescens	Gray Bat	S2	E	LE
TN	Bledsoe	Neotoma magister	Allegheny Woodrat	S3	D	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Bledsoe	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	S3	D	
TN	Bledsoe	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S3	T	
TN	Bledsoe	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Bledsoe	Helianthus occidentalis	naked-stem sunflower	S2	S	
TN	Bledsoe	Drosera capillaris	Sundew	S1	T	
TN	Bledsoe	Corydalis sempervirens	Pale Corydalis	S1S2	S	
TN	Bledsoe	Ribes curvatum	Granite Gooseberry	S1	T	
TN	Bledsoe	Scutellaria montana	Large-flowered Skullcap	S4	T	LT
TN	Bledsoe	Epilobium ciliatum	Willow-herb	S1	T	
TN	Bledsoe	Phemeranthus teretifolius	Roundleaf Fameflower	S2	T	
TN	Bledsoe	Amelanchier sanguinea	Round-leaved Serviceberry	S2	T	
TN	Bledsoe	Spiraea virginiana	Virginia Spiraea	S2	E	LT
TN	Bledsoe	Agalinis auriculata	Earleaf Foxglove	S2	E	
TN	Bledsoe	Pedicularis lanceolata	Swamp Lousewort	S1S2	S	
TN	Bledsoe	Fimbristylis puberula	Hairy Fimbristylis	S1S2	T	
TN	Bledsoe	Listera australis	Southern Twayblade	S1S2	E	
TN	Bledsoe	Platanthera integrilabia	White Fringeless Orchid	S2S3	E	LT
TN	Bledsoe	Poa saltuensis	Drooping Bluegrass	S1	T	
TN	Bledsoe	Potamogeton epihydrus	Creekgrass	S1S2	S	
TN	Blount	Cryptobranchus alleganiensis	Hellbender	S3	D	PS
TN	Blount	Desmognathus aeneus	Seepage Salamander	S1	D	
TN	Blount	Eurycea junaluska	Junaluska Salamander	S2	D	
TN	Blount	Hemidactylium scutatum	Four-toed Salamander	S3	D	
TN	Blount	Ixobrychus exilis	Least Bittern	S2B	D	
TN	Blount	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Blount	Rallus elegans	King Rail	S2	D	
TN	Blount	Tyto alba	Common Barn-owl	S3	D	
TN	Blount	Sphyrapicus varius	Yellow-bellied Sapsucker	S1B,S4N	D	
TN	Blount	Corvus corax	Common Raven	S2	T	
TN	Blount	Limnothlypis swainsonii	Swainson's Warbler	S3	D	
TN	Blount	Acipenser fulvescens	Lake Sturgeon	S1	E	
TN	Blount	Clinostomus funduloides ssp. 1	Smoky Dace	S1S2	D	
TN	Blount	Hemitremia flammea	Flame Chub	S3	D	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Blount	Chrosomus tennesseensis	Tennessee Dace	S3	D	
TN	Blount	Erimonax monachus	Spotfin Chub	S2	T	LT
TN	Blount	Noturus baileyi	Smoky Madtom	S1	E	LE
TN	Blount	Noturus flavipinnis	Yellowfin Madtom	S1	E	LT
TN	Blount	Etheostoma cinereum	Ashy Darter	S2S3	T	
TN	Blount	Etheostoma marmorpinnum	Marbled Darter	S1	E	LE
TN	Blount	Etheostoma sitikuense	Citico Darter	S1	E	LE
TN	Blount	Percina aurantiaca	Tangerine Darter	S3	D	
TN	Blount	Percina burtoni	Blotchside Logperch	S2	D	
TN	Blount	Percina macrocephala	Longhead Darter	S2	T	
TN	Blount	Percina tanasi	Snail Darter	S2S3	T	LT
TN	Blount	Sorex fumeus	Smoky Shrew	S4	D	
TN	Blount	Parascalops breweri	Hairy-tailed Mole	S3	D	
TN	Blount	Myotis sodalis	Indiana Bat	S1	E	LE
TN	Blount	Myotis septentrionalis	Northern Long-eared Bat	S1S2		LT
TN	Blount	Corynorhinus rafinesquii	Rafinesque’s Big-eared bat	S3	D	
TN	Blount	Glaucomys sabrinus coloratus	Carolina Northern Flying Squirrel	S1S2	E	LE
TN	Blount	Neotoma floridana haematoreia	Southern Appalachian Woodrat	S2	D	
TN	Blount	Microtus chrotorrhinus carolinensis	Southern Rock Vole	S2	D	
TN	Blount	Synaptomys cooperi	Southern Bog Lemming	S4	D	
TN	Blount	Napaeozapus insignis	Woodland Jumping Mouse	S4	D	
TN	Blount	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	S3	D	
TN	Blount	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S3	T	
TN	Blount	Bombus affinis	Rusty-patched Bumble Bee	SH		LE
TN	Blount	Ophiogomphus incurvatus alleghaniensis	Allegheny Snaketail	S1	TRKD	
TN	Blount	Epioblasma capsaeformis	Oyster Mussel	S1	E	LE
TN	Blount	Fusconaia cuneolus	Fine-rayed Pigtoe	S1	E	LE
TN	Blount	Pleuronaia dolabelloides	Slabside Pearlymussel	S2		LE
TN	Blount	Pilsbryna aurea	Ornate Bud	S1	TRKD	
TN	Blount	Athearnia anthonyi	Anthony's River Snail	S1	E	LE
TN	Blount	Lejeunea blomquistii	Blomquist Leafy Liverwort	S1S2	S	
TN	Blount	Lophocolea appalachiana	Liverwort	S1	S	
TN	Blount	Porella wataugensis	Liverwort	S1S2	T	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Blount	Porella gracillima	Hot Porella	S1	E	
TN	Blount	Radula voluta	Liverwort	S2	S	
TN	Blount	Lejeunea sharpii	Sharp's Lejeunea	S1S2	E	
TN	Blount	Plagiomnium carolinianum	Mountain Wavy-leaf Moss	S1	S	
TN	Blount	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Blount	Cardamine flagellifera	Bitter Cress	S2	T	
TN	Blount	Cardamine rotundifolia	Roundleaf Water-cress	S2S3	S	
TN	Blount	Draba ramosissima	Branching Whitlow-wort	S2	S	
TN	Blount	Campanula aparinoides	Marsh Bellflower	S2	S	
TN	Blount	Stellaria longifolia	Longleaf Stitchwort	S1	E	
TN	Blount	Hypericum mitchellianum	Blue Ridge St. John's-wort	S2	T	
TN	Blount	Desmodium ochroleucum	Creamflower Tick-trefoil	S1	E	
TN	Blount	Trifolium reflexum	Buffalo Clover	S1	E	
TN	Blount	Adlumia fungosa	Climbing Fumitory	S2	T	
TN	Blount	Juglans cinerea	Butternut	S3	T	
TN	Blount	Pycnanthemum torreyi	Torrey's Mountain Mint	S1	E	
TN	Blount	Stachys clingmanii	Clingman's Hedge-nettle	S1S2	T	
TN	Blount	Monotropsis odorata	Sweet Pinesap	S2	T	
TN	Blount	Polygonum cilinode	Fringed Black Bindweed	S1S2	T	
TN	Blount	Clematis glaucophylla	Whiteleaf Leatherflower	S1	S	
TN	Blount	Amelanchier sanguinea	Round-leaved Serviceberry	S2	T	
TN	Blount	Geum radiatum	Spreading Avens	S1	E	LE
TN	Blount	Prunus virginiana	Chokecherry	S1	S	
TN	Blount	Spiraea virginiana	Virginia Spiraea	S2	E	LT
TN	Blount	Agalinis setacea	Thread-leaved Gerardia	SH	S	
TN	Blount	Aureolaria patula	Spreading False-foxglove	S3	S	
TN	Blount	Carex misera	Wretched Sedge	S2	T	
TN	Blount	Cymophyllus fraserianus	Fraser's Sedge	S3	S	
TN	Blount	Melanthium latifolium	Broadleaf Bunchflower	S1S2	E	
TN	Blount	Trillium rugelii	Southern Nodding Trillium	S2	E	
TN	Blount	Xerophyllum asphodeloides	Eastern Turkeybeard	S3	T	
TN	Blount	Platanthera flava var. herbiola	Pale Green Orchid	S2	T	
TN	Blount	Poa saltuensis	Drooping Bluegrass	S1	T	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Blount	Potamogeton amplifolius	Large-leaf Pondweed	S1	T	
TN	Blount	Potamogeton epihydrus	Creekgrass	S1S2	S	
TN	Blount	Potamogeton tennesseensis	Tennessee Pondweed	S2	T	
TN	Blount	Sparganium androcladum	Branching Burreed	S1	E	
TN	Blount	Woodwardia virginica	Virginia Chainfern	S2	S	
TN	Blount	Trichomanes boschianum	Appalachian Bristle Fern	S1S2	T	
TN	Blount	Trichomanes petersii	Dwarf Filmy-fern	S2	T	
TN	Blount	Pilularia americana	American Pillwort	S1S2	S	
TN	Bradley	Ixobrychus exilis	Least Bittern	S2B	D	
TN	Bradley	Chrosomus tennesseensis	Tennessee Dace	S3	D	
TN	Bradley	Cyprinella caerulea	Blue Shiner	S1	E	LT
TN	Bradley	Noturus munitus	Frecklebelly Madtom	S1	T	
TN	Bradley	Etheostoma ditrema	Coldwater Darter	S1	T	
TN	Bradley	Etheostoma trisella	Trispot Darter	S1	T	
TN	Bradley	Etheostoma brevirostrum	Holiday Darter	S1	T	
TN	Bradley	Percina antesella	Amber Darter	S1	E	LE
TN	Bradley	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	S3	D	
TN	Bradley	Cambarus cymatilis	Conasauga Blue Burrower	S1	E	
TN	Bradley	Lampsilis altilis	Fine-lined Pocketbook	S1S2	T	LT
TN	Bradley	Medionidus acutissimus	Alabama Moccasinshell	S1	T	LT
TN	Bradley	Medionidus parvulus	Coosa Moccasinshell	S1	E	LE
TN	Bradley	Pleurobema georgianum	Southern Pigtoe	S1	E	LE
TN	Bradley	Pleurobema perovatum	Ovate Clubshell	SH	E	LE
TN	Bradley	Eryngium integrifolium	Button Snakeroot	S1	T	
TN	Bradley	Asclepias purpurascens	Purple Milkweed	S1	S	
TN	Bradley	Helianthus occidentalis	naked-stem sunflower	S2	S	
TN	Bradley	Silphium pinnatifidum	Prairie-dock	S2	T	
TN	Bradley	Polygala mariana	Maryland Milkwort	S1	S	
TN	Bradley	Lysimachia quadriflora	Four-flowered Loosestrife	S1	E	
TN	Bradley	Aureolaria patula	Spreading False-foxglove	S3	S	
TN	Bradley	Pedicularis lanceolata	Swamp Lousewort	S1S2	S	
TN	Bradley	Smilax laurifolia	Laurel-leaf Greenbrier	S1	S	
TN	Campbell	Cryptobranchus alleganiensis	Hellbender	S3	D	PS

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Campbell	Desmognathus welteri	Black Mountain Salamander	S3	D	
TN	Campbell	Hemidactylium scutatum	Four-toed Salamander	S3	D	
TN	Campbell	Plethodon wehrlei	Wehrle's Salamander	S1	D	
TN	Campbell	Accipiter striatus	Sharp-shinned Hawk	S3B,S4N	D	
TN	Campbell	Aquila chrysaetos	Golden Eagle	S1	T	
TN	Campbell	Falco peregrinus	Peregrine Falcon	S1B	E	
TN	Campbell	Vermivora chrysoptera	Golden-winged Warbler	S3B	D	
TN	Campbell	Setophaga cerulea	Cerulean Warbler	S3B	D	
TN	Campbell	Limnothlypis swainsonii	Swainson's Warbler	S3	D	
TN	Campbell	Notropis rubellus	Rosyface Shiner	S2	D	
TN	Campbell	Notropis albizonatus	Palezone Shiner	SH	E	LE
TN	Campbell	Chrosomus cumberlandensis	Blackside Dace	S2	T	LT
TN	Campbell	Erimystax cahni	Slender Chub	S1	T	LT
TN	Campbell	Notropis buccatus	Silverjaw Minnow	S1	T	
TN	Campbell	Cycleptus elongatus	Blue Sucker	S2	T	
TN	Campbell	Etheostoma cinereum	Ashy Darter	S2S3	T	
TN	Campbell	Etheostoma sagitta	Cumberland Arrow Darter	S2	D	
TN	Campbell	Etheostoma baileyi	Emerald Darter	S2	D	
TN	Campbell	Etheostoma susanae	Cumberland Darter	S1	E	LE
TN	Campbell	Sorex cinereus	Common Shrew	S4	D	
TN	Campbell	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Campbell	Sorex fumeus	Smoky Shrew	S4	D	
TN	Campbell	Parascalops breweri	Hairy-tailed Mole	S3	D	
TN	Campbell	Myotis grisescens	Gray Bat	S2	E	LE
TN	Campbell	Myotis sodalis	Indiana Bat	S1	E	LE
TN	Campbell	Myotis leibii	eastern small-footed bat	S2S3	D	
TN	Campbell	Myotis septentrionalis	Northern Long-eared Bat	S1S2		LT
TN	Campbell	Corynorhinus rafinesquii	Rafinesque’s Big-eared bat	S3	D	
TN	Campbell	Neotoma magister	Allegheny Woodrat	S3	D	
TN	Campbell	Synaptomys cooperi	Southern Bog Lemming	S4	D	
TN	Campbell	Napaeozapus insignis	Woodland Jumping Mouse	S4	D	
TN	Campbell	Cyprogenia stegaria	Fanshell	S1	E	LE
TN	Campbell	Epioblasma florentina walkeri	Tan Riffleshell	S1	E	LE

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Campbell	Epioblasma torulosa gubernaculum	Green Blossom Pearlymussel	SX	E	LE
TN	Campbell	Fusconaia cor	Shiny Pigtoe Pearlymussel	S1	E	LE
TN	Campbell	Fusconaia cuneolus	Fine-rayed Pigtoe	S1	E	LE
TN	Campbell	Lampsilis abrupta	Pink Mucket	S2	E	LE
TN	Campbell	Pleurobema plenum	Rough Pigtoe	S1	E	LE
TN	Campbell	Athearnia anthonyi	Anthony's River Snail	S1	E	LE
TN	Campbell	Drepanolejeunea appalachiana	a liverwort	S1	S	
TN	Campbell	Jungermannia fossombronioides	A liverwort	S1	S	
TN	Campbell	Lejeunea blomquistii	Blomquist Leafy Liverwort	S1S2	S	
TN	Campbell	Metzgeria uncigera	Liverwort	S1	S	
TN	Campbell	Bryoxiphium norvegicum	Sword Moss	S1	T	
TN	Campbell	Homaliadelphus sharpii	Sharp's Homaliadelphus	S1	E	
TN	Campbell	Palamocladium leskeoides	Palamocladium	S1	T	
TN	Campbell	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Campbell	Prenanthes alba	White Rattlesnake-root	S1	S	
TN	Campbell	Cardamine rotundifolia	Roundleaf Water-cress	S2S3	S	
TN	Campbell	Lonicera dioica	Mountain Honeysuckle	S2	S	
TN	Campbell	Adlumia fungosa	Climbing Fumitory	S2	T	
TN	Campbell	Corydalis sempervirens	Pale Corydalis	S1S2	S	
TN	Campbell	Juglans cinerea	Butternut	S3	T	
TN	Campbell	Meehania cordata	Meehania Mint (Heart-leaf Meehania)	S2	T	
TN	Campbell	Epilobium ciliatum	Willow-herb	S1	T	
TN	Campbell	Polygonum arifolium	Halberd-leaf Tearthumb	S1	T	
TN	Campbell	Rhamnus alnifolia	Alderleaf Buckthorn	S1	E	
TN	Campbell	Parnassia grandifolia	Large-leaved Grass-of-parnassus	S3	S	
TN	Campbell	Sullivantia sullivantii	Sullivantia	S1	E	
TN	Campbell	Aureolaria patula	Spreading False-foxglove	S3	S	
TN	Campbell	Veronica catenata	Sessile Water-speedwell	S1	E	
TN	Campbell	Thuja occidentalis	Northern White Cedar	S3	S	
TN	Campbell	Carex tetanica	Rigid Sedge	S1	E	
TN	Campbell	Eleocharis elliptica	Elliptic Spikerush	S1	E	
TN	Campbell	Eleocharis intermedia	Spike-rush	S1	E	
TN	Campbell	Rhynchospora capillacea	Horned Beakrush	S1	E	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Campbell	Juncus brachycephalus	Short-head Rush	S2	S	
TN	Campbell	Veratrum woodii	Ozark Bunchflower	S1	E	
TN	Campbell	Triantha glutinosa	Sticky False-asphodel	S1	E	
TN	Campbell	Platanthera flava var. herbiola	Pale Green Orchid	S2	T	
TN	Campbell	Patis racemosa	Mountain ricegrass	S1	E	
TN	Campbell	Trichomanes boschianum	Appalachian Bristle Fern	S1S2	T	
TN	Cannon	Aquila chrysaetos	Golden Eagle	S1	T	
TN	Cannon	Thryomanes bewickii	Bewick's Wren	S1	E	
TN	Cannon	Hemitremia flammea	Flame Chub	S3	D	
TN	Cannon	Notropis rupestris	Bedrock Shiner	S2	D	
TN	Cannon	Fundulus julisia	Barrens Topminnow	S1	E	
TN	Cannon	Etheostoma luteovinctum	Redband Darter	S4	D	
TN	Cannon	Etheostoma microlepidum	Smallscale Darter	S2	D	
TN	Cannon	Etheostoma olivaceum	Sooty Darter	S3	D	
TN	Cannon	Etheostoma forbesi	Barrens Darter	S1	E	
TN	Cannon	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Cannon	Myotis grisescens	Gray Bat	S2	E	LE
TN	Cannon	Neotoma magister	Allegheny Woodrat	S3	D	
TN	Cannon	Zapus hudsonius	Meadow Jumping Mouse	S4	D	
TN	Cannon	Cambarus williami	Brawleys Fork Crayfish	S2	E	
TN	Cannon	Leptoxis umbilicata	Umbilicate River Snail	S1	TRKD	
TN	Cannon	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Cannon	Caulophyllum giganteum	Blue Cohosh	S1	T	
TN	Cannon	Juglans cinerea	Butternut	S3	T	
TN	Cannon	Parnassia grandifolia	Large-leaved Grass-of-parnassus	S3	S	
TN	Cannon	Allium burdickii	Narrow-leaved Wild Leek	S1S2	T-C	
TN	Cannon	Xyris laxifolia var. iridifolia	Yellow-eyed-grass	S2	T	
TN	Carroll	Hyla gratiosa	Barking Treefrog	S3	D	
TN	Carroll	Noturus stigmosus	Northern Madtom	S3	D	
TN	Carroll	Etheostoma pyrrhogaster	Firebelly Darter	S2	D	
TN	Carroll	Sorex cinereus	Common Shrew	S4	D	
TN	Carroll	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Carroll	Zapus hudsonius	Meadow Jumping Mouse	S4	D	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Carroll	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Carroll	Silphium laciniatum	Compass-plant	S2	T	
TN	Carroll	Ceratophyllum echinatum	Prickly Hornwort	S1	S	
TN	Carroll	Juglans cinerea	Butternut	S3	T	
TN	Carroll	Magnolia virginiana	Sweetbay Magnolia	S2	T	
TN	Carroll	Polygonum arifolium	Halberd-leaf Tearthumb	S1	T	
TN	Carroll	Agalinis auriculata	Earleaf Foxglove	S2	E	
TN	Carroll	Chelone obliqua	Red Turtlehead	S1	S	
TN	Carroll	Symplocos tinctoria	Horsesugar	S2	S	
TN	Carroll	Cyperus plukenetii	Plukenet's Cyperus	S1	S	
TN	Carroll	Fuirena squarrosa	Hairy Umbrella-sedge	S1	S	
TN	Carroll	Erythronium rostratum	Yellow Trout-lily	S2	S	
TN	Carroll	Aristida ramosissima	Branched Three-awn Grass	S1	E	
TN	Carter	Cryptobranchus alleganiensis	Hellbender	S3	D	PS
TN	Carter	Plethodon welleri	Weller's Salamander	S2	D	
TN	Carter	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Carter	Accipiter striatus	Sharp-shinned Hawk	S3B,S4N	D	
TN	Carter	Tyto alba	Common Barn-owl	S3	D	
TN	Carter	Aegolius acadicus	Northern Saw-whet Owl	S1	T	
TN	Carter	Sphyrapicus varius	Yellow-bellied Sapsucker	S1B,S4N	D	
TN	Carter	Contopus cooperi	Olive-sided Flycatcher	S1	D	
TN	Carter	Corvus corax	Common Raven	S2	T	
TN	Carter	Vermivora chrysoptera	Golden-winged Warbler	S3B	D	
TN	Carter	Limnothlypis swainsonii	Swainson's Warbler	S3	D	
TN	Carter	Pooecetes gramineus	Vesper Sparrow	S1B,S4N	D	
TN	Carter	Percina aurantiaca	Tangerine Darter	S3	D	
TN	Carter	Percina macrocephala	Longhead Darter	S2	T	
TN	Carter	Sorex cinereus	Common Shrew	S4	D	
TN	Carter	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Carter	Sorex fumeus	Smoky Shrew	S4	D	
TN	Carter	Parascalops breweri	Hairy-tailed Mole	S3	D	
TN	Carter	Condylura cristata	Star-nosed Mole	S2	D	
TN	Carter	Myotis grisescens	Gray Bat	S2	E	LE

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Carter	Myotis leibii	eastern small-footed bat	S2S3	D	
TN	Carter	Myotis septentrionalis	Northern Long-eared Bat	S1S2		LT
TN	Carter	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	S1		LE
TN	Carter	Glaucomys sabrinus coloratus	Carolina Northern Flying Squirrel	S1S2	E	LE
TN	Carter	Neotoma magister	Allegheny Woodrat	S3	D	
TN	Carter	Microtus chrotorrhinus carolinensis	Southern Rock Vole	S2	D	
TN	Carter	Synaptomys cooperi	Southern Bog Lemming	S4	D	
TN	Carter	Zapus hudsonius	Meadow Jumping Mouse	S4	D	
TN	Carter	Napaeozapus insignis	Woodland Jumping Mouse	S4	D	
TN	Carter	Bombus affinis	Rusty-patched Bumble Bee	SH		LE
TN	Carter	Hesperia sassacus	Indian Skipper	S3	TRKD	
TN	Carter	Microhexura montivaga	Spruce-fir Moss Spider	S1		LE
TN	Carter	Anastrophyllum saxicola	Liverwort	S1	S	
TN	Carter	Bazzania nudicaulis	Liverwort	S2	T	
TN	Carter	Plagiochila exigua	Liverwort	S1S2	S	
TN	Carter	Brachydontium trichodes	Peak Moss	S1	E	
TN	Carter	Gymnoderma lineare	Rock Gnome Lichen	S1	E	LE
TN	Carter	Heracleum maximum	Cow Parsnip	S2	S	
TN	Carter	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Carter	Coreopsis latifolia	Broad-leaved Tickseed	S1S2	E	
TN	Carter	Helianthus glaucophyllus	White-leaved Sunflower	S1	T	
TN	Carter	Packera schweinitziana	Schweinitz's Ragwort	S1	T	
TN	Carter	Solidago spithamaea	Blue Ridge Goldenrod	S1	E	LT
TN	Carter	Berberis canadensis	American barberry	S2	S	
TN	Carter	Alnus viridis ssp. crispa	Green Alder	S1	S	
TN	Carter	Cardamine clematitis	mountain bittercress	S2	T	
TN	Carter	Cardamine rotundifolia	Roundleaf Water-cress	S2S3	S	
TN	Carter	Campanula aparinoides	Marsh Bellflower	S2	S	
TN	Carter	Minuartia godfreyi	Godfrey's Stitchwort	S1	E	
TN	Carter	Minuartia groenlandica	Mountain Sandwort	S1	E	
TN	Carter	Paronychia argyrocoma	Silverling	S1S2	T	
TN	Carter	Silene caroliniana ssp. pensylvanica	Wild Pink	S1S2	T	
TN	Carter	Stellaria alsine	Trailing Stitchwort	S1	E	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Carter	Stellaria longifolia	Longleaf Stitchwort	S1	E	
TN	Carter	Hypericum ellipticum	Pale St. John's-wort	S1	E	
TN	Carter	Hypericum graveolens	Mountain St. John's-wort	S3	E	
TN	Carter	Hypericum mitchellianum	Blue Ridge St. John's-wort	S2	T	
TN	Carter	Lonicera canadensis	American Fly-honeysuckle	S1	T	
TN	Carter	Lonicera dioica	Mountain Honeysuckle	S2	S	
TN	Carter	Drosera rotundifolia	Roundleaf Sundew	S1	T	
TN	Carter	Menziesia pilosa	Fetterbush	S2	S	
TN	Carter	Vaccinium macrocarpon	Large Cranberry	S2	T	
TN	Carter	Castanea dentata	American Chestnut	S2S3	S	
TN	Carter	Adlumia fungosa	Climbing Fumitory	S2	T	
TN	Carter	Corydalis sempervirens	Pale Corydalis	S1S2	S	
TN	Carter	Hydrophyllum virginianum	Virginia Waterleaf	S3	T	
TN	Carter	Juglans cinerea	Butternut	S3	T	
TN	Carter	Agastache scrophulariifolia	Giant Hyssop	S1S2	T	
TN	Carter	Meehania cordata	Meehania Mint (Heart-leaf Meehania)	S2	T	
TN	Carter	Didiplis diandra	Water-purslane	S1	T	
TN	Carter	Epilobium angustifolium	Fireweed	S1	T	
TN	Carter	Epilobium ciliatum	Willow-herb	S1	T	
TN	Carter	Epilobium leptophyllum	Willow-herb	S1	T	
TN	Carter	Polygonum cilinode	Fringed Black Bindweed	S1S2	T	
TN	Carter	Trientalis borealis	Northern Starflower	S1	T	
TN	Carter	Pyrola americana	American Wintergreen	S2	E	
TN	Carter	Aconitum reclinatum	Trailing Wolfsbane	S1	E	
TN	Carter	Caltha palustris	Marsh-marigold	S1	E	
TN	Carter	Geum geniculatum	Bent Avens	S1	E	
TN	Carter	Geum laciniatum	Rough Avens	S1	S	
TN	Carter	Geum radiatum	Spreading Avens	S1	E	LE
TN	Carter	Prunus virginiana	Chokecherry	S1	S	
TN	Carter	Sanguisorba canadensis	Canada Burnet	S1	E	
TN	Carter	Spiraea alba	Narrow-leaved Meadow-sweet	S1	E	
TN	Carter	Hedyotis purpurea var. montana	Mountain Bluet	S1	E	LE
TN	Carter	Buckleya distichophylla	piratebush	S2	T	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Carter	Parnassia grandifolia	Large-leaved Grass-of-parnassus	S3	S	
TN	Carter	Saxifraga caroliniana	Carolina saxifrage	S1S2	E	
TN	Carter	Veronica americana	American Speedwell	S1	S	
TN	Carter	Thuja occidentalis	Northern White Cedar	S3	S	
TN	Carter	Abies fraseri	Fraser Fir	S1S2	T	
TN	Carter	Tsuga caroliniana	Carolina Hemlock	S3	T	
TN	Carter	Symplocarpus foetidus	Skunk Cabbage	S1	E	
TN	Carter	Carex bromoides ssp. montana	Brome-like Sedge	S1	T	
TN	Carter	Carex echinata ssp. echinata	Little Prickly Sedge	S1?	S	
TN	Carter	Carex hitchcockiana	Sedge	S1	T	
TN	Carter	Carex misera	Wretched Sedge	S2	T	
TN	Carter	Carex roanensis	Sedge	S2	S	
TN	Carter	Carex ruthii	Ruth's Sedge	S2	T	
TN	Carter	Carex manhartii	Manhart's Sedge	S2	E	
TN	Carter	Cymophyllus fraserianus	Fraser's Sedge	S3	S	
TN	Carter	Trichophorum cespitosum	Tufted Clubrush	S1	E	
TN	Carter	Allium tricoccum	Small White Leek	S1S2	S-C	
TN	Carter	Lilium grayi	Gray's Lily	S1	E	
TN	Carter	Melanthium latifolium	Broadleaf Bunchflower	S1S2	E	
TN	Carter	Streptopus amplexifolius	Clasping Twisted-stalk	S1	T	
TN	Carter	Streptopus lanceolatus	Rosy Twisted-stalk	S2	S	
TN	Carter	Trillium rugelii	Southern Nodding Trillium	S2	E	
TN	Carter	Coeloglossum viride var. virescens	American Frog Orchid	S1	E	
TN	Carter	Corallorhiza maculata	Spotted Coral-root	S1	T	
TN	Carter	Goodyera repens	Dwarf Rattlesnake-plantain	S1	S	
TN	Carter	Liparis loeselii	Loesel's Twayblade	S1	T	
TN	Carter	Platanthera flava var. herbiola	Pale Green Orchid	S2	T	
TN	Carter	Platanthera grandiflora	Large Purple Fringed Orchid	S2	E	
TN	Carter	Platanthera psycodes	Small Purple Fringe Orchid	S2	S	
TN	Carter	Spiranthes lucida	Shining Ladies'-tresses	S1S2	T	
TN	Carter	Agrostis mertensii	Arctic Bentgrass	SH	S	
TN	Carter	Brachyelytrum aristosum	Northern Shorthusk	S2	S	
TN	Carter	Poa palustris	Fowl Bluegrass	S1	E	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Carter	Potamogeton epihydrus	Creekgrass	S1S2	S	
TN	Carter	Sparganium androcladum	Branching Burreed	S1	E	
TN	Carter	Athyrium filix-femina ssp. angustum	Lady Fern	S2	S	
TN	Carter	Dryopteris carthusiana	Spinulose Woodfern	S1	T	
TN	Carter	Dryopteris cristata	crested woodfern	S2	T	
TN	Carter	Woodsia scopulina ssp. appalachiana	Appalachian Cliff-fern	S1S2	S	
TN	Carter	Huperzia appalachiana	Appalachian Fir-clubmoss	S1	T	
TN	Cheatham	Hemidactylium scutatum	Four-toed Salamander	S3	D	
TN	Cheatham	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Cheatham	Accipiter striatus	Sharp-shinned Hawk	S3B,S4N	D	
TN	Cheatham	Setophaga cerulea	Cerulean Warbler	S3B	D	
TN	Cheatham	Limnothlypis swainsonii	Swainson's Warbler	S3	D	
TN	Cheatham	Etheostoma microlepidum	Smallscale Darter	S2	D	
TN	Cheatham	Etheostoma tippecanoe	Tippecanoe Darter	S1S2	D	
TN	Cheatham	Percina phoxocephala	Slenderhead Darter	S3	D	
TN	Cheatham	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Cheatham	Myotis grisescens	Gray Bat	S2	E	LE
TN	Cheatham	Neotoma magister	Allegheny Woodrat	S3	D	
TN	Cheatham	Zapus hudsonius	Meadow Jumping Mouse	S4	D	
TN	Cheatham	Epioblasma florentina florentina	Yellow-blossom Pearlymussel	SX	E	LE
TN	Cheatham	Amsonia tabernaemontana var. gattingeri	A Blue-star	S3	S	
TN	Cheatham	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Cheatham	Helianthus eggertii	Eggert's Sunflower	S3	S	DM
TN	Cheatham	Hasteola suaveolens	Sweet-scented Indian-plantain	S2	S	
TN	Cheatham	Paysonia densipila	Duck River Bladderpod	S3	S	
TN	Cheatham	Physaria globosa	Lesquereux's Mustard	S2	E	LE
TN	Cheatham	Stellaria fontinalis	Water Stitchwort	S3	S	
TN	Cheatham	Diervilla lonicera	Northern Bush-honeysuckle	S2	T	
TN	Cheatham	Apios priceana	Price's Potato-bean	S3	E	LT
TN	Cheatham	Juglans cinerea	Butternut	S3	T	
TN	Cheatham	Parnassia grandifolia	Large-leaved Grass-of-parnassus	S3	S	
TN	Cheatham	Carex davisii	Davis' Sedge	S1	S	
TN	Cheatham	Juncus brachycephalus	Short-head Rush	S2	S	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Chester	Hyla gratiosa	Barking Treefrog	S3	D	
TN	Chester	Chondestes grammacus	Lark Sparrow	S1B	T	
TN	Chester	Etheostoma pyrrhogaster	Firebelly Darter	S2	D	
TN	Chester	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	S3	D	
TN	Chester	Fallicambarus hortoni	Hatchie Burrowing Crayfish	S1	E	
TN	Chester	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Chester	Helianthus verticillatus	Whorled Sunflower	S1	E	LE
TN	Chester	Rudbeckia subtomentosa	Sweet Coneflower	S2	T	
TN	Chester	Sacciolepis striata	Gibbous Panic-grass	S1	S	
TN	Claiborne	Cryptobranchus alleganiensis	Hellbender	S3	D	PS
TN	Claiborne	Desmognathus welteri	Black Mountain Salamander	S3	D	
TN	Claiborne	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Claiborne	Falco peregrinus	Peregrine Falcon	S1B	E	
TN	Claiborne	Tyto alba	Common Barn-owl	S3	D	
TN	Claiborne	Aegolius acadicus	Northern Saw-whet Owl	S1	T	
TN	Claiborne	Vermivora chrysoptera	Golden-winged Warbler	S3B	D	
TN	Claiborne	Notropis rubellus	Rosyface Shiner	S2	D	
TN	Claiborne	Chrosomus cumberlandensis	Blackside Dace	S2	T	LT
TN	Claiborne	Erimonax monachus	Spotfin Chub	S2	T	LT
TN	Claiborne	Erimystax cahni	Slender Chub	S1	T	LT
TN	Claiborne	Notropis buccatus	Silverjaw Minnow	S1	T	
TN	Claiborne	Cycleptus elongatus	Blue Sucker	S2	T	
TN	Claiborne	Noturus flavipinnis	Yellowfin Madtom	S1	E	LT
TN	Claiborne	Ammocrypta clara	Western Sand Darter	S1	T	
TN	Claiborne	Etheostoma sagitta	Cumberland Arrow Darter	S2	D	
TN	Claiborne	Etheostoma baileyi	Emerald Darter	S2	D	
TN	Claiborne	Percina aurantiaca	Tangerine Darter	S3	D	
TN	Claiborne	Percina macrocephala	Longhead Darter	S2	T	
TN	Claiborne	Sorex cinereus	Common Shrew	S4	D	
TN	Claiborne	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Claiborne	Sorex fumeus	Smoky Shrew	S4	D	
TN	Claiborne	Parascalops breweri	Hairy-tailed Mole	S3	D	
TN	Claiborne	Myotis grisescens	Gray Bat	S2	E	LE

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Claiborne	Myotis sodalis	Indiana Bat	S1	E	LE
TN	Claiborne	Synaptomys cooperi	Southern Bog Lemming	S4	D	
TN	Claiborne	Zapus hudsonius	Meadow Jumping Mouse	S4	D	
TN	Claiborne	Cumberlandia monodonta	Spectaclecase	S2S3		LE
TN	Claiborne	Dromus dromas	Dromedary Pearlymussel	S1	E	LE
TN	Claiborne	Epioblasma brevidens	Cumberlandian Combshell	S1	E	LE
TN	Claiborne	Epioblasma capsaeformis	Oyster Mussel	S1	E	LE
TN	Claiborne	Epioblasma florentina walkeri	Tan Riffleshell	S1	E	LE
TN	Claiborne	Epioblasma torulosa gubernaculum	Green Blossom Pearlymussel	SX	E	LE
TN	Claiborne	Epioblasma triquetra	Snuffbox	S3		LE
TN	Claiborne	Fusconaia cor	Shiny Pigtoe Pearlymussel	S1	E	LE
TN	Claiborne	Fusconaia cuneolus	Fine-rayed Pigtoe	S1	E	LE
TN	Claiborne	Hemistena lata	Cracking Pearlymussel	S1	E	LE
TN	Claiborne	Lampsilis abrupta	Pink Mucket	S2	E	LE
TN	Claiborne	Lemiox rimosus	Birdwing Pearlymussel	S1	E	LE
TN	Claiborne	Pleuronaia dolabelloides	Slabside Pearlymussel	S2		LE
TN	Claiborne	Plethobasus cicatricosus	White Wartyback	S1	E	LE
TN	Claiborne	Plethobasus cyphyus	Sheepnose	S2S3		LE
TN	Claiborne	Ptychobranchus subtentum	Fluted Kidneyshell	S2		LE
TN	Claiborne	Quadrula cylindrica	Rabbitsfoot			LT
TN	Claiborne	Quadrula cylindrica strigillata	Rough Rabbitsfoot	S2	E	LE
TN	Claiborne	Quadrula intermedia	Cumberland Monkeyface	S1	E	LE
TN	Claiborne	Quadrula sparsa	Appalachian Monkeyface	S1	E	LE
TN	Claiborne	Lejeunea blomquistii	Blomquist Leafy Liverwort	S1S2	S	
TN	Claiborne	Homaliadelphus sharpii	Sharp's Homaliadelphus	S1	E	
TN	Claiborne	Amsonia tabernaemontana var. gattingeri	A Blue-star	S3	S	
TN	Claiborne	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Claiborne	Chrysogonum virginianum	Green-and-gold	S2	T	
TN	Claiborne	Berberis canadensis	American barberry	S2	S	
TN	Claiborne	Cardamine rotundifolia	Roundleaf Water-cress	S2S3	S	
TN	Claiborne	Lonicera dioica	Mountain Honeysuckle	S2	S	
TN	Claiborne	Juglans cinerea	Butternut	S3	T	
TN	Claiborne	Meehania cordata	Meehania Mint (Heart-leaf Meehania)	S2	T	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Claiborne	Rhamnus alnifolia	Alderleaf Buckthorn	S1	E	
TN	Claiborne	Parnassia grandifolia	Large-leaved Grass-of-parnassus	S3	S	
TN	Claiborne	Aureolaria patula	Spreading False-foxglove	S3	S	
TN	Claiborne	Thuja occidentalis	Northern White Cedar	S3	S	
TN	Claiborne	Eleocharis intermedia	Spike-rush	S1	E	
TN	Claiborne	Rhynchospora capillacea	Horned Beakrush	S1	E	
TN	Claiborne	Juncus brachycephalus	Short-head Rush	S2	S	
TN	Claiborne	Cypripedium reginae	Showy Lady-slipper	S1	E	
TN	Claiborne	Spiranthes lucida	Shining Ladies'-tresses	S1S2	T	
TN	Claiborne	Calamagrostis porteri ssp. porteri	Porter's Reedgrass	S1	E	
TN	Clay	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Clay	Chondestes grammacus	Lark Sparrow	S1B	T	
TN	Clay	Thoburnia atripinnis	Blackfin Sucker	S2	D	
TN	Clay	Crystallaria asprella	Crystal Darter	SX	D	
TN	Clay	Etheostoma barbouri	Teardrop Darter	S2	D	
TN	Clay	Etheostoma bellum	Orangefin Darter	S3	D	
TN	Clay	Etheostoma cinereum	Ashy Darter	S2S3	T	
TN	Clay	Etheostoma barrenense	Splendid Darter	S3	D	
TN	Clay	Percina phoxocephala	Slenderhead Darter	S3	D	
TN	Clay	Myotis grisescens	Gray Bat	S2	E	LE
TN	Clay	Dromus dromas	Dromedary Pearlymussel	S1	E	LE
TN	Clay	Epioblasma florentina walkeri	Tan Riffleshell	S1	E	LE
TN	Clay	Epioblasma florentina florentina	Yellow-blossom Pearlymussel	SX	E	LE
TN	Clay	Lampsilis abrupta	Pink Mucket	S2	E	LE
TN	Clay	Villosa trabalis	Cumberland Bean	S1	E	LE
TN	Clay	Juglans cinerea	Butternut	S3	T	
TN	Clay	Carex ouachitana	Ouachita Sedge	S1	S	
TN	Clay	Veratrum woodii	Ozark Bunchflower	S1	E	
TN	Cocke	Cryptobranchus alleganiensis	Hellbender	S3	D	PS
TN	Cocke	Desmognathus wrighti	Southern Pigmy Salamander	S2S3	D	
TN	Cocke	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Cocke	Charadrius melodus	Piping Plover			LE
TN	Cocke	Poecile atricapilla	Black-capped Chickadee	S2B	D	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Cocke	Pooecetes gramineus	Vesper Sparrow	S1B,S4N	D	
TN	Cocke	Acipenser fulvescens	Lake Sturgeon	S1	E	
TN	Cocke	Notropis rubellus	Rosyface Shiner	S2	D	
TN	Cocke	Chrosomus tennesseensis	Tennessee Dace	S3	D	
TN	Cocke	Carpiodes velifer	Highfin Carpsucker	S2S3	D	
TN	Cocke	Cycleptus elongatus	Blue Sucker	S2	T	
TN	Cocke	Etheostoma gutselli	Tuckasegee Darter	S1	E	
TN	Cocke	Percina aurantiaca	Tangerine Darter	S3	D	
TN	Cocke	Percina tanasi	Snail Darter	S2S3	T	LT
TN	Cocke	Sorex cinereus	Common Shrew	S4	D	
TN	Cocke	Sorex fumeus	Smoky Shrew	S4	D	
TN	Cocke	Myotis grisescens	Gray Bat	S2	E	LE
TN	Cocke	Myotis leibii	eastern small-footed bat	S2S3	D	
TN	Cocke	Corynorhinus rafinesquii	Rafinesque’s Big-eared bat	S3	D	
TN	Cocke	Neotoma floridana haematoreia	Southern Appalachian Woodrat	S2	D	
TN	Cocke	Synaptomys cooperi	Southern Bog Lemming	S4	D	
TN	Cocke	Zapus hudsonius	Meadow Jumping Mouse	S4	D	
TN	Cocke	Napaeozapus insignis	Woodland Jumping Mouse	S4	D	
TN	Cocke	Cumberlandia monodonta	Spectaclecase	S2S3		LE
TN	Cocke	Epioblasma capsaeformis	Oyster Mussel	S1	E	LE
TN	Cocke	Epioblasma torulosa gubernaculum	Green Blossom Pearlymussel	SX	E	LE
TN	Cocke	Fusconaia cuneolus	Fine-rayed Pigtoe	S1	E	LE
TN	Cocke	Quadrula cylindrica strigillata	Rough Rabbitsfoot	S2	E	LE
TN	Cocke	Villosa trabalis	Cumberland Bean	S1	E	LE
TN	Cocke	Megaceros aenigmaticus	Hornwort	S2S3	S	
TN	Cocke	Grimmia olneyi	Grimmia Moss	SH	S	
TN	Cocke	Heracleum maximum	Cow Parsnip	S2	S	
TN	Cocke	Thaspium pinnatifidum	cutleaf meadow-parsnip	S1	E	
TN	Cocke	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Cocke	Solidago lancifolia	Broad-leaf Golden-rod	S1	E	
TN	Cocke	Rugelia nudicaulis	Rugel's Ragwort	S2	E	
TN	Cocke	Draba ramosissima	Branching Whitlow-wort	S2	S	
TN	Cocke	Paronychia argyrocoma	Silverling	S1S2	T	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Cocke	Silene ovata	Ovate Catchfly	S2	E	
TN	Cocke	Stellaria alsine	Trailing Stitchwort	S1	E	
TN	Cocke	Hypericum mitchellianum	Blue Ridge St. John's-wort	S2	T	
TN	Cocke	Leucothoe racemosa	Fetter-bush	S2	T	
TN	Cocke	Menziesia pilosa	Fetterbush	S2	S	
TN	Cocke	Adlumia fungosa	Climbing Fumitory	S2	T	
TN	Cocke	Juglans cinerea	Butternut	S3	T	
TN	Cocke	Stachys clingmanii	Clingman's Hedge-nettle	S1S2	T	
TN	Cocke	Monotropsis odorata	Sweet Pinesap	S2	T	
TN	Cocke	Lysimachia fraseri	Fraser Loosestrife	S2	E	
TN	Cocke	Buckleya distichophylla	piratebush	S2	T	
TN	Cocke	Saxifraga caroliniana	Carolina saxifrage	S1S2	E	
TN	Cocke	Carex ruthii	Ruth's Sedge	S2	T	
TN	Cocke	Cymophyllus fraserianus	Fraser's Sedge	S3	S	
TN	Cocke	Trillium rugelii	Southern Nodding Trillium	S2	E	
TN	Cocke	Xerophyllum asphodeloides	Eastern Turkeybeard	S3	T	
TN	Cocke	Corallorhiza maculata	Spotted Coral-root	S1	T	
TN	Coffee	Cryptobranchus alleganiensis	Hellbender	S3	D	PS
TN	Coffee	Gyrinophilus palleucus	Tennessee Cave Salamander	S2	T	
TN	Coffee	Hemidactylium scutatum	Four-toed Salamander	S3	D	
TN	Coffee	Hyla gratiosa	Barking Treefrog	S3	D	
TN	Coffee	Ixobrychus exilis	Least Bittern	S2B	D	
TN	Coffee	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Coffee	Tyto alba	Common Barn-owl	S3	D	
TN	Coffee	Ammodramus henslowii	Henslow's Sparrow	S1B	D	
TN	Coffee	Hemitremia flammea	Flame Chub	S3	D	
TN	Coffee	Typhlichthys subterraneus	Southern Cavefish	S3	D	
TN	Coffee	Fundulus julisia	Barrens Topminnow	S1	E	
TN	Coffee	Etheostoma aquali	Coppercheek Darter	S2S3	T	
TN	Coffee	Etheostoma cinereum	Ashy Darter	S2S3	T	
TN	Coffee	Etheostoma luteovinctum	Redband Darter	S4	D	
TN	Coffee	Etheostoma striatulum	Striated Darter	S1	T	
TN	Coffee	Etheostoma forbesi	Barrens Darter	S1	E	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Coffee	Percina burtoni	Blotchside Logperch	S2	D	
TN	Coffee	Percina macrocephala	Longhead Darter	S2	T	
TN	Coffee	Sorex cinereus	Common Shrew	S4	D	
TN	Coffee	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Coffee	Sorex fumeus	Smoky Shrew	S4	D	
TN	Coffee	Myotis grisescens	Gray Bat	S2	E	LE
TN	Coffee	Neotoma magister	Allegheny Woodrat	S3	D	
TN	Coffee	Zapus hudsonius	Meadow Jumping Mouse	S4	D	
TN	Coffee	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S3	T	
TN	Coffee	Epioblasma turgidula	Turgid Blossom Pearlymussel	SX	E	LE
TN	Coffee	Pleuronaia dolabelloides	Slabside Pearlymussel	S2		LE
TN	Coffee	Pleurobema gibberum	Cumberland Pigtoe	S1	E	LE
TN	Coffee	Toxolasma cylindrellus	Pale Lilliput	S1	E	LE
TN	Coffee	Leptoxis umbilicata	Umbilicate River Snail	S1	TRKD	
TN	Coffee	Frullania obcordata	Liverwort	S1	S	
TN	Coffee	Pellia appalachiana	A Liverwort	S2	S	
TN	Coffee	Radula voluta	Liverwort	S2	S	
TN	Coffee	Lejeunea sharpii	Sharp's Lejeunea	S1S2	E	
TN	Coffee	Cotinus obovatus	American Smoke-tree	S2	S	
TN	Coffee	Eryngium integrifolium	Button Snakeroot	S1	T	
TN	Coffee	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Coffee	Echinacea pallida	Pale-purple Coneflower	S1	E	
TN	Coffee	Eupatorium leucolepis	White-bract Thoroughwort	S1	E	
TN	Coffee	Helianthus eggertii	Eggert's Sunflower	S3	S	DM
TN	Coffee	Hieracium scabrum	Rough Hawkweed	S2	T	
TN	Coffee	Marshallia trinervia	Broadleaf Barbara's-buttons	S2S3	T	
TN	Coffee	Prenanthes aspera	Rough Rattlesnake-root	S1	E	
TN	Coffee	Silphium pinnatifidum	Prairie-dock	S2	T	
TN	Coffee	Solidago stricta var. gracillima	A Goldenrod	S1	S	
TN	Coffee	Symphyotrichum pratense	Barrens Silky Aster	S1	E	
TN	Coffee	Campanula aparinoides	Marsh Bellflower	S2	S	
TN	Coffee	Silene ovata	Ovate Catchfly	S2	E	
TN	Coffee	Helianthemum propinquum	Low Frostweed	S1S2	E	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Coffee	Lechea pulchella	Leggett's Pinweed	S1	E	
TN	Coffee	Clethra alnifolia	Coast Pepper-bush	S1	E	
TN	Coffee	Hypericum adpressum	Creeping St. John's-wort	S1	E	
TN	Coffee	Drosera brevifolia	Dwarf Sundew	S2	T	
TN	Coffee	Drosera capillaris	Sundew	S1	T	
TN	Coffee	Gaylussacia dumosa	Dwarf Huckleberry	S3	T	
TN	Coffee	Vaccinium macrocarpon	Large Cranberry	S2	T	
TN	Coffee	Vaccinium elliottii	Elliott's Blueberry	S1	E	
TN	Coffee	Lathyrus palustris	Marsh Pea	S1	S	
TN	Coffee	Lespedeza angustifolia	Narrowleaf Bushclover	S2	T	
TN	Coffee	Gentiana puberulenta	Downy Gentian	S1	E	
TN	Coffee	Myriophyllum pinnatum	Water-milfoil	S1	E	
TN	Coffee	Juglans cinerea	Butternut	S3	T	
TN	Coffee	Utricularia cornuta	Horned Bladderwort	S1	E	
TN	Coffee	Utricularia subulata	Zigzag Bladderwort	S1	T	
TN	Coffee	Ludwigia sphaerocarpa	Globe-fruited Ludwigia	S1	T	
TN	Coffee	Polygala nuttallii	Nuttall's Milkwort	S1	E	
TN	Coffee	Phemeranthus calcaricus	Limestone Fame-flower	S3	S	
TN	Coffee	Lysimachia terrestris	Swamp Loosestrife	S1	E	
TN	Coffee	Clematis glaucophylla	Whiteleaf Leatherflower	S1	S	
TN	Coffee	Ranunculus flabellaris	Yellow Water-crowfoot	S2	T	
TN	Coffee	Prunus pumila	Sand Cherry	S1	E	
TN	Coffee	Nestronia umbellula	Nestronia	S1	E	
TN	Coffee	Parnassia grandifolia	Large-leaved Grass-of-parnassus	S3	S	
TN	Coffee	Agalinis oligophylla	Ridge-stem False-foxglove	S1	E	
TN	Coffee	Aureolaria patula	Spreading False-foxglove	S3	S	
TN	Coffee	Pedicularis lanceolata	Swamp Lousewort	S1S2	S	
TN	Coffee	Sagittaria graminea	Grassleaf Arrowhead	S1	T	
TN	Coffee	Carex barrattii	Barratt's Sedge	S2	E	
TN	Coffee	Carex buxbaumii	Buxbaum's Sedge	S1	E	
TN	Coffee	Carex hirtifolia	Sedge	S1S2	S	
TN	Coffee	Carex pellita	Wooly Sedge	S1	E	
TN	Coffee	Eleocharis wolfii	Wolf Spikerush	S1	E	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Coffee	Fimbristylis puberula	Hairy Fimbristylis	S1S2	T	
TN	Coffee	Rhynchospora caduca	Falling Beaked-rush	S1	S	
TN	Coffee	Rhynchospora chalarocephala	Loose-head Beakrush	S1	T	
TN	Coffee	Rhynchospora perplexa	Beakrush	S2	T	
TN	Coffee	Scleria verticillata	Low Nutrush	S2	S	
TN	Coffee	Lachnanthes caroliana	Red Root	S1	E	
TN	Coffee	Iris prismatica	Narrow Blue Flag	S2S3	T	
TN	Coffee	Melanthium latifolium	Broadleaf Bunchflower	S1S2	E	
TN	Coffee	Triantha racemosa	Coastal False-asphodel	S1	E	
TN	Coffee	Zigadenus leimanthoides	Death-camas	S2	T	
TN	Coffee	Liparis loeselii	Loesel's Twayblade	S1	T	
TN	Coffee	Listera australis	Southern Twayblade	S1S2	E	
TN	Coffee	Platanthera flava var. herbiola	Pale Green Orchid	S2	T	
TN	Coffee	Platanthera integra	Yellow Fringeless Orchid	S1	E	
TN	Coffee	Platanthera nivea	Snowy Orchid	S1	E	
TN	Coffee	Pogonia ophioglossoides	Rose Pogonia	S2	E	
TN	Coffee	Dichanthelium acuminatum ssp. spretum	Eaton's Witchgrass	S1	E	
TN	Coffee	Dichanthelium acuminatum ssp. leucothrix	Panic-grass	S1	S	
TN	Coffee	Festuca paradoxa	Cluster Fescue	S1	S	
TN	Coffee	Gymnopogon brevifolius	Shortleaf Beardgrass	S1S2	S	
TN	Coffee	Muhlenbergia torreyana	Torrey Muhly	S1	E	
TN	Coffee	Panicum hemitomon	Maidencane	S2	S	
TN	Coffee	Xyris fimbriata	Fringed Yellow-eyed-grass	S1	E	
TN	Coffee	Xyris laxifolia var. iridifolia	Yellow-eyed-grass	S2	T	
TN	Coffee	Woodwardia virginica	Virginia Chainfern	S2	S	
TN	Coffee	Trichomanes boschianum	Appalachian Bristle Fern	S1S2	T	
TN	Coffee	Isoetes melanopoda	Blackfoot Quillwort	S1S2	E	
TN	Coffee	Lycopodiella alopecuroides	Foxtail Clubmoss	S2	T	
TN	Crockett	Limnothlypis swainsonii	Swainson's Warbler	S3	D	
TN	Crockett	Corynorhinus rafinesquii	Rafinesque’s Big-eared bat	S3	D	
TN	Crockett	Carex reniformis	Sedge	S1	S	
TN	Cumberland	Cryptobranchus alleganiensis	Hellbender	S3	D	PS
TN	Cumberland	Desmognathus welteri	Black Mountain Salamander	S3	D	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Cumberland	Hemidactylium scutatum	Four-toed Salamander	S3	D	
TN	Cumberland	Vermivora chrysoptera	Golden-winged Warbler	S3B	D	
TN	Cumberland	Peucaea aestivalis	Bachman's Sparrow	S1B	E	
TN	Cumberland	Notropis rupestris	Bedrock Shiner	S2	D	
TN	Cumberland	Chrosomus tennesseensis	Tennessee Dace	S3	D	
TN	Cumberland	Chrosomus saylori	Laurel Dace	S1	E	LE
TN	Cumberland	Erimonax monachus	Spotfin Chub	S2	T	LT
TN	Cumberland	Percina aurantiaca	Tangerine Darter	S3	D	
TN	Cumberland	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Cumberland	Sorex fumeus	Smoky Shrew	S4	D	
TN	Cumberland	Myotis grisescens	Gray Bat	S2	E	LE
TN	Cumberland	Myotis sodalis	Indiana Bat	S1	E	LE
TN	Cumberland	Myotis leibii	eastern small-footed bat	S2S3	D	
TN	Cumberland	Myotis septentrionalis	Northern Long-eared Bat	S1S2		LT
TN	Cumberland	Corynorhinus rafinesquii	Rafinesque’s Big-eared bat	S3	D	
TN	Cumberland	Neotoma magister	Allegheny Woodrat	S3	D	
TN	Cumberland	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	S3	D	
TN	Cumberland	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S3	T	
TN	Cumberland	Cambarus obeyensis	Obey Crayfish	S2	T	
TN	Cumberland	Cambarus pristinus	Pristine Crayfish	S2	E	
TN	Cumberland	Ophiogomphus incurvatus alleghaniensis	Allegheny Snaketail	S1	TRKD	
TN	Cumberland	Villosa perpurpurea	Purple Bean	S1	E	LE
TN	Cumberland	Villosa trabalis	Cumberland Bean	S1	E	LE
TN	Cumberland	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Cumberland	Helianthus occidentalis	naked-stem sunflower	S2	S	
TN	Cumberland	Marshallia grandiflora	Large-flowered Barbara's-buttons	S2	E	
TN	Cumberland	Symphyotrichum pratense	Barrens Silky Aster	S1	E	
TN	Cumberland	Berberis canadensis	American barberry	S2	S	
TN	Cumberland	Campanula aparinoides	Marsh Bellflower	S2	S	
TN	Cumberland	Paronychia argyrocoma	Silverling	S1S2	T	
TN	Cumberland	Diamorpha smallii	Small's Stonecrop	S1S2	E	
TN	Cumberland	Drosera capillaris	Sundew	S1	T	
TN	Cumberland	Drosera intermedia	Spoon-leaved Sundew	S2	S	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Cumberland	Ribes curvatum	Granite Gooseberry	S1	T	
TN	Cumberland	Conradina verticillata	Cumberland Rosemary	S3	T	LT
TN	Cumberland	Utricularia subulata	Zigzag Bladderwort	S1	T	
TN	Cumberland	Amelanchier sanguinea	Round-leaved Serviceberry	S2	T	
TN	Cumberland	Spiraea virginiana	Virginia Spiraea	S2	E	LT
TN	Cumberland	Pedicularis lanceolata	Swamp Lousewort	S1S2	S	
TN	Cumberland	Sagittaria platyphylla	Ovate-leaved Arrowhead	S2S3	S	
TN	Cumberland	Carex buxbaumii	Buxbaum's Sedge	S1	E	
TN	Cumberland	Eleocharis equisetoides	Horse-tail Spikerush	S1	E	
TN	Cumberland	Eriophorum virginicum	Tawny Cotton-grass	S1S2	E	
TN	Cumberland	Schoenoplectus subterminalis	Water Bulrush	S1	S	
TN	Cumberland	Lilium philadelphicum	Wood Lily	S1	E	
TN	Cumberland	Platanthera integrilabia	White Fringeless Orchid	S2S3	E	LT
TN	Cumberland	Pogonia ophioglossoides	Rose Pogonia	S2	E	
TN	Cumberland	Spiranthes ochroleuca	Yellow Nodding Ladies'-tresses	S1	E	
TN	Cumberland	Calamovilfa arcuata	Sandreed Grass	S2	T	
TN	Cumberland	Danthonia epilis	Bog Oat-grass	S1S2	S	
TN	Cumberland	Potamogeton amplifolius	Large-leaf Pondweed	S1	T	
TN	Cumberland	Potamogeton epihydrus	Creekgrass	S1S2	S	
TN	Cumberland	Potamogeton tennesseensis	Tennessee Pondweed	S2	T	
TN	Cumberland	Asplenium scolopendrium var. americanum	American Hart's-tongue Fern	S1	E	LT
TN	Cumberland	Lycopodiella alopecuroides	Foxtail Clubmoss	S2	T	
TN	Davidson	Ambystoma barbouri	Streamside Salamander	S2	D	
TN	Davidson	Cryptobranchus alleganiensis	Hellbender	S3	D	PS
TN	Davidson	Hemidactylium scutatum	Four-toed Salamander	S3	D	
TN	Davidson	Ixobrychus exilis	Least Bittern	S2B	D	
TN	Davidson	Tyto alba	Common Barn-owl	S3	D	
TN	Davidson	Thryomanes bewickii	Bewick's Wren	S1	E	
TN	Davidson	Setophaga cerulea	Cerulean Warbler	S3B	D	
TN	Davidson	Peucaea aestivalis	Bachman's Sparrow	S1B	E	
TN	Davidson	Ichthyomyzon unicuspis	Silver Lamprey	S2	D	
TN	Davidson	Acipenser fulvescens	Lake Sturgeon	S1	E	
TN	Davidson	Cycleptus elongatus	Blue Sucker	S2	T	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Davidson	Etheostoma luteovinctum	Redband Darter	S4	D	
TN	Davidson	Etheostoma microlepidum	Smallscale Darter	S2	D	
TN	Davidson	Percina phoxocephala	Slenderhead Darter	S3	D	
TN	Davidson	Neotoma magister	Allegheny Woodrat	S3	D	
TN	Davidson	Zapus hudsonius	Meadow Jumping Mouse	S4	D	
TN	Davidson	Macrochelys temminckii	Alligator Snapping Turtle	S2S3	D	
TN	Davidson	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	S3	D	
TN	Davidson	Orconectes shoupi	Nashville Crayfish	S1S2	E	LE
TN	Davidson	Epioblasma brevidens	Cumberlandian Combshell	S1	E	LE
TN	Davidson	Epioblasma florentina walkeri	Tan Riffleshell	S1	E	LE
TN	Davidson	Ammoselinum popei	Pope Sand-parsley	S2	T	
TN	Davidson	Perideridia americana	Perideridia	S2	E	
TN	Davidson	Polytaenia nuttallii	Prairie Parsley	S1	T	
TN	Davidson	Amsonia tabernaemontana var. gattingeri	A Blue-star	S3	S	
TN	Davidson	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Davidson	Echinacea tennesseensis	Tennessee Coneflower	S2	T	DM
TN	Davidson	Helianthus eggertii	Eggert's Sunflower	S3	S	DM
TN	Davidson	Solidago rupestris	Rock Goldenrod	S1	E	
TN	Davidson	Arnoglossum plantagineum	Fen Indian-plantain	S2	T	
TN	Davidson	Symphyotrichum praealtum	Willow Aster	S1	E	
TN	Davidson	Onosmodium hispidissimum	Hairy False Gromwell	S1	E	
TN	Davidson	Arabis perstellata	Braun's Rock-cress	S1	E	LE
TN	Davidson	Boechera shortii	Short's Rock-cress	S1S2	S	
TN	Davidson	Erysimum capitatum	Western Wallflower	S1S2	E	PS
TN	Davidson	Paysonia densipila	Duck River Bladderpod	S3	S	
TN	Davidson	Physaria globosa	Lesquereux's Mustard	S2	E	LE
TN	Davidson	Paysonia stonensis	Stones River Bladderpod	S1	E	
TN	Davidson	Stellaria fontinalis	Water Stitchwort	S3	S	
TN	Davidson	Evolvulus nuttallianus	Evolvulus	S3	S	
TN	Davidson	Lonicera flava	Yellow Honeysuckle	S1	T	
TN	Davidson	Apios priceana	Price's Potato-bean	S3	E	LT
TN	Davidson	Astragalus tennesseensis	Tennessee Milk-vetch	S3	S	
TN	Davidson	Astragalus bibullatus	Pyne's Ground Plum	S1	E	LE

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Davidson	Dalea candida	White Prairie-clover	S2	T	
TN	Davidson	Dalea foliosa	Leafy Prairie-clover	S2S3	E	LE
TN	Davidson	Dalea purpurea	Purple Prairie-clover	S1	E	
TN	Davidson	Trifolium reflexum	Buffalo Clover	S1	E	
TN	Davidson	Juglans cinerea	Butternut	S3	T	
TN	Davidson	Magnolia virginiana	Sweetbay Magnolia	S2	T	
TN	Davidson	Mirabilis albida	Pale Umbrella-wort	S2	T	
TN	Davidson	Phlox bifida ssp. stellaria	Cleft Phlox	S3	T	
TN	Davidson	Phemeranthus calcaricus	Limestone Fame-flower	S3	S	
TN	Davidson	Anemone caroliniana	Carolina Anemone	S1S2	E	
TN	Davidson	Ranunculus aquatilis var. diffusus	White Water Buttercup	S1	E	
TN	Davidson	Crataegus harbisonii	Harbison Hawthorn	S1	E	
TN	Davidson	Zanthoxylum americanum	Northern Prickly-ash	S2	S	
TN	Davidson	Aureolaria patula	Spreading False-foxglove	S3	S	
TN	Davidson	Collinsia verna	Blue-eyed Mary	S1	E	
TN	Davidson	Vitis rupestris	Sand Grape	S1	E	
TN	Davidson	Carex davisii	Davis' Sedge	S1	S	
TN	Davidson	Carex hirtifolia	Sedge	S1S2	S	
TN	Davidson	Iris prismatica	Narrow Blue Flag	S2S3	T	
TN	Davidson	Allium stellatum	Glade Onion	S1	E	
TN	Davidson	Schoenolirion croceum	Sunnybell	S3	T	
TN	Davidson	Elymus svensonii	Svenson's Wild-rye	S2	T	
TN	Decatur	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Decatur	Limnothlypis swainsonii	Swainson's Warbler	S3	D	
TN	Decatur	Chondestes grammacus	Lark Sparrow	S1B	T	
TN	Decatur	Ichthyomyzon unicuspis	Silver Lamprey	S2	D	
TN	Decatur	Hemitremia flammea	Flame Chub	S3	D	
TN	Decatur	Typhlichthys subterraneus	Southern Cavefish	S3	D	
TN	Decatur	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Decatur	Myotis grisescens	Gray Bat	S2	E	LE
TN	Decatur	Cumberlandia monodonta	Spectaclecase	S2S3		LE
TN	Decatur	Cyprogenia stegaria	Fanshell	S1	E	LE
TN	Decatur	Hemistena lata	Cracking Pearlymussel	S1	E	LE

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Decatur	Lampsilis abrupta	Pink Mucket	S2	E	LE
TN	Decatur	Obovaria retusa	Ring Pink	S1	E	LE
TN	Decatur	Plethobasus cooperianus	Orange-foot Pimpleback	S1	E	LE
TN	Decatur	Plethobasus cyphyus	Sheepnose	S2S3		LE
TN	Decatur	Pleurobema plenum	Rough Pigtoe	S1	E	LE
TN	Decatur	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Decatur	Helianthus occidentalis	naked-stem sunflower	S2	S	
TN	Decatur	Liatris cylindracea	Slender Blazing-star	S2	T	
TN	Decatur	Prenanthes aspera	Rough Rattlesnake-root	S1	E	
TN	Decatur	Prenanthes barbata	Barbed Rattlesnake-root	S2	S	
TN	Decatur	Symphyotrichum pratense	Barrens Silky Aster	S1	E	
TN	Decatur	Onosmodium molle ssp. occidentale	Western False Gromwell	S1S2	T	
TN	Decatur	Turritis glabra	Tower-mustard	S1	S	
TN	Decatur	Arabis hirsuta	Western Hairy Rock-cress	S1	T	
TN	Decatur	Draba cuneifolia	Wedge-leaf Whitlow-grass	S1S2	S	
TN	Decatur	Acalypha deamii	Deam's Copperleaf	S1	S	
TN	Decatur	Salvia azurea var. grandiflora	Blue Sage	S3	S	
TN	Decatur	Polygala mariana	Maryland Milkwort	S1	S	
TN	Decatur	Eleocharis compressa	Flat-stemmed Spike-rush	S1	S	
TN	Decatur	Fimbristylis puberula	Hairy Fimbristylis	S1S2	T	
TN	Decatur	Cypripedium kentuckiense	Lady-slipper	S2	E	
TN	Decatur	Spiranthes magnicamporum	Great Plains Ladies'-tresses	S1	E	
TN	DeKalb	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	DeKalb	Setophaga cerulea	Cerulean Warbler	S3B	D	
TN	DeKalb	Hemitremia flammea	Flame Chub	S3	D	
TN	DeKalb	Notropis rupestris	Bedrock Shiner	S2	D	
TN	DeKalb	Etheostoma olivaceum	Sooty Darter	S3	D	
TN	DeKalb	Sorex fumeus	Smoky Shrew	S4	D	
TN	DeKalb	Myotis grisescens	Gray Bat	S2	E	LE
TN	DeKalb	Neotoma magister	Allegheny Woodrat	S3	D	
TN	DeKalb	Cumberlandia monodonta	Spectaclecase	S2S3		LE
TN	DeKalb	Dromus dromas	Dromedary Pearlymussel	S1	E	LE
TN	DeKalb	Epioblasma obliquata obliquata	Purple Catspaw	S1	E	LE

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	DeKalb	Epioblasma triquetra	Snuffbox	S3		LE
TN	DeKalb	Pleuronaia dolabelloides	Slabside Pearlymussel	S2		LE
TN	DeKalb	Plethobasus cicatricosus	White Wartyback	S1	E	LE
TN	DeKalb	Plethobasus cyphyus	Sheepnose	S2S3		LE
TN	DeKalb	Quadrula cylindrica cylindrica	Smooth Rabbitsfoot	S3		LT
TN	DeKalb	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	DeKalb	Caulophyllum giganteum	Blue Cohosh	S1	T	
TN	DeKalb	Draba ramosissima	Branching Whitlow-wort	S2	S	
TN	DeKalb	Erysimum capitatum	Western Wallflower	S1S2	E	PS
TN	DeKalb	Acalypha deamii	Deam's Copperleaf	S1	S	
TN	DeKalb	Apios priceana	Price's Potato-bean	S3	E	LT
TN	DeKalb	Juglans cinerea	Butternut	S3	T	
TN	DeKalb	Eriogonum harperi	Harper's Umbrella-plant	S1	E	
TN	DeKalb	Parnassia grandifolia	Large-leaved Grass-of-parnassus	S3	S	
TN	DeKalb	Allium burdickii	Narrow-leaved Wild Leek	S1S2	T-C	
TN	DeKalb	Allium tricoccum	Small White Leek	S1S2	S-C	
TN	DeKalb	Erythronium rostratum	Yellow Trout-lily	S2	S	
TN	DeKalb	Liparis loeselii	Loesel's Twayblade	S1	T	
TN	DeKalb	Elymus svensonii	Svenson's Wild-rye	S2	T	
TN	Dickson	Hemidactylium scutatum	Four-toed Salamander	S3	D	
TN	Dickson	Accipiter striatus	Sharp-shinned Hawk	S3B,S4N	D	
TN	Dickson	Typhlichthys subterraneus	Southern Cavefish	S3	D	
TN	Dickson	Etheostoma pseudovulatum	Egg-mimic Darter	S1	E	
TN	Dickson	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Dickson	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S3	T	
TN	Dickson	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Dickson	Helianthus eggertii	Eggert's Sunflower	S3	S	DM
TN	Dickson	Prenanthes barbata	Barbed Rattlesnake-root	S2	S	
TN	Dickson	Hasteola suaveolens	Sweet-scented Indian-plantain	S2	S	
TN	Dickson	Paysonia densipila	Duck River Bladderpod	S3	S	
TN	Dickson	Physaria globosa	Lesquereux's Mustard	S2	E	LE
TN	Dickson	Juglans cinerea	Butternut	S3	T	
TN	Dickson	Pycnanthemum torreyi	Torrey's Mountain Mint	S1	E	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Dickson	Agalinis oligophylla	Ridge-stem False-foxglove	S1	E	
TN	Dickson	Vitis rupestris	Sand Grape	S1	E	
TN	Dickson	Sagittaria graminea	Grassleaf Arrowhead	S1	T	
TN	Dickson	Spiranthes ochroleuca	Yellow Nodding Ladies'-tresses	S1	E	
TN	Dyer	Ardea alba	Great Egret	S2B,S3N	D	
TN	Dyer	Egretta caerulea	Little Blue Heron	S2B,S3N	D	
TN	Dyer	Ictinia mississippiensis	Mississippi Kite	S2S3	D	
TN	Dyer	Sterna antillarum athalassos	Interior Least Tern	S2S3B	E	LE
TN	Dyer	Limnothlypis swainsonii	Swainson's Warbler	S3	D	
TN	Dyer	Scaphirhynchus albus	Pallid Sturgeon	S1	E	LE
TN	Dyer	Atractosteus spatula	Alligator Gar	S1	D	
TN	Dyer	Cycleptus elongatus	Blue Sucker	S2	T	
TN	Dyer	Corynorhinus rafinesquii	Rafinesque’s Big-eared bat	S3	D	
TN	Dyer	Triodopsis multilineata	Striped Whitelip Snail	S2	TRKD	
TN	Dyer	Didiplis diandra	Water-purslane	S1	T	
TN	Dyer	Zanthoxylum americanum	Northern Prickly-ash	S2	S	
TN	Dyer	Carex hyalina	Tissue Sedge	S1	S	
TN	Dyer	Iris fulva	Red Iris	S2	T	
TN	Fayette	Acris gryllus	Southern Cricket Frog	S3	D	
TN	Fayette	Hyla gratiosa	Barking Treefrog	S3	D	
TN	Fayette	Limnothlypis swainsonii	Swainson's Warbler	S3	D	
TN	Fayette	Peucaea aestivalis	Bachman's Sparrow	S1B	E	
TN	Fayette	Noturus stigmosus	Northern Madtom	S3	D	
TN	Fayette	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Fayette	Synaptomys cooperi	Southern Bog Lemming	S4	D	
TN	Fayette	Zapus hudsonius	Meadow Jumping Mouse	S4	D	
TN	Fayette	Quercus margaretta	Sand Post Oak	S1	S	
TN	Fayette	Penstemon tubiflorus	Small Flowered Beardtongue	S1	S	
TN	Fayette	Bulbostylis ciliatifolia var. coarctata	Beak-rush	S1	E	
TN	Fayette	Iris fulva	Red Iris	S2	T	
TN	Fayette	Listera australis	Southern Twayblade	S1S2	E	
TN	Fayette	Festuca paradoxa	Cluster Fescue	S1	S	
TN	Fentress	Cryptobranchus alleganiensis	Hellbender	S3	D	PS

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Fentress	Desmognathus welteri	Black Mountain Salamander	S3	D	
TN	Fentress	Aquila chrysaetos	Golden Eagle	S1	T	
TN	Fentress	Falco peregrinus	Peregrine Falcon	S1B	E	
TN	Fentress	Setophaga cerulea	Cerulean Warbler	S3B	D	
TN	Fentress	Limnothlypis swainsonii	Swainson's Warbler	S3	D	
TN	Fentress	Typhlichthys subterraneus	Southern Cavefish	S3	D	
TN	Fentress	Etheostoma cinereum	Ashy Darter	S2S3	T	
TN	Fentress	Percina burtoni	Blotchside Logperch	S2	D	
TN	Fentress	Percina squamata	Olive Darter	S2	D	
TN	Fentress	Sorex cinereus	Common Shrew	S4	D	
TN	Fentress	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Fentress	Sorex fumeus	Smoky Shrew	S4	D	
TN	Fentress	Myotis grisescens	Gray Bat	S2	E	LE
TN	Fentress	Myotis sodalis	Indiana Bat	S1	E	LE
TN	Fentress	Myotis leibii	eastern small-footed bat	S2S3	D	
TN	Fentress	Myotis septentrionalis	Northern Long-eared Bat	S1S2		LT
TN	Fentress	Corynorhinus rafinesquii	Rafinesque's Big-eared bat	S3	D	
TN	Fentress	Neotoma magister	Allegheny Woodrat	S3	D	
TN	Fentress	Napaeozapus insignis	Woodland Jumping Mouse	S4	D	
TN	Fentress	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	S3	D	
TN	Fentress	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S3	T	
TN	Fentress	Cambarus obeyensis	Obey Crayfish	S2	T	
TN	Fentress	Alasmidonta atropurpurea	Cumberland Elktoe	S1S2	E	LE
TN	Fentress	Lejeunea blomquistii	Blomquist Leafy Liverwort	S1S2	S	
TN	Fentress	Bryoxiphium norvegicum	Sword Moss	S1	T	
TN	Fentress	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Fentress	Helenium brevifolium	Shortleaf Sneezeweed	S1	E	
TN	Fentress	Ageratina luciae-brauniae	Lucy Braun's White Snakeroot	S3	T	
TN	Fentress	Berberis canadensis	American barberry	S2	S	
TN	Fentress	Caulophyllum giganteum	Blue Cohosh	S1	T	
TN	Fentress	Campanula aparinoides	Marsh Bellflower	S2	S	
TN	Fentress	Minuartia cumberlandensis	Cumberland Sandwort	S2	E	LE
TN	Fentress	Drosera rotundifolia	Roundleaf Sundew	S1	T	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Fentress	Dalea candida	White Prairie-clover	S2	T	
TN	Fentress	Juglans cinerea	Butternut	S3	T	
TN	Fentress	Conradina verticillata	Cumberland Rosemary	S3	T	LT
TN	Fentress	Pycnanthemum verticillatum	Mountain-mint	S1	E	
TN	Fentress	Utricularia subulata	Zigzag Bladderwort	S1	T	
TN	Fentress	Epilobium ciliatum	Willow-herb	S1	T	
TN	Fentress	Amelanchier sanguinea	Round-leaved Serviceberry	S2	T	
TN	Fentress	Spiraea virginiana	Virginia Spiraea	S2	E	LT
TN	Fentress	Buckleya distichophylla	piratebush	S2	T	
TN	Fentress	Sagittaria graminea	Grassleaf Arrowhead	S1	T	
TN	Fentress	Carex hirtifolia	Sedge	S1S2	S	
TN	Fentress	Eleocharis equisetoides	Horse-tail Spikerush	S1	E	
TN	Fentress	Eriophorum virginicum	Tawny Cotton-grass	S1S2	E	
TN	Fentress	Lilium philadelphicum	Wood Lily	S1	E	
TN	Fentress	Platanthera integrilabia	White Fringeless Orchid	S2S3	E	LT
TN	Fentress	Pogonia ophioglossoides	Rose Pogonia	S2	E	
TN	Fentress	Dichanthelium ensifolium ssp. curtifolium	Panic-grass	S1	E	
TN	Fentress	Potamogeton tennesseensis	Tennessee Pondweed	S2	T	
TN	Fentress	Hymenophyllum tayloriae	Gorge Filmy Fern	S2	S	
TN	Fentress	Trichomanes boschianum	Appalachian Bristle Fern	S1S2	T	
TN	Fentress	Lycopodiella alopecuroides	Foxtail Clubmoss	S2	T	
TN	Franklin	Gyrinophilus palleucus	Tennessee Cave Salamander	S2	T	
TN	Franklin	Hemidactylium scutatum	Four-toed Salamander	S3	D	
TN	Franklin	Hyla gratiosa	Barking Treefrog	S3	D	
TN	Franklin	Ixobrychus exilis	Least Bittern	S2B	D	
TN	Franklin	Aquila chrysaetos	Golden Eagle	S1	T	
TN	Franklin	Setophaga cerulea	Cerulean Warbler	S3B	D	
TN	Franklin	Peucaea aestivalis	Bachman's Sparrow	S1B	E	
TN	Franklin	Hemitremia flammea	Flame Chub	S3	D	
TN	Franklin	Moxostoma lacerum	Harelip Sucker	SX	D	
TN	Franklin	Typhlichthys subterraneus	Southern Cavefish	S3	D	
TN	Franklin	Percina burtoni	Blotchside Logperch	S2	D	
TN	Franklin	Sorex cinereus	Common Shrew	S4	D	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Franklin	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Franklin	Sorex fumeus	Smoky Shrew	S4	D	
TN	Franklin	Myotis grisescens	Gray Bat	S2	E	LE
TN	Franklin	Myotis sodalis	Indiana Bat	S1	E	LE
TN	Franklin	Myotis leibii	eastern small-footed bat	S2S3	D	
TN	Franklin	Myotis septentrionalis	Northern Long-eared Bat	S1S2		LT
TN	Franklin	Corynorhinus rafinesquii	Rafinesque’s Big-eared bat	S3	D	
TN	Franklin	Neotoma magister	Allegheny Woodrat	S3	D	
TN	Franklin	Zapus hudsonius	Meadow Jumping Mouse	S4	D	
TN	Franklin	Napaeozapus insignis	Woodland Jumping Mouse	S4	D	
TN	Franklin	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	S3	D	
TN	Franklin	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S3	T	
TN	Franklin	Epioblasma florentina walkeri	Tan Riffleshell	S1	E	LE
TN	Franklin	Epioblasma turgidula	Turgid Blossom Pearlymussel	SX	E	LE
TN	Franklin	Fusconaia cor	Shiny Pigtoe Pearlymussel	S1	E	LE
TN	Franklin	Fusconaia cuneolus	Fine-rayed Pigtoe	S1	E	LE
TN	Franklin	Lampsilis virescens	Alabama Lampmussel	S1	E	LE
TN	Franklin	Pleuronaia dolabelloides	Slabside Pearlymussel	S2		LE
TN	Franklin	Pegias fabula	Little-wing Pearlymussel	S1	E	LE
TN	Franklin	Ptychobranchus subtentum	Fluted Kidneyshell	S2		LE
TN	Franklin	Quadrula intermedia	Cumberland Monkeyface	S1	E	LE
TN	Franklin	Toxolasma cylindrellus	Pale Lilliput	S1	E	LE
TN	Franklin	Anguispira picta	Painted Snake Coiled Forest Snail	S1	E	LT
TN	Franklin	Leptoxis umbilicata	Umbilicate River Snail	S1	TRKD	
TN	Franklin	Pellia appalachiana	A Liverwort	S2	S	
TN	Franklin	Lejeunea sharpii	Sharp's Lejeunea	S1S2	E	
TN	Franklin	Cotinus obovatus	American Smoke-tree	S2	S	
TN	Franklin	Amsonia tabernaemontana var. gattingeri	A Blue-star	S3	S	
TN	Franklin	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Franklin	Helianthus eggertii	Eggert's Sunflower	S3	S	DM
TN	Franklin	Helianthus occidentalis	naked-stem sunflower	S2	S	
TN	Franklin	Liatris cylindracea	Slender Blazing-star	S2	T	
TN	Franklin	Marshallia trinervia	Broadleaf Barbara's-buttons	S2S3	T	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Franklin	Prenanthes aspera	Rough Rattlesnake-root	S1	E	
TN	Franklin	Silphium brachiatum	Cumberland Rosinweed	S3	E	
TN	Franklin	Silphium pinnatifidum	Prairie-dock	S2	T	
TN	Franklin	Solidago ptarmicoides	Prairie Goldenrod	S1S2	E	
TN	Franklin	Onosmodium molle ssp. subsetosum	False Gromwell	S1	E	
TN	Franklin	Lonicera dioica	Mountain Honeysuckle	S2	S	
TN	Franklin	Lonicera flava	Yellow Honeysuckle	S1	T	
TN	Franklin	Viburnum bracteatum	Arrow-wood	S2	S	
TN	Franklin	Diamorpha smallii	Small's Stonecrop	S1S2	E	
TN	Franklin	Drosera brevifolia	Dwarf Sundew	S2	T	
TN	Franklin	Gaylussacia dumosa	Dwarf Huckleberry	S3	T	
TN	Franklin	Apios priceana	Price's Potato-bean	S3	E	LT
TN	Franklin	Dalea candida	White Prairie-clover	S2	T	
TN	Franklin	Desmodium ochroleucum	Creamflower Tick-trefoil	S1	E	
TN	Franklin	Myriophyllum pinnatum	Water-milfoil	S1	E	
TN	Franklin	Hydrolea ovata	Hydrolea	S1	S	
TN	Franklin	Juglans cinerea	Butternut	S3	T	
TN	Franklin	Ludwigia sphaerocarpa	Globe-fruited Ludwigia	S1	T	
TN	Franklin	Polygala mariana	Maryland Milkwort	S1	S	
TN	Franklin	Plantago cordata	Heartleaved Plantain	S1	E	
TN	Franklin	Phemeranthus teretifolius	Roundleaf Fameflower	S2	T	
TN	Franklin	Clematis glaucophylla	Whiteleaf Leatherflower	S1	S	
TN	Franklin	Clematis morefieldii	Morefield's Leather-flower	S2	E	LE
TN	Franklin	Ranunculus flabellaris	Yellow Water-crowfoot	S2	T	
TN	Franklin	Neviusia alabamensis	Alabama Snow-wreath	S2	T	
TN	Franklin	Prunus pumila	Sand Cherry	S1	E	
TN	Franklin	Agalinis oligophylla	Ridge-stem False-foxglove	S1	E	
TN	Franklin	Aureolaria patula	Spreading False-foxglove	S3	S	
TN	Franklin	Gratiola floridana	Florida Hedge-hyssop	S1	E	
TN	Franklin	Eleocharis equisetoides	Horse-tail Spikerush	S1	E	
TN	Franklin	Eleocharis wolfii	Wolf Spikerush	S1	E	
TN	Franklin	Eriophorum virginicum	Tawny Cotton-grass	S1S2	E	
TN	Franklin	Fimbristylis perpusilla	Harper's Fimbristylis	S1	E	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Franklin	Rhynchospora perplexa	Beakrush	S2	T	
TN	Franklin	Allium tricoccum	Small White Leek	S1S2	S-C	
TN	Franklin	Veratrum woodii	Ozark Bunchflower	S1	E	
TN	Franklin	Zigadenus leimanthoides	Death-camas	S2	T	
TN	Franklin	Cypripedium kentuckiense	Lady-slipper	S2	E	
TN	Franklin	Platanthera integrilabia	White Fringeless Orchid	S2S3	E	LT
TN	Franklin	Ponthieva racemosa	Shadow-witch Orchid	S1	E	
TN	Franklin	Dichanthelium ensifolium ssp. curtifolium	Panic-grass	S1	E	
TN	Franklin	Festuca paradoxa	Cluster Fescue	S1	S	
TN	Franklin	Glyceria acutiflora	Manna-grass	S2	S	
TN	Franklin	Xyris laxifolia var. iridifolia	Yellow-eyed-grass	S2	T	
TN	Franklin	Woodwardia virginica	Virginia Chainfern	S2	S	
TN	Franklin	Trichomanes boschianum	Appalachian Bristle Fern	S1S2	T	
TN	Franklin	Trichomanes petersii	Dwarf Filmy-fern	S2	T	
TN	Gibson	Ixobrychus exilis	Least Bittern	S2B	D	
TN	Gibson	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Gibson	Tyto alba	Common Barn-owl	S3	D	
TN	Gibson	Limnothlypis swainsonii	Swainson's Warbler	S3	D	
TN	Gibson	Sorex cinereus	Common Shrew	S4	D	
TN	Gibson	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Gibson	Corynorhinus rafinesquii	Rafinesque’s Big-eared bat	S3	D	
TN	Gibson	Zapus hudsonius	Meadow Jumping Mouse	S4	D	
TN	Gibson	Carex reniformis	Sedge	S1	S	
TN	Gibson	Iris fulva	Red Iris	S2	T	
TN	Giles	Cryptobranchus alleganiensis	Hellbender	S3	D	PS
TN	Giles	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Giles	Tyto alba	Common Barn-owl	S3	D	
TN	Giles	Hemitremia flammea	Flame Chub	S3	D	
TN	Giles	Moxostoma lacerum	Harelip Sucker	SX	D	
TN	Giles	Etheostoma luteovinctum	Redband Darter	S4	D	
TN	Giles	Etheostoma wapiti	Boulder Darter	S1	E	LE
TN	Giles	Percina tanasi	Snail Darter	S2S3	T	LT
TN	Giles	Sorex longirostris	Southeastern Shrew	S4	D	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Giles	Myotis grisescens	Gray Bat	S2	E	LE
TN	Giles	Cyprogenia stegaria	Fanshell	S1	E	LE
TN	Giles	Dromus dromas	Dromedary Pearlymussel	S1	E	LE
TN	Giles	Epioblasma triquetra	Snuffbox	S3		LE
TN	Giles	Hemistena lata	Cracking Pearlymussel	S1	E	LE
TN	Giles	Lampsilis virescens	Alabama Lampmussel	S1	E	LE
TN	Giles	Lemiox rimosus	Birdwing Pearlymussel	S1	E	LE
TN	Giles	Quadrula intermedia	Cumberland Monkeyface	S1	E	LE
TN	Giles	Perideridia americana	Perideridia	S2	E	
TN	Giles	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Giles	Helianthus eggertii	Eggert's Sunflower	S3	S	DM
TN	Giles	Solidago porteri	Porter's Goldenrod	S1	E	
TN	Giles	Paysonia densipila	Duck River Bladderpod	S3	S	
TN	Giles	Arenaria lanuginosa	A Sandwort	S1	E	
TN	Giles	Stellaria fontinalis	Water Stitchwort	S3	S	
TN	Giles	Apios priceana	Price's Potato-bean	S3	E	LT
TN	Giles	Castanea dentata	American Chestnut	S2S3	S	
TN	Giles	Juglans cinerea	Butternut	S3	T	
TN	Giles	Phemeranthus calcaricus	Limestone Fame-flower	S3	S	
TN	Giles	Crataegus harbisonii	Harbison Hawthorn	S1	E	
TN	Giles	Galium asprellum	Rough Bedstraw	S1	S	
TN	Giles	Allium burdickii	Narrow-leaved Wild Leek	S1S2	T-C	
TN	Giles	Schoenolirion croceum	Sunnybell	S3	T	
TN	Grainger	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Grainger	Erimonax monachus	Spotfin Chub	S2	T	LT
TN	Grainger	Cycleptus elongatus	Blue Sucker	S2	T	
TN	Grainger	Percina aurantiaca	Tangerine Darter	S3	D	
TN	Grainger	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Grainger	Myotis grisescens	Gray Bat	S2	E	LE
TN	Grainger	Myotis sodalis	Indiana Bat	S1	E	LE
TN	Grainger	Cumberlandia monodonta	Spectaclecase	S2S3		LE
TN	Grainger	Dromus dromas	Dromedary Pearlymussel	S1	E	LE
TN	Grainger	Epioblasma florentina walkeri	Tan Riffleshell	S1	E	LE

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Grainger	Epioblasma torulosa gubernaculum	Green Blossom Pearlymussel	SX	E	LE
TN	Grainger	Epioblasma turgidula	Turgid Blossom Pearlymussel	SX	E	LE
TN	Grainger	Fusconaia cor	Shiny Pigtoe Pearlymussel	S1	E	LE
TN	Grainger	Fusconaia cuneolus	Fine-rayed Pigtoe	S1	E	LE
TN	Grainger	Hemistena lata	Cracking Pearlymussel	S1	E	LE
TN	Grainger	Lampsilis abrupta	Pink Mucket	S2	E	LE
TN	Grainger	Lemiox rimosus	Birdwing Pearlymussel	S1	E	LE
TN	Grainger	Plethobasus cicatricosus	White Wartyback	S1	E	LE
TN	Grainger	Plethobasus cyphyus	Sheepnose	S2S3		LE
TN	Grainger	Ptychobranchus subtentum	Fluted Kidneyshell	S2		LE
TN	Grainger	Grimmia olneyi	Grimmia Moss	SH	S	
TN	Grainger	Homaliadelphus sharpii	Sharp's Homaliadelphus	S1	E	
TN	Grainger	Amsonia tabernaemontana var. gattingeri	A Blue-star	S3	S	
TN	Grainger	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Grainger	Eurybia schreberi	Schreber Aster	S1	S	
TN	Grainger	Berberis canadensis	American barberry	S2	S	
TN	Grainger	Cardamine rotundifolia	Roundleaf Water-cress	S2S3	S	
TN	Grainger	Corydalis sempervirens	Pale Corydalis	S1S2	S	
TN	Grainger	Ribes missouriense	Missouri gooseberry	S2	S	
TN	Grainger	Fothergilla major	Witch-alder	S2	T	
TN	Grainger	Phlox subulata	Moss phlox	S1	T	
TN	Grainger	Eleocharis intermedia	Spike-rush	S1	E	
TN	Grainger	Platanthera flava var. herbiola	Pale Green Orchid	S2	T	
TN	Grainger	Botrychium jenmanii	Alabama Grapefern	S1	T	
TN	Greene	Desmognathus wrighti	Southern Pigmy Salamander	S2S3	D	
TN	Greene	Falco peregrinus	Peregrine Falcon	S1B	E	
TN	Greene	Tyto alba	Common Barn-owl	S3	D	
TN	Greene	Corvus corax	Common Raven	S2	T	
TN	Greene	Acipenser fulvescens	Lake Sturgeon	S1	E	
TN	Greene	Polyodon spathula	Paddlefish	S3	TRKD	
TN	Greene	Notropis rubellus	Rosyface Shiner	S2	D	
TN	Greene	Chrosomus tennesseensis	Tennessee Dace	S3	D	
TN	Greene	Carpiodes velifer	Highfin Carpsucker	S2S3	D	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Greene	Cycleptus elongatus	Blue Sucker	S2	T	
TN	Greene	Noturus crypticus	Chucky Madtom	S1	E	LE
TN	Greene	Percina aurantiaca	Tangerine Darter	S3	D	
TN	Greene	Percina tanasi	Snail Darter	S2S3	T	LT
TN	Greene	Sorex fumeus	Smoky Shrew	S4	D	
TN	Greene	Parascalops breweri	Hairy-tailed Mole	S3	D	
TN	Greene	Myotis grisescens	Gray Bat	S2	E	LE
TN	Greene	Myotis leibii	eastern small-footed bat	S2S3	D	
TN	Greene	Myotis septentrionalis	Northern Long-eared Bat	S1S2		LT
TN	Greene	Neotoma floridana haematoreia	Southern Appalachian Woodrat	S2	D	
TN	Greene	Synaptomys cooperi	Southern Bog Lemming	S4	D	
TN	Greene	Cumberlandia monodonta	Spectaclecase	S2S3		LE
TN	Greene	Epioblasma brevidens	Cumberlandian Combshell	S1	E	LE
TN	Greene	Epioblasma capsaeformis	Oyster Mussel	S1	E	LE
TN	Greene	Epioblasma torulosa gubernaculum	Green Blossom Pearlymussel	SX	E	LE
TN	Greene	Lampsilis abrupta	Pink Mucket	S2	E	LE
TN	Greene	Lemiox rimosus	Birdwing Pearlymussel	S1	E	LE
TN	Greene	Pleuronaia dolabelloides	Slabside Pearlymussel	S2		LE
TN	Greene	Ptychobranchus subtentum	Fluted Kidneyshell	S2		LE
TN	Greene	Quadrula cylindrica strigillata	Rough Rabbitsfoot	S2	E	LE
TN	Greene	Villosa fabalis	Rayed Bean	S1		LE
TN	Greene	Villosa trabalis	Cumberland Bean	S1	E	LE
TN	Greene	Heracleum maximum	Cow Parsnip	S2	S	
TN	Greene	Hydrocotyle americana	American Water-pennywort	S1	E	
TN	Greene	Thaspium pinnatifidum	cutleaf meadow-parsnip	S1	E	
TN	Greene	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Greene	Asclepias purpurascens	Purple Milkweed	S1	S	
TN	Greene	Chrysogonum virginianum	Green-and-gold	S2	T	
TN	Greene	Coreopsis latifolia	Broad-leaved Tickseed	S1S2	E	
TN	Greene	Helianthus glaucophyllus	White-leaved Sunflower	S1	T	
TN	Greene	Berberis canadensis	American barberry	S2	S	
TN	Greene	Caulophyllum giganteum	Blue Cohosh	S1	T	
TN	Greene	Cardamine flagellifera	Bitter Cress	S2	T	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Greene	Draba ramosissima	Branching Whitlow-wort	S2	S	
TN	Greene	Campanula aparinoides	Marsh Bellflower	S2	S	
TN	Greene	Silene ovata	Ovate Catchfly	S2	E	
TN	Greene	Hypericum mitchellianum	Blue Ridge St. John's-wort	S2	T	
TN	Greene	Menziesia pilosa	Fetterbush	S2	S	
TN	Greene	Thermopsis fraxinifolia	Ash-leaved Bush-pea	S3	T	
TN	Greene	Adlumia fungosa	Climbing Fumitory	S2	T	
TN	Greene	Fothergilla major	Witch-alder	S2	T	
TN	Greene	Hydrophyllum virginianum	Virginia Waterleaf	S3	T	
TN	Greene	Monotropsis odorata	Sweet Pinesap	S2	T	
TN	Greene	Epilobium ciliatum	Willow-herb	S1	T	
TN	Greene	Polygonum cilinode	Fringed Black Bindweed	S1S2	T	
TN	Greene	Trientalis borealis	Northern Starflower	S1	T	
TN	Greene	Caltha palustris	Marsh-marigold	S1	E	
TN	Greene	Prunus virginiana	Chokecherry	S1	S	
TN	Greene	Buckleya distichophylla	piratebush	S2	T	
TN	Greene	Agalinis setacea	Thread-leaved Gerardia	SH	S	
TN	Greene	Pedicularis lanceolata	Swamp Lousewort	S1S2	S	
TN	Greene	Xerophyllum asphodeloides	Eastern Turkeybeard	S3	T	
TN	Greene	Platanthera grandiflora	Large Purple Fringed Orchid	S2	E	
TN	Greene	Platanthera psycodes	Small Purple Fringe Orchid	S2	S	
TN	Greene	Poa palustris	Fowl Bluegrass	S1	E	
TN	Greene	Dryopteris carthusiana	Spinulose Woodfern	S1	T	
TN	Grundy	Gyrinophilus palleucus	Tennessee Cave Salamander	S2	T	
TN	Grundy	Hemidactylium scutatum	Four-toed Salamander	S3	D	
TN	Grundy	Ixobrychus exilis	Least Bittern	S2B	D	
TN	Grundy	Falco peregrinus	Peregrine Falcon	S1B	E	
TN	Grundy	Rallus elegans	King Rail	S2	D	
TN	Grundy	Setophaga cerulea	Cerulean Warbler	S3B	D	
TN	Grundy	Hemitremia flammea	Flame Chub	S3	D	
TN	Grundy	Typhlichthys subterraneus	Southern Cavefish	S3	D	
TN	Grundy	Fundulus julisia	Barrens Topminnow	S1	E	
TN	Grundy	Etheostoma akatulo	Bluemask Darter	S1	E	LE

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Grundy	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Grundy	Sorex fumeus	Smoky Shrew	S4	D	
TN	Grundy	Myotis grisescens	Gray Bat	S2	E	LE
TN	Grundy	Myotis sodalis	Indiana Bat	S1	E	LE
TN	Grundy	Corynorhinus rafinesquii	Rafinesque’s Big-eared bat	S3	D	
TN	Grundy	Neotoma magister	Allegheny Woodrat	S3	D	
TN	Grundy	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	S3	D	
TN	Grundy	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S3	T	
TN	Grundy	Diacyclops yeatmani	Yeatmans Groundwater Copepod	S1	TRKD	
TN	Grundy	Alasmidonta atropurpurea	Cumberland Elktoe	S1S2	E	LE
TN	Grundy	Pleurobema gibberum	Cumberland Pigtoe	S1	E	LE
TN	Grundy	Cololejeunea ornata	Liverwort	S1	T	
TN	Grundy	Lejeunea blomquistii	Blomquist Leafy Liverwort	S1S2	S	
TN	Grundy	Radula voluta	Liverwort	S2	S	
TN	Grundy	Lejeunea sharpii	Sharp's Lejeunea	S1S2	E	
TN	Grundy	Cotinus obovatus	American Smoke-tree	S2	S	
TN	Grundy	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Grundy	Helianthus eggertii	Eggert's Sunflower	S3	S	DM
TN	Grundy	Marshallia trinervia	Broadleaf Barbara's-buttons	S2S3	T	
TN	Grundy	Armoracia lacustris	Lake-cress	S2	S	
TN	Grundy	Paronychia argyrocoma	Silverling	S1S2	T	
TN	Grundy	Diamorpha smallii	Small's Stonecrop	S1S2	E	
TN	Grundy	Gaylussacia dumosa	Dwarf Huckleberry	S3	T	
TN	Grundy	Vaccinium macrocarpon	Large Cranberry	S2	T	
TN	Grundy	Juglans cinerea	Butternut	S3	T	
TN	Grundy	Monotropsis odorata	Sweet Pinesap	S2	T	
TN	Grundy	Phemeranthus teretifolius	Roundleaf Fameflower	S2	T	
TN	Grundy	Clematis morefieldii	Morefield's Leather-flower	S2	E	LE
TN	Grundy	Ranunculus flabellaris	Yellow Water-crowfoot	S2	T	
TN	Grundy	Carex echinata ssp. echinata	Little Prickly Sedge	S1?	S	
TN	Grundy	Carex hitchcockiana	Sedge	S1	T	
TN	Grundy	Allium tricoccum	Small White Leek	S1S2	S-C	
TN	Grundy	Lilium philadelphicum	Wood Lily	S1	E	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Grundy	Veratrum woodii	Ozark Bunchflower	S1	E	
TN	Grundy	Zigadenus leimanthoides	Death-camas	S2	T	
TN	Grundy	Liparis loeselii	Loesel's Twayblade	S1	T	
TN	Grundy	Platanthera integrilabia	White Fringeless Orchid	S2S3	E	LT
TN	Grundy	Glyceria acutiflora	Manna-grass	S2	S	
TN	Grundy	Panicum hemitomon	Maidencane	S2	S	
TN	Grundy	Sparganium androcladum	Branching Burreed	S1	E	
TN	Grundy	Xyris laxifolia var. iridifolia	Yellow-eyed-grass	S2	T	
TN	Grundy	Woodwardia virginica	Virginia Chainfern	S2	S	
TN	Grundy	Trichomanes petersii	Dwarf Filmy-fern	S2	T	
TN	Hamblen	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Hamblen	Erimystax cahni	Slender Chub	S1	T	LT
TN	Hamblen	Carpiodes velifer	Highfin Carpsucker	S2S3	D	
TN	Hamblen	Percina tanasi	Snail Darter	S2S3	T	LT
TN	Hamblen	Synaptomys cooperi	Southern Bog Lemming	S4	D	
TN	Hamblen	Cumberlandia monodonta	Spectaclecase	S2S3		LE
TN	Hamblen	Dromus dromas	Dromedary Pearlymussel	S1	E	LE
TN	Hamblen	Epioblasma capsaeformis	Oyster Mussel	S1	E	LE
TN	Hamblen	Epioblasma florentina walkeri	Tan Riffleshell	S1	E	LE
TN	Hamblen	Epioblasma torulosa gubernaculum	Green Blossom Pearlymussel	SX	E	LE
TN	Hamblen	Epioblasma turgidula	Turgid Blossom Pearlymussel	SX	E	LE
TN	Hamblen	Fusconaia cuneolus	Fine-rayed Pigtoe	S1	E	LE
TN	Hamblen	Lemiox rimosus	Birdwing Pearlymussel	S1	E	LE
TN	Hamblen	Phlox subulata	Moss phlox	S1	T	
TN	Hamblen	Trillium tennesseense	Lilly	S1	E	
TN	Hamblen	Botrychium jenmanii	Alabama Grapefern	S1	T	
TN	Hamilton	Gyrinophilus palleucus	Tennessee Cave Salamander	S2	T	
TN	Hamilton	Ixobrychus exilis	Least Bittern	S2B	D	
TN	Hamilton	Ardea alba	Great Egret	S2B,S3N	D	
TN	Hamilton	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Hamilton	Accipiter striatus	Sharp-shinned Hawk	S3B,S4N	D	
TN	Hamilton	Falco peregrinus	Peregrine Falcon	S1B	E	
TN	Hamilton	Rallus elegans	King Rail	S2	D	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Hamilton	Tyto alba	Common Barn-owl	S3	D	
TN	Hamilton	Vermivora chrysoptera	Golden-winged Warbler	S3B	D	
TN	Hamilton	Limnothlypis swainsonii	Swainson's Warbler	S3	D	
TN	Hamilton	Peucaea aestivalis	Bachman's Sparrow	S1B	E	
TN	Hamilton	Acipenser fulvescens	Lake Sturgeon	S1	E	
TN	Hamilton	Carpiodes velifer	Highfin Carpsucker	S2S3	D	
TN	Hamilton	Etheostoma cinereum	Ashy Darter	S2S3	T	
TN	Hamilton	Percina tanasi	Snail Darter	S2S3	T	LT
TN	Hamilton	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Hamilton	Sorex fumeus	Smoky Shrew	S4	D	
TN	Hamilton	Neotoma magister	Allegheny Woodrat	S3	D	
TN	Hamilton	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	S3	D	
TN	Hamilton	Cambarus extraneus	Chickamauga Crayfish	S1S2	T	
TN	Hamilton	Dromus dromas	Dromedary Pearlymussel	S1	E	LE
TN	Hamilton	Epioblasma torulosa torulosa	Tuberculed Blossom Pearlymussel	SX	E	LE
TN	Hamilton	Lampsilis abrupta	Pink Mucket	S2	E	LE
TN	Hamilton	Plethobasus cooperianus	Orange-foot Pimpleback	S1	E	LE
TN	Hamilton	Pleurobema plenum	Rough Pigtoe	S1	E	LE
TN	Hamilton	Quadrula intermedia	Cumberland Monkeyface	S1	E	LE
TN	Hamilton	Lejeunea blomquistii	Blomquist Leafy Liverwort	S1S2	S	
TN	Hamilton	Metzgeria uncigera	Liverwort	S1	S	
TN	Hamilton	Lejeunea sharpii	Sharp's Lejeunea	S1S2	E	
TN	Hamilton	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Hamilton	Helianthus occidentalis	naked-stem sunflower	S2	S	
TN	Hamilton	Silphium laciniatum	Compass-plant	S2	T	
TN	Hamilton	Silphium pinnatifidum	Prairie-dock	S2	T	
TN	Hamilton	Solidago ptarmicoides	Prairie Goldenrod	S1S2	E	
TN	Hamilton	Stylisma humistrata	Southern Southern Morning-glory	S1	T	
TN	Hamilton	Diervilla lonicera	Northern Bush-honeysuckle	S2	T	
TN	Hamilton	Diervilla sessilifolia var. rivularis	Mountain Bush-honeysuckle	S2	T	
TN	Hamilton	Lonicera dioica	Mountain Honeysuckle	S2	S	
TN	Hamilton	Lonicera flava	Yellow Honeysuckle	S1	T	
TN	Hamilton	Diamorpha smallii	Small's Stonecrop	S1S2	E	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Hamilton	Thermopsis fraxinifolia	Ash-leaved Bush-pea	S3	T	
TN	Hamilton	Thermopsis mollis	Soft-haired Thermopsis	S2S3	S	
TN	Hamilton	Castanea dentata	American Chestnut	S2S3	S	
TN	Hamilton	Corydalis sempervirens	Pale Corydalis	S1S2	S	
TN	Hamilton	Sabatia capitata	Rose-gentian	S2	E	
TN	Hamilton	Ribes curvatum	Granite Gooseberry	S1	T	
TN	Hamilton	Scutellaria montana	Large-flowered Skullcap	S4	T	LT
TN	Hamilton	Polygala nana	Dwarf Milkwort	S1	E	
TN	Hamilton	Phemeranthus calcaricus	Limestone Fame-flower	S3	S	
TN	Hamilton	Phemeranthus mengesii	Fame-flower	S2	T	
TN	Hamilton	Phemeranthus teretifolius	Roundleaf Fameflower	S2	T	
TN	Hamilton	Lysimachia fraseri	Fraser Loosestrife	S2	E	
TN	Hamilton	Clematis fremontii	Fremont's Virgin's-bower	S1	E	
TN	Hamilton	Clematis glaucophylla	Whiteleaf Leatherflower	S1	S	
TN	Hamilton	Delphinium exaltatum	Tall Larkspur	S2	E	
TN	Hamilton	Spiraea virginiana	Virginia Spiraea	S2	E	LT
TN	Hamilton	Nestronia umbellula	Nestronia	S1	E	
TN	Hamilton	Aureolaria patula	Spreading False-foxglove	S3	S	
TN	Hamilton	Collinsia verna	Blue-eyed Mary	S1	E	
TN	Hamilton	Gratiola floridana	Florida Hedge-hyssop	S1	E	
TN	Hamilton	Sagittaria platyphylla	Ovate-leaved Arrowhead	S2S3	S	
TN	Hamilton	Cyperus plukenetii	Plukenet's Cyperus	S1	S	
TN	Hamilton	Lilium philadelphicum	Wood Lily	S1	E	
TN	Hamilton	Trillium lancifolium	Lance-leaf Trillium	S1	E	
TN	Hamilton	Trillium rugelii	Southern Nodding Trillium	S2	E	
TN	Hamilton	Isotria medeoloides	Small Whorled Pogonia	S1	E	LT
TN	Hamilton	Platanthera integrilabia	White Fringeless Orchid	S2S3	E	LT
TN	Hamilton	Danthonia epilis	Bog Oat-grass	S1S2	S	
TN	Hamilton	Glyceria acutiflora	Manna-grass	S2	S	
TN	Hamilton	Sacciolepis striata	Gibbous Panic-grass	S1	S	
TN	Hamilton	Potamogeton epihydrus	Creekgrass	S1S2	S	
TN	Hamilton	Woodwardia virginica	Virginia Chainfern	S2	S	
TN	Hancock	Cryptobranchus alleganiensis	Hellbender	S3	D	PS

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Hancock	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Hancock	Acipenser fulvescens	Lake Sturgeon	S1	E	
TN	Hancock	Notropis rubellus	Rosyface Shiner	S2	D	
TN	Hancock	Chrosomus tennesseensis	Tennessee Dace	S3	D	
TN	Hancock	Erimystax cahni	Slender Chub	S1	T	LT
TN	Hancock	Carpiodes velifer	Highfin Carpsucker	S2S3	D	
TN	Hancock	Noturus flavipinnis	Yellowfin Madtom	S1	E	LT
TN	Hancock	Noturus stanauli	Pygmy Madtom	S1	E	LE
TN	Hancock	Etheostoma cinereum	Ashy Darter	S2S3	T	
TN	Hancock	Percina aurantiaca	Tangerine Darter	S3	D	
TN	Hancock	Percina burtoni	Blotchside Logperch	S2	D	
TN	Hancock	Myotis grisescens	Gray Bat	S2	E	LE
TN	Hancock	Corynorhinus rafinesquii	Rafinesque’s Big-eared bat	S3	D	
TN	Hancock	Neotoma magister	Allegheny Woodrat	S3	D	
TN	Hancock	Cumberlandia monodonta	Spectaclecase	S2S3		LE
TN	Hancock	Cyprogenia stegaria	Fanshell	S1	E	LE
TN	Hancock	Dromus dromas	Dromedary Pearlymussel	S1	E	LE
TN	Hancock	Epioblasma brevidens	Cumberlandian Combshell	S1	E	LE
TN	Hancock	Epioblasma capsaeformis	Oyster Mussel	S1	E	LE
TN	Hancock	Epioblasma florentina walkeri	Tan Riffleshell	S1	E	LE
TN	Hancock	Epioblasma torulosa gubernaculum	Green Blossom Pearlymussel	SX	E	LE
TN	Hancock	Epioblasma triquetra	Snuffbox	S3		LE
TN	Hancock	Fusconaia cor	Shiny Pigtoe Pearlymussel	S1	E	LE
TN	Hancock	Fusconaia cuneolus	Fine-rayed Pigtoe	S1	E	LE
TN	Hancock	Hemistena lata	Cracking Pearlymussel	S1	E	LE
TN	Hancock	Lampsilis abrupta	Pink Mucket	S2	E	LE
TN	Hancock	Lemiox rimosus	Birdwing Pearlymussel	S1	E	LE
TN	Hancock	Pleuronaia dolabelloides	Slabside Pearlymussel	S2		LE
TN	Hancock	Plethobasus cyphyus	Sheepnose	S2S3		LE
TN	Hancock	Pleurobema plenum	Rough Pigtoe	S1	E	LE
TN	Hancock	Ptychobranchus subtentum	Fluted Kidneyshell	S2		LE
TN	Hancock	Quadrula cylindrica strigillata	Rough Rabbitsfoot	S2	E	LE
TN	Hancock	Quadrula intermedia	Cumberland Monkeyface	S1	E	LE

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Hancock	Quadrula sparsa	Appalachian Monkeyface	S1	E	LE
TN	Hancock	Villosa perpurpurea	Purple Bean	S1	E	LE
TN	Hancock	Draba ramosissima	Branching Whitlow-wort	S2	S	
TN	Hancock	Lonicera dioica	Mountain Honeysuckle	S2	S	
TN	Hancock	Meehania cordata	Meehania Mint (Heart-leaf Meehania)	S2	T	
TN	Hancock	Thuja occidentalis	Northern White Cedar	S3	S	
TN	Hardeman	Acris gryllus	Southern Cricket Frog	S3	D	
TN	Hardeman	Hyla gratiosa	Barking Treefrog	S3	D	
TN	Hardeman	Setophaga cerulea	Cerulean Warbler	S3B	D	
TN	Hardeman	Limnothlypis swainsonii	Swainson's Warbler	S3	D	
TN	Hardeman	Chondestes grammacus	Lark Sparrow	S1B	T	
TN	Hardeman	Noturus stigmosus	Northern Madtom	S3	D	
TN	Hardeman	Ammocrypta beani	Naked Sand Darter	S2	D	
TN	Hardeman	Ammocrypta vivax	Scaly Sand Darter	S2	D	
TN	Hardeman	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Hardeman	Myotis grisescens	Gray Bat	S2	E	LE
TN	Hardeman	Synaptomys cooperi	Southern Bog Lemming	S4	D	
TN	Hardeman	Zapus hudsonius	Meadow Jumping Mouse	S4	D	
TN	Hardeman	Macrochelys temminckii	Alligator Snapping Turtle	S2S3	D	
TN	Hardeman	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	S3	D	
TN	Hardeman	Sistrurus miliarius streckeri	Western Pigmy Rattlesnake	S2S3	T	
TN	Hardeman	Ceratophyllum echinatum	Prickly Hornwort	S1	S	
TN	Hardeman	Magnolia virginiana	Sweetbay Magnolia	S2	T	
TN	Hardeman	Penstemon tubiflorus	Small Flowered Beardtongue	S1	S	
TN	Hardeman	Symplocos tinctoria	Horsesugar	S2	S	
TN	Hardin	Cryptobranchus alleganiensis	Hellbender	S3	D	PS
TN	Hardin	Acris gryllus	Southern Cricket Frog	S3	D	
TN	Hardin	Egretta caerulea	Little Blue Heron	S2B,S3N	D	
TN	Hardin	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Hardin	Thryomanes bewickii	Bewick's Wren	S1	E	
TN	Hardin	Limnothlypis swainsonii	Swainson's Warbler	S3	D	
TN	Hardin	Chondestes grammacus	Lark Sparrow	S1B	T	
TN	Hardin	Ichthyomyzon gagei	Southern Brook Lamprey	S1	D	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Hardin	Hemitremia flammea	Flame Chub	S3	D	
TN	Hardin	Carpiodes velifer	Highfin Carpsucker	S2S3	D	
TN	Hardin	Cycleptus elongatus	Blue Sucker	S2	T	
TN	Hardin	Noturus fasciatus	Saddled Madtom	S2	T	
TN	Hardin	Typhlichthys subterraneus	Southern Cavefish	S3	D	
TN	Hardin	Etheostoma tuscumbia	Tuscumbia Darter	SX	D	
TN	Hardin	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Hardin	Myotis grisescens	Gray Bat	S2	E	LE
TN	Hardin	Zapus hudsonius	Meadow Jumping Mouse	S4	D	
TN	Hardin	Sistrurus miliarius streckeri	Western Pigmy Rattlesnake	S2S3	T	
TN	Hardin	Orconectes wrighti	Hardin Crayfish	S2	E	
TN	Hardin	Cumberlandia monodonta	Spectaclecase	S2S3		LE
TN	Hardin	Cyprogenia stegaria	Fanshell	S1	E	LE
TN	Hardin	Hemistena lata	Cracking Pearlymussel	S1	E	LE
TN	Hardin	Lampsilis abrupta	Pink Mucket	S2	E	LE
TN	Hardin	Pleuronaia dolabelloides	Slabside Pearlymussel	S2		LE
TN	Hardin	Obovaria retusa	Ring Pink	S1	E	LE
TN	Hardin	Plethobasus cicatricosus	White Wartyback	S1	E	LE
TN	Hardin	Plethobasus cooperianus	Orange-foot Pimpleback	S1	E	LE
TN	Hardin	Plethobasus cyphyus	Sheepnose	S2S3		LE
TN	Hardin	Pleurobema clava	Clubshell	SH	E	LE
TN	Hardin	Pleurobema plenum	Rough Pigtoe	S1	E	LE
TN	Hardin	Quadrula cylindrica	Rabbitsfoot			LT
TN	Hardin	Pleurocera alveare	Rugged Hornsnail	S2	TRKD	
TN	Hardin	Pleurocera curta	Shortspire Hornsnail	S2	TRKD	
TN	Hardin	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Hardin	Prenanthes barbata	Barbed Rattlesnake-root	S2	S	
TN	Hardin	Turritis glabra	Tower-mustard	S1	S	
TN	Hardin	Silene ovata	Ovate Catchfly	S2	E	
TN	Hardin	Stylisma humistrata	Southern Southern Morning-glory	S1	T	
TN	Hardin	Apios priceana	Price's Potato-bean	S3	E	LT
TN	Hardin	Salvia azurea var. grandiflora	Blue Sage	S3	S	
TN	Hardin	Didiplis diandra	Water-purslane	S1	T	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Hardin	Polygala mariana	Maryland Milkwort	S1	S	
TN	Hardin	Lysimachia fraseri	Fraser Loosestrife	S2	E	
TN	Hardin	Symplocos tinctoria	Horsesugar	S2	S	
TN	Hardin	Iris brevicaulis	Lamance Iris	S1	E	
TN	Hardin	Erythronium rostratum	Yellow Trout-lily	S2	S	
TN	Hardin	Melanthium virginicum	Bunchflower	S1	E	
TN	Hawkins	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Hawkins	Tyto alba	Common Barn-owl	S3	D	
TN	Hawkins	Corvus corax	Common Raven	S2	T	
TN	Hawkins	Chrosomus tennesseensis	Tennessee Dace	S3	D	
TN	Hawkins	Erimonax monachus	Spotfin Chub	S2	T	LT
TN	Hawkins	Carpiodes velifer	Highfin Carpsucker	S2S3	D	
TN	Hawkins	Percina aurantiaca	Tangerine Darter	S3	D	
TN	Hawkins	Percina burtoni	Blotchside Logperch	S2	D	
TN	Hawkins	Sorex cinereus	Common Shrew	S4	D	
TN	Hawkins	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Hawkins	Parascalops breweri	Hairy-tailed Mole	S3	D	
TN	Hawkins	Myotis grisescens	Gray Bat	S2	E	LE
TN	Hawkins	Myotis sodalis	Indiana Bat	S1	E	LE
TN	Hawkins	Corynorhinus rafinesquii	Rafinesque’s Big-eared bat	S3	D	
TN	Hawkins	Neotoma magister	Allegheny Woodrat	S3	D	
TN	Hawkins	Synaptomys cooperi	Southern Bog Lemming	S4	D	
TN	Hawkins	Napaeozapus insignis	Woodland Jumping Mouse	S4	D	
TN	Hawkins	Epioblasma torulosa gubernaculum	Green Blossom Pearlymussel	SX	E	LE
TN	Hawkins	Epioblasma turgidula	Turgid Blossom Pearlymussel	SX	E	LE
TN	Hawkins	Fusconaia cor	Shiny Pigtoe Pearlymussel	S1	E	LE
TN	Hawkins	Fusconaia cuneolus	Fine-rayed Pigtoe	S1	E	LE
TN	Hawkins	Lemiox rimosus	Birdwing Pearlymussel	S1	E	LE
TN	Hawkins	Quadrula intermedia	Cumberland Monkeyface	S1	E	LE
TN	Hawkins	Villosa perpurpurea	Purple Bean	S1	E	LE
TN	Hawkins	Villosa trabalis	Cumberland Bean	S1	E	LE
TN	Hawkins	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Hawkins	Berberis canadensis	American barberry	S2	S	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Hawkins	Cardamine rotundifolia	Roundleaf Water-cress	S2S3	S	
TN	Hawkins	Paxistima canbyi	Canby's Mountain-lover	S1	E	
TN	Hawkins	Lonicera dioica	Mountain Honeysuckle	S2	S	
TN	Hawkins	Pieris floribunda	Mountain Fetter-bush	S2	T	
TN	Hawkins	Juglans cinerea	Butternut	S3	T	
TN	Hawkins	Trillium tennesseense	Lilly	S1	E	
TN	Haywood	Thryomanes bewickii	Bewick's Wren	S1	E	
TN	Haywood	Setophaga cerulea	Cerulean Warbler	S3B	D	
TN	Haywood	Limnothlypis swainsonii	Swainson's Warbler	S3	D	
TN	Haywood	Cycleptus elongatus	Blue Sucker	S2	T	
TN	Haywood	Noturus stigmosus	Northern Madtom	S3	D	
TN	Haywood	Ammocrypta beani	Naked Sand Darter	S2	D	
TN	Haywood	Ammocrypta vivax	Scaly Sand Darter	S2	D	
TN	Haywood	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Haywood	Corynorhinus rafinesquii	Rafinesque’s Big-eared bat	S3	D	
TN	Haywood	Neotoma floridana illinoensis	Eastern Woodrat	S3	D	
TN	Haywood	Ceratophyllum echinatum	Prickly Hornwort	S1	S	
TN	Haywood	Agalinis heterophylla	Prairie False-foxglove	S1	E	
TN	Haywood	Ulmus crassifolia	Cedar Elm	S2	S	
TN	Haywood	Carex reniformis	Sedge	S1	S	
TN	Henderson	Thryomanes bewickii	Bewick's Wren	S1	E	
TN	Henderson	Setophaga cerulea	Cerulean Warbler	S3B	D	
TN	Henderson	Limnothlypis swainsonii	Swainson's Warbler	S3	D	
TN	Henderson	Peucaea aestivalis	Bachman's Sparrow	S1B	E	
TN	Henderson	Chondestes grammacus	Lark Sparrow	S1B	T	
TN	Henderson	Etheostoma pyrrhogaster	Firebelly Darter	S2	D	
TN	Henderson	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Henderson	Zapus hudsonius	Meadow Jumping Mouse	S4	D	
TN	Henderson	Macrochelys temminckii	Alligator Snapping Turtle	S2S3	D	
TN	Henderson	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	S3	D	
TN	Henderson	Plestiodon anthracinus	Coal Skink	S1	D	
TN	Henderson	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S3	T	
TN	Henderson	Panax quinquefolius	American ginseng	S3S4	S-C	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Henderson	Fuirena squarrosa	Hairy Umbrella-sedge	S1	S	
TN	Henderson	Pilularia americana	American Pillwort	S1S2	S	
TN	Henry	Hemidactylium scutatum	Four-toed Salamander	S3	D	
TN	Henry	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Henry	Chondestes grammacus	Lark Sparrow	S1B	T	
TN	Henry	Atractosteus spatula	Alligator Gar	S1	D	
TN	Henry	Noturus stigmosus	Northern Madtom	S3	D	
TN	Henry	Etheostoma pyrrhogaster	Firebelly Darter	S2	D	
TN	Henry	Myotis sodalis	Indiana Bat	S1	E	LE
TN	Henry	Macrochelys temminckii	Alligator Snapping Turtle	S2S3	D	
TN	Henry	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S3	T	
TN	Henry	Hieracium longipilum	Hairy Hawkweed	S1	S	
TN	Henry	Silphium laciniatum	Compass-plant	S2	T	
TN	Henry	Myriophyllum pinnatum	Water-milfoil	S1	E	
TN	Henry	Salvia azurea var. grandiflora	Blue Sage	S3	S	
TN	Henry	Didiplis diandra	Water-purslane	S1	T	
TN	Henry	Polygonum arifolium	Halberd-leaf Tearthumb	S1	T	
TN	Henry	Carex reniformis	Sedge	S1	S	
TN	Henry	Bolboschoenus fluviatilis	River Bulrush	S1	S	
TN	Henry	Heteranthera limosa	Smaller Mud-plantain	S1S2	T	
TN	Henry	Isoetes melanopoda	Blackfoot Quillwort	S1S2	E	
TN	Hickman	Setophaga cerulea	Cerulean Warbler	S3B	D	
TN	Hickman	Ichthyomyzon gagei	Southern Brook Lamprey	S1	D	
TN	Hickman	Noturus stanauli	Pygmy Madtom	S1	E	LE
TN	Hickman	Noturus fasciatus	Saddled Madtom	S2	T	
TN	Hickman	Typhlichthys subterraneus	Southern Cavefish	S3	D	
TN	Hickman	Etheostoma aquali	Coppercheek Darter	S2S3	T	
TN	Hickman	Etheostoma luteovinctum	Redband Darter	S4	D	
TN	Hickman	Etheostoma pseudovulatum	Egg-mimic Darter	S1	E	
TN	Hickman	Percina burtoni	Blotchside Logperch	S2	D	
TN	Hickman	Percina phoxocephala	Slenderhead Darter	S3	D	
TN	Hickman	Myotis grisescens	Gray Bat	S2	E	LE
TN	Hickman	Myotis sodalis	Indiana Bat	S1	E	LE

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Hickman	Myotis septentrionalis	Northern Long-eared Bat	S1S2		LT
TN	Hickman	Neotoma magister	Allegheny Woodrat	S3	D	
TN	Hickman	Zapus hudsonius	Meadow Jumping Mouse	S4	D	
TN	Hickman	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S3	T	
TN	Hickman	Sistrurus miliarius streckeri	Western Pigmy Rattlesnake	S2S3	T	
TN	Hickman	Lampsilis abrupta	Pink Mucket	S2	E	LE
TN	Hickman	Lemiox rimosus	Birdwing Pearlymussel	S1	E	LE
TN	Hickman	Pleuronaia dolabelloides	Slabside Pearlymussel	S2		LE
TN	Hickman	Quadrula cylindrica	Rabbitsfoot			LT
TN	Hickman	Quadrula cylindrica cylindrica	Smooth Rabbitsfoot	S3		LT
TN	Hickman	Quadrula fragosa	Winged Mapleleaf	S1	E	LE
TN	Hickman	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Hickman	Paysonia densipila	Duck River Bladderpod	S3	S	
TN	Hickman	Cerastium arvense ssp. velutinum	Velvety Cerastium	S1	E	
TN	Hickman	Stellaria fontinalis	Water Stitchwort	S3	S	
TN	Hickman	Apios priceana	Price's Potato-bean	S3	E	LT
TN	Hickman	Juglans cinerea	Butternut	S3	T	
TN	Hickman	Collinsia verna	Blue-eyed Mary	S1	E	
TN	Hickman	Vitis rupestris	Sand Grape	S1	E	
TN	Hickman	Carex hirtifolia	Sedge	S1S2	S	
TN	Hickman	Erythronium rostratum	Yellow Trout-lily	S2	S	
TN	Hickman	Veratrum woodii	Ozark Bunchflower	S1	E	
TN	Hickman	Elymus svensonii	Svenson's Wild-rye	S2	T	
TN	Houston	Egretta caerulea	Little Blue Heron	S2B,S3N	D	
TN	Houston	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Houston	Percina burtoni	Blotchside Logperch	S2	D	
TN	Houston	Percina phoxocephala	Slenderhead Darter	S3	D	
TN	Houston	Myotis grisescens	Gray Bat	S2	E	LE
TN	Houston	Macrochelys temminckii	Alligator Snapping Turtle	S2S3	D	
TN	Houston	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S3	T	
TN	Houston	Vitis rupestris	Sand Grape	S1	E	
TN	Humphreys	Cryptobranchus alleganiensis	Hellbender	S3	D	PS
TN	Humphreys	Anhinga anhinga	Anhinga	S1B	D	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Humphreys	Ardea alba	Great Egret	S2B,S3N	D	
TN	Humphreys	Egretta caerulea	Little Blue Heron	S2B,S3N	D	
TN	Humphreys	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Humphreys	Charadrius melodus	Piping Plover			LE
TN	Humphreys	Thryomanes bewickii	Bewick's Wren	S1	E	
TN	Humphreys	Carpiodes velifer	Highfin Carpsucker	S2S3	D	
TN	Humphreys	Cycleptus elongatus	Blue Sucker	S2	T	
TN	Humphreys	Noturus stanauli	Pygmy Madtom	S1	E	LE
TN	Humphreys	Noturus fasciatus	Saddled Madtom	S2	T	
TN	Humphreys	Etheostoma aquali	Coppercheek Darter	S2S3	T	
TN	Humphreys	Percina burtoni	Blotchside Logperch	S2	D	
TN	Humphreys	Percina phoxocephala	Slenderhead Darter	S3	D	
TN	Humphreys	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Humphreys	Neotoma magister	Allegheny Woodrat	S3	D	
TN	Humphreys	Zapus hudsonius	Meadow Jumping Mouse	S4	D	
TN	Humphreys	Macrochelys temminckii	Alligator Snapping Turtle	S2S3	D	
TN	Humphreys	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S3	T	
TN	Humphreys	Sistrurus miliarius streckeri	Western Pigmy Rattlesnake	S2S3	T	
TN	Humphreys	Cumberlandia monodonta	Spectaclecase	S2S3		LE
TN	Humphreys	Lampsilis abrupta	Pink Mucket	S2	E	LE
TN	Humphreys	Pleuronaia dolabelloides	Slabside Pearlymussel	S2		LE
TN	Humphreys	Obovaria retusa	Ring Pink	S1	E	LE
TN	Humphreys	Plethobasus cooperianus	Orange-foot Pimpleback	S1	E	LE
TN	Humphreys	Pleurobema clava	Clubshell	SH	E	LE
TN	Humphreys	Pleurobema plenum	Rough Pigtoe	S1	E	LE
TN	Humphreys	Quadrula cylindrica	Rabbitsfoot			LT
TN	Humphreys	Quadrula cylindrica cylindrica	Smooth Rabbitsfoot	S3		LT
TN	Humphreys	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Humphreys	Pseudognaphalium helleri	Heller's Catfoot	S2	S	
TN	Humphreys	Prenanthes barbata	Barbed Rattlesnake-root	S2	S	
TN	Humphreys	Hasteola suaveolens	Sweet-scented Indian-plantain	S2	S	
TN	Humphreys	Boechera shortii	Short's Rock-cress	S1S2	S	
TN	Humphreys	Phlox pilosa ssp. ozarkana	Downy Phlox	S1S2	S	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Humphreys	Lysimachia fraseri	Fraser Loosestrife	S2	E	
TN	Humphreys	Sagittaria brevirostra	Short-beak Arrowhead	S1	T	
TN	Humphreys	Carex hirtifolia	Sedge	S1S2	S	
TN	Humphreys	Carex reniformis	Sedge	S1	S	
TN	Humphreys	Bolboschoenus fluviatilis	River Bulrush	S1	S	
TN	Humphreys	Iris brevicaulis	Lamance Iris	S1	E	
TN	Humphreys	Liparis loeselii	Loesel's Twayblade	S1	T	
TN	Humphreys	Spiranthes odorata	Sweetscent Ladies'-tresses	S1	E	
TN	Humphreys	Echinochloa walteri	Walter's Barnyard Grass	S1	S	
TN	Humphreys	Heteranthera limosa	Smaller Mud-plantain	S1S2	T	
TN	Jackson	Ambystoma barbouri	Streamside Salamander	S2	D	
TN	Jackson	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Jackson	Aquila chrysaetos	Golden Eagle	S1	T	
TN	Jackson	Crystallaria asprella	Crystal Darter	SX	D	
TN	Jackson	Etheostoma cinereum	Ashy Darter	S2S3	T	
TN	Jackson	Myotis grisescens	Gray Bat	S2	E	LE
TN	Jackson	Neotoma magister	Allegheny Woodrat	S3	D	
TN	Jackson	Zapus hudsonius	Meadow Jumping Mouse	S4	D	
TN	Jackson	Orconectes incomptus	Tennessee Cave Crayfish	S1	E	
TN	Jackson	Cumberlandia monodonta	Spectaclecase	S2S3		LE
TN	Jackson	Dromus dromas	Dromedary Pearlymussel	S1	E	LE
TN	Jackson	Epioblasma florentina florentina	Yellow-blossom Pearlymussel	SX	E	LE
TN	Jackson	Pilsbryna aurea	Ornate Bud	S1	TRKD	
TN	Jackson	Physaria globosa	Lesquereux's Mustard	S2	E	LE
TN	Jackson	Lonicera dioica	Mountain Honeysuckle	S2	S	
TN	Jackson	Geranium robertianum	Herb-robert	S1	S	
TN	Jackson	Juglans cinerea	Butternut	S3	T	
TN	Jackson	Carex hitchcockiana	Sedge	S1	T	
TN	Jefferson	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Jefferson	Charadrius melodus	Piping Plover			LE
TN	Jefferson	Acipenser fulvescens	Lake Sturgeon	S1	E	
TN	Jefferson	Myotis grisescens	Gray Bat	S2	E	LE
TN	Jefferson	Dromus dromas	Dromedary Pearlymussel	S1	E	LE

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Jefferson	Epioblasma torulosa gubernaculum	Green Blossom Pearlymussel	SX	E	LE
TN	Jefferson	Fusconaia cuneolus	Fine-rayed Pigtoe	S1	E	LE
TN	Jefferson	Lampsilis abrupta	Pink Mucket	S2	E	LE
TN	Jefferson	Plethobasus cyphyus	Sheepnose	S2S3		LE
TN	Jefferson	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Jefferson	Eurybia schreberi	Schreber Aster	S1	S	
TN	Jefferson	Arabis patens	Spreading Rockcress	S1	E	
TN	Jefferson	Corydalis sempervirens	Pale Corydalis	S1S2	S	
TN	Johnson	Cryptobranchus alleganiensis	Hellbender	S3	D	PS
TN	Johnson	Hemidactylium scutatum	Four-toed Salamander	S3	D	
TN	Johnson	Plethodon welleri	Weller's Salamander	S2	D	
TN	Johnson	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Johnson	Tyto alba	Common Barn-owl	S3	D	
TN	Johnson	Sphyrapicus varius	Yellow-bellied Sapsucker	S1B,S4N	D	
TN	Johnson	Corvus corax	Common Raven	S2	T	
TN	Johnson	Limnothlypis swainsonii	Swainson's Warbler	S3	D	
TN	Johnson	Pooecetes gramineus	Vesper Sparrow	S1B,S4N	D	
TN	Johnson	Chrosomus tennesseensis	Tennessee Dace	S3	D	
TN	Johnson	Percina aurantiaca	Tangerine Darter	S3	D	
TN	Johnson	Sorex cinereus	Common Shrew	S4	D	
TN	Johnson	Sorex fumeus	Smoky Shrew	S4	D	
TN	Johnson	Parascalops breweri	Hairy-tailed Mole	S3	D	
TN	Johnson	Myotis leibii	eastern small-footed bat	S2S3	D	
TN	Johnson	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	S1		LE
TN	Johnson	Neotoma magister	Allegheny Woodrat	S3	D	
TN	Johnson	Synaptomys cooperi	Southern Bog Lemming	S4	D	
TN	Johnson	Zapus hudsonius	Meadow Jumping Mouse	S4	D	
TN	Johnson	Napaeozapus insignis	Woodland Jumping Mouse	S4	D	
TN	Johnson	Glyptemys muhlenbergii	Bog Turtle	S1	T	LT(SA)
TN	Johnson	Bombus affinis	Rusty-patched Bumble Bee	SH		LE
TN	Johnson	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Johnson	Hexastylis virginica	Virginia Heartleaf	S2	S	
TN	Johnson	Hieracium scabrum	Rough Hawkweed	S2	T	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Johnson	Symphyotrichum praealtum	Willow Aster	S1	E	
TN	Johnson	Berberis canadensis	American barberry	S2	S	
TN	Johnson	Cardamine clematitis	mountain bittercress	S2	T	
TN	Johnson	Cardamine rotundifolia	Roundleaf Water-cress	S2S3	S	
TN	Johnson	Campanula aparinoides	Marsh Bellflower	S2	S	
TN	Johnson	Minuartia godfreyi	Godfrey's Stitchwort	S1	E	
TN	Johnson	Paronychia argyrocoma	Silverling	S1S2	T	
TN	Johnson	Hypericum ellipticum	Pale St. John's-wort	S1	E	
TN	Johnson	Hypericum graveolens	Mountain St. John's-wort	S3	E	
TN	Johnson	Hypericum mitchellianum	Blue Ridge St. John's-wort	S2	T	
TN	Johnson	Triadenum fraseri	Fraser's Marsh St. Johnswort	S1?	S	
TN	Johnson	Diervilla lonicera	Northern Bush-honeysuckle	S2	T	
TN	Johnson	Lonicera dioica	Mountain Honeysuckle	S2	S	
TN	Johnson	Drosera rotundifolia	Roundleaf Sundew	S1	T	
TN	Johnson	Menziesia pilosa	Fetterbush	S2	S	
TN	Johnson	Vaccinium macrocarpon	Large Cranberry	S2	T	
TN	Johnson	Adlumia fungosa	Climbing Fumitory	S2	T	
TN	Johnson	Corydalis sempervirens	Pale Corydalis	S1S2	S	
TN	Johnson	Hydrophyllum virginianum	Virginia Waterleaf	S3	T	
TN	Johnson	Juglans cinerea	Butternut	S3	T	
TN	Johnson	Meehania cordata	Meehania Mint (Heart-leaf Meehania)	S2	T	
TN	Johnson	Epilobium ciliatum	Willow-herb	S1	T	
TN	Johnson	Epilobium leptophyllum	Willow-herb	S1	T	
TN	Johnson	Oenothera parviflora	Northern Evening-primrose	S1	S	
TN	Johnson	Polygonum arifolium	Halberd-leaf Tearthumb	S1	T	
TN	Johnson	Polygonum cilinode	Fringed Black Bindweed	S1S2	T	
TN	Johnson	Lysimachia terrestris	Swamp Loosestrife	S1	E	
TN	Johnson	Pyrola americana	American Wintergreen	S2	E	
TN	Johnson	Caltha palustris	Marsh-marigold	S1	E	
TN	Johnson	Geum aleppicum	Yellow Avens	S1	E	
TN	Johnson	Prunus virginiana	Chokecherry	S1	S	
TN	Johnson	Sanguisorba canadensis	Canada Burnet	S1	E	
TN	Johnson	Spiraea alba	Narrow-leaved Meadow-sweet	S1	E	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Johnson	Potentilla tridentata	Three-toothed Cinquefoil	S1S2	T	
TN	Johnson	Galium asprellum	Rough Bedstraw	S1	S	
TN	Johnson	Galium palustre	Marsh Bedstraw	S1	S	
TN	Johnson	Saxifraga caroliniana	Carolina saxifrage	S1S2	E	
TN	Johnson	Saxifraga pensylvanica	Swamp Saxifrage	S1	E	
TN	Johnson	Veronica americana	American Speedwell	S1	S	
TN	Johnson	Veronica scutellata	Marsh-speedwell	S1	E	
TN	Johnson	Thuja occidentalis	Northern White Cedar	S3	S	
TN	Johnson	Abies fraseri	Fraser Fir	S1S2	T	
TN	Johnson	Tsuga caroliniana	Carolina Hemlock	S3	T	
TN	Johnson	Symplocarpus foetidus	Skunk Cabbage	S1	E	
TN	Johnson	Carex echinata ssp. echinata	Little Prickly Sedge	S1?	S	
TN	Johnson	Carex folliculata	northern long sedge	S1	T	
TN	Johnson	Carex hitchcockiana	Sedge	S1	T	
TN	Johnson	Carex roanensis	Sedge	S2	S	
TN	Johnson	Cymophyllus fraserianus	Fraser's Sedge	S3	S	
TN	Johnson	Eriophorum virginicum	Tawny Cotton-grass	S1S2	E	
TN	Johnson	Streptopus lanceolatus	Rosy Twisted-stalk	S2	S	
TN	Johnson	Zigadenus glaucus	White Camas	S1	E	
TN	Johnson	Cypripedium reginae	Showy Lady-slipper	S1	E	
TN	Johnson	Goodyera repens	Dwarf Rattlesnake-plantain	S1	S	
TN	Johnson	Platanthera grandiflora	Large Purple Fringed Orchid	S2	E	
TN	Johnson	Platanthera psycodes	Small Purple Fringe Orchid	S2	S	
TN	Johnson	Pogonia ophioglossoides	Rose Pogonia	S2	E	
TN	Johnson	Spiranthes lucida	Shining Ladies'-tresses	S1S2	T	
TN	Johnson	Glyceria laxa	Northern Manna-grass	S1	E	
TN	Johnson	Potamogeton epihydrus	Creekgrass	S1S2	S	
TN	Johnson	Sparganium androcladum	Branching Burreed	S1	E	
TN	Johnson	Asplenium scolopendrium var. americanum	American Hart's-tongue Fern	S1	E	LT
TN	Johnson	Dryopteris carthusiana	Spinulose Woodfern	S1	T	
TN	Johnson	Dryopteris cristata	crested woodfern	S2	T	
TN	Johnson	Woodsia scopulina ssp. appalachiana	Appalachian Cliff-fern	S1S2	S	
TN	Johnson	Botrychium matricariifolium	Matricary Grapefern	S1	S	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Johnson	Phegopteris connectilis	Northern Beechfern	S1	E	
TN	Knox	Cryptobranchus alleganiensis	Hellbender	S3	D	PS
TN	Knox	Gyrinophilus palleucus	Tennessee Cave Salamander	S2	T	
TN	Knox	Gyrinophilus gulolineatus	Berry Cave Salamander	S1	T	C
TN	Knox	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Knox	Accipiter striatus	Sharp-shinned Hawk	S3B,S4N	D	
TN	Knox	Falco peregrinus	Peregrine Falcon	S1B	E	
TN	Knox	Tyto alba	Common Barn-owl	S3	D	
TN	Knox	Acipenser fulvescens	Lake Sturgeon	S1	E	
TN	Knox	Hemitremia flammea	Flame Chub	S3	D	
TN	Knox	Chrosomus tennesseensis	Tennessee Dace	S3	D	
TN	Knox	Carpiodes velifer	Highfin Carpsucker	S2S3	D	
TN	Knox	Cycleptus elongatus	Blue Sucker	S2	T	
TN	Knox	Noturus flavipinnis	Yellowfin Madtom	S1	E	LT
TN	Knox	Percina tanasi	Snail Darter	S2S3	T	LT
TN	Knox	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Knox	Myotis grisescens	Gray Bat	S2	E	LE
TN	Knox	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	S3	D	
TN	Knox	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S3	T	
TN	Knox	Cumberlandia monodonta	Spectaclecase	S2S3		LE
TN	Knox	Cyprogenia stegaria	Fanshell	S1	E	LE
TN	Knox	Dromus dromas	Dromedary Pearlymussel	S1	E	LE
TN	Knox	Epioblasma capsaeformis	Oyster Mussel	S1	E	LE
TN	Knox	Epioblasma florentina walkeri	Tan Riffleshell	S1	E	LE
TN	Knox	Epioblasma torulosa gubernaculum	Green Blossom Pearlymussel	SX	E	LE
TN	Knox	Epioblasma torulosa torulosa	Tuberculed Blossom Pearlymussel	SX	E	LE
TN	Knox	Epioblasma turgidula	Turgid Blossom Pearlymussel	SX	E	LE
TN	Knox	Fusconaia cor	Shiny Pigtoe Pearlymussel	S1	E	LE
TN	Knox	Fusconaia cuneolus	Fine-rayed Pigtoe	S1	E	LE
TN	Knox	Lampsilis abrupta	Pink Mucket	S2	E	LE
TN	Knox	Lemiox rimosus	Birdwing Pearlymussel	S1	E	LE
TN	Knox	Obovaria retusa	Ring Pink	S1	E	LE
TN	Knox	Plethobasus cooperianus	Orange-foot Pimpleback	S1	E	LE

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Knox	Plethobasus cyphyus	Sheepnose	S2S3		LE
TN	Knox	Pleurobema plenum	Rough Pigtoe	S1	E	LE
TN	Knox	Quadrula cylindrica cylindrica	Smooth Rabbitsfoot	S3		LT
TN	Knox	Quadrula intermedia	Cumberland Monkeyface	S1	E	LE
TN	Knox	Athearnia anthonyi	Anthony's River Snail	S1	E	LE
TN	Knox	Radula voluta	Liverwort	S2	S	
TN	Knox	Archidium alternifolium	A moss	S1	T	
TN	Knox	Funaria americana	American Funaria Moss	S1?	T	
TN	Knox	Homaliadelphus sharpii	Sharp's Homaliadelphus	S1	E	
TN	Knox	Rhachithecium perpusillum	Budding Tortula	SH	S	
TN	Knox	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Knox	Helianthus occidentalis	naked-stem sunflower	S2	S	
TN	Knox	Packera plattensis	Prairie Ragwort	S1	S	
TN	Knox	Symphyotrichum ericoides	White Heath Aster	S1	E	
TN	Knox	Onosmodium hispidissimum	Hairy False Gromwell	S1	E	
TN	Knox	Onosmodium molle ssp. occidentale	Western False Gromwell	S1S2	T	
TN	Knox	Arabis patens	Spreading Rockcress	S1	E	
TN	Knox	Cardamine flagellifera	Bitter Cress	S2	T	
TN	Knox	Lonicera dioica	Mountain Honeysuckle	S2	S	
TN	Knox	Dalea foliosa	Leafy Prairie-clover	S2S3	E	LE
TN	Knox	Desmodium ochroleucum	Creamflower Tick-trefoil	S1	E	
TN	Knox	Lathyrus palustris	Marsh Pea	S1	S	
TN	Knox	Juglans cinerea	Butternut	S3	T	
TN	Knox	Conradina verticillata	Cumberland Rosemary	S3	T	LT
TN	Knox	Monotropsis odorata	Sweet Pinesap	S2	T	
TN	Knox	Delphinium exaltatum	Tall Larkspur	S2	E	
TN	Knox	Ranunculus flabellaris	Yellow Water-crowfoot	S2	T	
TN	Knox	Saxifraga caroliniana	Carolina saxifrage	S1S2	E	
TN	Knox	Aureolaria patula	Spreading False-foxglove	S3	S	
TN	Knox	Cyperus plukenetii	Plukenet's Cyperus	S1	S	
TN	Knox	Spiranthes odorata	Sweetscent Ladies'-tresses	S1	E	
TN	Lake	Anhinga anhinga	Anhinga	S1B	D	
TN	Lake	Ixobrychus exilis	Least Bittern	S2B	D	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Lake	Ardea alba	Great Egret	S2B,S3N	D	
TN	Lake	Ictinia mississippiensis	Mississippi Kite	S2S3	D	
TN	Lake	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Lake	Falco peregrinus	Peregrine Falcon	S1B	E	
TN	Lake	Sterna antillarum athalassos	Interior Least Tern	S2S3B	E	LE
TN	Lake	Tyto alba	Common Barn-owl	S3	D	
TN	Lake	Thryomanes bewickii	Bewick's Wren	S1	E	
TN	Lake	Limnothlypis swainsonii	Swainson's Warbler	S3	D	
TN	Lake	Chondestes grammacus	Lark Sparrow	S1B	T	
TN	Lake	Scaphirhynchus albus	Pallid Sturgeon	S1	E	LE
TN	Lake	Atractosteus spatula	Alligator Gar	S1	D	
TN	Lake	Macrhybopsis meeki	Sicklefin Chub	S2	D	
TN	Lake	Fundulus chrysotus	Golden Topminnow	S1S2	D	
TN	Lake	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Lake	Neotoma floridana illinoensis	Eastern Woodrat	S3	D	
TN	Lake	Zapus hudsonius	Meadow Jumping Mouse	S4	D	
TN	Lake	Nerodia cyclopion	Mississippi Green Water Snake	S2	D	
TN	Lake	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Lake	Armoracia lacustris	Lake-cress	S2	S	
TN	Lake	Hottonia inflata	Featherfoil	S2	S	
TN	Lake	Ranunculus flabellaris	Yellow Water-crowfoot	S2	T	
TN	Lake	Sagittaria graminea	Grassleaf Arrowhead	S1	T	
TN	Lake	Sagittaria platyphylla	Ovate-leaved Arrowhead	S2S3	S	
TN	Lake	Carex comosa	Sedge	S2	T	
TN	Lake	Elodea nuttallii	Waterweed	S2	S	
TN	Lake	Iris fulva	Red Iris	S2	T	
TN	Lauderdale	Anhinga anhinga	Anhinga	S1B	D	
TN	Lauderdale	Ardea alba	Great Egret	S2B,S3N	D	
TN	Lauderdale	Egretta caerulea	Little Blue Heron	S2B,S3N	D	
TN	Lauderdale	Ictinia mississippiensis	Mississippi Kite	S2S3	D	
TN	Lauderdale	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Lauderdale	Sterna antillarum athalassos	Interior Least Tern	S2S3B	E	LE
TN	Lauderdale	Setophaga cerulea	Cerulean Warbler	S3B	D	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Lauderdale	Limnothlypis swainsonii	Swainson's Warbler	S3	D	
TN	Lauderdale	Polyodon spathula	Paddlefish	S3	TRKD	
TN	Lauderdale	Hybognathus placitus	Plains Minnow	S1	D	
TN	Lauderdale	Macrhybopsis meeki	Sicklefin Chub	S2	D	
TN	Lauderdale	Cycleptus elongatus	Blue Sucker	S2	T	
TN	Lauderdale	Triodopsis multilineata	Striped Whitelip Snail	S2	TRKD	
TN	Lauderdale	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Lauderdale	Armoracia lacustris	Lake-cress	S2	S	
TN	Lauderdale	Juglans cinerea	Butternut	S3	T	
TN	Lauderdale	Hottonia inflata	Featherfoil	S2	S	
TN	Lauderdale	Schisandra glabra	Bay Starvine	S2	T	
TN	Lauderdale	Agalinis auriculata	Earleaf Foxglove	S2	E	
TN	Lauderdale	Ulmus crassifolia	Cedar Elm	S2	S	
TN	Lauderdale	Sagittaria platyphylla	Ovate-leaved Arrowhead	S2S3	S	
TN	Lauderdale	Carex hyalina	Tissue Sedge	S1	S	
TN	Lawrence	Cryptobranchus alleganiensis	Hellbender	S3	D	PS
TN	Lawrence	Thryomanes bewickii	Bewick's Wren	S1	E	
TN	Lawrence	Setophaga cerulea	Cerulean Warbler	S3B	D	
TN	Lawrence	Peucaea aestivalis	Bachman's Sparrow	S1B	E	
TN	Lawrence	Chondestes grammacus	Lark Sparrow	S1B	T	
TN	Lawrence	Notropis rubellus	Rosyface Shiner	S2	D	
TN	Lawrence	Erimonax monachus	Spotfin Chub	S2	T	LT
TN	Lawrence	Etheostoma boschungi	Slackwater Darter	S1	T	LT
TN	Lawrence	Etheostoma wapiti	Boulder Darter	S1	E	LE
TN	Lawrence	Etheostoma pseudovulatum	Egg-mimic Darter	S1	E	
TN	Lawrence	Myotis grisescens	Gray Bat	S2	E	LE
TN	Lawrence	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S3	T	
TN	Lawrence	Sistrurus miliarius streckeri	Western Pigmy Rattlesnake	S2S3	T	
TN	Lawrence	Orconectes alabamensis	Alabama Crayfish	S2	D	
TN	Lawrence	Pleuronaia dolabelloides	Slabside Pearlymussel	S2		LE
TN	Lawrence	Quadrula cylindrica cylindrica	Smooth Rabbitsfoot	S3		LT
TN	Lawrence	Pleurocera walkeri	Telescope Hornsnail	S2	TRKD	
TN	Lawrence	Panax quinquefolius	American ginseng	S3S4	S-C	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Lawrence	Helianthus eggertii	Eggert's Sunflower	S3	S	DM
TN	Lawrence	Marshallia trinervia	Broadleaf Barbara's-buttons	S2S3	T	
TN	Lawrence	Solidago porteri	Porter's Goldenrod	S1	E	
TN	Lawrence	Hasteola suaveolens	Sweet-scented Indian-plantain	S2	S	
TN	Lawrence	Drosera brevifolia	Dwarf Sundew	S2	T	
TN	Lawrence	Castanea dentata	American Chestnut	S2S3	S	
TN	Lawrence	Juglans cinerea	Butternut	S3	T	
TN	Lawrence	Polygala mariana	Maryland Milkwort	S1	S	
TN	Lawrence	Crataegus harbisonii	Harbison Hawthorn	S1	E	
TN	Lawrence	Parnassia grandifolia	Large-leaved Grass-of-parnassus	S3	S	
TN	Lawrence	Erythronium rostratum	Yellow Trout-lily	S2	S	
TN	Lawrence	Aristida ramosissima	Branched Three-awn Grass	S1	E	
TN	Lewis	Cryptobranchus alleganiensis	Hellbender	S3	D	PS
TN	Lewis	Setophaga cerulea	Cerulean Warbler	S3B	D	
TN	Lewis	Ammodramus henslowii	Henslow's Sparrow	S1B	D	
TN	Lewis	Erimonax monachus	Spotfin Chub	S2	T	LT
TN	Lewis	Noturus fasciatus	Saddled Madtom	S2	T	
TN	Lewis	Typhlichthys subterraneus	Southern Cavefish	S3	D	
TN	Lewis	Ammocrypta vivax	Scaly Sand Darter	S2	D	
TN	Lewis	Etheostoma aquali	Coppercheek Darter	S2S3	T	
TN	Lewis	Etheostoma cinereum	Ashy Darter	S2S3	T	
TN	Lewis	Etheostoma striatulum	Striated Darter	S1	T	
TN	Lewis	Percina burtoni	Blotchside Logperch	S2	D	
TN	Lewis	Percina macrocephala	Longhead Darter	S2	T	
TN	Lewis	Myotis grisescens	Gray Bat	S2	E	LE
TN	Lewis	Neotoma magister	Allegheny Woodrat	S3	D	
TN	Lewis	Sistrurus miliarius streckeri	Western Pigmy Rattlesnake	S2S3	T	
TN	Lewis	Toxolasma cylindrellus	Pale Lilliput	S1	E	LE
TN	Lewis	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Lewis	Helianthus eggertii	Eggert's Sunflower	S3	S	DM
TN	Lewis	Marshallia trinervia	Broadleaf Barbara's-buttons	S2S3	T	
TN	Lewis	Prenanthes barbata	Barbed Rattlesnake-root	S2	S	
TN	Lewis	Hasteola suaveolens	Sweet-scented Indian-plantain	S2	S	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Lewis	Minuartia godfreyi	Godfrey's Stitchwort	S1	E	
TN	Lewis	Stellaria fontinalis	Water Stitchwort	S3	S	
TN	Lewis	Lonicera flava	Yellow Honeysuckle	S1	T	
TN	Lewis	Drosera brevifolia	Dwarf Sundew	S2	T	
TN	Lewis	Juglans cinerea	Butternut	S3	T	
TN	Lewis	Phlox pilosa ssp. ozarkana	Downy Phlox	S1S2	S	
TN	Lewis	Zanthoxylum americanum	Northern Prickly-ash	S2	S	
TN	Lewis	Parnassia grandifolia	Large-leaved Grass-of-parnassus	S3	S	
TN	Lewis	Carex comosa	Sedge	S2	T	
TN	Lewis	Juncus brachycephalus	Short-head Rush	S2	S	
TN	Lewis	Erythronium rostratum	Yellow Trout-lily	S2	S	
TN	Lewis	Liparis loeselii	Loesel's Twayblade	S1	T	
TN	Lewis	Spiranthes lucida	Shining Ladies'-tresses	S1S2	T	
TN	Lewis	Dichanthelium acuminatum ssp. leucothrix	Panic-grass	S1	S	
TN	Lewis	Xyris tennesseensis	Yellow-eyed-grass	S1	E	LE
TN	Lincoln	Hemitremia flammea	Flame Chub	S3	D	
TN	Lincoln	Carpiodes velifer	Highfin Carpsucker	S2S3	D	
TN	Lincoln	Etheostoma boschungi	Slackwater Darter	S1	T	LT
TN	Lincoln	Etheostoma cinereum	Ashy Darter	S2S3	T	
TN	Lincoln	Etheostoma wapiti	Boulder Darter	S1	E	LE
TN	Lincoln	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Lincoln	Myotis grisescens	Gray Bat	S2	E	LE
TN	Lincoln	Myotis sodalis	Indiana Bat	S1	E	LE
TN	Lincoln	Epioblasma brevidens	Cumberlandian Combshell	S1	E	LE
TN	Lincoln	Epioblasma florentina walkeri	Tan Riffleshell	S1	E	LE
TN	Lincoln	Epioblasma torulosa torulosa	Tuberculed Blossom Pearlymussel	SX	E	LE
TN	Lincoln	Fusconaia cor	Shiny Pigtoe Pearlymussel	S1	E	LE
TN	Lincoln	Fusconaia cuneolus	Fine-rayed Pigtoe	S1	E	LE
TN	Lincoln	Hemistena lata	Cracking Pearlymussel	S1	E	LE
TN	Lincoln	Lampsilis abrupta	Pink Mucket	S2	E	LE
TN	Lincoln	Lampsilis virescens	Alabama Lampmussel	S1	E	LE
TN	Lincoln	Lemiox rimosus	Birdwing Pearlymussel	S1	E	LE
TN	Lincoln	Pleuronaia dolabelloides	Slabside Pearlymussel	S2		LE

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Lincoln	Quadrula cylindrica cylindrica	Smooth Rabbitsfoot	S3		LT
TN	Lincoln	Quadrula intermedia	Cumberland Monkeyface	S1	E	LE
TN	Lincoln	Villosa fabalis	Rayed Bean	S1		LE
TN	Lincoln	Cotinus obovatus	American Smoke-tree	S2	S	
TN	Lincoln	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Lincoln	Stellaria fontinalis	Water Stitchwort	S3	S	
TN	Lincoln	Viburnum bracteatum	Arrow-wood	S2	S	
TN	Lincoln	Drosera brevifolia	Dwarf Sundew	S2	T	
TN	Lincoln	Lespedeza angustifolia	Narrowleaf Bushclover	S2	T	
TN	Lincoln	Phemeranthus calcaricus	Limestone Fame-flower	S3	S	
TN	Lincoln	Neviusia alabamensis	Alabama Snow-wreath	S2	T	
TN	Lincoln	Gratiola floridana	Florida Hedge-hyssop	S1	E	
TN	Lincoln	Rhynchospora inexpansa	Nodding Beakrush	S1	S	
TN	Lincoln	Allium burdickii	Narrow-leaved Wild Leek	S1S2	T-C	
TN	Lincoln	Melanthium virginicum	Bunchflower	S1	E	
TN	Loudon	Cryptobranchus alleganiensis	Hellbender	S3	D	PS
TN	Loudon	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Loudon	Acipenser fulvescens	Lake Sturgeon	S1	E	
TN	Loudon	Hemitremia flammea	Flame Chub	S3	D	
TN	Loudon	Cycleptus elongatus	Blue Sucker	S2	T	
TN	Loudon	Percina aurantiaca	Tangerine Darter	S3	D	
TN	Loudon	Percina burtoni	Blotchside Logperch	S2	D	
TN	Loudon	Percina tanasi	Snail Darter	S2S3	T	LT
TN	Loudon	Myotis grisescens	Gray Bat	S2	E	LE
TN	Loudon	Cyprogenia stegaria	Fanshell	S1	E	LE
TN	Loudon	Lampsilis abrupta	Pink Mucket	S2	E	LE
TN	Loudon	Obovaria retusa	Ring Pink	S1	E	LE
TN	Loudon	Plethobasus cooperianus	Orange-foot Pimpleback	S1	E	LE
TN	Loudon	Plethobasus cyphyus	Sheepnose	S2S3		LE
TN	Loudon	Athearnia anthonyi	Anthony's River Snail	S1	E	LE
TN	Loudon	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Loudon	Berberis canadensis	American barberry	S2	S	
TN	Loudon	Lonicera dioica	Mountain Honeysuckle	S2	S	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Loudon	Juglans cinerea	Butternut	S3	T	
TN	Loudon	Aureolaria patula	Spreading False-foxglove	S3	S	
TN	Loudon	Carex comosa	Sedge	S2	T	
TN	Loudon	Potamogeton amplifolius	Large-leaf Pondweed	S1	T	
TN	Loudon	Potamogeton epihydrus	Creekgrass	S1S2	S	
TN	Macon	Thryomanes bewickii	Bewick's Wren	S1	E	
TN	Macon	Chondestes grammacus	Lark Sparrow	S1B	T	
TN	Macon	Thoburnia atripinnis	Blackfin Sucker	S2	D	
TN	Macon	Etheostoma barbouri	Teardrop Darter	S2	D	
TN	Macon	Etheostoma bellum	Orangefin Darter	S3	D	
TN	Macon	Etheostoma barrenense	Splendid Darter	S3	D	
TN	Macon	Percina macrocephala	Longhead Darter	S2	T	
TN	Macon	Percina stictogaster	Frecklebelly Darter	S1	D	
TN	Macon	Myotis septentrionalis	Northern Long-eared Bat	S1S2		LT
TN	Macon	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Macon	Caulophyllum giganteum	Blue Cohosh	S1	T	
TN	Macon	Juglans cinerea	Butternut	S3	T	
TN	Macon	Carex hitchcockiana	Sedge	S1	T	
TN	Madison	Noturus stigmosus	Northern Madtom	S3	D	
TN	Madison	Ammocrypta beani	Naked Sand Darter	S2	D	
TN	Madison	Etheostoma pyrrhogaster	Firebelly Darter	S2	D	
TN	Madison	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Madison	Corynorhinus rafinesquii	Rafinesque’s Big-eared bat	S3	D	
TN	Madison	Synaptomys cooperi	Southern Bog Lemming	S4	D	
TN	Madison	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	S3	D	
TN	Madison	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Madison	Helianthus verticillatus	Whorled Sunflower	S1	E	LE
TN	Madison	Trifolium reflexum	Buffalo Clover	S1	E	
TN	Madison	Schisandra glabra	Bay Starvine	S2	T	
TN	Madison	Chelone obliqua	Red Turtlehead	S1	S	
TN	Madison	Carex pellita	Wooly Sedge	S1	E	
TN	Madison	Iris brevicaulis	Lamance Iris	S1	E	
TN	Marion	Cryptobranchus alleganiensis	Hellbender	S3	D	PS

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Marion	Gyrinophilus palleucus	Tennessee Cave Salamander	S2	T	
TN	Marion	Hemidactylium scutatum	Four-toed Salamander	S3	D	
TN	Marion	Hyla gratiosa	Barking Treefrog	S3	D	
TN	Marion	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Marion	Falco peregrinus	Peregrine Falcon	S1B	E	
TN	Marion	Corvus corax	Common Raven	S2	T	
TN	Marion	Setophaga cerulea	Cerulean Warbler	S3B	D	
TN	Marion	Hemitremia flammea	Flame Chub	S3	D	
TN	Marion	Chrosomus tennesseensis	Tennessee Dace	S3	D	
TN	Marion	Carpiodes velifer	Highfin Carpsucker	S2S3	D	
TN	Marion	Typhlichthys subterraneus	Southern Cavefish	S3	D	
TN	Marion	Percina tanasi	Snail Darter	S2S3	T	LT
TN	Marion	Sorex cinereus	Common Shrew	S4	D	
TN	Marion	Myotis grisescens	Gray Bat	S2	E	LE
TN	Marion	Myotis sodalis	Indiana Bat	S1	E	LE
TN	Marion	Myotis leibii	eastern small-footed bat	S2S3	D	
TN	Marion	Corynorhinus rafinesquii	Rafinesque’s Big-eared bat	S3	D	
TN	Marion	Neotoma floridana haematoreia	Southern Appalachian Woodrat	S2	D	
TN	Marion	Neotoma magister	Allegheny Woodrat	S3	D	
TN	Marion	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S3	T	
TN	Marion	Cumberlandia monodonta	Spectaclecase	S2S3		LE
TN	Marion	Cyprogenia stegaria	Fanshell	S1	E	LE
TN	Marion	Dromus dromas	Dromedary Pearlymussel	S1	E	LE
TN	Marion	Lampsilis abrupta	Pink Mucket	S2	E	LE
TN	Marion	Lampsilis virescens	Alabama Lampmussel	S1	E	LE
TN	Marion	Toxolasma cylindrellus	Pale Lilliput	S1	E	LE
TN	Marion	Pyrgulopsis ogmorhaphe	Royal Marstonia	S1	E	LE
TN	Marion	Athearnia anthonyi	Anthony's River Snail	S1	E	LE
TN	Marion	Lejeunea blomquistii	Blomquist Leafy Liverwort	S1S2	S	
TN	Marion	Pellia appalachiana	A Liverwort	S2	S	
TN	Marion	Palamocladium leskeoides	Palamocladium	S1	T	
TN	Marion	Cotinus obovatus	American Smoke-tree	S2	S	
TN	Marion	Panax quinquefolius	American ginseng	S3S4	S-C	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Marion	Helianthus eggertii	Eggert's Sunflower	S3	S	DM
TN	Marion	Liatris cylindracea	Slender Blazing-star	S2	T	
TN	Marion	Polymnia johnbeckii	John Beck's Leafcup	S1	E	
TN	Marion	Silphium brachiatum	Cumberland Rosinweed	S3	E	
TN	Marion	Solidago tarda	Late Goldenrod	SH	S	
TN	Marion	Onosmodium hispidissimum	Hairy False Gromwell	S1	E	
TN	Marion	Arabis patens	Spreading Rockcress	S1	E	
TN	Marion	Cardamine clematitis	mountain bittercress	S2	T	
TN	Marion	Paronychia argyrocoma	Silverling	S1S2	T	
TN	Marion	Silene ovata	Ovate Catchfly	S2	E	
TN	Marion	Hypericum adpressum	Creeping St. John's-wort	S1	E	
TN	Marion	Diervilla lonicera	Northern Bush-honeysuckle	S2	T	
TN	Marion	Diervilla sessilifolia var. rivularis	Mountain Bush-honeysuckle	S2	T	
TN	Marion	Lonicera flava	Yellow Honeysuckle	S1	T	
TN	Marion	Diamorpha smallii	Small's Stonecrop	S1S2	E	
TN	Marion	Sedum nevii	Nevius' Stonecrop	S1	E	
TN	Marion	Apios priceana	Price's Potato-bean	S3	E	LT
TN	Marion	Thermopsis mollis	Soft-haired Thermopsis	S2S3	S	
TN	Marion	Sabatia capitata	Rose-gentian	S2	E	
TN	Marion	Fothergilla major	Witch-alder	S2	T	
TN	Marion	Juglans cinerea	Butternut	S3	T	
TN	Marion	Scutellaria montana	Large-flowered Skullcap	S4	T	LT
TN	Marion	Phemeranthus mengesii	Fame-flower	S2	T	
TN	Marion	Phemeranthus teretifolius	Roundleaf Fameflower	S2	T	
TN	Marion	Hottonia inflata	Featherfoil	S2	S	
TN	Marion	Lysimachia fraseri	Fraser Loosestrife	S2	E	
TN	Marion	Amelanchier sanguinea	Round-leaved Serviceberry	S2	T	
TN	Marion	Nestronia umbellula	Nestronia	S1	E	
TN	Marion	Aureolaria patula	Spreading False-foxglove	S3	S	
TN	Marion	Eriophorum virginicum	Tawny Cotton-grass	S1S2	E	
TN	Marion	Rhynchospora perplexa	Beakrush	S2	T	
TN	Marion	Trillium lancifolium	Lance-leaf Trillium	S1	E	
TN	Marion	Isotria medeoloides	Small Whorled Pogonia	S1	E	LT

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Marion	Platanthera integrilabia	White Fringeless Orchid	S2S3	E	LT
TN	Marion	Spiranthes magnicamporum	Great Plains Ladies'-tresses	S1	E	
TN	Marion	Danthonia epilis	Bog Oat-grass	S1S2	S	
TN	Marion	Glyceria acutiflora	Manna-grass	S2	S	
TN	Marion	Asplenium scolopendrium var. americanum	American Hart's-tongue Fern	S1	E	LT
TN	Marion	Woodwardia virginica	Virginia Chainfern	S2	S	
TN	Marshall	Ambystoma barbouri	Streamside Salamander	S2	D	
TN	Marshall	Cryptobranchus alleganiensis	Hellbender	S3	D	PS
TN	Marshall	Gyrinophilus palleucus	Tennessee Cave Salamander	S2	T	
TN	Marshall	Hemitremia flammea	Flame Chub	S3	D	
TN	Marshall	Noturus fasciatus	Saddled Madtom	S2	T	
TN	Marshall	Etheostoma aquali	Coppercheek Darter	S2S3	T	
TN	Marshall	Etheostoma cinereum	Ashy Darter	S2S3	T	
TN	Marshall	Etheostoma luteovinctum	Redband Darter	S4	D	
TN	Marshall	Etheostoma striatulum	Striated Darter	S1	T	
TN	Marshall	Percina phoxocephala	Slenderhead Darter	S3	D	
TN	Marshall	Cumberlandia monodonta	Spectaclecase	S2S3		LE
TN	Marshall	Cyprogenia stegaria	Fanshell	S1	E	LE
TN	Marshall	Epioblasma brevidens	Cumberlandian Combshell	S1	E	LE
TN	Marshall	Epioblasma capsaeformis	Oyster Mussel	S1	E	LE
TN	Marshall	Epioblasma florentina walkeri	Tan Riffleshell	S1	E	LE
TN	Marshall	Epioblasma torulosa torulosa	Tuberculed Blossom Pearlymussel	SX	E	LE
TN	Marshall	Epioblasma triquetra	Snuffbox	S3		LE
TN	Marshall	Lampsilis abrupta	Pink Mucket	S2	E	LE
TN	Marshall	Lemiox rimosus	Birdwing Pearlymussel	S1	E	LE
TN	Marshall	Pleuronaia dolabelloides	Slabside Pearlymussel	S2		LE
TN	Marshall	Plethobasus cooperianus	Orange-foot Pimpleback	S1	E	LE
TN	Marshall	Ptychobranchus subtentum	Fluted Kidneyshell	S2		LE
TN	Marshall	Quadrula cylindrica	Rabbitsfoot			LT
TN	Marshall	Quadrula cylindrica cylindrica	Smooth Rabbitsfoot	S3		LT
TN	Marshall	Quadrula intermedia	Cumberland Monkeyface	S1	E	LE
TN	Marshall	Toxolasma cylindrellus	Pale Lilliput	S1	E	LE
TN	Marshall	Villosa fabalis	Rayed Bean	S1		LE

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Marshall	Amsonia tabernaemontana var. gattingeri	A Blue-star	S3	S	
TN	Marshall	Echinacea tennesseensis	Tennessee Coneflower	S2	T	DM
TN	Marshall	Arnoglossum plantagineum	Fen Indian-plantain	S2	T	
TN	Marshall	Paysonia densipila	Duck River Bladderpod	S3	S	
TN	Marshall	Stellaria fontinalis	Water Stitchwort	S3	S	
TN	Marshall	Astragalus tennesseensis	Tennessee Milk-vetch	S3	S	
TN	Marshall	Dalea foliosa	Leafy Prairie-clover	S2S3	E	LE
TN	Marshall	Trifolium calcaricum	Running Glade Clover	S1	E	
TN	Marshall	Phemeranthus calcaricus	Limestone Fame-flower	S3	S	
TN	Marshall	Anemone caroliniana	Carolina Anemone	S1S2	E	
TN	Marshall	Zanthoxylum americanum	Northern Prickly-ash	S2	S	
TN	Marshall	Carex davisii	Davis' Sedge	S1	S	
TN	Marshall	Eleocharis wolfii	Wolf Spikerush	S1	E	
TN	Marshall	Schoenolirion croceum	Sunnybell	S3	T	
TN	Maury	Cryptobranchus alleganiensis	Hellbender	S3	D	PS
TN	Maury	Gyrinophilus palleucus	Tennessee Cave Salamander	S2	T	
TN	Maury	Ixobrychus exilis	Least Bittern	S2B	D	
TN	Maury	Tyto alba	Common Barn-owl	S3	D	
TN	Maury	Hemitremia flammea	Flame Chub	S3	D	
TN	Maury	Noturus fasciatus	Saddled Madtom	S2	T	
TN	Maury	Etheostoma aquali	Coppercheek Darter	S2S3	T	
TN	Maury	Etheostoma luteovinctum	Redband Darter	S4	D	
TN	Maury	Etheostoma striatulum	Striated Darter	S1	T	
TN	Maury	Percina phoxocephala	Slenderhead Darter	S3	D	
TN	Maury	Myotis grisescens	Gray Bat	S2	E	LE
TN	Maury	Myotis sodalis	Indiana Bat	S1	E	LE
TN	Maury	Neotoma magister	Allegheny Woodrat	S3	D	
TN	Maury	Sistrurus miliarius streckeri	Western Pigmy Rattlesnake	S2S3	T	
TN	Maury	Epioblasma brevidens	Cumberlandian Combshell	S1	E	LE
TN	Maury	Epioblasma capsaeformis	Oyster Mussel	S1	E	LE
TN	Maury	Epioblasma florentina walkeri	Tan Riffleshell	S1	E	LE
TN	Maury	Epioblasma turgidula	Turgid Blossom Pearlymussel	SX	E	LE
TN	Maury	Hemistena lata	Cracking Pearlymussel	S1	E	LE

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Maury	Lemiox rimosus	Birdwing Pearlymussel	S1	E	LE
TN	Maury	Pleuronaia dolabelloides	Slabside Pearlymussel	S2		LE
TN	Maury	Plethobasus cooperianus	Orange-foot Pimpleback	S1	E	LE
TN	Maury	Plethobasus cyphyus	Sheepnose	S2S3		LE
TN	Maury	Quadrula cylindrica	Rabbitsfoot			LT
TN	Maury	Quadrula cylindrica cylindrica	Smooth Rabbitsfoot	S3		LT
TN	Maury	Quadrula intermedia	Cumberland Monkeyface	S1	E	LE
TN	Maury	Toxolasma cylindrellus	Pale Lilliput	S1	E	LE
TN	Maury	Ammoselinum popei	Pope Sand-parsley	S2	T	
TN	Maury	Amsonia tabernaemontana var. gattingeri	A Blue-star	S3	S	
TN	Maury	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Maury	Helianthus eggertii	Eggert's Sunflower	S3	S	DM
TN	Maury	Silphium pinnatifidum	Prairie-dock	S2	T	
TN	Maury	Turritis glabra	Tower-mustard	S1	S	
TN	Maury	Paysonia densipila	Duck River Bladderpod	S3	S	
TN	Maury	Physaria globosa	Lesquereux's Mustard	S2	E	LE
TN	Maury	Cerastium arvense ssp. velutinum	Velvety Cerastium	S1	E	
TN	Maury	Stellaria fontinalis	Water Stitchwort	S3	S	
TN	Maury	Apios priceana	Price's Potato-bean	S3	E	LT
TN	Maury	Astragalus tennesseensis	Tennessee Milk-vetch	S3	S	
TN	Maury	Dalea foliosa	Leafy Prairie-clover	S2S3	E	LE
TN	Maury	Castanea dentata	American Chestnut	S2S3	S	
TN	Maury	Juglans cinerea	Butternut	S3	T	
TN	Maury	Mirabilis albida	Pale Umbrella-wort	S2	T	
TN	Maury	Polygala mariana	Maryland Milkwort	S1	S	
TN	Maury	Phlox pilosa ssp. ozarkana	Downy Phlox	S1S2	S	
TN	Maury	Phemeranthus calcaricus	Limestone Fame-flower	S3	S	
TN	Maury	Zanthoxylum americanum	Northern Prickly-ash	S2	S	
TN	Maury	Parnassia grandifolia	Large-leaved Grass-of-parnassus	S3	S	
TN	Maury	Vitis rupestris	Sand Grape	S1	E	
TN	Maury	Carex comosa	Sedge	S2	T	
TN	Maury	Eleocharis wolfii	Wolf Spikerush	S1	E	
TN	Maury	Juncus brachycephalus	Short-head Rush	S2	S	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Maury	Allium tricoccum	Small White Leek	S1S2	S-C	
TN	Maury	Schoenolirion croceum	Sunnybell	S3	T	
TN	Maury	Liparis loeselii	Loesel's Twayblade	S1	T	
TN	Maury	Muhlenbergia glabrifloris	Muhly	S1	S	
TN	Maury	Xyris tennesseensis	Yellow-eyed-grass	S1	E	LE
TN	McMinn	Cryptobranchus alleganiensis	Hellbender	S3	D	PS
TN	McMinn	Gyrinophilus palleucus	Tennessee Cave Salamander	S2	T	
TN	McMinn	Gyrinophilus gulolineatus	Berry Cave Salamander	S1	T	C
TN	McMinn	Limnothlypis swainsonii	Swainson's Warbler	S3	D	
TN	McMinn	Hemitremia flammea	Flame Chub	S3	D	
TN	McMinn	Chrosomus tennesseensis	Tennessee Dace	S3	D	
TN	McMinn	Synaptomys cooperi	Southern Bog Lemming	S4	D	
TN	McMinn	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	S3	D	
TN	McMinn	Aureolaria patula	Spreading False-foxglove	S3	S	
TN	McMinn	Xerophyllum asphodeloides	Eastern Turkeybeard	S3	T	
TN	McNairy	Hyla gratiosa	Barking Treefrog	S3	D	
TN	McNairy	Anhinga anhinga	Anhinga	S1B	D	
TN	McNairy	Thryomanes bewickii	Bewick's Wren	S1	E	
TN	McNairy	Limnothlypis swainsonii	Swainson's Warbler	S3	D	
TN	McNairy	Peucaea aestivalis	Bachman's Sparrow	S1B	E	
TN	McNairy	Chondestes grammacus	Lark Sparrow	S1B	T	
TN	McNairy	Noturus stigmosus	Northern Madtom	S3	D	
TN	McNairy	Ammocrypta beani	Naked Sand Darter	S2	D	
TN	McNairy	Ammocrypta vivax	Scaly Sand Darter	S2	D	
TN	McNairy	Etheostoma pyrrhogaster	Firebelly Darter	S2	D	
TN	McNairy	Sorex longirostris	Southeastern Shrew	S4	D	
TN	McNairy	Corynorhinus rafinesquii	Rafinesque’s Big-eared bat	S3	D	
TN	McNairy	Macrochelys temminckii	Alligator Snapping Turtle	S2S3	D	
TN	McNairy	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	S3	D	
TN	McNairy	Sistrurus miliarius streckeri	Western Pigmy Rattlesnake	S2S3	T	
TN	McNairy	Fallicambarus hortoni	Hatchie Burrowing Crayfish	S1	E	
TN	McNairy	Polytaenia nuttallii	Prairie Parsley	S1	T	
TN	McNairy	Panax quinquefolius	American ginseng	S3S4	S-C	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	McNairy	Helianthus verticillatus	Whorled Sunflower	S1	E	LE
TN	McNairy	Silene ovata	Ovate Catchfly	S2	E	
TN	McNairy	Ceratophyllum echinatum	Prickly Hornwort	S1	S	
TN	McNairy	Stylisma humistrata	Southern Southern Morning-glory	S1	T	
TN	McNairy	Drosera capillaris	Sundew	S1	T	
TN	McNairy	Vaccinium elliottii	Elliott's Blueberry	S1	E	
TN	McNairy	Magnolia virginiana	Sweetbay Magnolia	S2	T	
TN	McNairy	Polygala mariana	Maryland Milkwort	S1	S	
TN	McNairy	Plantago cordata	Heartleaved Plantain	S1	E	
TN	McNairy	Cyperus plukenetii	Plukenet's Cyperus	S1	S	
TN	McNairy	Eleocharis tortilis	Twisted Spike-rush	S1	S	
TN	McNairy	Fuirena squarrosa	Hairy Umbrella-sedge	S1	S	
TN	McNairy	Sacciolepis striata	Gibbous Panic-grass	S1	S	
TN	McNairy	Tridens flavus var. chapmanii	Chapman's Redtop	S1	E	
TN	Meigs	Cryptobranchus alleganiensis	Hellbender	S3	D	PS
TN	Meigs	Gyrinophilus palleucus	Tennessee Cave Salamander	S2	T	
TN	Meigs	Gyrinophilus gulolineatus	Berry Cave Salamander	S1	T	C
TN	Meigs	Ixobrychus exilis	Least Bittern	S2B	D	
TN	Meigs	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Meigs	Tyto alba	Common Barn-owl	S3	D	
TN	Meigs	Acipenser fulvescens	Lake Sturgeon	S1	E	
TN	Meigs	Carpiodes velifer	Highfin Carpsucker	S2S3	D	
TN	Meigs	Percina tanasi	Snail Darter	S2S3	T	LT
TN	Meigs	Myotis grisescens	Gray Bat	S2	E	LE
TN	Meigs	Myotis septentrionalis	Northern Long-eared Bat	S1S2		LT
TN	Meigs	Cyprogenia stegaria	Fanshell	S1	E	LE
TN	Meigs	Dromus dromas	Dromedary Pearlymussel	S1	E	LE
TN	Meigs	Lampsilis abrupta	Pink Mucket	S2	E	LE
TN	Meigs	Pleurobema plenum	Rough Pigtoe	S1	E	LE
TN	Meigs	Helianthus occidentalis	naked-stem sunflower	S2	S	
TN	Meigs	Liatris cylindracea	Slender Blazing-star	S2	T	
TN	Meigs	Symphyotrichum pratense	Barrens Silky Aster	S1	E	
TN	Meigs	Onosmodium molle ssp. occidentale	Western False Gromwell	S1S2	T	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Meigs	Diervilla lonicera	Northern Bush-honeysuckle	S2	T	
TN	Meigs	Dalea candida	White Prairie-clover	S2	T	
TN	Meigs	Neviusia alabamensis	Alabama Snow-wreath	S2	T	
TN	Meigs	Aureolaria patula	Spreading False-foxglove	S3	S	
TN	Meigs	Carex comosa	Sedge	S2	T	
TN	Meigs	Sacciolepis striata	Gibbous Panic-grass	S1	S	
TN	Monroe	Cryptobranchus alleganiensis	Hellbender	S3	D	PS
TN	Monroe	Desmognathus aeneus	Seepage Salamander	S1	D	
TN	Monroe	Eurycea junaluska	Junaluska Salamander	S2	D	
TN	Monroe	Hemidactylium scutatum	Four-toed Salamander	S3	D	
TN	Monroe	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Monroe	Aquila chrysaetos	Golden Eagle	S1	T	
TN	Monroe	Aegolius acadicus	Northern Saw-whet Owl	S1	T	
TN	Monroe	Sphyrapicus varius	Yellow-bellied Sapsucker	S1B,S4N	D	
TN	Monroe	Corvus corax	Common Raven	S2	T	
TN	Monroe	Vermivora chrysoptera	Golden-winged Warbler	S3B	D	
TN	Monroe	Setophaga cerulea	Cerulean Warbler	S3B	D	
TN	Monroe	Limnothlypis swainsonii	Swainson's Warbler	S3	D	
TN	Monroe	Acipenser fulvescens	Lake Sturgeon	S1	E	
TN	Monroe	Clinostomus funduloides ssp. 1	Smoky Dace	S1S2	D	
TN	Monroe	Hemitremia flammea	Flame Chub	S3	D	
TN	Monroe	Chrosomus tennesseensis	Tennessee Dace	S3	D	
TN	Monroe	Erimonax monachus	Spotfin Chub	S2	T	LT
TN	Monroe	Cycleptus elongatus	Blue Sucker	S2	T	
TN	Monroe	Noturus baileyi	Smoky Madtom	S1	E	LE
TN	Monroe	Noturus flavipinnis	Yellowfin Madtom	S1	E	LT
TN	Monroe	Etheostoma gutselli	Tuckasegee Darter	S1	E	
TN	Monroe	Etheostoma sitikuense	Citico Darter	S1	E	LE
TN	Monroe	Percina aurantiaca	Tangerine Darter	S3	D	
TN	Monroe	Percina burtoni	Blotchside Logperch	S2	D	
TN	Monroe	Percina tanasi	Snail Darter	S2S3	T	LT
TN	Monroe	Sorex cinereus	Common Shrew	S4	D	
TN	Monroe	Sorex longirostris	Southeastern Shrew	S4	D	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Monroe	Sorex fumeus	Smoky Shrew	S4	D	
TN	Monroe	Myotis sodalis	Indiana Bat	S1	E	LE
TN	Monroe	Myotis leibii	eastern small-footed bat	S2S3	D	
TN	Monroe	Myotis septentrionalis	Northern Long-eared Bat	S1S2		LT
TN	Monroe	Corynorhinus rafinesquii	Rafinesque’s Big-eared bat	S3	D	
TN	Monroe	Glaucomys sabrinus coloratus	Carolina Northern Flying Squirrel	S1S2	E	LE
TN	Monroe	Neotoma floridana haematoreia	Southern Appalachian Woodrat	S2	D	
TN	Monroe	Synaptomys cooperi	Southern Bog Lemming	S4	D	
TN	Monroe	Zapus hudsonius	Meadow Jumping Mouse	S4	D	
TN	Monroe	Napaeozapus insignis	Woodland Jumping Mouse	S4	D	
TN	Monroe	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	S3	D	
TN	Monroe	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S3	T	
TN	Monroe	Ophiogomphus incurvatus alleghaniensis	Allegheny Snaketail	S1	TRKD	
TN	Monroe	Epioblasma florentina walkeri	Tan Riffleshell	S1	E	LE
TN	Monroe	Quadrula intermedia	Cumberland Monkeyface	S1	E	LE
TN	Monroe	Quadrula sparsa	Appalachian Monkeyface	S1	E	LE
TN	Monroe	Athearnia anthonyi	Anthony's River Snail	S1	E	LE
TN	Monroe	Megaceros aenigmaticus	Hornwort	S2S3	S	
TN	Monroe	Jungermannia fossombronioides	A liverwort	S1	S	
TN	Monroe	Porella wataugensis	Liverwort	S1S2	T	
TN	Monroe	Plagiomnium carolinianum	Mountain Wavy-leaf Moss	S1	S	
TN	Monroe	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Monroe	Coreopsis latifolia	Broad-leaved Tickseed	S1S2	E	
TN	Monroe	Cardamine clematitis	mountain bittercress	S2	T	
TN	Monroe	Draba ramosissima	Branching Whitlow-wort	S2	S	
TN	Monroe	Lobelia amoena	Southern Lobelia	S1S2	T	
TN	Monroe	Hypericum mitchellianum	Blue Ridge St. John's-wort	S2	T	
TN	Monroe	Menziesia pilosa	Fetterbush	S2	S	
TN	Monroe	Lathyrus palustris	Marsh Pea	S1	S	
TN	Monroe	Thermopsis fraxinifolia	Ash-leaved Bush-pea	S3	T	
TN	Monroe	Adlumia fungosa	Climbing Fumitory	S2	T	
TN	Monroe	Hydrophyllum virginianum	Virginia Waterleaf	S3	T	
TN	Monroe	Juglans cinerea	Butternut	S3	T	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Monroe	Stachys clingmanii	Clingman's Hedge-nettle	S1S2	T	
TN	Monroe	Monotropsis odorata	Sweet Pinesap	S2	T	
TN	Monroe	Clematis glaucophylla	Whiteleaf Leatherflower	S1	S	
TN	Monroe	Neviusia alabamensis	Alabama Snow-wreath	S2	T	
TN	Monroe	Aureolaria patula	Spreading False-foxglove	S3	S	
TN	Monroe	Symplocos tinctoria	Horsesugar	S2	S	
TN	Monroe	Abies fraseri	Fraser Fir	S1S2	T	
TN	Monroe	Carex comosa	Sedge	S2	T	
TN	Monroe	Carex ruthii	Ruth's Sedge	S2	T	
TN	Monroe	Carex manhartii	Manhart's Sedge	S2	E	
TN	Monroe	Cymophyllus fraserianus	Fraser's Sedge	S3	S	
TN	Monroe	Allium tricoccum	Small White Leek	S1S2	S-C	
TN	Monroe	Streptopus lanceolatus	Rosy Twisted-stalk	S2	S	
TN	Monroe	Xerophyllum asphodeloides	Eastern Turkeybeard	S3	T	
TN	Monroe	Platanthera integrilabia	White Fringeless Orchid	S2S3	E	LT
TN	Monroe	Platanthera psycodes	Small Purple Fringe Orchid	S2	S	
TN	Monroe	Calamagrostis porteri ssp. porteri	Porter's Reedgrass	S1	E	
TN	Monroe	Glyceria nubigena	Smoky Mountain Manna-grass	S1S2	T	
TN	Monroe	Poa palustris	Fowl Bluegrass	S1	E	
TN	Monroe	Potamogeton amplifolius	Large-leaf Pondweed	S1	T	
TN	Monroe	Potamogeton epihydrus	Creekgrass	S1S2	S	
TN	Monroe	Potamogeton tennesseensis	Tennessee Pondweed	S2	T	
TN	Monroe	Trichomanes boschianum	Appalachian Bristle Fern	S1S2	T	
TN	Monroe	Trichomanes petersii	Dwarf Filmy-fern	S2	T	
TN	Monroe	Botrychium jenmanii	Alabama Grapefern	S1	T	
TN	Monroe	Botrychium matricariifolium	Matricary Grapefern	S1	S	
TN	Montgomery	Cryptobranchus alleganiensis	Hellbender	S3	D	PS
TN	Montgomery	Hyla gratiosa	Barking Treefrog	S3	D	
TN	Montgomery	Sphyrapicus varius	Yellow-bellied Sapsucker	S1B,S4N	D	
TN	Montgomery	Thryomanes bewickii	Bewick's Wren	S1	E	
TN	Montgomery	Limnothlypis swainsonii	Swainson's Warbler	S3	D	
TN	Montgomery	Chondestes grammacus	Lark Sparrow	S1B	T	
TN	Montgomery	Ammodramus henslowii	Henslow's Sparrow	S1B	D	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Montgomery	Acipenser fulvescens	Lake Sturgeon	S1	E	
TN	Montgomery	Typhlichthys subterraneus	Southern Cavefish	S3	D	
TN	Montgomery	Etheostoma cinereum	Ashy Darter	S2S3	T	
TN	Montgomery	Percina phoxocephala	Slenderhead Darter	S3	D	
TN	Montgomery	Sorex cinereus	Common Shrew	S4	D	
TN	Montgomery	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Montgomery	Myotis grisescens	Gray Bat	S2	E	LE
TN	Montgomery	Myotis sodalis	Indiana Bat	S1	E	LE
TN	Montgomery	Myotis leibii	eastern small-footed bat	S2S3	D	
TN	Montgomery	Myotis septentrionalis	Northern Long-eared Bat	S1S2		LT
TN	Montgomery	Synaptomys cooperi	Southern Bog Lemming	S4	D	
TN	Montgomery	Zapus hudsonius	Meadow Jumping Mouse	S4	D	
TN	Montgomery	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	S3	D	
TN	Montgomery	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S3	T	
TN	Montgomery	Sistrurus miliarius streckeri	Western Pigmy Rattlesnake	S2S3	T	
TN	Montgomery	Epioblasma florentina florentina	Yellow-blossom Pearlymussel	SX	E	LE
TN	Montgomery	Pleurobema clava	Clubshell	SH	E	LE
TN	Montgomery	Quadrula cylindrica	Rabbitsfoot			LT
TN	Montgomery	Amsonia tabernaemontana var. gattingeri	A Blue-star	S3	S	
TN	Montgomery	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Montgomery	Asclepias purpurascens	Purple Milkweed	S1	S	
TN	Montgomery	Helianthus occidentalis	naked-stem sunflower	S2	S	
TN	Montgomery	Hieracium longipilum	Hairy Hawkweed	S1	S	
TN	Montgomery	Marshallia trinervia	Broadleaf Barbara's-buttons	S2S3	T	
TN	Montgomery	Prenanthes barbata	Barbed Rattlesnake-root	S2	S	
TN	Montgomery	Rudbeckia subtomentosa	Sweet Coneflower	S2	T	
TN	Montgomery	Silphium laciniatum	Compass-plant	S2	T	
TN	Montgomery	Silphium pinnatifidum	Prairie-dock	S2	T	
TN	Montgomery	Solidago rupestris	Rock Goldenrod	S1	E	
TN	Montgomery	Boechera shortii	Short's Rock-cress	S1S2	S	
TN	Montgomery	Armoracia lacustris	Lake-cress	S2	S	
TN	Montgomery	Physaria globosa	Lesquereux's Mustard	S2	E	LE
TN	Montgomery	Apios priceana	Price's Potato-bean	S3	E	LT

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Montgomery	Desmodium ochroleucum	Creamflower Tick-trefoil	S1	E	
TN	Montgomery	Trifolium reflexum	Buffalo Clover	S1	E	
TN	Montgomery	Ribes odoratum	Buffalo Currant	S1	T	
TN	Montgomery	Polygala mariana	Maryland Milkwort	S1	S	
TN	Montgomery	Hottonia inflata	Featherfoil	S2	S	
TN	Montgomery	Ranunculus aquatilis var. diffusus	White Water Buttercup	S1	E	
TN	Montgomery	Agalinis auriculata	Earleaf Foxglove	S2	E	
TN	Montgomery	Aureolaria patula	Spreading False-foxglove	S3	S	
TN	Montgomery	Sagittaria brevirostra	Short-beak Arrowhead	S1	T	
TN	Montgomery	Sagittaria rigida	Sessile-fruited Arrowhead	S1	E	
TN	Montgomery	Carex comosa	Sedge	S2	T	
TN	Montgomery	Carex muskingumensis	Sedge	S1	E	
TN	Montgomery	Eleocharis lanceolata	Lance-like Spikerush	S1	S	
TN	Montgomery	Elodea nuttallii	Waterweed	S2	S	
TN	Montgomery	Diarrhena obovata	Beak Grass	S1	S	
TN	Montgomery	Muhlenbergia glabrifloris	Muhly	S1	S	
TN	Montgomery	Heteranthera limosa	Smaller Mud-plantain	S1S2	T	
TN	Moore	Hemitremia flammea	Flame Chub	S3	D	
TN	Moore	Myotis grisescens	Gray Bat	S2	E	LE
TN	Moore	Epioblasma turgidula	Turgid Blossom Pearlymussel	SX	E	LE
TN	Moore	Fusconaia cor	Shiny Pigtoe Pearlymussel	S1	E	LE
TN	Moore	Pleuronaia dolabelloides	Slabside Pearlymussel	S2		LE
TN	Moore	Leptoxis umbilicata	Umbilicate River Snail	S1	TRKD	
TN	Moore	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Moore	Drosera brevifolia	Dwarf Sundew	S2	T	
TN	Moore	Neviusia alabamensis	Alabama Snow-wreath	S2	T	
TN	Moore	Zigadenus leimanthoides	Death-camas	S2	T	
TN	Moore	Dichanthelium acuminatum ssp. leucothrix	Panic-grass	S1	S	
TN	Moore	Dichanthelium ensifolium ssp. curtifolium	Panic-grass	S1	E	
TN	Morgan	Cryptobranchus alleganiensis	Hellbender	S3	D	PS
TN	Morgan	Desmognathus welteri	Black Mountain Salamander	S3	D	
TN	Morgan	Vermivora chrysoptera	Golden-winged Warbler	S3B	D	
TN	Morgan	Setophaga cerulea	Cerulean Warbler	S3B	D	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Morgan	Limnothlypis swainsonii	Swainson's Warbler	S3	D	
TN	Morgan	Chrosomus tennesseensis	Tennessee Dace	S3	D	
TN	Morgan	Erimonax monachus	Spotfin Chub	S2	T	LT
TN	Morgan	Etheostoma cinereum	Ashy Darter	S2S3	T	
TN	Morgan	Etheostoma baileyi	Emerald Darter	S2	D	
TN	Morgan	Percina aurantiaca	Tangerine Darter	S3	D	
TN	Morgan	Percina macrocephala	Longhead Darter	S2	T	
TN	Morgan	Sorex fumeus	Smoky Shrew	S4	D	
TN	Morgan	Parascalops breweri	Hairy-tailed Mole	S3	D	
TN	Morgan	Myotis leibii	eastern small-footed bat	S2S3	D	
TN	Morgan	Neotoma magister	Allegheny Woodrat	S3	D	
TN	Morgan	Napaeozapus insignis	Woodland Jumping Mouse	S4	D	
TN	Morgan	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	S3	D	
TN	Morgan	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S3	T	
TN	Morgan	Alasmidonta atropurpurea	Cumberland Elktoe	S1S2	E	LE
TN	Morgan	Epioblasma capsaeformis	Oyster Mussel	S1	E	LE
TN	Morgan	Epioblasma turgidula	Turgid Blossom Pearlymussel	SX	E	LE
TN	Morgan	Fusconaia cuneolus	Fine-rayed Pigtoe	S1	E	LE
TN	Morgan	Lampsilis virescens	Alabama Lampmussel	S1	E	LE
TN	Morgan	Villosa perpurpurea	Purple Bean	S1	E	LE
TN	Morgan	Villosa trabalis	Cumberland Bean	S1	E	LE
TN	Morgan	Bryoxiphium norvegicum	Sword Moss	S1	T	
TN	Morgan	Myurella julacea	Small Mousetail Moss	SH	S-P	
TN	Morgan	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Morgan	Helenium brevifolium	Shortleaf Sneezeweed	S1	E	
TN	Morgan	Helianthus eggertii	Eggert's Sunflower	S3	S	DM
TN	Morgan	Marshallia grandiflora	Large-flowered Barbara's-buttons	S2	E	
TN	Morgan	Ageratina luciae-brauniae	Lucy Braun's White Snakeroot	S3	T	
TN	Morgan	Berberis canadensis	American barberry	S2	S	
TN	Morgan	Minuartia cumberlandensis	Cumberland Sandwort	S2	E	LE
TN	Morgan	Leucothoe racemosa	Fetter-bush	S2	T	
TN	Morgan	Adlumia fungosa	Climbing Fumitory	S2	T	
TN	Morgan	Conradina verticillata	Cumberland Rosemary	S3	T	LT

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Morgan	Utricularia subulata	Zigzag Bladderwort	S1	T	
TN	Morgan	Monotropsis odorata	Sweet Pinesap	S2	T	
TN	Morgan	Polygonella americana	Southern Jointweed	S1S2	E	
TN	Morgan	Phemeranthus mengesii	Fame-flower	S2	T	
TN	Morgan	Trientalis borealis	Northern Starflower	S1	T	
TN	Morgan	Amelanchier sanguinea	Round-leaved Serviceberry	S2	T	
TN	Morgan	Spiraea virginiana	Virginia Spiraea	S2	E	LT
TN	Morgan	Buckleya distichophylla	piratebush	S2	T	
TN	Morgan	Lilium philadelphicum	Wood Lily	S1	E	
TN	Morgan	Veratrum woodii	Ozark Bunchflower	S1	E	
TN	Morgan	Calamovilfa arcuata	Sandreed Grass	S2	T	
TN	Morgan	Danthonia epilis	Bog Oat-grass	S1S2	S	
TN	Morgan	Sporobolus junceus	A Dropseed	S1	E	
TN	Morgan	Potamogeton tennesseensis	Tennessee Pondweed	S2	T	
TN	Obion	Anhinga anhinga	Anhinga	S1B	D	
TN	Obion	Ixobrychus exilis	Least Bittern	S2B	D	
TN	Obion	Ardea alba	Great Egret	S2B,S3N	D	
TN	Obion	Ictinia mississippiensis	Mississippi Kite	S2S3	D	
TN	Obion	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Obion	Falco peregrinus	Peregrine Falcon	S1B	E	
TN	Obion	Tyto alba	Common Barn-owl	S3	D	
TN	Obion	Thryomanes bewickii	Bewick's Wren	S1	E	
TN	Obion	Setophaga cerulea	Cerulean Warbler	S3B	D	
TN	Obion	Limnothlypis swainsonii	Swainson's Warbler	S3	D	
TN	Obion	Peucaea aestivalis	Bachman's Sparrow	S1B	E	
TN	Obion	Chondestes grammacus	Lark Sparrow	S1B	T	
TN	Obion	Atractosteus spatula	Alligator Gar	S1	D	
TN	Obion	Noturus stigmosus	Northern Madtom	S3	D	
TN	Obion	Fundulus chrysotus	Golden Topminnow	S1S2	D	
TN	Obion	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Obion	Corynorhinus rafinesquii	Rafinesque’s Big-eared bat	S3	D	
TN	Obion	Neotoma floridana illinoensis	Eastern Woodrat	S3	D	
TN	Obion	Zapus hudsonius	Meadow Jumping Mouse	S4	D	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Obion	Macrochelys temminckii	Alligator Snapping Turtle	S2S3	D	
TN	Obion	Nerodia cyclopion	Mississippi Green Water Snake	S2	D	
TN	Obion	Triodopsis multilineata	Striped Whitelip Snail	S2	TRKD	
TN	Obion	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Obion	Armoracia lacustris	Lake-cress	S2	S	
TN	Obion	Hottonia inflata	Featherfoil	S2	S	
TN	Obion	Ranunculus flabellaris	Yellow Water-crowfoot	S2	T	
TN	Obion	Crataegus harbisonii	Harbison Hawthorn	S1	E	
TN	Obion	Prunus virginiana	Chokecherry	S1	S	
TN	Obion	Sagittaria platyphylla	Ovate-leaved Arrowhead	S2S3	S	
TN	Obion	Carex comosa	Sedge	S2	T	
TN	Obion	Elodea nuttallii	Waterweed	S2	S	
TN	Obion	Iris fulva	Red Iris	S2	T	
TN	Obion	Spiranthes odorata	Sweetscent Ladies'-tresses	S1	E	
TN	Overton	Hemidactylium scutatum	Four-toed Salamander	S3	D	
TN	Overton	Ixobrychus exilis	Least Bittern	S2B	D	
TN	Overton	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Overton	Thryomanes bewickii	Bewick's Wren	S1	E	
TN	Overton	Setophaga cerulea	Cerulean Warbler	S3B	D	
TN	Overton	Typhlichthys subterraneus	Southern Cavefish	S3	D	
TN	Overton	Etheostoma cinereum	Ashy Darter	S2S3	T	
TN	Overton	Percina burtoni	Blotchside Logperch	S2	D	
TN	Overton	Percina macrocephala	Longhead Darter	S2	T	
TN	Overton	Myotis grisescens	Gray Bat	S2	E	LE
TN	Overton	Myotis septentrionalis	Northern Long-eared Bat	S1S2		LT
TN	Overton	Corynorhinus rafinesquii	Rafinesque’s Big-eared bat	S3	D	
TN	Overton	Neotoma magister	Allegheny Woodrat	S3	D	
TN	Overton	Zapus hudsonius	Meadow Jumping Mouse	S4	D	
TN	Overton	Cambarus obeyensis	Obey Crayfish	S2	T	
TN	Overton	Ptychobranchus subtentum	Fluted Kidneyshell	S2		LE
TN	Overton	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Overton	Ageratina luciae-brauniae	Lucy Braun's White Snakeroot	S3	T	
TN	Overton	Caulophyllum giganteum	Blue Cohosh	S1	T	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Overton	Juglans cinerea	Butternut	S3	T	
TN	Overton	Allium burdickii	Narrow-leaved Wild Leek	S1S2	T-C	
TN	Overton	Spiranthes lucida	Shining Ladies'-tresses	S1S2	T	
TN	Overton	Glyceria acutiflora	Manna-grass	S2	S	
TN	Perry	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Perry	Setophaga cerulea	Cerulean Warbler	S3B	D	
TN	Perry	Noturus fasciatus	Saddled Madtom	S2	T	
TN	Perry	Typhlichthys subterraneus	Southern Cavefish	S3	D	
TN	Perry	Etheostoma aquali	Coppercheek Darter	S2S3	T	
TN	Perry	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Perry	Myotis grisescens	Gray Bat	S2	E	LE
TN	Perry	Myotis sodalis	Indiana Bat	S1	E	LE
TN	Perry	Myotis septentrionalis	Northern Long-eared Bat	S1S2		LT
TN	Perry	Neotoma magister	Allegheny Woodrat	S3	D	
TN	Perry	Zapus hudsonius	Meadow Jumping Mouse	S4	D	
TN	Perry	Sistrurus miliarius streckeri	Western Pigmy Rattlesnake	S2S3	T	
TN	Perry	Cumberlandia monodonta	Spectaclecase	S2S3		LE
TN	Perry	Pleuronaia dolabelloides	Slabside Pearlymussel	S2		LE
TN	Perry	Obovaria retusa	Ring Pink	S1	E	LE
TN	Perry	Plethobasus cicatricosus	White Wartyback	S1	E	LE
TN	Perry	Plethobasus cooperianus	Orange-foot Pimpleback	S1	E	LE
TN	Perry	Quadrula cylindrica	Rabbitsfoot			LT
TN	Perry	Quadrula cylindrica cylindrica	Smooth Rabbitsfoot	S3		LT
TN	Perry	Liatris cylindracea	Slender Blazing-star	S2	T	
TN	Perry	Prenanthes aspera	Rough Rattlesnake-root	S1	E	
TN	Perry	Prenanthes barbata	Barbed Rattlesnake-root	S2	S	
TN	Perry	Hasteola suaveolens	Sweet-scented Indian-plantain	S2	S	
TN	Perry	Onosmodium molle ssp. occidentale	Western False Gromwell	S1S2	T	
TN	Perry	Arabis hirsuta	Western Hairy Rock-cress	S1	T	
TN	Perry	Draba cuneifolia	Wedge-leaf Whitlow-grass	S1S2	S	
TN	Perry	Acalypha deamii	Deam's Copperleaf	S1	S	
TN	Perry	Desmodium ochroleucum	Creamflower Tick-trefoil	S1	E	
TN	Perry	Salvia azurea var. grandiflora	Blue Sage	S3	S	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Perry	Erythronium rostratum	Yellow Trout-lily	S2	S	
TN	Pickett	Desmognathus welteri	Black Mountain Salamander	S3	D	
TN	Pickett	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Pickett	Falco peregrinus	Peregrine Falcon	S1B	E	
TN	Pickett	Limnothlypis swainsonii	Swainson's Warbler	S3	D	
TN	Pickett	Carpiodes velifer	Highfin Carpsucker	S2S3	D	
TN	Pickett	Crystallaria asprella	Crystal Darter	SX	D	
TN	Pickett	Etheostoma cinereum	Ashy Darter	S2S3	T	
TN	Pickett	Percina burtoni	Blotchside Logperch	S2	D	
TN	Pickett	Percina macrocephala	Longhead Darter	S2	T	
TN	Pickett	Percina phoxocephala	Slenderhead Darter	S3	D	
TN	Pickett	Sorex fumeus	Smoky Shrew	S4	D	
TN	Pickett	Myotis sodalis	Indiana Bat	S1	E	LE
TN	Pickett	Corynorhinus rafinesquii	Rafinesque’s Big-eared bat	S3	D	
TN	Pickett	Neotoma magister	Allegheny Woodrat	S3	D	
TN	Pickett	Napaeozapus insignis	Woodland Jumping Mouse	S4	D	
TN	Pickett	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	S3	D	
TN	Pickett	Epioblasma florentina walkeri	Tan Riffleshell	S1	E	LE
TN	Pickett	Ptychobranchus subtentum	Fluted Kidneyshell	S2		LE
TN	Pickett	Villosa trabalis	Cumberland Bean	S1	E	LE
TN	Pickett	Pellia appalachiana	A Liverwort	S2	S	
TN	Pickett	Bryoxiphium norvegicum	Sword Moss	S1	T	
TN	Pickett	Scopelophila cataractae	Agoyan Cataract Moss	S1	S	
TN	Pickett	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Pickett	Ageratina luciae-brauniae	Lucy Braun's White Snakeroot	S3	T	
TN	Pickett	Eurybia schreberi	Schreber Aster	S1	S	
TN	Pickett	Minuartia cumberlandensis	Cumberland Sandwort	S2	E	LE
TN	Pickett	Juglans cinerea	Butternut	S3	T	
TN	Pickett	Parnassia grandifolia	Large-leaved Grass-of-parnassus	S3	S	
TN	Pickett	Aureolaria patula	Spreading False-foxglove	S3	S	
TN	Pickett	Thuja occidentalis	Northern White Cedar	S3	S	
TN	Pickett	Taxus canadensis	Canadian Yew	S1	E	
TN	Pickett	Maianthemum stellatum	Starflower Solomons-seal	S1	E	

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TN	Pickett	Spiranthes lucida	Shining Ladies'-tresses	S1S2	T	
TN	Polk	Cryptobranchus alleganiensis	Hellbender	S3	D	PS
TN	Polk	Desmognathus aeneus	Seepage Salamander	S1	D	
TN	Polk	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Polk	Limnothlypis swainsonii	Swainson's Warbler	S3	D	
TN	Polk	Ichthyomyzon gagei	Southern Brook Lamprey	S1	D	
TN	Polk	Notropis lineapunctata	Lined Chub	S1	D	
TN	Polk	Chrosomus tennesseensis	Tennessee Dace	S3	D	
TN	Polk	Cyprinella caerulea	Blue Shiner	S1	E	LT
TN	Polk	Carpiodes velifer	Highfin Carpsucker	S2S3	D	
TN	Polk	Noturus munitus	Frecklebelly Madtom	S1	T	
TN	Polk	Etheostoma ditrema	Coldwater Darter	S1	T	
TN	Polk	Etheostoma trisella	Trispot Darter	S1	T	
TN	Polk	Etheostoma brevirostrum	Holiday Darter	S1	T	
TN	Polk	Percina antesella	Amber Darter	S1	E	LE
TN	Polk	Percina aurantiaca	Tangerine Darter	S3	D	
TN	Polk	Percina burtoni	Blotchside Logperch	S2	D	
TN	Polk	Percina tanasi	Snail Darter	S2S3	T	LT
TN	Polk	Percina jenkinsi	Conasauga Logperch	S1	E	LE
TN	Polk	Sorex cinereus	Common Shrew	S4	D	
TN	Polk	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Polk	Sorex fumeus	Smoky Shrew	S4	D	
TN	Polk	Myotis leibii	eastern small-footed bat	S2S3	D	
TN	Polk	Myotis septentrionalis	Northern Long-eared Bat	S1S2		LT
TN	Polk	Neotoma floridana haematoreia	Southern Appalachian Woodrat	S2	D	
TN	Polk	Napaeozapus insignis	Woodland Jumping Mouse	S4	D	
TN	Polk	Plestiodon anthracinus	Coal Skink	S1	D	
TN	Polk	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S3	T	
TN	Polk	Ophiogomphus incurvatus alleghaniensis	Allegheny Snaketail	S1	TRKD	
TN	Polk	Epioblasma capsaeformis	Oyster Mussel	S1	E	LE
TN	Polk	Epioblasma florentina walkeri	Tan Riffleshell	S1	E	LE
TN	Polk	Epioblasma metastriata	Upland Combshell	SH	E	LE
TN	Polk	Lampsilis altilis	Fine-lined Pocketbook	S1S2	T	LT

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Polk	Pleuronaia dolabelloides	Slabside Pearlymussel	S2		LE
TN	Polk	Medionidus acutissimus	Alabama Moccasinshell	S1	T	LT
TN	Polk	Medionidus parvulus	Coosa Moccasinshell	S1	E	LE
TN	Polk	Pleurobema georgianum	Southern Pigtoe	S1	E	LE
TN	Polk	Pleurobema hanleyianum	Georgia Pigtoe	S1		LE
TN	Polk	Pleurobema perovatum	Ovate Clubshell	SH	E	LE
TN	Polk	Ptychobranchus greenii	Triangular Kidneyshell	S1	E	LE
TN	Polk	Ptychobranchus foremanianus	Rayed Kidneyshell	S1	E	LE
TN	Polk	Villosa trabalis	Cumberland Bean	S1	E	LE
TN	Polk	Elimia interrupta	Knotty Elimia	S1	TRKD	
TN	Polk	Megaceros aenigmaticus	Hornwort	S2S3	S	
TN	Polk	Acer leucoderme	Chalk Maple	S3	WP	
TN	Polk	Heracleum maximum	Cow Parsnip	S2	S	
TN	Polk	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Polk	Chrysogonum virginianum	Green-and-gold	S2	T	
TN	Polk	Coreopsis latifolia	Broad-leaved Tickseed	S1S2	E	
TN	Polk	Pseudognaphalium helleri	Heller's Catfoot	S2	S	
TN	Polk	Marshallia obovata	Obovate Marshallia	S1	E	
TN	Polk	Pityopsis ruthii	Ruth's Golden Aster	S1	E	LE
TN	Polk	Cardamine clematitis	mountain bittercress	S2	T	
TN	Polk	Cardamine flagellifera	Bitter Cress	S2	T	
TN	Polk	Draba ramosissima	Branching Whitlow-wort	S2	S	
TN	Polk	Lobelia amoena	Southern Lobelia	S1S2	T	
TN	Polk	Silene ovata	Ovate Catchfly	S2	E	
TN	Polk	Diervilla lonicera	Northern Bush-honeysuckle	S2	T	
TN	Polk	Diervilla sessilifolia var. rivularis	Mountain Bush-honeysuckle	S2	T	
TN	Polk	Lonicera dioica	Mountain Honeysuckle	S2	S	
TN	Polk	Sedum nevii	Nevius' Stonecrop	S1	E	
TN	Polk	Vaccinium macrocarpon	Large Cranberry	S2	T	
TN	Polk	Thermopsis fraxinifolia	Ash-leaved Bush-pea	S3	T	
TN	Polk	Juglans cinerea	Butternut	S3	T	
TN	Polk	Agastache scrophulariifolia	Giant Hyssop	S1S2	T	
TN	Polk	Stachys clingmanii	Clingman's Hedge-nettle	S1S2	T	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Polk	Magnolia virginiana	Sweetbay Magnolia	S2	T	
TN	Polk	Monotropsis odorata	Sweet Pinesap	S2	T	
TN	Polk	Lysimachia fraseri	Fraser Loosestrife	S2	E	
TN	Polk	Amelanchier sanguinea	Round-leaved Serviceberry	S2	T	
TN	Polk	Prunus virginiana	Chokecherry	S1	S	
TN	Polk	Nestronia umbellula	Nestronia	S1	E	
TN	Polk	Agalinis plukenetii	Purple Gerardia	S1	E	
TN	Polk	Symplocos tinctoria	Horsesugar	S2	S	
TN	Polk	Cyperus dentatus	Toothed Sedge	S1	S	
TN	Polk	Cyperus plukenetii	Plukenet's Cyperus	S1	S	
TN	Polk	Eriophorum virginicum	Tawny Cotton-grass	S1S2	E	
TN	Polk	Fuirena squarrosa	Hairy Umbrella-sedge	S1	S	
TN	Polk	Melanthium latifolium	Broadleaf Bunchflower	S1S2	E	
TN	Polk	Trillium decumbens	Trailing Trillium	S1	E	
TN	Polk	Trillium rugelii	Southern Nodding Trillium	S2	E	
TN	Polk	Xerophyllum asphodeloides	Eastern Turkeybeard	S3	T	
TN	Polk	Platanthera integrilabia	White Fringeless Orchid	S2S3	E	LT
TN	Polk	Platanthera psycodes	Small Purple Fringe Orchid	S2	S	
TN	Polk	Dichanthelium acuminatum ssp. leucothrix	Panic-grass	S1	S	
TN	Polk	Festuca paradoxa	Cluster Fescue	S1	S	
TN	Polk	Sacciolepis striata	Gibbous Panic-grass	S1	S	
TN	Polk	Potamogeton epihydrus	Creekgrass	S1S2	S	
TN	Polk	Potamogeton tennesseensis	Tennessee Pondweed	S2	T	
TN	Polk	Trichomanes petersii	Dwarf Filmy-fern	S2	T	
TN	Polk	Pilularia americana	American Pillwort	S1S2	S	
TN	Putnam	Hemidactylium scutatum	Four-toed Salamander	S3	D	
TN	Putnam	Setophaga cerulea	Cerulean Warbler	S3B	D	
TN	Putnam	Peucaea aestivalis	Bachman's Sparrow	S1B	E	
TN	Putnam	Notropis rupestris	Bedrock Shiner	S2	D	
TN	Putnam	Typhlichthys subterraneus	Southern Cavefish	S3	D	
TN	Putnam	Etheostoma olivaceum	Sooty Darter	S3	D	
TN	Putnam	Sorex cinereus	Common Shrew	S4	D	
TN	Putnam	Sorex longirostris	Southeastern Shrew	S4	D	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Putnam	Sorex fumeus	Smoky Shrew	S4	D	
TN	Putnam	Myotis grisescens	Gray Bat	S2	E	LE
TN	Putnam	Myotis sodalis	Indiana Bat	S1	E	LE
TN	Putnam	Myotis leibii	eastern small-footed bat	S2S3	D	
TN	Putnam	Corynorhinus rafinesquii	Rafinesque’s Big-eared bat	S3	D	
TN	Putnam	Neotoma magister	Allegheny Woodrat	S3	D	
TN	Putnam	Zapus hudsonius	Meadow Jumping Mouse	S4	D	
TN	Putnam	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	S3	D	
TN	Putnam	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S3	T	
TN	Putnam	Cambarus obeyensis	Obey Crayfish	S2	T	
TN	Putnam	Orconectes incomptus	Tennessee Cave Crayfish	S1	E	
TN	Putnam	Cyprogenia stegaria	Fanshell	S1	E	LE
TN	Putnam	Dromus dromas	Dromedary Pearlymussel	S1	E	LE
TN	Putnam	Epioblasma brevidens	Cumberlandian Combshell	S1	E	LE
TN	Putnam	Epioblasma capsaeformis	Oyster Mussel	S1	E	LE
TN	Putnam	Epioblasma obliquata obliquata	Purple Catspaw	S1	E	LE
TN	Putnam	Epioblasma triquetra	Snuffbox	S3		LE
TN	Putnam	Lampsilis abrupta	Pink Mucket	S2	E	LE
TN	Putnam	Pleuronaia dolabelloides	Slabside Pearlymussel	S2		LE
TN	Putnam	Plethobasus cyphyus	Sheepnose	S2S3		LE
TN	Putnam	Pleurobema clava	Clubshell	SH	E	LE
TN	Putnam	Quadrula cylindrica cylindrica	Smooth Rabbitsfoot	S3		LT
TN	Putnam	Villosa trabalis	Cumberland Bean	S1	E	LE
TN	Putnam	Tortula fragilis	Fragmented Screw-moss	S1	E	
TN	Putnam	Eryngium integrifolium	Button Snakeroot	S1	T	
TN	Putnam	Amsonia tabernaemontana var. gattingeri	A Blue-star	S3	S	
TN	Putnam	Ageratina luciae-brauniae	Lucy Braun's White Snakeroot	S3	T	
TN	Putnam	Draba ramosissima	Branching Whitlow-wort	S2	S	
TN	Putnam	Erysimum capitatum	Western Wallflower	S1S2	E	PS
TN	Putnam	Lonicera dioica	Mountain Honeysuckle	S2	S	
TN	Putnam	Diamorpha smallii	Small's Stonecrop	S1S2	E	
TN	Putnam	Drosera intermedia	Spoon-leaved Sundew	S2	S	
TN	Putnam	Geranium robertianum	Herb-robert	S1	S	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Putnam	Juglans cinerea	Butternut	S3	T	
TN	Putnam	Pycnanthemum torreyi	Torrey's Mountain Mint	S1	E	
TN	Putnam	Eriogonum harperi	Harper's Umbrella-plant	S1	E	
TN	Putnam	Spiraea alba	Narrow-leaved Meadow-sweet	S1	E	
TN	Putnam	Thuja occidentalis	Northern White Cedar	S3	S	
TN	Putnam	Eleocharis equisetoides	Horse-tail Spikerush	S1	E	
TN	Putnam	Rhynchospora perplexa	Beakrush	S2	T	
TN	Putnam	Eriocaulon decangulare	Ten-angle Pipewort	S1	E	
TN	Putnam	Trillium pusillum	Least Trillium	S2	E	
TN	Putnam	Elymus svensonii	Svenson's Wild-rye	S2	T	
TN	Putnam	Muhlenbergia cuspidata	Plains Muhlenbergia	S1	E	
TN	Putnam	Potamogeton amplifolius	Large-leaf Pondweed	S1	T	
TN	Putnam	Botrychium jenmanii	Alabama Grapefern	S1	T	
TN	Rhea	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Rhea	Tyto alba	Common Barn-owl	S3	D	
TN	Rhea	Peucaea aestivalis	Bachman's Sparrow	S1B	E	
TN	Rhea	Acipenser fulvescens	Lake Sturgeon	S1	E	
TN	Rhea	Hemitremia flammea	Flame Chub	S3	D	
TN	Rhea	Chrosomus tennesseensis	Tennessee Dace	S3	D	
TN	Rhea	Chrosomus saylori	Laurel Dace	S1	E	LE
TN	Rhea	Erimonax monachus	Spotfin Chub	S2	T	LT
TN	Rhea	Carpiodes velifer	Highfin Carpsucker	S2S3	D	
TN	Rhea	Percina aurantiaca	Tangerine Darter	S3	D	
TN	Rhea	Percina tanasi	Snail Darter	S2S3	T	LT
TN	Rhea	Myotis grisescens	Gray Bat	S2	E	LE
TN	Rhea	Myotis leibii	eastern small-footed bat	S2S3	D	
TN	Rhea	Synaptomys cooperi	Southern Bog Lemming	S4	D	
TN	Rhea	Zapus hudsonius	Meadow Jumping Mouse	S4	D	
TN	Rhea	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S3	T	
TN	Rhea	Cyprogenia stegaria	Fanshell	S1	E	LE
TN	Rhea	Dromus dromas	Dromedary Pearlymussel	S1	E	LE
TN	Rhea	Fusconaia cor	Shiny Pigtoe Pearlymussel	S1	E	LE
TN	Rhea	Lampsilis abrupta	Pink Mucket	S2	E	LE

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Rhea	Plethobasus cooperianus	Orange-foot Pimpleback	S1	E	LE
TN	Rhea	Plethobasus cyphyus	Sheepnose	S2S3		LE
TN	Rhea	Pleurobema plenum	Rough Pigtoe	S1	E	LE
TN	Rhea	Liatris cylindracea	Slender Blazing-star	S2	T	
TN	Rhea	Solidago ptarmicoides	Prairie Goldenrod	S1S2	E	
TN	Rhea	Diervilla lonicera	Northern Bush-honeysuckle	S2	T	
TN	Rhea	Diamorpha smallii	Small's Stonecrop	S1S2	E	
TN	Rhea	Lathyrus palustris	Marsh Pea	S1	S	
TN	Rhea	Ribes curvatum	Granite Gooseberry	S1	T	
TN	Rhea	Polygala nana	Dwarf Milkwort	S1	E	
TN	Rhea	Phemeranthus teretifolius	Roundleaf Fameflower	S2	T	
TN	Rhea	Spiraea virginiana	Virginia Spiraea	S2	E	LT
TN	Rhea	Schisandra glabra	Bay Starvine	S2	T	
TN	Rhea	Aureolaria patula	Spreading False-foxglove	S3	S	
TN	Rhea	Woodwardia virginica	Virginia Chainfern	S2	S	
TN	Roane	Cryptobranchus alleganiensis	Hellbender	S3	D	PS
TN	Roane	Gyrinophilus palleucus	Tennessee Cave Salamander	S2	T	
TN	Roane	Gyrinophilus gulolineatus	Berry Cave Salamander	S1	T	C
TN	Roane	Hemidactylium scutatum	Four-toed Salamander	S3	D	
TN	Roane	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Roane	Accipiter striatus	Sharp-shinned Hawk	S3B,S4N	D	
TN	Roane	Limnothlypis swainsonii	Swainson's Warbler	S3	D	
TN	Roane	Peucaea aestivalis	Bachman's Sparrow	S1B	E	
TN	Roane	Acipenser fulvescens	Lake Sturgeon	S1	E	
TN	Roane	Hemitremia flammea	Flame Chub	S3	D	
TN	Roane	Chrosomus tennesseensis	Tennessee Dace	S3	D	
TN	Roane	Erimonax monachus	Spotfin Chub	S2	T	LT
TN	Roane	Cycleptus elongatus	Blue Sucker	S2	T	
TN	Roane	Percina aurantiaca	Tangerine Darter	S3	D	
TN	Roane	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Roane	Myotis grisescens	Gray Bat	S2	E	LE
TN	Roane	Zapus hudsonius	Meadow Jumping Mouse	S4	D	
TN	Roane	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	S3	D	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Roane	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S3	T	
TN	Roane	Cumberlandia monodonta	Spectaclecase	S2S3		LE
TN	Roane	Cyprogenia stegaria	Fanshell	S1	E	LE
TN	Roane	Epioblasma turgidula	Turgid Blossom Pearlymussel	SX	E	LE
TN	Roane	Fusconaia cor	Shiny Pigtoe Pearlymussel	S1	E	LE
TN	Roane	Fusconaia cuneolus	Fine-rayed Pigtoe	S1	E	LE
TN	Roane	Lampsilis abrupta	Pink Mucket	S2	E	LE
TN	Roane	Lampsilis virescens	Alabama Lampmussel	S1	E	LE
TN	Roane	Obovaria retusa	Ring Pink	S1	E	LE
TN	Roane	Plethobasus cooperianus	Orange-foot Pimpleback	S1	E	LE
TN	Roane	Villosa perpurpurea	Purple Bean	S1	E	LE
TN	Roane	Athearnia anthonyi	Anthony's River Snail	S1	E	LE
TN	Roane	Preissia quadrata	Narrow Mushroom-headed Liverwort	S1	T	
TN	Roane	Myurella julacea	Small Mousetail Moss	SH	S-P	
TN	Roane	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Roane	Eupatorium godfreyanum	Godfrey's Thoroughwort	S1	S	
TN	Roane	Pseudognaphalium helleri	Heller's Catfoot	S2	S	
TN	Roane	Helianthus occidentalis	naked-stem sunflower	S2	S	
TN	Roane	Liatris cylindracea	Slender Blazing-star	S2	T	
TN	Roane	Marshallia grandiflora	Large-flowered Barbara's-buttons	S2	E	
TN	Roane	Solidago ptarmicoides	Prairie Goldenrod	S1S2	E	
TN	Roane	Symphyotrichum pratense	Barrens Silky Aster	S1	E	
TN	Roane	Eurybia schreberi	Schreber Aster	S1	S	
TN	Roane	Draba ramosissima	Branching Whitlow-wort	S2	S	
TN	Roane	Erysimum capitatum	Western Wallflower	S1S2	E	PS
TN	Roane	Diervilla lonicera	Northern Bush-honeysuckle	S2	T	
TN	Roane	Diervilla sessilifolia var. rivularis	Mountain Bush-honeysuckle	S2	T	
TN	Roane	Lonicera dioica	Mountain Honeysuckle	S2	S	
TN	Roane	Leucothoe racemosa	Fetter-bush	S2	T	
TN	Roane	Juglans cinerea	Butternut	S3	T	
TN	Roane	Delphinium exaltatum	Tall Larkspur	S2	E	
TN	Roane	Spiraea virginiana	Virginia Spiraea	S2	E	LT
TN	Roane	Agalinis auriculata	Earleaf Foxglove	S2	E	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Roane	Aureolaria patula	Spreading False-foxglove	S3	S	
TN	Roane	Pedicularis lanceolata	Swamp Lousewort	S1S2	S	
TN	Roane	Thuja occidentalis	Northern White Cedar	S3	S	
TN	Roane	Bolboschoenus fluviatilis	River Bulrush	S1	S	
TN	Roane	Elodea nuttallii	Waterweed	S2	S	
TN	Roane	Juncus brachycephalus	Short-head Rush	S2	S	
TN	Roane	Veratrum woodii	Ozark Bunchflower	S1	E	
TN	Roane	Liparis loeselii	Loesel's Twayblade	S1	T	
TN	Roane	Platanthera flava var. herbiola	Pale Green Orchid	S2	T	
TN	Roane	Platanthera integrilabia	White Fringeless Orchid	S2S3	E	LT
TN	Roane	Spiranthes lucida	Shining Ladies'-tresses	S1S2	T	
TN	Roane	Asplenium scolopendrium var. americanum	American Hart's-tongue Fern	S1	E	LT
TN	Robertson	Hemidactylium scutatum	Four-toed Salamander	S3	D	
TN	Robertson	Hyla gratiosa	Barking Treefrog	S3	D	
TN	Robertson	Etheostoma cinereum	Ashy Darter	S2S3	T	
TN	Robertson	Etheostoma microlepidum	Smallscale Darter	S2	D	
TN	Robertson	Etheostoma tippecanoe	Tippecanoe Darter	S1S2	D	
TN	Robertson	Percina phoxocephala	Slenderhead Darter	S3	D	
TN	Robertson	Myotis grisescens	Gray Bat	S2	E	LE
TN	Robertson	Zapus hudsonius	Meadow Jumping Mouse	S4	D	
TN	Robertson	Sistrurus miliarius streckeri	Western Pigmy Rattlesnake	S2S3	T	
TN	Robertson	Quadrula cylindrica	Rabbitsfoot			LT
TN	Robertson	Polytaenia nuttallii	Prairie Parsley	S1	T	
TN	Robertson	Helianthus eggertii	Eggert's Sunflower	S3	S	DM
TN	Robertson	Leucothoe racemosa	Fetter-bush	S2	T	
TN	Robertson	Astragalus tennesseensis	Tennessee Milk-vetch	S3	S	
TN	Robertson	Desmodium ochroleucum	Creamflower Tick-trefoil	S1	E	
TN	Robertson	Ranunculus aquatilis var. diffusus	White Water Buttercup	S1	E	
TN	Robertson	Ranunculus flabellaris	Yellow Water-crowfoot	S2	T	
TN	Robertson	Carex buxbaumii	Buxbaum's Sedge	S1	E	
TN	Robertson	Spiranthes odorata	Sweetscent Ladies'-tresses	S1	E	
TN	Robertson	Torreyochloa pallida	Pale Manna Grass	S1	S	
TN	Rutherford	Ambystoma barbouri	Streamside Salamander	S2	D	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Rutherford	Gyrinophilus palleucus	Tennessee Cave Salamander	S2	T	
TN	Rutherford	Tyto alba	Common Barn-owl	S3	D	
TN	Rutherford	Thryomanes bewickii	Bewick's Wren	S1	E	
TN	Rutherford	Chondestes grammacus	Lark Sparrow	S1B	T	
TN	Rutherford	Notropis rupestris	Bedrock Shiner	S2	D	
TN	Rutherford	Notropis buccatus	Silverjaw Minnow	S1	T	
TN	Rutherford	Moxostoma lacerum	Harelip Sucker	SX	D	
TN	Rutherford	Typhlichthys subterraneus	Southern Cavefish	S3	D	
TN	Rutherford	Etheostoma cinereum	Ashy Darter	S2S3	T	
TN	Rutherford	Etheostoma luteovinctum	Redband Darter	S4	D	
TN	Rutherford	Etheostoma microlepidum	Smallscale Darter	S2	D	
TN	Rutherford	Etheostoma tippecanoe	Tippecanoe Darter	S1S2	D	
TN	Rutherford	Percina phoxocephala	Slenderhead Darter	S3	D	
TN	Rutherford	Myotis grisescens	Gray Bat	S2	E	LE
TN	Rutherford	Neotoma magister	Allegheny Woodrat	S3	D	
TN	Rutherford	Zapus hudsonius	Meadow Jumping Mouse	S4	D	
TN	Rutherford	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	S3	D	
TN	Rutherford	Cambarus williami	Brawleys Fork Crayfish	S2	E	
TN	Rutherford	Epioblasma florentina walkeri	Tan Riffleshell	S1	E	LE
TN	Rutherford	Pegias fabula	Little-wing Pearlymussel	S1	E	LE
TN	Rutherford	Quadrula cylindrica cylindrica	Smooth Rabbitsfoot	S3		LT
TN	Rutherford	Cololejeunea ornata	Liverwort	S1	T	
TN	Rutherford	Lejeunea sharpii	Sharp's Lejeunea	S1S2	E	
TN	Rutherford	Ammoselinum popei	Pope Sand-parsley	S2	T	
TN	Rutherford	Amsonia tabernaemontana var. gattingeri	A Blue-star	S3	S	
TN	Rutherford	Echinacea simulata	Wavy-leaf Purple-coneflower	S2	T	
TN	Rutherford	Echinacea tennesseensis	Tennessee Coneflower	S2	T	DM
TN	Rutherford	Helianthus occidentalis	naked-stem sunflower	S2	S	
TN	Rutherford	Liatris cylindracea	Slender Blazing-star	S2	T	
TN	Rutherford	Silphium pinnatifidum	Prairie-dock	S2	T	
TN	Rutherford	Solidago gattingeri	Gattinger's Goldenrod	S1	E	
TN	Rutherford	Arnoglossum plantagineum	Fen Indian-plantain	S2	T	
TN	Rutherford	Onosmodium molle ssp. subsetosum	False Gromwell	S1	E	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Rutherford	Turritis glabra	Tower-mustard	S1	S	
TN	Rutherford	Arabis hirsuta	Western Hairy Rock-cress	S1	T	
TN	Rutherford	Arabis perstellata	Braun's Rock-cress	S1	E	LE
TN	Rutherford	Paysonia densipila	Duck River Bladderpod	S3	S	
TN	Rutherford	Physaria globosa	Lesquereux's Mustard	S2	E	LE
TN	Rutherford	Paysonia stonensis	Stones River Bladderpod	S1	E	
TN	Rutherford	Stellaria fontinalis	Water Stitchwort	S3	S	
TN	Rutherford	Evolvulus nuttallianus	Evolvulus	S3	S	
TN	Rutherford	Astragalus tennesseensis	Tennessee Milk-vetch	S3	S	
TN	Rutherford	Astragalus bibullatus	Pyne's Ground Plum	S1	E	LE
TN	Rutherford	Dalea candida	White Prairie-clover	S2	T	
TN	Rutherford	Dalea foliosa	Leafy Prairie-clover	S2S3	E	LE
TN	Rutherford	Dalea purpurea	Purple Prairie-clover	S1	E	
TN	Rutherford	Trifolium calcaricum	Running Glade Clover	S1	E	
TN	Rutherford	Gentiana puberulenta	Downy Gentian	S1	E	
TN	Rutherford	Ribes missouriense	Missouri gooseberry	S2	S	
TN	Rutherford	Mirabilis albida	Pale Umbrella-wort	S2	T	
TN	Rutherford	Oenothera macrocarpa ssp. macrocarpa	Missouri Evening-primrose	S2	T	
TN	Rutherford	Polygala boykinii	Boykin's Milkwort	S2	T	
TN	Rutherford	Phlox bifida ssp. stellaria	Cleft Phlox	S3	T	
TN	Rutherford	Phemeranthus calcaricus	Limestone Fame-flower	S3	S	
TN	Rutherford	Anemone caroliniana	Carolina Anemone	S1S2	E	
TN	Rutherford	Neviusia alabamensis	Alabama Snow-wreath	S2	T	
TN	Rutherford	Zanthoxylum americanum	Northern Prickly-ash	S2	S	
TN	Rutherford	Veronica catenata	Sessile Water-speedwell	S1	E	
TN	Rutherford	Sagittaria platyphylla	Ovate-leaved Arrowhead	S2S3	S	
TN	Rutherford	Carex davisii	Davis' Sedge	S1	S	
TN	Rutherford	Eleocharis equisetoides	Horse-tail Spikerush	S1	E	
TN	Rutherford	Eleocharis wolfii	Wolf Spikerush	S1	E	
TN	Rutherford	Eleocharis compressa	Flat-stemmed Spike-rush	S1	S	
TN	Rutherford	Fimbristylis puberula	Hairy Fimbristylis	S1S2	T	
TN	Rutherford	Scleria verticillata	Low Nutrush	S2	S	
TN	Rutherford	Allium stellatum	Glade Onion	S1	E	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Rutherford	Schoenolirion croceum	Sunnybell	S3	T	
TN	Rutherford	Sporobolus heterolepis	Northern Dropseed	S1	T	
TN	Rutherford	Isoetes melanopoda	Blackfoot Quillwort	S1S2	E	
TN	Scott	Desmognathus welteri	Black Mountain Salamander	S3	D	
TN	Scott	Hemidactylium scutatum	Four-toed Salamander	S3	D	
TN	Scott	Vermivora chrysoptera	Golden-winged Warbler	S3B	D	
TN	Scott	Setophaga cerulea	Cerulean Warbler	S3B	D	
TN	Scott	Limnothlypis swainsonii	Swainson's Warbler	S3	D	
TN	Scott	Notropis rubellus	Rosyface Shiner	S2	D	
TN	Scott	Chrosomus cumberlandensis	Blackside Dace	S2	T	LT
TN	Scott	Crystallaria asprella	Crystal Darter	SX	D	
TN	Scott	Etheostoma cinereum	Ashy Darter	S2S3	T	
TN	Scott	Etheostoma sagitta	Cumberland Arrow Darter	S2	D	
TN	Scott	Etheostoma tippecanoe	Tippecanoe Darter	S1S2	D	
TN	Scott	Etheostoma baileyi	Emerald Darter	S2	D	
TN	Scott	Etheostoma susanae	Cumberland Darter	S1	E	LE
TN	Scott	Etheostoma lemniscatum	Tuxedo Darter	S1	E	LE
TN	Scott	Percina squamata	Olive Darter	S2	D	
TN	Scott	Neotoma magister	Allegheny Woodrat	S3	D	
TN	Scott	Synaptomys cooperi	Southern Bog Lemming	S4	D	
TN	Scott	Napaeozapus insignis	Woodland Jumping Mouse	S4	D	
TN	Scott	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	S3	D	
TN	Scott	Cambarus bouchardi	Big South Fork Crayfish	S1	E	
TN	Scott	Alasmidonta atropurpurea	Cumberland Elktoe	S1S2	E	LE
TN	Scott	Epioblasma brevidens	Cumberlandian Combshell	S1	E	LE
TN	Scott	Epioblasma florentina walkeri	Tan Riffleshell	S1	E	LE
TN	Scott	Pegias fabula	Little-wing Pearlymussel	S1	E	LE
TN	Scott	Villosa trabalis	Cumberland Bean	S1	E	LE
TN	Scott	Lejeunea blomquistii	Blomquist Leafy Liverwort	S1S2	S	
TN	Scott	Bryoxiphium norvegicum	Sword Moss	S1	T	
TN	Scott	Hydrocotyle americana	American Water-pennywort	S1	E	
TN	Scott	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Scott	Chrysogonum virginianum	Green-and-gold	S2	T	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Scott	Helenium brevifolium	Shortleaf Sneezeweed	S1	E	
TN	Scott	Marshallia grandiflora	Large-flowered Barbara's-buttons	S2	E	
TN	Scott	Ageratina luciae-brauniae	Lucy Braun's White Snakeroot	S3	T	
TN	Scott	Eurybia saxicastellii	Rockcastle Aster	S1S2	E	
TN	Scott	Berberis canadensis	American barberry	S2	S	
TN	Scott	Cardamine rotundifolia	Roundleaf Water-cress	S2S3	S	
TN	Scott	Minuartia cumberlandensis	Cumberland Sandwort	S2	E	LE
TN	Scott	Sedum nevii	Nevius' Stonecrop	S1	E	
TN	Scott	Corydalis sempervirens	Pale Corydalis	S1S2	S	
TN	Scott	Fothergilla major	Witch-alder	S2	T	
TN	Scott	Juglans cinerea	Butternut	S3	T	
TN	Scott	Conradina verticillata	Cumberland Rosemary	S3	T	LT
TN	Scott	Comptonia peregrina	Sweet Fern	S1	E	
TN	Scott	Phemeranthus teretifolius	Roundleaf Fameflower	S2	T	
TN	Scott	Spiraea virginiana	Virginia Spiraea	S2	E	LT
TN	Scott	Buckleya distichophylla	piratebush	S2	T	
TN	Scott	Thuja occidentalis	Northern White Cedar	S3	S	
TN	Scott	Taxus canadensis	Canadian Yew	S1	E	
TN	Scott	Carex echinata ssp. echinata	Little Prickly Sedge	S1?	S	
TN	Scott	Eriophorum virginicum	Tawny Cotton-grass	S1S2	E	
TN	Scott	Lilium philadelphicum	Wood Lily	S1	E	
TN	Scott	Corallorhiza maculata	Spotted Coral-root	S1	T	
TN	Scott	Cypripedium kentuckiense	Lady-slipper	S2	E	
TN	Scott	Calamovilfa arcuata	Sandreed Grass	S2	T	
TN	Scott	Potamogeton tennesseensis	Tennessee Pondweed	S2	T	
TN	Scott	Hymenophyllum tayloriae	Gorge Filmy Fern	S2	S	
TN	Scott	Trichomanes boschianum	Appalachian Bristle Fern	S1S2	T	
TN	Scott	Botrychium jenmanii	Alabama Grapefern	S1	T	
TN	Sequatchie	Gyrinophilus palleucus	Tennessee Cave Salamander	S2	T	
TN	Sequatchie	Hemidactylium scutatum	Four-toed Salamander	S3	D	
TN	Sequatchie	Hemitremia flammea	Flame Chub	S3	D	
TN	Sequatchie	Chrosomus tennesseensis	Tennessee Dace	S3	D	
TN	Sequatchie	Erimonax monachus	Spotfin Chub	S2	T	LT

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Sequatchie	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Sequatchie	Sorex fumeus	Smoky Shrew	S4	D	
TN	Sequatchie	Myotis grisescens	Gray Bat	S2	E	LE
TN	Sequatchie	Neotoma magister	Allegheny Woodrat	S3	D	
TN	Sequatchie	Epioblasma capsaeformis	Oyster Mussel	S1	E	LE
TN	Sequatchie	Fusconaia cuneolus	Fine-rayed Pigtoe	S1	E	LE
TN	Sequatchie	Pleuronaia dolabelloides	Slabside Pearlymussel	S2		LE
TN	Sequatchie	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Sequatchie	Helianthus eggertii	Eggert's Sunflower	S3	S	DM
TN	Sequatchie	Diervilla sessilifolia var. rivularis	Mountain Bush-honeysuckle	S2	T	
TN	Sequatchie	Diamorpha smallii	Small's Stonecrop	S1S2	E	
TN	Sequatchie	Sabatia capitata	Rose-gentian	S2	E	
TN	Sequatchie	Ribes curvatum	Granite Gooseberry	S1	T	
TN	Sequatchie	Scutellaria montana	Large-flowered Skullcap	S4	T	LT
TN	Sequatchie	Cyperus plukenetii	Plukenet's Cyperus	S1	S	
TN	Sequatchie	Lilium philadelphicum	Wood Lily	S1	E	
TN	Sequatchie	Platanthera integrilabia	White Fringeless Orchid	S2S3	E	LT
TN	Sequatchie	Pogonia ophioglossoides	Rose Pogonia	S2	E	
TN	Sequatchie	Danthonia epilis	Bog Oat-grass	S1S2	S	
TN	Sequatchie	Dichanthelium ensifolium ssp. curtifolium	Panic-grass	S1	E	
TN	Sequatchie	Glyceria acutiflora	Manna-grass	S2	S	
TN	Sequatchie	Woodwardia virginica	Virginia Chainfern	S2	S	
TN	Sevier	Cryptobranchus alleganiensis	Hellbender	S3	D	PS
TN	Sevier	Desmognathus wrighti	Southern Pigmy Salamander	S2S3	D	
TN	Sevier	Eurycea junaluska	Junaluska Salamander	S2	D	
TN	Sevier	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Sevier	Accipiter striatus	Sharp-shinned Hawk	S3B,S4N	D	
TN	Sevier	Falco peregrinus	Peregrine Falcon	S1B	E	
TN	Sevier	Tyto alba	Common Barn-owl	S3	D	
TN	Sevier	Aegolius acadicus	Northern Saw-whet Owl	S1	T	
TN	Sevier	Sphyrapicus varius	Yellow-bellied Sapsucker	S1B,S4N	D	
TN	Sevier	Contopus cooperi	Olive-sided Flycatcher	S1	D	
TN	Sevier	Corvus corax	Common Raven	S2	T	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Sevier	Poecile atricapilla	Black-capped Chickadee	S2B	D	
TN	Sevier	Limnothlypis swainsonii	Swainson's Warbler	S3	D	
TN	Sevier	Loxia curvirostra	Red Crossbill	S1B,S2N	TRKD	
TN	Sevier	Acipenser fulvescens	Lake Sturgeon	S1	E	
TN	Sevier	Chrosomus tennesseensis	Tennessee Dace	S3	D	
TN	Sevier	Carpiodes velifer	Highfin Carpsucker	S2S3	D	
TN	Sevier	Cycleptus elongatus	Blue Sucker	S2	T	
TN	Sevier	Noturus crypticus	Chucky Madtom	S1	E	LE
TN	Sevier	Percina aurantiaca	Tangerine Darter	S3	D	
TN	Sevier	Percina macrocephala	Longhead Darter	S2	T	
TN	Sevier	Percina tanasi	Snail Darter	S2S3	T	LT
TN	Sevier	Sorex cinereus	Common Shrew	S4	D	
TN	Sevier	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Sevier	Sorex palustris	Water Shrew	S2	D	
TN	Sevier	Sorex fumeus	Smoky Shrew	S4	D	
TN	Sevier	Sorex dispar	Long-tailed Shrew	S2	D	
TN	Sevier	Parascalops breweri	Hairy-tailed Mole	S3	D	
TN	Sevier	Myotis sodalis	Indiana Bat	S1	E	LE
TN	Sevier	Myotis leibii	eastern small-footed bat	S2S3	D	
TN	Sevier	Corynorhinus rafinesquii	Rafinesque’s Big-eared bat	S3	D	
TN	Sevier	Glaucomys sabrinus coloratus	Carolina Northern Flying Squirrel	S1S2	E	LE
TN	Sevier	Neotoma floridana haematoreia	Southern Appalachian Woodrat	S2	D	
TN	Sevier	Microtus chrotorrhinus carolinensis	Southern Rock Vole	S2	D	
TN	Sevier	Synaptomys cooperi	Southern Bog Lemming	S4	D	
TN	Sevier	Napaeozapus insignis	Woodland Jumping Mouse	S4	D	
TN	Sevier	Puma concolor couguar	Eastern Cougar	SX		LE
TN	Sevier	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S3	T	
TN	Sevier	Trechus novaculosus	A Carabid Beetle	S1	TRKD	
TN	Sevier	Bombus affinis	Rusty-patched Bumble Bee	SH		LE
TN	Sevier	Microhexura montivaga	Spruce-fir Moss Spider	S1		LE
TN	Sevier	Cyprogenia stegaria	Fanshell	S1	E	LE
TN	Sevier	Dromus dromas	Dromedary Pearlymussel	S1	E	LE
TN	Sevier	Epioblasma capsaeformis	Oyster Mussel	S1	E	LE

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Sevier	Epioblasma torulosa torulosa	Tuberculed Blossom Pearlymussel	SX	E	LE
TN	Sevier	Obovaria retusa	Ring Pink	S1	E	LE
TN	Sevier	Plethobasus cooperianus	Orange-foot Pimpleback	S1	E	LE
TN	Sevier	Plethobasus cyphyus	Sheepnose	S2S3		LE
TN	Sevier	Pleurobema plenum	Rough Pigtoe	S1	E	LE
TN	Sevier	Quadrula cylindrica cylindrica	Smooth Rabbitsfoot	S3		LT
TN	Sevier	Megaceros aenigmaticus	Hornwort	S2S3	S	
TN	Sevier	Acrobolbus ciliatus	Liverwort	S1	S	
TN	Sevier	Anastrophyllum saxicola	Liverwort	S1	S	
TN	Sevier	Bazzania nudicaulis	Liverwort	S2	T	
TN	Sevier	Cephaloziella massalongi	Liverwort	S1	E	
TN	Sevier	Cephaloziella spinicaulis	Liverwort	S1	S	
TN	Sevier	Gymnomitrion laceratum	Liverwort	S1	T	
TN	Sevier	Lejeunea blomquistii	Blomquist Leafy Liverwort	S1S2	S	
TN	Sevier	Leptoscyphus cuneifolius	Liverwort	S1	E	
TN	Sevier	Marsupella funckii	Liverwort	S1	E	
TN	Sevier	Plagiochila exigua	Liverwort	S1S2	S	
TN	Sevier	Plagiochila sharpii	Sharps Leafy Liverwort	S1	S	
TN	Sevier	Porella wataugensis	Liverwort	S1S2	T	
TN	Sevier	Radula voluta	Liverwort	S2	S	
TN	Sevier	Sphenolobopsis pearsonii	Liverwort	S1	E	
TN	Sevier	Brachydontium trichodes	Peak Moss	S1	E	
TN	Sevier	Entodon concinnus	Lime Entodon	S1	S	
TN	Sevier	Grimmia olneyi	Grimmia Moss	SH	S	
TN	Sevier	Leptodontium viticulosoides var. sulphureum	Grandfather Mountain Leptodontium	S1S2	E	
TN	Sevier	Mielichhoferia elongata	A Moss	S1	S	
TN	Sevier	Orthodontium pellucens	Translucent Orthodontium	SH	S	
TN	Sevier	Tetrodontium brownianum	Little Georgia	S1	S	
TN	Sevier	Tortula ammonsiana	Ammons's Tortula	S1	E	
TN	Sevier	Leptohymenium sharpii	Mount Leconte Moss	S1	E	
TN	Sevier	Gymnoderma lineare	Rock Gnome Lichen	S1	E	LE
TN	Sevier	Acer leucoderme	Chalk Maple	S3	WP	
TN	Sevier	Panax quinquefolius	American ginseng	S3S4	S-C	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Sevier	Krigia montana	False Dandelion	S1	T	
TN	Sevier	Rugelia nudicaulis	Rugel's Ragwort	S2	E	
TN	Sevier	Betula papyrifera var. cordifolia	Heart-leaved Paper Birch	S1	E	
TN	Sevier	Cardamine clematitis	mountain bittercress	S2	T	
TN	Sevier	Cardamine flagellifera	Bitter Cress	S2	T	
TN	Sevier	Cardamine rotundifolia	Roundleaf Water-cress	S2S3	S	
TN	Sevier	Silene ovata	Ovate Catchfly	S2	E	
TN	Sevier	Hypericum graveolens	Mountain St. John's-wort	S3	E	
TN	Sevier	Hypericum mitchellianum	Blue Ridge St. John's-wort	S2	T	
TN	Sevier	Lonicera canadensis	American Fly-honeysuckle	S1	T	
TN	Sevier	Drosera rotundifolia	Roundleaf Sundew	S1	T	
TN	Sevier	Menziesia pilosa	Fetterbush	S2	S	
TN	Sevier	Pieris floribunda	Mountain Fetter-bush	S2	T	
TN	Sevier	Adlumia fungosa	Climbing Fumitory	S2	T	
TN	Sevier	Gentiana linearis	Narrowleaf Gentian	S1	T	
TN	Sevier	Fothergilla major	Witch-alder	S2	T	
TN	Sevier	Hydrophyllum virginianum	Virginia Waterleaf	S3	T	
TN	Sevier	Stachys clingmanii	Clingman's Hedge-nettle	S1S2	T	
TN	Sevier	Monotropsis odorata	Sweet Pinesap	S2	T	
TN	Sevier	Amelanchier sanguinea	Round-leaved Serviceberry	S2	T	
TN	Sevier	Geum radiatum	Spreading Avens	S1	E	LE
TN	Sevier	Prunus virginiana	Chokecherry	S1	S	
TN	Sevier	Zanthoxylum americanum	Northern Prickly-ash	S2	S	
TN	Sevier	Saxifraga caroliniana	Carolina saxifrage	S1S2	E	
TN	Sevier	Abies fraseri	Fraser Fir	S1S2	T	
TN	Sevier	Carex misera	Wretched Sedge	S2	T	
TN	Sevier	Carex ruthii	Ruth's Sedge	S2	T	
TN	Sevier	Cymophyllus fraserianus	Fraser's Sedge	S3	S	
TN	Sevier	Trichophorum cespitosum	Tufted Clubrush	S1	E	
TN	Sevier	Melanthium latifolium	Broadleaf Bunchflower	S1S2	E	
TN	Sevier	Streptopus amplexifolius	Clasping Twisted-stalk	S1	T	
TN	Sevier	Streptopus lanceolatus	Rosy Twisted-stalk	S2	S	
TN	Sevier	Trillium rugelii	Southern Nodding Trillium	S2	E	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Sevier	Xerophyllum asphodeloides	Eastern Turkeybeard	S3	T	
TN	Sevier	Platanthera flava var. herbiola	Pale Green Orchid	S2	T	
TN	Sevier	Platanthera psycodes	Small Purple Fringe Orchid	S2	S	
TN	Sevier	Spiranthes ochroleuca	Yellow Nodding Ladies'-tresses	S1	E	
TN	Sevier	Agrostis mertensii	Arctic Bentgrass	SH	S	
TN	Sevier	Calamagrostis cainii	Reedgrass	S1	E	
TN	Sevier	Glyceria nubigena	Smoky Mountain Manna-grass	S1S2	T	
TN	Sevier	Milium effusum	Millet-grass	S1	S	
TN	Sevier	Dryopteris carthusiana	Spinulose Woodfern	S1	T	
TN	Sevier	Hymenophyllum tayloriae	Gorge Filmy Fern	S2	S	
TN	Sevier	Trichomanes petersii	Dwarf Filmy-fern	S2	T	
TN	Sevier	Huperzia appalachiana	Appalachian Fir-clubmoss	S1	T	
TN	Sevier	Botrychium matricariifolium	Matricary Grapefern	S1	S	
TN	Sevier	Phegopteris connectilis	Northern Beechfern	S1	E	
TN	Shelby	Acris gryllus	Southern Cricket Frog	S3	D	
TN	Shelby	Hyla gratiosa	Barking Treefrog	S3	D	
TN	Shelby	Ictinia mississippiensis	Mississippi Kite	S2S3	D	
TN	Shelby	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Shelby	Charadrius melodus	Piping Plover			LE
TN	Shelby	Sterna antillarum athalassos	Interior Least Tern	S2S3B	E	LE
TN	Shelby	Tyto alba	Common Barn-owl	S3	D	
TN	Shelby	Thryomanes bewickii	Bewick's Wren	S1	E	
TN	Shelby	Setophaga cerulea	Cerulean Warbler	S3B	D	
TN	Shelby	Limnothlypis swainsonii	Swainson's Warbler	S3	D	
TN	Shelby	Chondestes grammacus	Lark Sparrow	S1B	T	
TN	Shelby	Cycleptus elongatus	Blue Sucker	S2	T	
TN	Shelby	Noturus stigmosus	Northern Madtom	S3	D	
TN	Shelby	Ammocrypta beani	Naked Sand Darter	S2	D	
TN	Shelby	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Shelby	Myotis sodalis	Indiana Bat	S1	E	LE
TN	Shelby	Corynorhinus rafinesquii	Rafinesque’s Big-eared bat	S3	D	
TN	Shelby	Neotoma floridana illinoensis	Eastern Woodrat	S3	D	
TN	Shelby	Macrochelys temminckii	Alligator Snapping Turtle	S2S3	D	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Shelby	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S3	T	
TN	Shelby	Triodopsis multilineata	Striped Whitelip Snail	S2	TRKD	
TN	Shelby	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Shelby	Symphyotrichum praealtum	Willow Aster	S1	E	
TN	Shelby	Silene ovata	Ovate Catchfly	S2	E	
TN	Shelby	Crataegus harbisonii	Harbison Hawthorn	S1	E	
TN	Shelby	Schisandra glabra	Bay Starvine	S2	T	
TN	Shelby	Penstemon tubiflorus	Small Flowered Beardtongue	S1	S	
TN	Shelby	Ulmus crassifolia	Cedar Elm	S2	S	
TN	Shelby	Iris fulva	Red Iris	S2	T	
TN	Shelby	Heteranthera multiflora	Multiflowered Mud-plantain	S1	S	
TN	Smith	Thryomanes bewickii	Bewick's Wren	S1	E	
TN	Smith	Acipenser fulvescens	Lake Sturgeon	S1	E	
TN	Smith	Notropis rupestris	Bedrock Shiner	S2	D	
TN	Smith	Cycleptus elongatus	Blue Sucker	S2	T	
TN	Smith	Typhlichthys subterraneus	Southern Cavefish	S3	D	
TN	Smith	Etheostoma olivaceum	Sooty Darter	S3	D	
TN	Smith	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Smith	Myotis grisescens	Gray Bat	S2	E	LE
TN	Smith	Neotoma magister	Allegheny Woodrat	S3	D	
TN	Smith	Cumberlandia monodonta	Spectaclecase	S2S3		LE
TN	Smith	Dromus dromas	Dromedary Pearlymussel	S1	E	LE
TN	Smith	Epioblasma florentina florentina	Yellow-blossom Pearlymussel	SX	E	LE
TN	Smith	Epioblasma obliquata obliquata	Purple Catspaw	S1	E	LE
TN	Smith	Epioblasma torulosa torulosa	Tuberculed Blossom Pearlymussel	SX	E	LE
TN	Smith	Epioblasma triquetra	Snuffbox	S3		LE
TN	Smith	Lampsilis abrupta	Pink Mucket	S2	E	LE
TN	Smith	Pleuronaia dolabelloides	Slabside Pearlymussel	S2		LE
TN	Smith	Obovaria retusa	Ring Pink	S1	E	LE
TN	Smith	Plethobasus cicatricosus	White Wartyback	S1	E	LE
TN	Smith	Plethobasus cooperianus	Orange-foot Pimpleback	S1	E	LE
TN	Smith	Plethobasus cyphyus	Sheepnose	S2S3		LE
TN	Smith	Pleurobema clava	Clubshell	SH	E	LE

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Smith	Pleurobema plenum	Rough Pigtoe	S1	E	LE
TN	Smith	Quadrula cylindrica cylindrica	Smooth Rabbitsfoot	S3		LT
TN	Smith	Tortula fragilis	Fragmented Screw-moss	S1	E	
TN	Smith	Arabis perstellata	Braun's Rock-cress	S1	E	LE
TN	Smith	Erysimum capitatum	Western Wallflower	S1S2	E	PS
TN	Smith	Physaria globosa	Lesquereux's Mustard	S2	E	LE
TN	Smith	Cerastium arvense ssp. velutinum	Velvety Cerastium	S1	E	
TN	Smith	Stellaria fontinalis	Water Stitchwort	S3	S	
TN	Smith	Geranium robertianum	Herb-robert	S1	S	
TN	Smith	Eriogonum harperi	Harper's Umbrella-plant	S1	E	
TN	Smith	Elymus svensonii	Svenson's Wild-rye	S2	T	
TN	Stewart	Cryptobranchus alleganiensis	Hellbender	S3	D	PS
TN	Stewart	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Stewart	Aquila chrysaetos	Golden Eagle	S1	T	
TN	Stewart	Thryomanes bewickii	Bewick's Wren	S1	E	
TN	Stewart	Setophaga cerulea	Cerulean Warbler	S3B	D	
TN	Stewart	Limnothlypis swainsonii	Swainson's Warbler	S3	D	
TN	Stewart	Pooecetes gramineus	Vesper Sparrow	S1B,S4N	D	
TN	Stewart	Ammodramus henslowii	Henslow's Sparrow	S1B	D	
TN	Stewart	Ichthyomyzon unicuspis	Silver Lamprey	S2	D	
TN	Stewart	Acipenser fulvescens	Lake Sturgeon	S1	E	
TN	Stewart	Atractosteus spatula	Alligator Gar	S1	D	
TN	Stewart	Cycleptus elongatus	Blue Sucker	S2	T	
TN	Stewart	Sorex cinereus	Common Shrew	S4	D	
TN	Stewart	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Stewart	Myotis grisescens	Gray Bat	S2	E	LE
TN	Stewart	Myotis sodalis	Indiana Bat	S1	E	LE
TN	Stewart	Zapus hudsonius	Meadow Jumping Mouse	S4	D	
TN	Stewart	Macrochelys temminckii	Alligator Snapping Turtle	S2S3	D	
TN	Stewart	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S3	T	
TN	Stewart	Sistrurus miliarius streckeri	Western Pigmy Rattlesnake	S2S3	T	
TN	Stewart	Lampsilis abrupta	Pink Mucket	S2	E	LE
TN	Stewart	Panax quinquefolius	American ginseng	S3S4	S-C	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Stewart	Asclepias purpurascens	Purple Milkweed	S1	S	
TN	Stewart	Hieracium longipilum	Hairy Hawkweed	S1	S	
TN	Stewart	Prenanthes barbata	Barbed Rattlesnake-root	S2	S	
TN	Stewart	Rudbeckia subtomentosa	Sweet Coneflower	S2	T	
TN	Stewart	Hasteola suaveolens	Sweet-scented Indian-plantain	S2	S	
TN	Stewart	Armoracia lacustris	Lake-cress	S2	S	
TN	Stewart	Apios priceana	Price's Potato-bean	S3	E	LT
TN	Stewart	Baptisia bracteata var. leucophaea	Cream Wild Indigo	S1S2	S	
TN	Stewart	Juglans cinerea	Butternut	S3	T	
TN	Stewart	Salvia azurea var. grandiflora	Blue Sage	S3	S	
TN	Stewart	Phlox pilosa ssp. ozarkana	Downy Phlox	S1S2	S	
TN	Stewart	Lysimachia fraseri	Fraser Loosestrife	S2	E	
TN	Stewart	Aureolaria patula	Spreading False-foxglove	S3	S	
TN	Stewart	Pedicularis lanceolata	Swamp Lousewort	S1S2	S	
TN	Stewart	Sagittaria brevirostra	Short-beak Arrowhead	S1	T	
TN	Stewart	Carex comosa	Sedge	S2	T	
TN	Stewart	Eleocharis intermedia	Spike-rush	S1	E	
TN	Stewart	Eleocharis lanceolata	Lance-like Spikerush	S1	S	
TN	Stewart	Iris brevicaulis	Lamance Iris	S1	E	
TN	Stewart	Liparis loeselii	Loesel's Twayblade	S1	T	
TN	Stewart	Heteranthera limosa	Smaller Mud-plantain	S1S2	T	
TN	Sullivan	Hemidactylium scutatum	Four-toed Salamander	S3	D	
TN	Sullivan	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Sullivan	Tyto alba	Common Barn-owl	S3	D	
TN	Sullivan	Corvus corax	Common Raven	S2	T	
TN	Sullivan	Limnothlypis swainsonii	Swainson's Warbler	S3	D	
TN	Sullivan	Chrosomus tennesseensis	Tennessee Dace	S3	D	
TN	Sullivan	Erimonax monachus	Spotfin Chub	S2	T	LT
TN	Sullivan	Etheostoma marmorpinnum	Marbled Darter	S1	E	LE
TN	Sullivan	Percina aurantiaca	Tangerine Darter	S3	D	
TN	Sullivan	Percina burtoni	Blotchside Logperch	S2	D	
TN	Sullivan	Percina macrocephala	Longhead Darter	S2	T	
TN	Sullivan	Sorex cinereus	Common Shrew	S4	D	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Sullivan	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Sullivan	Sorex fumeus	Smoky Shrew	S4	D	
TN	Sullivan	Parascalops breweri	Hairy-tailed Mole	S3	D	
TN	Sullivan	Myotis grisescens	Gray Bat	S2	E	LE
TN	Sullivan	Myotis leibii	eastern small-footed bat	S2S3	D	
TN	Sullivan	Neotoma magister	Allegheny Woodrat	S3	D	
TN	Sullivan	Synaptomys cooperi	Southern Bog Lemming	S4	D	
TN	Sullivan	Zapus hudsonius	Meadow Jumping Mouse	S4	D	
TN	Sullivan	Epioblasma florentina walkeri	Tan Riffleshell	S1	E	LE
TN	Sullivan	Epioblasma torulosa gubernaculum	Green Blossom Pearlymussel	SX	E	LE
TN	Sullivan	Pegias fabula	Little-wing Pearlymussel	S1	E	LE
TN	Sullivan	Quadrula intermedia	Cumberland Monkeyface	S1	E	LE
TN	Sullivan	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Sullivan	Hexastylis virginica	Virginia Heartleaf	S2	S	
TN	Sullivan	Berberis canadensis	American barberry	S2	S	
TN	Sullivan	Draba ramosissima	Branching Whitlow-wort	S2	S	
TN	Sullivan	Silene caroliniana ssp. pensylvanica	Wild Pink	S1S2	T	
TN	Sullivan	Hypericum ellipticum	Pale St. John's-wort	S1	E	
TN	Sullivan	Lonicera dioica	Mountain Honeysuckle	S2	S	
TN	Sullivan	Vaccinium macrocarpon	Large Cranberry	S2	T	
TN	Sullivan	Hydrophyllum virginianum	Virginia Waterleaf	S3	T	
TN	Sullivan	Juglans cinerea	Butternut	S3	T	
TN	Sullivan	Meehania cordata	Meehania Mint (Heart-leaf Meehania)	S2	T	
TN	Sullivan	Magnolia virginiana	Sweetbay Magnolia	S2	T	
TN	Sullivan	Trientalis borealis	Northern Starflower	S1	T	
TN	Sullivan	Pyrola americana	American Wintergreen	S2	E	
TN	Sullivan	Buckleya distichophylla	piratebush	S2	T	
TN	Sullivan	Vitis rupestris	Sand Grape	S1	E	
TN	Sullivan	Thuja occidentalis	Northern White Cedar	S3	S	
TN	Sullivan	Tsuga caroliniana	Carolina Hemlock	S3	T	
TN	Sullivan	Symplocarpus foetidus	Skunk Cabbage	S1	E	
TN	Sullivan	Cymophyllus fraserianus	Fraser's Sedge	S3	S	
TN	Sullivan	Eriophorum virginicum	Tawny Cotton-grass	S1S2	E	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Sullivan	Allium burdickii	Narrow-leaved Wild Leek	S1S2	T-C	
TN	Sullivan	Maianthemum stellatum	Starflower Solomons-seal	S1	E	
TN	Sullivan	Streptopus amplexifolius	Clasping Twisted-stalk	S1	T	
TN	Sullivan	Coeloglossum viride var. virescens	American Frog Orchid	S1	E	
TN	Sullivan	Corallorhiza maculata	Spotted Coral-root	S1	T	
TN	Sullivan	Goodyera repens	Dwarf Rattlesnake-plantain	S1	S	
TN	Sullivan	Platanthera flava var. herbiola	Pale Green Orchid	S2	T	
TN	Sullivan	Platanthera grandiflora	Large Purple Fringed Orchid	S2	E	
TN	Sullivan	Glyceria laxa	Northern Manna-grass	S1	E	
TN	Sullivan	Dryopteris cristata	crested woodfern	S2	T	
TN	Sullivan	Woodsia scopulina ssp. appalachiana	Appalachian Cliff-fern	S1S2	S	
TN	Sullivan	Botrychium matricariifolium	Matricary Grapefern	S1	S	
TN	Sumner	Ambystoma barbouri	Streamside Salamander	S2	D	
TN	Sumner	Cryptobranchus alleganiensis	Hellbender	S3	D	PS
TN	Sumner	Ardea alba	Great Egret	S2B,S3N	D	
TN	Sumner	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Sumner	Tyto alba	Common Barn-owl	S3	D	
TN	Sumner	Thryomanes bewickii	Bewick's Wren	S1	E	
TN	Sumner	Acipenser fulvescens	Lake Sturgeon	S1	E	
TN	Sumner	Hemitremia flammea	Flame Chub	S3	D	
TN	Sumner	Notropis rupestris	Bedrock Shiner	S2	D	
TN	Sumner	Thoburnia atripinnis	Blackfin Sucker	S2	D	
TN	Sumner	Etheostoma barbouri	Teardrop Darter	S2	D	
TN	Sumner	Etheostoma bellum	Orangefin Darter	S3	D	
TN	Sumner	Etheostoma barrenense	Splendid Darter	S3	D	
TN	Sumner	Percina stictogaster	Frecklebelly Darter	S1	D	
TN	Sumner	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Sumner	Myotis grisescens	Gray Bat	S2	E	LE
TN	Sumner	Myotis septentrionalis	Northern Long-eared Bat	S1S2		LT
TN	Sumner	Zapus hudsonius	Meadow Jumping Mouse	S4	D	
TN	Sumner	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	S3	D	
TN	Sumner	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S3	T	
TN	Sumner	Panax quinquefolius	American ginseng	S3S4	S-C	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Sumner	Caulophyllum giganteum	Blue Cohosh	S1	T	
TN	Sumner	Stellaria fontinalis	Water Stitchwort	S3	S	
TN	Sumner	Hypericum adpressum	Creeping St. John's-wort	S1	E	
TN	Sumner	Dalea foliosa	Leafy Prairie-clover	S2S3	E	LE
TN	Sumner	Juglans cinerea	Butternut	S3	T	
TN	Sumner	Collinsia verna	Blue-eyed Mary	S1	E	
TN	Sumner	Carex davisii	Davis' Sedge	S1	S	
TN	Sumner	Carex hitchcockiana	Sedge	S1	T	
TN	Sumner	Allium tricoccum	Small White Leek	S1S2	S-C	
TN	Sumner	Spiranthes odorata	Sweetscent Ladies'-tresses	S1	E	
TN	Tipton	Ictinia mississippiensis	Mississippi Kite	S2S3	D	
TN	Tipton	Sterna antillarum athalassos	Interior Least Tern	S2S3B	E	LE
TN	Tipton	Notropis dorsalis	Bigmouth Shiner	S1	D	
TN	Tipton	Macrhybopsis gelida	Sturgeon Chub	S1	D	
TN	Tipton	Cycleptus elongatus	Blue Sucker	S2	T	
TN	Tipton	Noturus stigmosus	Northern Madtom	S3	D	
TN	Tipton	Ammocrypta beani	Naked Sand Darter	S2	D	
TN	Tipton	Ammocrypta vivax	Scaly Sand Darter	S2	D	
TN	Tipton	Macrochelys temminckii	Alligator Snapping Turtle	S2S3	D	
TN	Tipton	Sistrurus miliarius streckeri	Western Pigmy Rattlesnake	S2S3	T	
TN	Tipton	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Tipton	Schisandra glabra	Bay Starvine	S2	T	
TN	Tipton	Agalinis auriculata	Earleaf Foxglove	S2	E	
TN	Tipton	Carex reniformis	Sedge	S1	S	
TN	Trousdale	Thryomanes bewickii	Bewick's Wren	S1	E	
TN	Trousdale	Etheostoma olivaceum	Sooty Darter	S3	D	
TN	Trousdale	Dromus dromas	Dromedary Pearlymussel	S1	E	LE
TN	Trousdale	Epioblasma brevidens	Cumberlandian Combshell	S1	E	LE
TN	Trousdale	Epioblasma obliquata obliquata	Purple Catspaw	S1	E	LE
TN	Trousdale	Lampsilis abrupta	Pink Mucket	S2	E	LE
TN	Trousdale	Obovaria retusa	Ring Pink	S1	E	LE
TN	Trousdale	Pleurobema plenum	Rough Pigtoe	S1	E	LE
TN	Trousdale	Quadrula sparsa	Appalachian Monkeyface	S1	E	LE

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Trousdale	Physaria globosa	Lesquereux's Mustard	S2	E	LE
TN	Trousdale	Stellaria fontinalis	Water Stitchwort	S3	S	
TN	Trousdale	Phemeranthus calcaricus	Limestone Fame-flower	S3	S	
TN	Trousdale	Elymus svensonii	Svenson's Wild-rye	S2	T	
TN	Unicoi	Cryptobranchus alleganiensis	Hellbender	S3	D	PS
TN	Unicoi	Desmognathus wrighti	Southern Pigmy Salamander	S2S3	D	
TN	Unicoi	Plethodon welleri	Weller's Salamander	S2	D	
TN	Unicoi	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Unicoi	Aquila chrysaetos	Golden Eagle	S1	T	
TN	Unicoi	Falco peregrinus	Peregrine Falcon	S1B	E	
TN	Unicoi	Aegolius acadicus	Northern Saw-whet Owl	S1	T	
TN	Unicoi	Corvus corax	Common Raven	S2	T	
TN	Unicoi	Vermivora chrysoptera	Golden-winged Warbler	S3B	D	
TN	Unicoi	Limnothlypis swainsonii	Swainson's Warbler	S3	D	
TN	Unicoi	Carpiodes velifer	Highfin Carpsucker	S2S3	D	
TN	Unicoi	Percina aurantiaca	Tangerine Darter	S3	D	
TN	Unicoi	Percina squamata	Olive Darter	S2	D	
TN	Unicoi	Sorex cinereus	Common Shrew	S4	D	
TN	Unicoi	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Unicoi	Sorex fumeus	Smoky Shrew	S4	D	
TN	Unicoi	Myotis grisescens	Gray Bat	S2	E	LE
TN	Unicoi	Myotis leibii	eastern small-footed bat	S2S3	D	
TN	Unicoi	Myotis septentrionalis	Northern Long-eared Bat	S1S2		LT
TN	Unicoi	Neotoma magister	Allegheny Woodrat	S3	D	
TN	Unicoi	Zapus hudsonius	Meadow Jumping Mouse	S4	D	
TN	Unicoi	Napaeozapus insignis	Woodland Jumping Mouse	S4	D	
TN	Unicoi	Alasmidonta raveneliana	Appalachian Elktoe	S1	E	LE
TN	Unicoi	Pilsbryna aurea	Ornate Bud	S1	TRKD	
TN	Unicoi	Heracleum maximum	Cow Parsnip	S2	S	
TN	Unicoi	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Unicoi	Hexastylis virginica	Virginia Heartleaf	S2	S	
TN	Unicoi	Helianthus glaucophyllus	White-leaved Sunflower	S1	T	
TN	Unicoi	Packera schweinitziana	Schweinitz's Ragwort	S1	T	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Unicoi	Symphyotrichum ericoides	White Heath Aster	S1	E	
TN	Unicoi	Caulophyllum giganteum	Blue Cohosh	S1	T	
TN	Unicoi	Cardamine clematitis	mountain bittercress	S2	T	
TN	Unicoi	Cardamine rotundifolia	Roundleaf Water-cress	S2S3	S	
TN	Unicoi	Campanula aparinoides	Marsh Bellflower	S2	S	
TN	Unicoi	Paronychia argyrocoma	Silverling	S1S2	T	
TN	Unicoi	Hypericum graveolens	Mountain St. John's-wort	S3	E	
TN	Unicoi	Hypericum mitchellianum	Blue Ridge St. John's-wort	S2	T	
TN	Unicoi	Diervilla sessilifolia var. rivularis	Mountain Bush-honeysuckle	S2	T	
TN	Unicoi	Adlumia fungosa	Climbing Fumitory	S2	T	
TN	Unicoi	Corydalis sempervirens	Pale Corydalis	S1S2	S	
TN	Unicoi	Hydrophyllum virginianum	Virginia Waterleaf	S3	T	
TN	Unicoi	Juglans cinerea	Butternut	S3	T	
TN	Unicoi	Agastache scrophulariifolia	Giant Hyssop	S1S2	T	
TN	Unicoi	Stachys clingmanii	Clingman's Hedge-nettle	S1S2	T	
TN	Unicoi	Epilobium angustifolium	Fireweed	S1	T	
TN	Unicoi	Oenothera parviflora	Northern Evening-primrose	S1	S	
TN	Unicoi	Polygonum cilinode	Fringed Black Bindweed	S1S2	T	
TN	Unicoi	Lysimachia terrestris	Swamp Loosestrife	S1	E	
TN	Unicoi	Spiraea virginiana	Virginia Spiraea	S2	E	LT
TN	Unicoi	Potentilla tridentata	Three-toothed Cinquefoil	S1S2	T	
TN	Unicoi	Buckleya distichophylla	piratebush	S2	T	
TN	Unicoi	Abies fraseri	Fraser Fir	S1S2	T	
TN	Unicoi	Tsuga caroliniana	Carolina Hemlock	S3	T	
TN	Unicoi	Carex argyrantha	Hay Sedge	S1	T	
TN	Unicoi	Carex misera	Wretched Sedge	S2	T	
TN	Unicoi	Carex pallescens	Sedge	S1	S	
TN	Unicoi	Carex roanensis	Sedge	S2	S	
TN	Unicoi	Cymophyllus fraserianus	Fraser's Sedge	S3	S	
TN	Unicoi	Allium tricoccum	Small White Leek	S1S2	S-C	
TN	Unicoi	Melanthium latifolium	Broadleaf Bunchflower	S1S2	E	
TN	Unicoi	Streptopus lanceolatus	Rosy Twisted-stalk	S2	S	
TN	Unicoi	Trillium rugelii	Southern Nodding Trillium	S2	E	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Unicoi	Coeloglossum viride var. virescens	American Frog Orchid	S1	E	
TN	Unicoi	Corallorhiza maculata	Spotted Coral-root	S1	T	
TN	Unicoi	Goodyera repens	Dwarf Rattlesnake-plantain	S1	S	
TN	Unicoi	Liparis loeselii	Loesel's Twayblade	S1	T	
TN	Unicoi	Platanthera psycodes	Small Purple Fringe Orchid	S2	S	
TN	Unicoi	Spiranthes ochroleuca	Yellow Nodding Ladies'-tresses	S1	E	
TN	Unicoi	Dryopteris carthusiana	Spinulose Woodfern	S1	T	
TN	Unicoi	Woodsia scopulina ssp. appalachiana	Appalachian Cliff-fern	S1S2	S	
TN	Unicoi	Lycopodium dendroideum	Treelike Clubmoss	S1	S	
TN	Unicoi	Botrychium matricariifolium	Matricary Grapefern	S1	S	
TN	Union	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Union	Erimonax monachus	Spotfin Chub	S2	T	LT
TN	Union	Erimystax cahni	Slender Chub	S1	T	LT
TN	Union	Noturus flavipinnis	Yellowfin Madtom	S1	E	LT
TN	Union	Percina aurantiaca	Tangerine Darter	S3	D	
TN	Union	Myotis grisescens	Gray Bat	S2	E	LE
TN	Union	Myotis sodalis	Indiana Bat	S1	E	LE
TN	Union	Myotis septentrionalis	Northern Long-eared Bat	S1S2		LT
TN	Union	Epioblasma torulosa gubernaculum	Green Blossom Pearlymussel	SX	E	LE
TN	Union	Fusconaia cuneolus	Fine-rayed Pigtoe	S1	E	LE
TN	Union	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Union	Berberis canadensis	American barberry	S2	S	
TN	Union	Cardamine rotundifolia	Roundleaf Water-cress	S2S3	S	
TN	Union	Fothergilla major	Witch-alder	S2	T	
TN	Union	Meehania cordata	Meehania Mint (Heart-leaf Meehania)	S2	T	
TN	Union	Phlox ovata	Wideflower phlox	S2S3	S	
TN	Union	Parnassia grandifolia	Large-leaved Grass-of-parnassus	S3	S	
TN	Union	Aureolaria patula	Spreading False-foxglove	S3	S	
TN	Union	Pedicularis lanceolata	Swamp Lousewort	S1S2	S	
TN	Union	Thuja occidentalis	Northern White Cedar	S3	S	
TN	Union	Eleocharis intermedia	Spike-rush	S1	E	
TN	Union	Rhynchospora capillacea	Horned Beakrush	S1	E	
TN	Union	Juncus brachycephalus	Short-head Rush	S2	S	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Van Buren	Cryptobranchus alleganiensis	Hellbender	S3	D	PS
TN	Van Buren	Hemidactylium scutatum	Four-toed Salamander	S3	D	
TN	Van Buren	Hyla gratiosa	Barking Treefrog	S3	D	
TN	Van Buren	Aquila chrysaetos	Golden Eagle	S1	T	
TN	Van Buren	Falco peregrinus	Peregrine Falcon	S1B	E	
TN	Van Buren	Notropis rupestris	Bedrock Shiner	S2	D	
TN	Van Buren	Typhlichthys subterraneus	Southern Cavefish	S3	D	
TN	Van Buren	Etheostoma akatulo	Bluemask Darter	S1	E	LE
TN	Van Buren	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Van Buren	Sorex fumeus	Smoky Shrew	S4	D	
TN	Van Buren	Myotis grisescens	Gray Bat	S2	E	LE
TN	Van Buren	Myotis sodalis	Indiana Bat	S1	E	LE
TN	Van Buren	Myotis leibii	eastern small-footed bat	S2S3	D	
TN	Van Buren	Corynorhinus rafinesquii	Rafinesque’s Big-eared bat	S3	D	
TN	Van Buren	Neotoma magister	Allegheny Woodrat	S3	D	
TN	Van Buren	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	S3	D	
TN	Van Buren	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S3	T	
TN	Van Buren	Diacyclops yeatmani	Yeatmans Groundwater Copepod	S1	TRKD	
TN	Van Buren	Pegias fabula	Little-wing Pearlymussel	S1	E	LE
TN	Van Buren	Pleurobema gibberum	Cumberland Pigtoe	S1	E	LE
TN	Van Buren	Cololejeunea ornata	Liverwort	S1	T	
TN	Van Buren	Lejeunea blomquistii	Blomquist Leafy Liverwort	S1S2	S	
TN	Van Buren	Metzgeria uncigera	Liverwort	S1	S	
TN	Van Buren	Plagiochila punctata	Spotty featherwort	S1	S	
TN	Van Buren	Radula voluta	Liverwort	S2	S	
TN	Van Buren	Lejeunea sharpii	Sharp's Lejeunea	S1S2	E	
TN	Van Buren	Hydrocotyle americana	American Water-pennywort	S1	E	
TN	Van Buren	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Van Buren	Helianthus eggertii	Eggert's Sunflower	S3	S	DM
TN	Van Buren	Berberis canadensis	American barberry	S2	S	
TN	Van Buren	Helianthemum propinquum	Low Frostweed	S1S2	E	
TN	Van Buren	Drosera capillaris	Sundew	S1	T	
TN	Van Buren	Gaylussacia dumosa	Dwarf Huckleberry	S3	T	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Van Buren	Acalypha deamii	Deam's Copperleaf	S1	S	
TN	Van Buren	Castanea dentata	American Chestnut	S2S3	S	
TN	Van Buren	Juglans cinerea	Butternut	S3	T	
TN	Van Buren	Utricularia subulata	Zigzag Bladderwort	S1	T	
TN	Van Buren	Spiraea virginiana	Virginia Spiraea	S2	E	LT
TN	Van Buren	Nestronia umbellula	Nestronia	S1	E	
TN	Van Buren	Thuja occidentalis	Northern White Cedar	S3	S	
TN	Van Buren	Eleocharis equisetoides	Horse-tail Spikerush	S1	E	
TN	Van Buren	Rhynchospora rariflora	Beakrush	S1	E	
TN	Van Buren	Allium burdickii	Narrow-leaved Wild Leek	S1S2	T-C	
TN	Van Buren	Lilium philadelphicum	Wood Lily	S1	E	
TN	Van Buren	Platanthera cristata	Yellow-crested Orchid	S2S3	S	
TN	Van Buren	Platanthera integra	Yellow Fringeless Orchid	S1	E	
TN	Van Buren	Platanthera integrilabia	White Fringeless Orchid	S2S3	E	LT
TN	Van Buren	Pogonia ophioglossoides	Rose Pogonia	S2	E	
TN	Van Buren	Dichanthelium ensifolium ssp. curtifolium	Panic-grass	S1	E	
TN	Van Buren	Poa saltuensis	Drooping Bluegrass	S1	T	
TN	Van Buren	Potamogeton epihydrus	Creekgrass	S1S2	S	
TN	Van Buren	Xyris ambigua	Coastal-plain Yellow-eyed-grass	S1	E	
TN	Van Buren	Woodwardia virginica	Virginia Chainfern	S2	S	
TN	Van Buren	Pilularia americana	American Pillwort	S1S2	S	
TN	Warren	Cryptobranchus alleganiensis	Hellbender	S3	D	PS
TN	Warren	Gyrinophilus palleucus	Tennessee Cave Salamander	S2	T	
TN	Warren	Hyla gratiosa	Barking Treefrog	S3	D	
TN	Warren	Ixobrychus exilis	Least Bittern	S2B	D	
TN	Warren	Tyto alba	Common Barn-owl	S3	D	
TN	Warren	Hemitremia flammea	Flame Chub	S3	D	
TN	Warren	Notropis rupestris	Bedrock Shiner	S2	D	
TN	Warren	Typhlichthys subterraneus	Southern Cavefish	S3	D	
TN	Warren	Fundulus julisia	Barrens Topminnow	S1	E	
TN	Warren	Etheostoma luteovinctum	Redband Darter	S4	D	
TN	Warren	Etheostoma forbesi	Barrens Darter	S1	E	
TN	Warren	Etheostoma akatulo	Bluemask Darter	S1	E	LE

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Warren	Myotis grisescens	Gray Bat	S2	E	LE
TN	Warren	Myotis sodalis	Indiana Bat	S1	E	LE
TN	Warren	Myotis leibii	eastern small-footed bat	S2S3	D	
TN	Warren	Corynorhinus rafinesquii	Rafinesque’s Big-eared bat	S3	D	
TN	Warren	Neotoma magister	Allegheny Woodrat	S3	D	
TN	Warren	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	S3	D	
TN	Warren	Pegias fabula	Little-wing Pearlymussel	S1	E	LE
TN	Warren	Pleurobema gibberum	Cumberland Pigtoe	S1	E	LE
TN	Warren	Leptoxis umbilicata	Umbilicate River Snail	S1	TRKD	
TN	Warren	Palamocladium leskeoides	Palamocladium	S1	T	
TN	Warren	Eryngium integrifolium	Button Snakeroot	S1	T	
TN	Warren	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Warren	Helianthemum propinquum	Low Frostweed	S1S2	E	
TN	Warren	Lechea pulchella	Leggett's Pinweed	S1	E	
TN	Warren	Hypericum adpressum	Creeping St. John's-wort	S1	E	
TN	Warren	Drosera brevifolia	Dwarf Sundew	S2	T	
TN	Warren	Gaylussacia dumosa	Dwarf Huckleberry	S3	T	
TN	Warren	Lathyrus palustris	Marsh Pea	S1	S	
TN	Warren	Lespedeza angustifolia	Narrowleaf Bushclover	S2	T	
TN	Warren	Myriophyllum pinnatum	Water-milfoil	S1	E	
TN	Warren	Polygala nana	Dwarf Milkwort	S1	E	
TN	Warren	Lysimachia terrestris	Swamp Loosestrife	S1	E	
TN	Warren	Lysimachia x producta	Loosestrife	S1	S	
TN	Warren	Aureolaria patula	Spreading False-foxglove	S3	S	
TN	Warren	Pedicularis lanceolata	Swamp Lousewort	S1S2	S	
TN	Warren	Carex barrattii	Barratt's Sedge	S2	E	
TN	Warren	Eleocharis lanceolata	Lance-like Spikerush	S1	S	
TN	Warren	Eleocharis wolfii	Wolf Spikerush	S1	E	
TN	Warren	Rhynchospora chalarocephala	Loose-head Beakrush	S1	T	
TN	Warren	Rhynchospora perplexa	Beakrush	S2	T	
TN	Warren	Rhynchospora rariflora	Beakrush	S1	E	
TN	Warren	Iris prismatica	Narrow Blue Flag	S2S3	T	
TN	Warren	Juncus brachycephalus	Short-head Rush	S2	S	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Warren	Zigadenus leimanthoides	Death-camas	S2	T	
TN	Warren	Liparis loeselii	Loesel's Twayblade	S1	T	
TN	Warren	Listera australis	Southern Twayblade	S1S2	E	
TN	Warren	Platanthera integra	Yellow Fringeless Orchid	S1	E	
TN	Warren	Pogonia ophioglossoides	Rose Pogonia	S2	E	
TN	Warren	Ponthieva racemosa	Shadow-witch Orchid	S1	E	
TN	Warren	Spiranthes lucida	Shining Ladies'-tresses	S1S2	T	
TN	Warren	Dichanthelium acuminatum ssp. leucothrix	Panic-grass	S1	S	
TN	Warren	Glyceria acutiflora	Manna-grass	S2	S	
TN	Warren	Gymnopogon brevifolius	Shortleaf Beardgrass	S1S2	S	
TN	Warren	Muhlenbergia torreyana	Torrey Muhly	S1	E	
TN	Warren	Panicum hemitomon	Maidencane	S2	S	
TN	Warren	Xyris laxifolia var. iridifolia	Yellow-eyed-grass	S2	T	
TN	Warren	Lycopodiella alopecuroides	Foxtail Clubmoss	S2	T	
TN	Washington	Cryptobranchus alleganiensis	Hellbender	S3	D	PS
TN	Washington	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Washington	Falco peregrinus	Peregrine Falcon	S1B	E	
TN	Washington	Tyto alba	Common Barn-owl	S3	D	
TN	Washington	Corvus corax	Common Raven	S2	T	
TN	Washington	Limnothlypis swainsonii	Swainson's Warbler	S3	D	
TN	Washington	Chrosomus tennesseensis	Tennessee Dace	S3	D	
TN	Washington	Carpiodes velifer	Highfin Carpsucker	S2S3	D	
TN	Washington	Percina aurantiaca	Tangerine Darter	S3	D	
TN	Washington	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Washington	Sorex fumeus	Smoky Shrew	S4	D	
TN	Washington	Myotis septentrionalis	Northern Long-eared Bat	S1S2		LT
TN	Washington	Neotoma magister	Allegheny Woodrat	S3	D	
TN	Washington	Napaeozapus insignis	Woodland Jumping Mouse	S4	D	
TN	Washington	Pilsbryna aurea	Ornate Bud	S1	TRKD	
TN	Washington	Heracleum maximum	Cow Parsnip	S2	S	
TN	Washington	Hydrocotyle americana	American Water-pennywort	S1	E	
TN	Washington	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Washington	Berberis canadensis	American barberry	S2	S	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Washington	Cardamine clematitis	mountain bittercress	S2	T	
TN	Washington	Draba ramosissima	Branching Whitlow-wort	S2	S	
TN	Washington	Silene caroliniana ssp. pensylvanica	Wild Pink	S1S2	T	
TN	Washington	Diervilla sessilifolia var. rivularis	Mountain Bush-honeysuckle	S2	T	
TN	Washington	Lonicera canadensis	American Fly-honeysuckle	S1	T	
TN	Washington	Lonicera dioica	Mountain Honeysuckle	S2	S	
TN	Washington	Adlumia fungosa	Climbing Fumitory	S2	T	
TN	Washington	Oenothera parviflora	Northern Evening-primrose	S1	S	
TN	Washington	Polygonum cilinode	Fringed Black Bindweed	S1S2	T	
TN	Washington	Buckleya distichophylla	piratebush	S2	T	
TN	Washington	Parnassia grandifolia	Large-leaved Grass-of-parnassus	S3	S	
TN	Washington	Thuja occidentalis	Northern White Cedar	S3	S	
TN	Washington	Tsuga caroliniana	Carolina Hemlock	S3	T	
TN	Washington	Cymophyllus fraserianus	Fraser's Sedge	S3	S	
TN	Washington	Melanthium latifolium	Broadleaf Bunchflower	S1S2	E	
TN	Washington	Trillium rugelii	Southern Nodding Trillium	S2	E	
TN	Washington	Goodyera repens	Dwarf Rattlesnake-plantain	S1	S	
TN	Washington	Isotria medeoloides	Small Whorled Pogonia	S1	E	LT
TN	Washington	Botrychium matricariifolium	Matricary Grapefern	S1	S	
TN	Washington	Botrychium oneidense	Blunt-lobe Grapefern	S1	S	
TN	Wayne	Cryptobranchus alleganiensis	Hellbender	S3	D	PS
TN	Wayne	Tyto alba	Common Barn-owl	S3	D	
TN	Wayne	Thryomanes bewickii	Bewick's Wren	S1	E	
TN	Wayne	Ichthyomyzon gagei	Southern Brook Lamprey	S1	D	
TN	Wayne	Hemitremia flammea	Flame Chub	S3	D	
TN	Wayne	Noturus fasciatus	Saddled Madtom	S2	T	
TN	Wayne	Typhlichthys subterraneus	Southern Cavefish	S3	D	
TN	Wayne	Etheostoma aquali	Coppercheek Darter	S2S3	T	
TN	Wayne	Etheostoma boschungi	Slackwater Darter	S1	T	LT
TN	Wayne	Etheostoma cinereum	Ashy Darter	S2S3	T	
TN	Wayne	Etheostoma corona	Crown Darter	S1S2	E	
TN	Wayne	Percina burtoni	Blotchside Logperch	S2	D	
TN	Wayne	Myotis grisescens	Gray Bat	S2	E	LE

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Wayne	Neotoma magister	Allegheny Woodrat	S3	D	
TN	Wayne	Pituophis melanoleucus melanoleucus	Northern Pine Snake	S3	T	
TN	Wayne	Sistrurus miliarius streckeri	Western Pigmy Rattlesnake	S2S3	T	
TN	Wayne	Orconectes alabamensis	Alabama Crayfish	S2	D	
TN	Wayne	Cumberlandia monodonta	Spectaclecase	S2S3		LE
TN	Wayne	Hemistena lata	Cracking Pearlymussel	S1	E	LE
TN	Wayne	Lemiox rimosus	Birdwing Pearlymussel	S1	E	LE
TN	Wayne	Plethobasus cooperianus	Orange-foot Pimpleback	S1	E	LE
TN	Wayne	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Wayne	Helianthus eggertii	Eggert's Sunflower	S3	S	DM
TN	Wayne	Prenanthes barbata	Barbed Rattlesnake-root	S2	S	
TN	Wayne	Hasteola suaveolens	Sweet-scented Indian-plantain	S2	S	
TN	Wayne	Onosmodium molle ssp. occidentale	Western False Gromwell	S1S2	T	
TN	Wayne	Turritis glabra	Tower-mustard	S1	S	
TN	Wayne	Arabis hirsuta	Western Hairy Rock-cress	S1	T	
TN	Wayne	Draba cuneifolia	Wedge-leaf Whitlow-grass	S1S2	S	
TN	Wayne	Apios priceana	Price's Potato-bean	S3	E	LT
TN	Wayne	Juglans cinerea	Butternut	S3	T	
TN	Wayne	Polygala mariana	Maryland Milkwort	S1	S	
TN	Wayne	Carex hirtifolia	Sedge	S1S2	S	
TN	Wayne	Juncus brachycephalus	Short-head Rush	S2	S	
TN	Wayne	Erythronium rostratum	Yellow Trout-lily	S2	S	
TN	Wayne	Liparis loeselii	Loesel's Twayblade	S1	T	
TN	Weakley	Tyto alba	Common Barn-owl	S3	D	
TN	Weakley	Limnothlypis swainsonii	Swainson's Warbler	S3	D	
TN	Weakley	Noturus stigmosus	Northern Madtom	S3	D	
TN	Weakley	Etheostoma pyrrhogaster	Firebelly Darter	S2	D	
TN	Weakley	Sorex longirostris	Southeastern Shrew	S4	D	
TN	Weakley	Corynorhinus rafinesquii	Rafinesque’s Big-eared bat	S3	D	
TN	Weakley	Synaptomys cooperi	Southern Bog Lemming	S4	D	
TN	Weakley	Zapus hudsonius	Meadow Jumping Mouse	S4	D	
TN	Weakley	Helianthus occidentalis	naked-stem sunflower	S2	S	
TN	Weakley	Didiplis diandra	Water-purslane	S1	T	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Weakley	Crataegus harbisonii	Harbison Hawthorn	S1	E	
TN	White	Cryptobranchus alleganiensis	Hellbender	S3	D	PS
TN	White	Hyla gratiosa	Barking Treefrog	S3	D	
TN	White	Falco peregrinus	Peregrine Falcon	S1B	E	
TN	White	Vermivora chrysoptera	Golden-winged Warbler	S3B	D	
TN	White	Limnothlypis swainsonii	Swainson's Warbler	S3	D	
TN	White	Notropis rupestris	Bedrock Shiner	S2	D	
TN	White	Typhlichthys subterraneus	Southern Cavefish	S3	D	
TN	White	Etheostoma akatulo	Bluemask Darter	S1	E	LE
TN	White	Sorex longirostris	Southeastern Shrew	S4	D	
TN	White	Myotis grisescens	Gray Bat	S2	E	LE
TN	White	Myotis sodalis	Indiana Bat	S1	E	LE
TN	White	Myotis leibii	eastern small-footed bat	S2S3	D	
TN	White	Corynorhinus rafinesquii	Rafinesque’s Big-eared bat	S3	D	
TN	White	Neotoma magister	Allegheny Woodrat	S3	D	
TN	White	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	S3	D	
TN	White	Folsomia sp.2 nr. macrochaeta	A Springtail From Indian Cave	S1	TRKD	
TN	White	Pleurobema gibberum	Cumberland Pigtoe	S1	E	LE
TN	White	Eryngium integrifolium	Button Snakeroot	S1	T	
TN	White	Ceratophyllum echinatum	Prickly Hornwort	S1	S	
TN	White	Ribes curvatum	Granite Gooseberry	S1	T	
TN	White	Myriophyllum pinnatum	Water-milfoil	S1	E	
TN	White	Conradina verticillata	Cumberland Rosemary	S3	T	LT
TN	White	Ludwigia sphaerocarpa	Globe-fruited Ludwigia	S1	T	
TN	White	Lysimachia terrestris	Swamp Loosestrife	S1	E	
TN	White	Spiraea virginiana	Virginia Spiraea	S2	E	LT
TN	White	Fuirena squarrosa	Hairy Umbrella-sedge	S1	S	
TN	White	Eriocaulon decangulare	Ten-angle Pipewort	S1	E	
TN	White	Juncus brachycephalus	Short-head Rush	S2	S	
TN	White	Pogonia ophioglossoides	Rose Pogonia	S2	E	
TN	White	Spiranthes lucida	Shining Ladies'-tresses	S1S2	T	
TN	White	Glyceria acutiflora	Manna-grass	S2	S	
TN	White	Torreyochloa pallida	Pale Manna Grass	S1	S	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	White	Xyris ambigua	Coastal-plain Yellow-eyed-grass	S1	E	
TN	White	Xyris laxifolia var. iridifolia	Yellow-eyed-grass	S2	T	
TN	Williamson	Ambystoma barbouri	Streamside Salamander	S2	D	
TN	Williamson	Accipiter striatus	Sharp-shinned Hawk	S3B,S4N	D	
TN	Williamson	Setophaga cerulea	Cerulean Warbler	S3B	D	
TN	Williamson	Hemitremia flammea	Flame Chub	S3	D	
TN	Williamson	Etheostoma luteovinctum	Redband Darter	S4	D	
TN	Williamson	Percina phoxocephala	Slenderhead Darter	S3	D	
TN	Williamson	Orconectes shoupi	Nashville Crayfish	S1S2	E	LE
TN	Williamson	Toxolasma cylindrellus	Pale Lilliput	S1	E	LE
TN	Williamson	Perideridia americana	Perideridia	S2	E	
TN	Williamson	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Williamson	Asclepias purpurascens	Purple Milkweed	S1	S	
TN	Williamson	Helianthus eggertii	Eggert's Sunflower	S3	S	DM
TN	Williamson	Paysonia densipila	Duck River Bladderpod	S3	S	
TN	Williamson	Stellaria fontinalis	Water Stitchwort	S3	S	
TN	Williamson	Apios priceana	Price's Potato-bean	S3	E	LT
TN	Williamson	Astragalus tennesseensis	Tennessee Milk-vetch	S3	S	
TN	Williamson	Dalea foliosa	Leafy Prairie-clover	S2S3	E	LE
TN	Williamson	Juglans cinerea	Butternut	S3	T	
TN	Williamson	Parnassia grandifolia	Large-leaved Grass-of-parnassus	S3	S	
TN	Williamson	Juncus brachycephalus	Short-head Rush	S2	S	
TN	Williamson	Erythronium rostratum	Yellow Trout-lily	S2	S	
TN	Wilson	Ambystoma barbouri	Streamside Salamander	S2	D	
TN	Wilson	Gyrinophilus palleucus	Tennessee Cave Salamander	S2	T	
TN	Wilson	Ardea alba	Great Egret	S2B,S3N	D	
TN	Wilson	Haliaeetus leucocephalus	Bald Eagle	S3	D	DM
TN	Wilson	Tyto alba	Common Barn-owl	S3	D	
TN	Wilson	Thryomanes bewickii	Bewick's Wren	S1	E	
TN	Wilson	Chondestes grammacus	Lark Sparrow	S1B	T	
TN	Wilson	Acipenser fulvescens	Lake Sturgeon	S1	E	
TN	Wilson	Notropis rupestris	Bedrock Shiner	S2	D	
TN	Wilson	Typhlichthys subterraneus	Southern Cavefish	S3	D	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Wilson	Etheostoma olivaceum	Sooty Darter	S3	D	
TN	Wilson	Percina phoxocephala	Slenderhead Darter	S3	D	
TN	Wilson	Myotis grisescens	Gray Bat	S2	E	LE
TN	Wilson	Myotis sodalis	Indiana Bat	S1	E	LE
TN	Wilson	Neotoma magister	Allegheny Woodrat	S3	D	
TN	Wilson	Macrochelys temminckii	Alligator Snapping Turtle	S2S3	D	
TN	Wilson	Obovaria retusa	Ring Pink	S1	E	LE
TN	Wilson	Ammoselinum popei	Pope Sand-parsley	S2	T	
TN	Wilson	Amsonia tabernaemontana var. gattingeri	A Blue-star	S3	S	
TN	Wilson	Panax quinquefolius	American ginseng	S3S4	S-C	
TN	Wilson	Echinacea tennesseensis	Tennessee Coneflower	S2	T	DM
TN	Wilson	Helianthus occidentalis	naked-stem sunflower	S2	S	
TN	Wilson	Silphium pinnatifidum	Prairie-dock	S2	T	
TN	Wilson	Solidago gattingeri	Gattinger's Goldenrod	S1	E	
TN	Wilson	Arabis hirsuta	Western Hairy Rock-cress	S1	T	
TN	Wilson	Arabis perstellata	Braun's Rock-cress	S1	E	LE
TN	Wilson	Lesquerella perforata	Spring Creek Bladderpod	S1	E	LE
TN	Wilson	Stellaria fontinalis	Water Stitchwort	S3	S	
TN	Wilson	Evolvulus nuttallianus	Evolvulus	S3	S	
TN	Wilson	Astragalus tennesseensis	Tennessee Milk-vetch	S3	S	
TN	Wilson	Dalea candida	White Prairie-clover	S2	T	
TN	Wilson	Dalea foliosa	Leafy Prairie-clover	S2S3	E	LE
TN	Wilson	Dalea purpurea	Purple Prairie-clover	S1	E	
TN	Wilson	Mirabilis albida	Pale Umbrella-wort	S2	T	
TN	Wilson	Oenothera macrocarpa ssp. macrocarpa	Missouri Evening-primrose	S2	T	
TN	Wilson	Phlox bifida ssp. stellaria	Cleft Phlox	S3	T	
TN	Wilson	Phlox pilosa ssp. ozarkana	Downy Phlox	S1S2	S	
TN	Wilson	Phemeranthus calcaricus	Limestone Fame-flower	S3	S	
TN	Wilson	Anemone caroliniana	Carolina Anemone	S1S2	E	
TN	Wilson	Zanthoxylum americanum	Northern Prickly-ash	S2	S	
TN	Wilson	Collinsia verna	Blue-eyed Mary	S1	E	
TN	Wilson	Vitis rupestris	Sand Grape	S1	E	
TN	Wilson	Scleria verticillata	Low Nutrush	S2	S	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
TN	Wilson	Allium stellatum	Glade Onion	S1	E	
TN	Wilson	Schoenolirion croceum	Sunnybell	S3	T	
TN	Wilson	Diarrhena obovata	Beak Grass	S1	S	
TN	Wilson	Sporobolus heterolepis	Northern Dropseed	S1	T	
VA	Lee	Cryptobranchus alleganiensis	Hellbender	S2		PS
VA	Lee	Accipiter cooperii	Cooper's Hawk	S3B,S3N	TRKD	
VA	Lee	Falco peregrinus	Peregrine Falcon	S1B,S2N	LT	
VA	Lee	Picoides borealis	Red-cockaded Woodpecker	S1	LE	LE
VA	Lee	Thryomanes bewickii altus	Appalachian Bewick's Wren	SHB	LE	
VA	Lee	Lanius ludovicianus	Loggerhead Shrike	S1B,S2N	LT	
VA	Lee	Notropis atherinoides	Emerald Shiner	S1S2	LT	
VA	Lee	Chrosomus cumberlandensis	Blackside Dace	S1	LT	LT
VA	Lee	Erimystax cahni	Slender Chub	S1	LT	LT
VA	Lee	Noturus flavipinnis	Yellowfin Madtom	S1	LT	LT
VA	Lee	Myotis grisescens	Gray Bat	S1	LE	LE
VA	Lee	Myotis sodalis	Indiana Bat	S1	LE	LE
VA	Lee	Myotis septentrionalis	Northern Long-eared Bat	S1S3	LT	LT
VA	Lee	Perimyotis subflavus	Tricolored Bat	S1S3	PE	
VA	Lee	Graptemys geographica	Map Turtle	S3	TRKD	
VA	Lee	Lampropeltis getula nigra	Black Kingsnake	S2	TRKD	
VA	Lee	Caecidotea recurvata	Southwestern Virginia Cave Isopod	S3	SC	
VA	Lee	Caecidotea richardsonae	Tennessee Valley Cave Isopod	S3	SC	
VA	Lee	Lirceus usdagalun	Lee County Cave Isopod	S1	LE	LE
VA	Lee	Crangonyx antennatus	Appalachian Valley Cave Amphipod	S3	SC	
VA	Lee	Arrhopalites carolynae	Carolyn's Cave Springtail	S3	TRKD	
VA	Lee	Pseudanophthalmus holsingeri	Holsinger's Cave Beetle	S1	LE	
VA	Lee	Nemoria elfa	Cypress Emerald Moth	S1S3	TRKD	
VA	Lee	Nesticus holsingeri	A Cave Cobweb Spider	S3	TRKD	
VA	Lee	Dromus dromas	Dromedary Pearlymussel	S1	LE	LE
VA	Lee	Elliptio crassidens	Elephant-ear	S1	LE	
VA	Lee	Epioblasma brevidens	Cumberlandian Combshell	S1	LE	LE
VA	Lee	Epioblasma capsaeformis	Oyster Mussel	S1	LE	LE
VA	Lee	Epioblasma triquetra	Snuffbox	S1	LE	LE

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
VA	Lee	Fusconaia cor	Shiny Pigtoe Pearlymussel	S1	LE	LE
VA	Lee	Fusconaia cuneolus	Fine-rayed Pigtoe	S1	LE	LE
VA	Lee	Hemistena lata	Cracking Pearlymussel	S1	LE	LE
VA	Lee	Lasmigona holstonia	Tennessee Heelsplitter	S1	LE	
VA	Lee	Lemiox rimosus	Birdwing Pearlymussel	S1	LE	LE
VA	Lee	Leptodea fragilis	Fragile Papershell	S1	LT	
VA	Lee	Pleuronaia dolabelloides	Slabside Pearlymussel	S2	LT	LE
VA	Lee	Ligumia recta	Black Sandshell	S2	LT	
VA	Lee	Pegias fabula	Little-wing Pearlymussel	S1	LE	LE
VA	Lee	Plethobasus cyphyus	Sheepnose	S1	LE	LE
VA	Lee	Ptychobranchus subtentum	Fluted Kidneyshell	S2	LE	LE
VA	Lee	Quadrula cylindrica strigillata	Rough Rabbitsfoot	S2	LE	LE
VA	Lee	Quadrula intermedia	Cumberland Monkeyface	S1	LE	LE
VA	Lee	Quadrula pustulosa	Pimpleback	S2	LT	
VA	Lee	Quadrula sparsa	Appalachian Monkeyface	S1	LE	LE
VA	Lee	Truncilla truncata	Deertoe	S1	LE	
VA	Lee	Villosa perpurpurea	Purple Bean	S1	LE	LE
VA	Lee	Io fluvialis	Spiny Riversnail	S2	LT	
VA	Lee	Holsingeria unthanksensis	Unthanks Cave Snail	S2	LE	
VA	Lee	Eryngium yuccifolium var. yuccifolium	Rattesnake-master	S2	SLNS	
VA	Lee	Fleischmannia incarnata	Pink Thoroughwort	S2	SLNS	
VA	Lee	Packera millefolium	Blue Ridge Ragwort	S2	SLNS	
VA	Lee	Silphium terebinthinaceum	Prairie Rosinweed	S1	SLNS	
VA	Lee	Solidago rigida ssp. rigida	Prairies Bold Goldenrod	S2	SLNS	
VA	Lee	Eurybia surculosa	Creeping Aster	S1S2	SLNS	
VA	Lee	Silene ovata	Ovate Catchfly	S1	SLNS	
VA	Lee	Silene rotundifolia	Roundleaf Catchfly	S2	SLNS	
VA	Lee	Symphoricarpos albus var. albus	Snowberry	S1	SLNS	
VA	Lee	Leucothoe fontanesiana	Highland Dog-hobble	S1S2	SLNS	
VA	Lee	Trifolium calcaricum	Running Glade Clover	S1	LE	
VA	Lee	Scutellaria incana	Hoary Scullcap	S2	SLNS	
VA	Lee	Synandra hispidula	Guyandotte Beauty	S2	SLNS	
VA	Lee	Magnolia macrophylla	Bigleaf Magnolia	S1	SLNS	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
VA	Lee	Malvastrum hispidum	Hispid Falsemallow	S1	SLNS	
VA	Lee	Cocculus carolinus	Red-berried Moonseed	S1	SLNS	
VA	Lee	Stylophorum diphyllum	Celandine Poppy	S2	SLNS	
VA	Lee	Phlox amplifolia	Large-leaved Phlox	S1	SLNS	
VA	Lee	Clematis catesbyana	satincurls	S1	SLNS	
VA	Lee	Ranunculus ambigens	Water-plantain Spearwort	S1	SLNS	
VA	Lee	Rosa setigera	Prairie Rose	S1	SLNS	
VA	Lee	Hedyotis nigricans	Barren Bluets	S1	SLNS	
VA	Lee	Houstonia canadensis	Canada Bluets	S2	SLNS	
VA	Lee	Dasistoma macrophylla	Mullein Foxglove	S1	SLNS	
VA	Lee	Manfreda virginica	False Aloe	S2	SLNS	
VA	Lee	Carex crawei	Sedge	S2	SLNS	
VA	Lee	Eleocharis compressa	Flat-stemmed Spike-rush	S2	SLNS	
VA	Lee	Sisyrinchium albidum	White Blue-eyed-grass	S2	SLNS	
VA	Lee	Camassia scilloides	Wild Hyacinth	S1	SLNS	
VA	Lee	Trillium flexipes	Nodding Trillium	SH	SLNS	
VA	Lee	Calopogon tuberosus	Tuberous Grass-pink	S1S2	SLNS	
VA	Lee	Cleistes bifaria	Spreading Pogonia	S2	SLNS	
VA	Lee	Isotria medeoloides	Small Whorled Pogonia	S2	LE	LT
VA	Lee	Dichanthelium consanguineum	Blood Witchgrass	S1S2	SLNS	
VA	Lee	Dichanthelium annulum	Witchgrass	S3	SLNS	
VA	Lee	Sporobolus neglectus	Small Dropseed	S1	SLNS	
VA	Lee	Sporobolus compositus var. compositus	Longleaf Dropseed	S2	SLNS	
VA	Lee	Smilax ecirrata	Upright Greenbriar	S1	SLNS	
VA	Lee	Cheilanthes alabamensis	Alabama Lipfern	S1	SLNS	
VA	Lee	Huperzia porophila	Rock Clubmoss	S1	SLNS	
VA	Scott	Cryptobranchus alleganiensis	Hellbender	S2		PS
VA	Scott	Accipiter cooperii	Cooper's Hawk	S3B,S3N	TRKD	
VA	Scott	Lanius ludovicianus	Loggerhead Shrike	S1B,S2N	LT	
VA	Scott	Polyodon spathula	Paddlefish	S1	LT	
VA	Scott	Notropis atherinoides	Emerald Shiner	S1S2	LT	
VA	Scott	Cyprinella whipplei	Steelcolor Shiner	S1	LT	
VA	Scott	Erimonax monachus	Spotfin Chub	S1	LT	LT

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
VA	Scott	Noturus flavipinnis	Yellowfin Madtom	S1	LT	LT
VA	Scott	Etheostoma denoncourti	Golden Darter	S1	LT	
VA	Scott	Etheostoma percnurum	Duskytail Darter	S1	LE	LE
VA	Scott	Percina williamsi	Sickle Darter	S1S2	LT	
VA	Scott	Myotis grisescens	Gray Bat	S1	LE	LE
VA	Scott	Myotis septentrionalis	Northern Long-eared Bat	S1S3	LT	LT
VA	Scott	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	S1	LE	LE
VA	Scott	Graptemys geographica	Map Turtle	S3	TRKD	
VA	Scott	Lampropeltis getula nigra	Black Kingsnake	S2	TRKD	
VA	Scott	Caecidotea recurvata	Southwestern Virginia Cave Isopod	S3	SC	
VA	Scott	Caecidotea richardsonae	Tennessee Valley Cave Isopod	S3	SC	
VA	Scott	Stygobromus mackini	Southwestern Virginia Cave Amphipod	S3S4	SC	
VA	Scott	Crangonyx antennatus	Appalachian Valley Cave Amphipod	S3	SC	
VA	Scott	Arrhopalites pavo	A Cave Springtail	S3	TRKD	
VA	Scott	Anthrobia mammouthia	A Sheetweb Weaver	S2	TRKD	
VA	Scott	Nesticus holsingeri	A Cave Cobweb Spider	S3	TRKD	
VA	Scott	Alasmidonta viridis	Slippershell Mussel	S1	LE	
VA	Scott	Cumberlandia monodonta	Spectaclecase	S1	LE	LE
VA	Scott	Cyprogenia stegaria	Fanshell	S1	LE	LE
VA	Scott	Dromus dromas	Dromedary Pearlymussel	S1	LE	LE
VA	Scott	Elliptio crassidens	Elephant-ear	S1	LE	
VA	Scott	Epioblasma brevidens	Cumberlandian Combshell	S1	LE	LE
VA	Scott	Epioblasma capsaeformis	Oyster Mussel	S1	LE	LE
VA	Scott	Epioblasma torulosa gubernaculum	Green Blossom Pearlymussel	SX	LE	LE
VA	Scott	Epioblasma triquetra	Snuffbox	S1	LE	LE
VA	Scott	Fusconaia cor	Shiny Pigtoe Pearlymussel	S1	LE	LE
VA	Scott	Fusconaia cuneolus	Fine-rayed Pigtoe	S1	LE	LE
VA	Scott	Hemistena lata	Cracking Pearlymussel	S1	LE	LE
VA	Scott	Lasmigona holstonia	Tennessee Heelsplitter	S1	LE	
VA	Scott	Lemiox rimosus	Birdwing Pearlymussel	S1	LE	LE
VA	Scott	Leptodea fragilis	Fragile Papershell	S1	LT	
VA	Scott	Pleuronaia dolabelloides	Slabside Pearlymussel	S2	LT	LE
VA	Scott	Ligumia recta	Black Sandshell	S2	LT	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
VA	Scott	Pegias fabula	Little-wing Pearlymussel	S1	LE	LE
VA	Scott	Plethobasus cyphyus	Sheepnose	S1	LE	LE
VA	Scott	Pleurobema cordatum	Ohio Pigtoe	S1	LE	
VA	Scott	Pleurobema plenum	Rough Pigtoe	SH	LE	LE
VA	Scott	Pleurobema rubrum	Pyramid Pigtoe	SH	LE	
VA	Scott	Ptychobranchus subtentum	Fluted Kidneyshell	S2	LE	LE
VA	Scott	Quadrula cylindrica cylindrica	Smooth Rabbitsfoot			LT
VA	Scott	Quadrula cylindrica strigillata	Rough Rabbitsfoot	S2	LE	LE
VA	Scott	Quadrula intermedia	Cumberland Monkeyface	S1	LE	LE
VA	Scott	Quadrula pustulosa	Pimpleback	S2	LT	
VA	Scott	Quadrula sparsa	Appalachian Monkeyface	S1	LE	LE
VA	Scott	Toxolasma lividus	Purple Lilliput	SH	LE	
VA	Scott	Truncilla truncata	Deertoe	S1	LE	
VA	Scott	Villosa fabalis	Rayed Bean	SX		LE
VA	Scott	Villosa perpurpurea	Purple Bean	S1	LE	LE
VA	Scott	Villosa trabalis	Cumberland Bean	SX	LE	LE
VA	Scott	Io fluvialis	Spiny Riversnail	S2	LT	
VA	Scott	Fleischmannia incarnata	Pink Thoroughwort	S2	SLNS	
VA	Scott	Packera millefolium	Blue Ridge Ragwort	S2	SLNS	
VA	Scott	Paxistima canbyi	Canby's Mountain-lover	S2	SLNS	
VA	Scott	Leucothoe fontanesiana	Highland Dog-hobble	S1S2	SLNS	
VA	Scott	Desmodium cuspidatum	Toothed Tick-trefoil	S2	SLNS	
VA	Scott	Synandra hispidula	Guyandotte Beauty	S2	SLNS	
VA	Scott	Stylophorum diphyllum	Celandine Poppy	S2	SLNS	
VA	Scott	Phlox amplifolia	Large-leaved Phlox	S1	SLNS	
VA	Scott	Actaea rubifolia	Appalachian Bugbane	S1	SLNS	
VA	Scott	Rosa setigera	Prairie Rose	S1	SLNS	
VA	Scott	Houstonia canadensis	Canada Bluets	S2	SLNS	
VA	Scott	Saxifraga careyana	golden eye saxifrage	S1	SLNS	
VA	Scott	Collinsia verna	Blue-eyed Mary	S1	SLNS	
VA	Scott	Trillium flexipes	Nodding Trillium	SH	SLNS	
VA	Scott	Cleistes bifaria	Spreading Pogonia	S2	SLNS	
VA	Scott	Liparis loeselii	Loesel's Twayblade	S2	SLNS	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
VA	Scott	Triphora trianthophora	Three-birds-orchids	S1	SLNS	
VA	Scott	Melica nitens	Three-flowered Melic	S1	SLNS	
VA	Scott	Muhlenbergia cuspidata	Plains Muhlenbergia	S2	SLNS	
VA	Scott	Trichomanes boschianum	Appalachian Bristle Fern	S1	SLNS	
VA	Washington	Cryptobranchus alleganiensis	Hellbender	S2		PS
VA	Washington	Haliaeetus leucocephalus	Bald Eagle	S3S4B,S3S4N	LT	DM
VA	Washington	Accipiter cooperii	Cooper's Hawk	S3B,S3N	TRKD	
VA	Washington	Tyto alba	Common Barn-owl	S3B,S3N	SC	
VA	Washington	Thryomanes bewickii altus	Appalachian Bewick's Wren	SHB	LE	
VA	Washington	Lanius ludovicianus	Loggerhead Shrike	S1B,S2N	LT	
VA	Washington	Cottus baileyi	Black Sculpin	S2	TRKD	
VA	Washington	Notropis atherinoides	Emerald Shiner	S1S2	LT	
VA	Washington	Erimonax monachus	Spotfin Chub	S1	LT	LT
VA	Washington	Noturus flavipinnis	Yellowfin Madtom	S1	LT	LT
VA	Washington	Etheostoma chlorobranchium	Greenfin Darter	S1	LT	
VA	Washington	Etheostoma acuticeps	Sharphead Darter	S1	LE	
VA	Washington	Percina macrocephala	Longhead Darter	S1S2	LT	
VA	Washington	Percina williamsi	Sickle Darter	S1S2	LT	
VA	Washington	Myotis grisescens	Gray Bat	S1	LE	LE
VA	Washington	Myotis sodalis	Indiana Bat	S1	LE	LE
VA	Washington	Myotis septentrionalis	Northern Long-eared Bat	S1S3	LT	LT
VA	Washington	Glaucomys sabrinus fuscus	Virginia Northern Flying Squirrel	S1	LE	
VA	Washington	Graptemys geographica	Map Turtle	S3	TRKD	
VA	Washington	Lampropeltis getula nigra	Black Kingsnake	S2	TRKD	
VA	Washington	Caecidotea recurvata	Southwestern Virginia Cave Isopod	S3	SC	
VA	Washington	Stygobromus mackini	Southwestern Virginia Cave Amphipod	S3S4	SC	
VA	Washington	Nesticus holsingeri	A Cave Cobweb Spider	S3	TRKD	
VA	Washington	Alasmidonta viridis	Slippershell Mussel	S1	LE	
VA	Washington	Epioblasma brevidens	Cumberlandian Combshell	S1	LE	LE
VA	Washington	Epioblasma capsaeformis	Oyster Mussel	S1	LE	LE
VA	Washington	Epioblasma florentina aureola	Golden Riffleshell	S1	LE	LE
VA	Washington	Epioblasma triquetra	Snuffbox	S1	LE	LE
VA	Washington	Fusconaia cor	Shiny Pigtoe Pearlymussel	S1	LE	LE

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
VA	Washington	Fusconaia cuneolus	Fine-rayed Pigtoe	S1	LE	LE
VA	Washington	Lemiox rimosus	Birdwing Pearlymussel	S1	LE	LE
VA	Washington	Pleuronaia dolabelloides	Slabside Pearlymussel	S2	LT	LE
VA	Washington	Ligumia recta	Black Sandshell	S2	LT	
VA	Washington	Pegias fabula	Little-wing Pearlymussel	S1	LE	LE
VA	Washington	Ptychobranchus subtentum	Fluted Kidneyshell	S2	LE	LE
VA	Washington	Quadrula cylindrica cylindrica	Smooth Rabbitsfoot			LT
VA	Washington	Quadrula intermedia	Cumberland Monkeyface	S1	LE	LE
VA	Washington	Toxolasma lividus	Purple Lilliput	SH	LE	
VA	Washington	Villosa fabalis	Rayed Bean	SX		LE
VA	Washington	Villosa perpurpurea	Purple Bean	S1	LE	LE
VA	Washington	Io fluvialis	Spiny Riversnail	S2	LT	
VA	Washington	Brachoria turneri	A Millipede	S1	TRKD	
VA	Washington	Sphagnum girgensohnii	Girgensohn's Peatmoss	S1S2	SLNS	
VA	Washington	Sphagnum quinquefarium	Five-rowed Peatmoss	S2S3	SLNS	
VA	Washington	Ilex collina	Long-stalked Holly	S1	LE	
VA	Washington	Hexastylis contracta	Southern Heartleaf	S1	SLNS	
VA	Washington	Cacalia muehlenbergii	Great Indian-plantain	S2	SLNS	
VA	Washington	Cardamine clematitis	mountain bittercress	S1	SLNS	
VA	Washington	Cuscuta rostrata	Beaked Dodder	S1S2	SLNS	
VA	Washington	Desmodium canadense	Showy Tick-trefoil	S1	SLNS	
VA	Washington	Vicia americana ssp. americana	American Purple Vetch	S1	SLNS	
VA	Washington	Phacelia fimbriata	Fringed Scorpion-weed	S2	SLNS	
VA	Washington	Synandra hispidula	Guyandotte Beauty	S2	SLNS	
VA	Washington	Stylophorum diphyllum	Celandine Poppy	S2	SLNS	
VA	Washington	Phlox amplifolia	Large-leaved Phlox	S1	SLNS	
VA	Washington	Rhamnus alnifolia	Alderleaf Buckthorn	S1	SLNS	
VA	Washington	Potentilla tridentata	Three-toothed Cinquefoil	S2	SLNS	
VA	Washington	Buckleya distichophylla	piratebush	S2	SLNS	
VA	Washington	Parnassia grandifolia	Large-leaved Grass-of-parnassus	S2	SLNS	
VA	Washington	Saxifraga careyana	golden eye saxifrage	S1	SLNS	
VA	Washington	Collinsia verna	Blue-eyed Mary	S1	SLNS	
VA	Washington	Tsuga caroliniana	Carolina Hemlock	S3	SLNS	

STATE	COUNTY	SCIENTIFIC_NAME	COMMON_NAME	ST_RANK	ST_STATUS	FED STATUS
VA	Washington	Carex interior	Inland Sedge	S1S2	SLNS	
VA	Washington	Cymophyllus fraserianus	Fraser's Sedge	S3	SLNS	
VA	Washington	Rhynchospora capillacea	Horned Beakrush	S1	SLNS	
VA	Washington	Juncus articulatus	Jointed Rush	S1	SLNS	
VA	Washington	Lilium grayi	Gray's Lily	S2	SLNS	
VA	Washington	Streptopus amplexifolius	Clasping Twisted-stalk	S1	SLNS	
VA	Washington	Cypripedium reginae	Showy Lady-slipper	S1	SLNS	
VA	Washington	Goodyera repens	Dwarf Rattlesnake-plantain	S1	SLNS	
VA	Washington	Spiranthes lucida	Shining Ladies'-tresses	S1S2	SLNS	
VA	Washington	Potamogeton amplifolius	Large-leaf Pondweed	S1	SLNS	
VA	Washington	Huperzia appalachiana	Appalachian Fir-clubmoss	S2	SLNS	

Definitions of Federal and State Species Codes used in Species Lists

Endangered Species Program

Conserving the Nature of America

About Us | Frequently Asked Questions | Species Status Codes

A series of codes has been developed to identify the current status of each listed species in our endangered species database. See below for descriptions of some of the more commonly used codes.

E = endangered. A species "in danger of extinction throughout all or a significant portion of its range."

T = threatened. A species "likely to become endangered within the foreseeable future throughout all or a significant portion of its range."

C = candidate. A species under consideration for official listing for which there is sufficient information to support listing.

SAE, E(S/A) = endangered due to similarity of appearance. A species that is endangered due to similarity of appearance with another listed species and is listed for its protection. Species listed as E(S/A) are not biologically endangered or threatened and are not subject to Section 7 consultation.

SAT, T(S/A) = threatened due to similarity of appearance. A species that is threatened due to similarity of appearance with another listed species and is listed for its protection. Species listed as T(S/A) are not biologically endangered or threatened and are not subject to Section 7 consultation.

EXPE, XE = experimental essential population. A species listed as experimental and essential. EXPN, XN = experimental non-essential population. A species listed as experimental and non-essential. Experimental, nonessential populations of endangered species (e.g., red wolf) are treated as threatened species on public land, for consultation purposes, and as species proposed for listing on private land.

PE = proposed endangered. Species proposed for official listing as endangered.

PT = proposed threatened. Species proposed for official listing as threatened.

PEXPE, PXE = proposed experimental population, essential. Species proposed for official listing as experimental and essential.

PEXPN, PXN = proposed experimental population, non-essential. Species proposed for official listing as experimental and non-essential.

PSAE, PE (S/A) = proposed endangered, due to similarity of appearance. Species proposed for official listing as endangered due to similarity of appearance with another listed species.

PSAT, PT (S/A) = proposed threatened, due to similarity of appearance. Species proposed for official listing as threatened due to similarity of appearance with another listed species.

Emergency Endangered - A temporary (240 days) listing for emergency purposes when species is at significant, immediate risk.

Delisted - Species that has been removed from the list due to recovery, original data in error, or extinction.

Species of Concern (SC) - Species that have not been petitioned or been given E, T, or C status but have been identified as important to monitor.

Resolved Taxon (RT) - Species that have been petitioned for listing and for which a Not Warranted 12 month finding or Not Substantial 90-day finding has been published in the Federal Register. Also includes species that have been removed from the candidate list.

Under Review (UR) - Species that have been petitioned for listing and for which a 90 day finding has not been published or for which a 90 day substantial has been published but a 12 Month finding have not yet been published in the Federal Register. Also includes species that are being reviewed through the candidate process, but the CNOR has not yet been signed.

Last updated: August 28, 2012

Heritage Rank Definitions

The Alabama Natural Heritage Program uses the Heritage ranking system developed by NatureServe. Each species is assigned two ranks; one representing its range-wide or global status (G rank), and one representing its status in the state (S rank). Species with a rank of 1 are most critically imperiled; those with a rank of 5 are most secure. Rank numbers may be combined when there is uncertainty over the status, but ranges cannot skip more than one rank (e.g., an element may be given a G-rank of G2G3, indicating global status is somewhere between imperiled and vulnerable).

Global Ranking System

G1 Critically Imperiled – At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors.

G2 Imperiled – At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors.

G3 Vulnerable – At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors.

G4 Apparently Secure – Uncommon but not rare; some cause for long-term concern due to declines or other factors.

G5 Secure – Common; widespread and abundant.

GX Presumed Extinct (species) – Not located despite intensive searches and virtually no likelihood of rediscovery.
Eliminated (ecological communities) – Eliminated throughout its range, with no restoration potential due to extinction of dominant or characteristic species.

GH Of historical occurrence throughout its range.
Possibly Extinct (species) – Missing; known from only historical occurrences but still some hope of rediscovery.
Presumed Eliminated – (Historic, ecological communities)-Presumed eliminated throughout its range, with no or virtually no likelihood that it will be rediscovered, but with the potential for restoration, for example, American Chestnut Forest.

GU Unrankable – Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.

GNR Not ranked to date.

G#T# Infraspecific Taxon (trinomial) – The status of infraspecific taxa (subspecies or varieties) are indicated by a "T-rank" following the species' global rank. Rules for assigning T-ranks follow the same principles outlined above for global conservation status ranks. A T-rank cannot imply the subspecies or variety is more abundant than the species as a whole-for example, a G1T2 cannot occur. At this time, the T rank is not used for ecological communities.

State Ranking System

S1 Critically imperiled - Critically imperiled in Alabama because of extreme rarity (5 or fewer occurrences of very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extirpation from Alabama.

S2 Imperiled - Imperiled in state because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extirpation from Alabama.

S3 Vulnerable - Rare or uncommon in Alabama (on the order of 21 to 100 occurrences).

S4 Apparently Secure - Apparently secure in Alabama, with many occurrences.

S5 Secure - Demonstrably secure in Alabama; common, widespread, and abundant in the state.

SX Presumed Extirpated – Species or community is believed to be extirpated from Alabama. Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered.

SH Historical (Possibly Extirpated) – Species or community occurred historically in Alabama, and there is some possibility that it may be rediscovered. Its presence may not have been verified in the past 20-40 years. A species or community could become SH without such a 20-40 year delay if the only known occurrences in a nation or state/province were destroyed or if it had been extensively and unsuccessfully looked for. The SH rank is reserved for species or communities for which some effort has been made to relocate occurrences, rather than simply using this status for all elements not known from verified extant occurrences.

SNR Unranked – State conservation status not yet assessed.

SNA A conservation status rank is not applicable because the species is not a suitable target for conservation activities in the state. [1]

SU Unrankable – Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.

SE An exotic established in Alabama.

Variant Ranks and Rank Modifiers

G#G# Range Rank – A numeric range rank (e.g., G2G3) is used to indicate the range of uncertainty in the status of a species or community (e.g., an element may be given a G-rank of G2G3, indicating global status is somewhere between imperiled and vulnerable). Ranges cannot skip more than one rank (e.g., GU should be used rather than G1G4). Also applies to state ranks (e.g., S2S3)

HYB Hybrid

Q Questionable taxonomy – Taxonomic distinctiveness of this entity at the current level is questionable; resolution of this uncertainty may result in change from a species to a subspecies or hybrid, or the inclusion of this taxon in another taxon, with the resulting taxon having a lower-priority conservation priority.

? Inexact Numeric Rank – Denotes inexact numeric rank (e.g., G2?)

Breeding Status Qualifiers[2]

B Breeding - Conservation status refers to the breeding population of the species in the state. Regularly occurring, usually migratory and may be present only during the breeding season.

N Nonbreeding - Conservation status refers to the non-breeding population of the species in the state. Regularly occurring, usually migratory and may not breed in Alabama; this category includes migratory birds, bats, sea turtles, and cetaceans.

M Migrant - Migrant species occurring regularly on migration at particular staging areas or concentration spots where the species might warrant conservation attention. Conservation status refers to the aggregating transient population of the species in the nation or state/province.

[1] A conservation status rank may be not applicable for some species, including long distance aerial and aquatic migrants, hybrids without conservation value, and non-native species or ecosystems, for several reason

[2] A breeding status is only used for species that have distinct breeding and/or non-breeding populations in the state. A breeding-status S-rank can be coupled with its complementary non-breeding-status S-rank if the species also winters in the state. In addition, a breeding-status S-rank can also be coupled with a migrant-status S-rank if, on migration, the species occurs regularly at particular staging areas or concentration spots where it might warrant conservation attention. Multiple conservation status ranks (typically two, or rarely three) are separated by commas (e.g., S2B,S3N or SHN,S4B,S1M).

For more information regarding Conservation Status Ranks, see http://www.natureserve.org/explorer/ranking.htm#globalstatus

Definitions of Federal and State Listed Species Status

Federal - U.S. Fish and Wildlife Service

The U.S. Endangered Species Act (U.S. ESA) is the primary legislation that affords federal legal protections to threatened and endangered species in the United States, and is administered by the U.S. Fish and Wildlife Service (USFWS) (http://endangered.fws.gov/) and U.S. National Marine Fisheries Service (NMFS) (http://www.nmfs.noaa.gov/prot_res/overview/es.html). As defined by the Act, endangered refers to species that are "in danger of extinction within the foreseeable future throughout all or a significant portion of its range," while threatened refers to "those animals and plants likely to become endangered within the foreseeable future throughout all or a significant portion of their ranges." Plant species and varieties (including fungi and lichens), animal species and subspecies, and vertebrate animal populations are eligible for listing under the Act. Status under the U.S. Endangered Species Act in data provided by ALNHP is based on formal notices published by USFWS or NMFS in the Federal Register. Where names used by the USFWS differ from those used by ALNHP, ALNHP records include notes indicating under what name the USFWS lists the species and how that relates to the name used by ALNHP.

ESA Status Definitions

LE Listed Endangered: A species in danger of extinction throughout all or a significant portion of their range.

LT Listed Threatened: A species likely to become endangered within the foreseeable future throughout all or a significant portion of their range.

PE Proposed Endangered: A species proposed to be listed as endangered.

PT Proposed Threatened: A species proposed to be listed as threatened.

PS Status: An infraspecific taxon or population has federal status but the entire species does not-- status is in only a portion of the species range.

C Candidate: A species for which the U.S. Fish and Wildlife Service has on file enough substantial information on biological vulnerability and threat(s) to support proposals to list them as endangered or threatened. Development and publication of proposed rules on Candidate taxa are anticipated, and USFWS encourages other agencies to give consideration to such taxa in environmental planning.

XN Experimental Population, Nonessential: Experimental reintroduced population.

SC Species of Concern – Species that have not been petitioned or been given Endangered, Threatened, or Candidate status, but have been identified as important to monitor. (Informal status with no regulatory requirements.)

State - Alabama Department of Conservation and Natural Resources (ADCNR)

Alabama does not have a state law equivalent to the federal endangered species act so species do not have regulatory protection as state endangered or threatened species. However, some species do receive regulatory protection through the *Alabama Regulations on Game Fish and Fur Bearing Animals* published annually. These are the primary regulations affording state protection for some species in Alabama, and are administered by the Alabama Department of Conservation and Natural Resources. Copies of these regulations may be obtained from the Division of Wildlife & Freshwater Fisheries, Alabama Department of Conservation & Natural Resources, 64 North Union Street, Montgomery, AL 36104. A digital version of these regulations is available online at http://www.outdooralabama.com/hunting/regulations/.
The Nongame Species Regulation (Section 220-2-.92) is also available online at:
http://www.outdooralabama.com/watchable-wildlife/regulations/nongame.cfm.

State Status Code Definitions

SP State Protected: Species protected by Regulation 220-2-.92 (Nongame Species Regulation), 220-2-.98 (Invertebrate Species Regulation), 220-2-.26(4) (Protection of Sturgeon), 220-2-.94 (Prohibition of Taking or Possessing Paddlefish), or 220-2-.97 (Alligator Protection Regulation).

PSM Partial Status Mussels: All mussel species not listed as a protected species under the Invertebrate Species Regulation are partially protected by other regulations of the Alabama Game, Fish, and Fur Bearing Animals Regulations. Regulation 220-2-.104 prohibits the commercial harvest of all but the 11 mussel species for which commercial harvest is legal. Regulation 220-2-.52 prohibits the take, capture, kill, or attempt to take, capture, or kill of any freshwater mussel from Wheeler Lake from Guntersville Dam downstream to the mouth of Shoal Creek and from the upstream end or head of Hobbs Island downstream to Whitesburg Bridge, Pickwick Lake from Wilson Dam downstream to the upper end or head of Seven Mile Island, Wilson Lake from Wheeler Dam downstream to the mouth of Town Creek on the south bank and the mouth of Bluewater Creek on the north bank, and the Cahaba River.

CHM Commercially Harvestable Mussel - Legal to Take for Commercial Purposes (Managed commercial harvest regulations).

RT Regulated Turtle: Species for which the Turtle Catcher/Dealer/Farmer Regulation (Regulation 220-2-.142) imposes a limit on the number which can be possessed or size limits.

GA Game Animal (Managed hunting regulations).

GA-SP Game Animal - Special Permit Only (Managed hunting regulations).

GANOS Game Animal - No Open Season: Species designated a game animal by Regulation 220-2-.07, but for which there is no open season.

GB Game Bird (Managed hunting regulations).

GBNOS Game Bird - No Open Season: Species designated a game bird by Regulation 220-2-.04, but for which there is no open season.

FB Fur-bearing Animal (Managed trapping regulations).

GF Game Fish (Managed fishing regulations).

GF-HP Game Fish - Harvest Prohibited: Species designated a game fish by Regulation 220-2-.34, but harvest of the species in the state is prohibited.

CNGF Commercial or Non-Game Fish (Managed fishing regulations).

GEORGIA DEPARTMENT OF NATURAL RESOURCES WILDLIFE RESOURCES DIVISION

GEORGIA RARE NATURAL ELEMENT DATA PORTAL

About Georgia Rare Natural Elements Conservation Data

Data Limitations: Before using our rare element location data please read the Disclaimer for Use of Rare Species Location Data

Rare natural elements: Plant and animal populations, natural communities, bird nesting colonies, caves and other features in nature that are considered important for biodiversity conservation. Do not confuse the adjective, "rare", used here with the Georgia protection status "R - Listed as rare" (see Georgia Protection Status below).

Biotics: A biodiversity conservation database developed and maintained by NatureServe, Arlington Virginia, that is used by Georgia DNR to hold and interpret information about rare natural elements in Georgia. Biotics data is widely used by many private and public agencies.

Element Occurrences (EOs): Locations of rare natural elements that are monitored in the field and recorded in the Biotics database.

State Wildlife Action Plan (SWAP): A plan developed by each state for conserving wildlife and habitats before they become too rare or expensive to restore. Get more information about Georgia's SWAP.

Georgia Biodiversity Conservation Statuses Hierarchy

Tracked Special Concern: Rare natural elements with occurrence data (EOs) maintained in the Biotics conservation database. Contains protected and SWAP species, but also unprotected species, rare plant communities and other rare natural elements considered important for biodiversity conservation.

SWAP High Priority: Species of greatest conservation need (SGCN) in Georgia’s SWAP. Contains both protected and unprotected species.

Georgia Protected: Species with protection status under Georgia’s Endangered Wildlife Act or Wildflower Preservation Act which are implemented through the Protection of Endangered, Threatened, Rare, or Unusual Species Rules and Regulations. Georgia’s protected species include U.S. protected species.

U.S. Protected: Species protected by the U.S. Endangered Species Act (ESA).

Data used to generate information in this data portal comes from Georgia Department of Natural Resources, Wildlife Resources Division, Nongame Conservation Section's instance of NatureServe Biotics biodiversity conservation database.

Georgia Rare Element Conservation Database Attributes

SNAME	Scientific Name used by GA-DNR, Nongame Conservation Section
GNAME	Scientific Name used by NatureServe, Arlington, Virginia
SCOMNAME	Common name used by GA-DNR, Nongame Conservation Section
ELCODE	Unique code assigned to each element in Biotics
SPROT	State of Georgia Protection Status
USESA	US protection status under the Endangered Species Act
SRANK	State rarity rank
GRANK	Global rarity rank
SWAP_STATUS	Status of State Wildlife Action Plan (SWAP) species of greatest conservation need
AREA	Unit area within map unit sets used in this data portal; for example, Georgia counties and HUC10 watersheds.
SSHABITAT	Short description of habitat species typically occurs in Georgia

Georgia Protection Status (Georgia Department of Natural Resources, GA-DNR)

E	Listed as endangered—A species which is in danger of extinction throughout all or part of its range.
T	Listed as threatened—A species which is likely to become an endangered species in the foreseeable future throughout all or parts of its range.
R	Listed as rare—A species which may not be endangered or threatened but which should be protected because of its scarcity.
U	Listed as unusual (and thus deserving of special consideration)—Plants subject to commercial exploitation would have this status.

US Federal Protection Status (US Fish and Wildlife Service, USFWS)

LE	Listed as endangered—The most critically imperiled species. A species that may become extinct or disappear from a significant part of its range if not immediately protected.
LT	Listed as threatened—The next most critical level of threatened species. A species that may become endangered if not protected.
PE or PT	Candidate species—currently proposed for listing as endangered or threatened.
C	Candidate species—presently under status review for federal listing for which adequate information exists on biological vulnerability and threats to list the taxa as endangered or threatened.
PDL	Proposed for delisting
E(S/A) or T(S/A)	Similarity of appearance—Listed as endangered or threatened because of similarity of appearance.
(PS)	Partial status— status in only a portion of the species' range. Typically indicated in a "full" species record where an infraspecific taxon or population has U.S. ESA status, but the entire species does not.

Descriptions of federal status on this page have been adapted from information provided by NatureServe. Deteils can be found at Listings under the U.S. Endangered Species Act

State Rank (Georgia Conservation Status)

SX

	Presumed Extirpated—Species or ecosystem is believed to be extirpated from Georgia. Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered.
SH	Possibly Extirpated—Known from only historical records but still some hope of rediscovery. There is evidence that the species or ecosystem may no longer be present in Georgia, but not enough to state this with certainty. Examples of such evidence include (1) that a species has not been documented in approximately 20-40 years despite some searching or some evidence of significant habitat loss or degradation; (2) that a species or ecosystem has been searched for unsuccessfully, but not thoroughly enough to presume that it is no longer present in the state.
S1	Critically Imperiled—Critically imperiled in Georgia because of extreme rarity or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state.
S2	Imperiled—Imperiled in Georgia because of rarity due to very restricted range, very few populations, steep declines, or other factors making it very vulnerable to extirpation from state.
S3	Vulnerable—Vulnerable in the state due to a restricted range, relatively few populations, recent and widespread declines, or other factors making it vulnerable to extirpation.
S4	Apparently Secure—Uncommon but not rare; some cause for long-term concern due to declines or other factors.
S5	Secure—Common, widespread, and abundant in Georgia.
S#S#	Range Rank—A numeric range rank (e.g., S2S3 or S1S3) is used to indicate any range of uncertainty about the status of the species or ecosystem. Ranges cannot skip more than two ranks (e.g., SU is used rather than S1S4).
SU	Unrankable—Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
SNR	Unranked—Georgia conservation status not yet assessed.
SNA	Not Applicable—A conservation status rank is not applicable because the species or ecosystem is not a suitable target for conservation activities

Descriptions of state ranks on this page have been adapted from information provided by NatureServe. Deteils can be found at NatureServe Conservation Status.

Global Rank (Global Conservation Status)

GX	Presumed Extinct (species)—Not located despite intensive searches and virtually no likelihood of rediscovery. Eliminated (ecological communities)—Eliminated throughout its range, with no restoration potential due to extinction of dominant or characteristic taxa and/or elimination of the sites and disturbance factors on which the type depends.
GH	Possibly Extinct (species) Eliminated (ecological communities and systems)—Known from only historical occurrences but still some hope of rediscovery. There is evidence that the species may be extinct or the ecosystem may be eliminated throughout its range, but not enough to state this with certainty. Examples of such evidence include (1) that a species has not been documented in approximately 20-40 years despite some searching or some evidence of significant habitat loss or degradation; (2) that a species or ecosystem has been searched for unsuccessfully, but not thoroughly enough to presume that it is extinct or eliminated throughout its range.
G1	Critically Imperiled—At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors.
G2	Imperiled—At high risk of extinction or elimination due to very restricted range, very few populations, steep declines, or other factors.
G3	Vulnerable—At moderate risk of extinction or elimination due to a restricted range, relatively few populations, recent and widespread declines, or other factors.

G4	Apparently Secure—Uncommon but not rare; some cause for long-term concern due to declines or other factors.
G5	Secure—Common; widespread and abundant.
G#G#	Range Rank—A numeric range rank (e.g., G2G3, G1G3) is used to indicate the range of uncertainty about the exact status of a taxon or ecosystem type. Ranges cannot skip more than two ranks (e.g., GU should be used rather than G1G4).
GU	Unrankable—Currently unrankable due to lack of information or due to substantially conflicting information about status or trends. NOTE: Whenever possible (when the range of uncertainty is three consecutive ranks or less), a range rank (e.g., G2G3) should be used to delineate the limits (range) of uncertainty.
GNR	Unranked—Global rank not yet assessed.
GNA	Not Applicable—A conservation status rank is not applicable because the species is not a suitable target for conservation activities.
?	Inexact Numeric Rank—Denotes inexact numeric rank; this should not be used with any of the Variant Global Conservation Status Ranks or GX or GH.
Q	Questionable taxonomy that may reduce conservation priority—Distinctiveness of this entity as a taxon or ecosystem type at the current level is questionable; resolution of this uncertainty may result in change from a species to a subspecies or hybrid, or inclusion of this taxon or type in another taxon or type, with the resulting taxon having a lower-priority (numerically higher) conservation status rank. The SQ modifier is only used at a global level and not at a national or subnational level.
C	Captive or Cultivated Only—Taxon at present is extinct in the wild across their entire native range but is extant in cultivation, in captivity, as a naturalized population (or populations) outside their native range, or as a reintroduced population not yet established. The SC modifier is only used at a global level and not at a national or subnational level. Possible ranks are GXC or GHC.
T#	Infraspecific Taxon (trinomial)—The status of infraspecific taxa (subspecies or varieties) are indicated by a ST-rank following the species' global rank. Rules for assigning T-ranks follow the same principles outlined above. For example, the global rank of a critically imperiled subspecies of an otherwise widespread and common species would be G5T1. A T subrank cannot imply the subspecies or variety is more abundant than the species . For example, a G1T2 subrank should not occur. A vertebrate animal population, (e.g., listed under the U.S. Endangered Species Act or assigned candidate status) may be tracked as an infraspecific taxon and given a T-rank; in such cases a Q is used after the T-rank to denote the taxon's informal taxonomic status.

Descriptions of global rank on this page have been adapted from information provided by NatureServe. Deteils can be found at NatureServe Conservation Status.

Map unit sets used in this data portal

Counties	Georgia County Outlines
Quarter Quads	¼ of a USGS 7.5-minute quadrangle map
HUC8 Watersheds	USGS 8 digit watersheds
HUC10 Watersheds	USGS 10 digit watersheds
Level 3 & 4 Ecoregions	EPA Level III & IV Ecoregions
24 km Hexagon Grid	Hexagon grid with centers separated by 24 km (~15 mi) and with ~500 km² (~200 mi²) each

Explanation of fields used in species accounts

Class: The taxonomic class for the species based on NatureServe (NatureServe 2004)

Common and scientific name: The common name and scientific name from NatureServe (NatureServe 2004).

Federal Status: This is a description of the protection status from the U.S. Endangered Species Act administered by the U.S. Fish and Wildlife Service. The following values are possible and are described at http://www.natureserve.org/explorer/statusus.htm#status . See Appendix 2.4 for a summary of Federal Status by taxonomic group.

N	No protection status
LE	Listed endangered
C	Candidate
LE, LT	Listed endangered, listed threatened
LE, PXN	Listed endangered, proposed nonessential experimental population
LE, XN	Listed endangered, nonessential experimental population
LT	Listed threatened
PS	Partial Status
PS:LE	Partial Status:List endangered
PS:LT	Partial Status:List threatened
PS:LT, PDL	Partial Status:List threatened,Proposed for delisting

Heritage Status: Kentucky State Nature Preserve Commission protection status (see http://www.naturepreserves.ky.gov/NR/rdonlyres/689E5754-0221-4F67-9545-51CE438C0A27/0/ets2004.pdf). See Appendix 2.2 for a summary of Heritage Status by taxonomic group.

E	Endangered. A taxon in danger of extirpation and/or extinction throughout all or a significant part of its range in Kentucky
H	Historic. A taxon documented from Kentucky, but not observed reliably since 1984 and not considered extinct or extirpated.
N	No classification
S	Special Concern. A taxon that should be monitored
T	Threatened. A taxon likely to become endangered within the foreseeable future throughout all or a significant part of its range in Kentucky.
X	Presumed extinct or extirpated in Kentucky

GRank: Nature Serve Global Conservation Status Rank, Range Rank — A numeric range rank (e.g., G2G3) is used to indicate the rank of uncertainty in the status of a species or community. For more information see NatureServe Conservation Status (http://www.natureserve.org/explorer/ranking.htm#natsub). Subspecies and variety abundances are coded with a “T” suffix; the “G” portion of the rank refers to the entire species.

G1	Critically Imperiled. At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors.
G2	Imperiled. At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors.
G3	Vulnerable. At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors
G4	Apparently Secure. Uncommon but not rare; some cause for long-term concern due to declines or other factors.
G5	Secure. Common; widespread, and abundant.

SRank: Subnational or state rank developed by Kentucky State Nature Preserve Commission (KSNPC). A numeric range rank (e.g., S2S3) is used to indicate the range of uncertainty about the status of the species or community. For more information see http://www.naturepreserves.ky.gov/NR/rdonlyres/7B61A56A-C89E-4C02-8E67-82ADC25DE32F/0/SpeciesHabitat2005.pdf. The breeding rank for a non-resident species is coded with a ‘B’ suffix and an ‘N’ suffix refers to the non-breeding rank for a non-resident species.

S1	Critically Imperiled. Critically imperiled in the state because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state.
S2	Imperiled. Imperiled in the state because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the state.
S3	Vulnerable. Vulnerable in the state due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation
S4	Apparently Secure. Uncommon but not rare; some cause for long-term concern due to declines or other factors
S5	Secure. Common, widespread, and abundant in the state.
SA	Accidental species in the state.
SRF	Falsely reported in the literature.
SH	Historically known in the state.
SX	Extirpated from the state.
SZ	Not of significant conservation concern.

GRank (Simplified): Revised from NatureServe GRANK by Kentucky Department of Fish and Wildlife Resources (KDFWR) staff. Where NatureServe GRANK includes multiple statuses, this field is the single status that best indicates its status for CWCS planning (See Appendix 2.3).

SRank (Simplified): Revised from Kentucky State Nature Preserve Commission (KSNPC) SRANK by Kentucky Department of Fish and Wildlife Resources (KDFWR) staff in consultation with KSNPC staff. Where the KSNPC SRANK includes multiple statuses, this field is the single status that best indicates its status for CWCS panning (See Appendix 2.5)

G-Trend: Global trend assigned by KDFWR biologists, status may be Decreasing, Increasing, Stable, or Unknown

G-Trend Comment: Global trend comment by KDFWR biologists, describing sources of information about the global trend.

S-Trend: State trend assigned by KDFWR biologists, status may be Decreasing, Increasing, Stable, or Unknown

S-Trend Comment: State trend comment by KDFWR biologist, indicating the source of the information about the statewide trend.

Habitat/Life History: Comments on preferred habitat and life history information relevant to conservation of that species.

Key Habitat: Comments on location and condition of habitat for this species. Descriptions of key habitat areas are described by quadrangle, county, watershed, ecoregion, Wildlife Management Area, or other specific areas.

Guilds: Lists all habitat guilds assigned to a particular species. See also Section 3.3: Guilds and Guild Accounts

Statewide Map: This field is only relevant to electronic versions of this document. Clicking on the hyperlink to the PDF opens a distribution map showing all occurrences as well as only occurrences from 1984 to present.

Conservation Issues: Description of conservation issues affecting this species or its habitats. See Section 3.2: Conservation Issues and Conservation Actions.

Mississippi Natural Heritage Program
Species Status & Rank Explanations
2014

GLOBAL RARITY RANK – The global or world-wide rank of a species which is a non-legal rank indicating the rarity and vulnerability of a species.

G1 – Critically Imperiled	Critically imperiled globally because of extreme rarity (five or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extinction.
G2 – Imperiled	Imperiled globally because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extinction throughout its range.
G3 – Vulnerable	Rare and uncommon in its range or found locally in a restricted range, generally from 21-100 occurrences. At moderate risk of extinction.
G4 – Apparently Secure	Apparently globally secure, though it may be quite rare in parts of its range, especially at the periphery.
G5 – Secure	Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.
GU – Unranked	Cannot be ranked using available information.
GH – Possibly Extinct	Missing; known only from historical occurrences but still some hope of rediscovery.
GX – Presumed Extinct	Believed to be extinct throughout its range with virtually no likelihood that it will be rediscovered.

TAXON (T) RANK – The T-ranks (T1 - T5) are defined the same way as the Global ranks (G1 - G5), but the T-rank refers only to the rarity of the subspecific taxon. T1 through T5: See Global Rank definitions above.

FEDERAL PROTECTION STATUS – The federal listing of plants and animals under the U.S. Endangered Species Act.

LE – Listed Endangered	Taxon is threatened by extinction throughout all or a significant portion of its range.
LT – Listed Threatened	Taxon is likely to become endangered in the foreseeable future throughout all or a significant portion of its range.
E/SA – Listed Endangered by Similarity of Appearance	Taxon is treated as an endangered species because it may not be distinguishable from the listed species.
T/SA – Listed Threatened by Similarity of Appearance	Taxon is treated as a threatened species because it may not be distinguishable from the listed species.
PE – Proposed Endangered	Taxon proposed for listing as endangered.
PT – Proposed Threatened	Taxon proposed for listing as threatened.
C – Candidate Species	Taxon for which the USFWS has sufficient information to support proposals to list the species as threatened or endangered and for which the service anticipates a listing proposal.
LE, LT –	The species is formally listed as endangered in part of its range and as threatened in the other part; or, one or more subspecies or varieties is listed as endangered and the others are listed as threatened.
LT, PDL –	Populations of the species are formally listed as threatened and proposed for delisting.
LT, T(S/A) –	One or more subspecies or populations of the species are formally listed as threatened and the others are treated as threatened because of similarity of appearance to the listed threatened subspecies or populations.
PS – Partial status	The species is listed in parts of its range and not in others; or, one or more subspecies or varieties is

	listed, while the others are not listed.
XN –	Nonessential experimental population.
Non-listed –	Taxon does not have any federal protection under the ESA but may have other federal protections or be state protected.

STATE PROTECTION STATUS – The legal listing of animals in Mississippi. Plants do not have any threatened or endangered status in the state.

LE – Listed Endangered	Taxon is threatened by extinction throughout all or a significant portion of its range.
Non-listed	Taxon does not have any state endangered status but may be federally protected.

STATE RARITY RANK – The State Rarity Rank of a species in Mississippi. This is a non-legal rank indicating the rarity and vulnerability of a species at the state level.

S1 – Critically Imperiled	Critically imperiled in Mississippi because of extreme rarity (five or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extirpation from the state.
S2 – Imperiled	Imperiled in Mississippi because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extirpation from the state.
S3 – Vulnerable	Rare or uncommon in Mississippi (21 to 100 occurrences).
S4 – Apparently Secure	Apparently secure in Mississippi, with many occurrences.
S5 – Secure	Demonstrably common, widespread, and secure in Mississippi.

S#B, S#N –	Where S# is one of the alphanumeric codes above (S1, S2, etc.) and refers to the rarity within Mississippi of the breeding (B) and/or non-breeding populations (N) of migratory species (e.g., S1B, S3N).
SU – Unrankable	Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
SH – Possibly Extirpated	Missing; known only from historical occurrences in Mississippi but still with some hope of rediscovery.
SX – Presumed Extirpated	Apparently extirpated from the state.
SNA – Not applicable	A conservation status rank is not applicable because the species is not a suitable target for conservation activities.

TERMINOLOGY AND DEFINITIONS

June 2017

ELEMENTS

The North Carolina Natural Heritage Program (NC NHP) collects information on occurrences of rare plants and animals, exemplary or unique natural communities, and important animal assemblages (e.g., heronries and colonial waterbird nesting sites). Collectively, these plants, animals, natural communities, and animal assemblages are referred to as "elements of natural diversity" or simply as "elements." Specific occurrences of these elements are referred to as "element occurrences."

TAXONOMIC GROUP

A taxonomic group is the broad biological group into which the element falls. Most are well known, such are mammals, crayfish, and mosses. Less familiar groups are *natural communities*, which are a distinct and reoccurring assemblage of populations of plants, animals, bacteria, and fungi naturally associated with each other and their physical environment; and *animal assemblages*, which are a concentration of animal species using the same site for a phase of their life cycle (feeding, reproduction, migration, hibernating, etc.), e.g. bird colonies, bat or reptile hibernacula, concentrations of migrating shorebirds, multispecific spawning grounds, or multispecific mussel habitats.

SCIENTIFIC NAME

Plant names follow those used in "Flora of the Southern and Mid-Atlantic States" by Alan Weakley (2015 draft). For the most part, animal names follow those found in NatureServe Explorer (http://www.natureserve.org/explorer/). Names of natural communities are from a "Guide to the Natural Communities of North Carolina, Fourth Approximation" by Michael P. Schafale, 2012.

COMMON NAME

Plant names follow those used in "Flora of the Southern and Mid-Atlantic States" by Alan Weakley (2015 draft). For the most part, animal names follow those found in NatureServe Explorer (http://www.natureserve.org/explorer/).

STATUS AND RANK CODES

Definitions of the state and federal protection status for plants and animals differ. The North Carolina Natural Heritage Program (NCNHP) also maintains Watch Lists for species of plants and animals that are rare or uncommon, are not well studied, or are otherwise threatened with serious decline but for which current information does not justify placement on the Rare List by NCNHP.

EXPLANATION OF RANK CODES FOR NATURAL COMMUNITIES

Natural Heritage Programs and the NatureServe Network have developed a consistent method for evaluating the relative imperilment of species and ecological communities. Status and rank codes for natural community types are derived from the Natural Heritage Database (2015). An S or G rank involving two numbers indicates uncertainty of rank. For instance, a G2G3 rank indicates that the community appears to warrant either a G2 or a G3 ranking, but existing data do not allow that determination to be made. Number of occurrences is given as a general guide. Ranks also depend on other factors that affect vulnerability, including extent of occurrences, range, trends, and threats.

N.C. RANK

RANK	DEFINITION
S1	Critically imperiled in North Carolina because of extreme rarity or because of some factor making it especially vulnerable to extirpation from the state. Typically 1-5 occurrences and/or less than 2,000 acres occupied in the state.

S2	Imperiled in North Carolina because of rarity or because of some factor making it very vulnerable to extirpation from the state. Typically 6-20 occurrences and/or 2,000-10,000 acres occupied in the state.
S3	Rare or uncommon in North Carolina. Typically 21-100 occurrences and/or 10,000-50,000 acres occupied in the state.
S4	Apparently secure in the state.
S5	Demonstrably secure in the state.
S_?	Rank uncertain.

GLOBAL RANK

RANK	DEFINITION
G1	Critically imperiled globally because of extreme rarity or because of some factor making it especially vulnerable to extinction throughout its range. Typically 5 or fewer occurrences and/or less than 2,000 acres occupied globally.
G2	Imperiled globally because of rarity or because of some factor making it very vulnerable to extinction throughout its range. Typically 6-20 occurrences and/or 2,000-10,000 acres occupied globally.
G3	Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range or because of other factors making it vulnerable to extinction throughout its range. Typically 21-100 occurrences and/or 10,000-50,000 acres occupied globally.
G4	Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.
G5	Demonstrably secure globally, though it may be quite rare in parts, especially at the periphery.
G_?	Uncertain rank.
G_Q	Questionable taxonomy that may reduce conservation priority. Distinctiveness of this entity as a type or subtype at the current level is questionable.

EXPLANATION OF STATUS AND RANK CODES FOR PLANTS

Status Codes

In North Carolina, Endangered, Threatened, and Special Concern species have legally protected status through the North Carolina Plant Conservation Program (NCPCP). The Natural Heritage Program maintains computerized records and GIS map files on Significantly Rare species, as well as species considered extirpated in the state.

United States Status is designated by the U.S. Fish and Wildlife Service (USFWS) and the U.S. National Marine Fisheries Service (USNMFS) in accordance with the U.S. Endangered Species Act of 1973 (USESA), as amended. Plants and plant varieties, (including fungi and lichens), animal species and subspecies, and vertebrate populations are considered for Endangered or Threatened status according to the criteria established under the USESA. Proposals and determinations to add taxa or populations to the Lists of Endangered and Threatened Wildlife and plants are published in the Federal Register. Additionally, the USFWS and the USNMFS periodically publish a Notice of Review or Notice of Reclassification in the Federal Register that presents an updated list of plant and animal taxa that are regarded as candidates or proposed for possible addition to the Lists of Endangered and Threatened Wildlife and Plants. Contact the Asheville or Raleigh Ecological Services Field Offices for more information.

N.C. STATUS – PLANTS

N.C. STATUS CODE	STATUS	DEFINITION
E	Endangered	Any native or once-native species of higher taxon of plant whose continued existence as a viable component of the state's flora is determined to be in jeopardy or any species of plant determined to be an Endangered species pursuant to the Endangered Species Act. (GS19B-106:202.12.)
T	Threatened	Any native or once-native resident species of plant which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range, or one that is designated as a Threatened species pursuant to the Endangered Species Act. (GS19B-106:202.12.)
SC-V	Special Concern-Vulnerable	Any species or higher taxon of plant which is likely to become a threatened species within the forseeable future. (NCAC 02 NCAC 48F .0401.)
SC-H	Special Concern-Historical	Any species or higher taxon of plant that occurred in North Carolina at one time, but for which all known populations are currently considered to be either historical or extirpated. (NCAC 02 NCAC 48F .0401)
SR	Significantly Rare	This is a NCNHP designation. Any species which has not been listed by the NCPCP as an Endangered, Threatened, or Special Concern species, but which exists in the state (or recently occurred in the state) in small numbers (generally 1-100 statewide populations) and has been determined by the NCNHP to need monitoring. Significantly Rare species include species of historical occurrence with some likelihood of rediscovery in the state and species substantially reduced in numbers by habitat destruction, direct exploitation, or disease. Species considered extirpated in the state, with little likelihood of rediscovery, are given no N.C. status (unless already listed by the NCWRC or NCPCP as E, T, or SC).
SR-L	Significantly Rare-Limited	The range of the species is **limited** to North Carolina and adjacent states (endemic or near endemic). These are species that may have 20-50 populations in North Carolina, but fewer than 100 populations rangewide. The preponderance of their distribution is in North Carolina and their fate depends largely on conservation here.
SR-T	Significantly Rare-Throughout	The species is rare **throughout** its range (fewer than 100 populations total).
SR-D	Significantly Rare-Disjunct	The species is **disjunct** to North Carolina from a main range in a different part of the country or world.
SR-P	Significantly Rare-Peripheral	The species is at the **periphery** of its range in North Carolina. These species are generally more common somewhere else in their ranges, occurring in North Carolina peripherally to their main ranges, mostly in habitats that are unusual in North Carolina.
SR-O	Significantly Rare-Other	The range of the species is sporadic or cannot be described by the other Significantly Rare categories.
WL	Watch List	This is an NCNHP designation for any other species believed to be rare and of conservation concern in the state but not warranting active monitoring at this time.

U.S. STATUS – PLANTS

U.S. STATUS CODE	STATUS	DEFINITION
E	Endangered	A taxon that is in danger of extinction throughout all or a significant portion of its range (Public Law 93-205 87 Stat. 884).
T	Threatened	A taxon that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range (Public Law 93-205 87 Stat. 884).
C	Candidate	Taxa for which the USFWS has on file enough substantial information on biological vulnerability and threat(s) to support proposals to list them as endangered or threatened. Proposed rules have not yet been issued because this action is precluded at present by other listing activity. Development and publication of proposed rules on these taxa are anticipated. The USFWS encourages state and other federal agencies as well as other affected parties to give consideration to these taxa in environmental planning [Federal Register, 5 December 1996 Volume 61(235):64481]. Taxa formerly considered "Category 1" are now considered "Candidate."
FSC	Federal Species of Concern	Those species that appear to be in decline or otherwise in need of conservation and are under consideration for listing or for which there is insufficient information to support listing at this time. Subsumed under the term FSC are all species petitioned by outside parties and other selected focal species identified in USFWS strategic plans, state Wildlife Action Plans, or Natural Heritage Program Lists.

Ranking System

Natural Heritage Programs and the NatureServe Network have developed a consistent method for evaluating the relative imperilment of both species and ecological communities. These assessments led to the designation of a conservation status rank. These ranks provide an estimate of extinction risk. Conservation rank values have been assigned over the past 30 years by the NCNHP, NatureServe, and a large number of collaborators in government agencies, universities, natural history museums, botanical gardens, and other conservation organizations. This information has been developed primarily to help in guiding conservation and informing environmental planning and management.

Conservation ranks are either state (S) or global (G) and are based on a one-to-five scale, ranging from critically imperiled (S1 or G1) to demonstrably secure (S5 or G5). These assessments are based on the best available information, considering a variety of factors such as abundance, distribution, population trends, and threats. Global ranks apply to the status of a species throughout its range. The system is widely used by nationwide agencies and organizations, as the best available scientific and objective assessment of a species' rarity throughout its range.

A rank involving two numbers indicates uncertainty of rank. For example, an S2S3 or a G2G3 rank indicates that the species may be S2 or S3 (or G2 or G3), but that existing data do not allow that determination to be made.

N.C. RANK – PLANTS

N.C. RANK	NUMBER OF EXTANT POPULATIONS	DESIGNATION	DESCRIPTION
S1	1-5	Critically Imperiled	Critically imperiled due to extreme rarity or some factor(s) making it especially vulnerable to

N.C. RANK	NUMBER OF EXTANT POPULATIONS	DESIGNATION	DESCRIPTION
			extirpation (local extinction) from the state. Typically 5 or fewer occurrences or very few remaining individuals (<1,000).
S2	6-20	Imperiled	Imperiled due to rarity or some factor(s) making it very vulnerable to extirpation from the state. Typically 6 to 20 occurrences or few remaining individuals (1,000 to 3,000).
S3	21-100	Vulnerable	Vulnerable to extinction either because rare or uncommon, found only in a restricted range (even if abundant at some locations), or due to other factors making it vulnerable to extirpation. Typically 21 to 100 occurrences or between 3,000 to 10,000 individuals.
S4	101-1,000	Apparently Secure	Apparently secure and widespread, usually with more than 100 occurrences and more than 10,000 individuals.
S5	1,001+	Secure	Common, widespread, and abundant. Essentially ineradicable under present conditions. Typically with considerably more than 100 occurrences and more than 10,000 individuals.
SH	0?	Historical	Of historical occurrence, with some expectation that it may be rediscovered. Its presence may not have been verified in the past 20 years. Upon verification of an extant occurrence, SH-ranked elements would typically receive an S1 rank. Note: an element is not automatically assigned an SH (or SX) rank if it has not been verified in the past 20 years; some effort must have been made to locate or relocate occurrences.
SX	0	Presumed Extirpated	Believed to be extirpated. Has not been located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered.
SU	Unknown	Unrankable	Currently unrankable due to lack of information or substantially conflicting information about status or trends. More information is needed.
SNR	Unknown	Not Ranked	Statewide rank not yet assessed.
SNA	N/A	Not Applicable	A conservation status rank is not applicable because the element is not a suitable target for conservation for one of these reasons: • Hybrid – an interspecific hybrid without conservation value; • Exotic Origin – not native to North Carolina; • Accidental/Nonregular – outside usual range and not regularly found in North Carolina;

N.C. RANK	NUMBER OF EXTANT POPULATIONS	DESIGNATION	DESCRIPTION
			• Not Confidently Present – never documented as present in NC; • Synonym – the taxon is not recognized by the NCNHP.
S_?	---	Uncertain	Denotes inexact or uncertain numeric rank.

GLOBAL STATUS - PLANTS

GLOBAL RANK	NUMBER OF EXTANT POPULATIONS	DESIGNATION	DESCRIPTION
G1	1-5	Critically Imperiled	Critically imperiled globally because of extreme rarity or because of some factor(s) making it especially vulnerable to extinction. Typically five or fewer occurrences or very few remaining individuals (<1,000) or acres (<2,000) or linear miles (<10).
G2	6-20	Imperiled	Imperiled globally because of rarity or because of some factor(s) making it very vulnerable to extinction. Typically 6 to 20 occurrences or few remaining individuals (1,000 to 3,000) or acres (2,000 to 10,000) or linear miles (10 to 50).
G3	21-100	Vulnerable	Vulnerable globally either because very rare throughout its range, found only in a restricted range (even if abundant at some locations), or other factors making it vulnerable to extinction. Typically 21 to 100 occurrences or between 3,000 and 10,000 individuals.
G4	101-1,000	Apparently Secure	Uncommon but not rare (although it may be rare in parts of its range, particularly on the periphery) and usually widespread. Apparently not vulnerable in most of its range, but possibly cause for long-term concern. Typically more than 100 occurrences and more than 10,000 individuals.
G5	1,001+	Secure	Common, widespread, and abundant (although it may be rare in parts of its range, particularly on the periphery). Not vulnerable in most of its range. Typically with considerably more than 100 occurrences and more than 10,000 individuals.
GH	0?	Historical	Known only from historical occurrences, but with some expectation that it may be rediscovered. May still be extant; further searching is needed.
GX	0	Presumed Extinct	Believed to be extinct throughout its range (e.g., passenger pigeon) with virtually no likelihood that it will be rediscovered. Not located despite intensive searches of historical sites and other appropriate habitat.

GLOBAL RANK	NUMBER OF EXTANT POPULATIONS	DESIGNATION	DESCRIPTION
GU	Unknown	Unrankable	Currently unrankable due to lack of information or due to substantially conflicting information about status or trends; need more information.
GNR	Unknown	Not Ranked	Global rank not yet assessed.
G_T_	---	Subspecies or Variety Rank	The rank of a taxonomic subspecies or variety. As an example, G4T1 would apply to a subspecies of a species with an overall rank of G4, but the subspecies warranting a rank of G1.
G_?	---	Uncertain	Denotes inexact or uncertain numeric rank.
G_Q	---	Questionable Taxonomy	Taxonomic classification that may reduce conservation priority. Distinctiveness of this entity as a taxon at the current level is questionable. Resolution of this uncertainty may result in change from a species to a subspecies or inclusion of this taxon in another taxon, with the resulting element having a lower-priority conservation status rank.

EXPLANATION OF STATUS AND RANK CODES FOR ANIMALS

Status Codes

In North Carolina, Endangered, Threatened, and Special Concern species have legally protected status through the North Carolina Wildlife Resources Commission (NCWRC). The Natural Heritage Program maintains computerized records and GIS map files on Significantly Rare species, as well as species considered extirpated in the state.

United States Status is designated by the U.S. Fish and Wildlife Service (USFWS) and the U.S. National Marine Fisheries Service (USNMFS) in accordance with the U.S. Endangered Species Act of 1973 (USESA), as amended. Plants and plant varieties, (including fungi and lichens), animal species and subspecies, and vertebrate populations are considered for Endangered or Threatened status according to the criteria established under the USESA. Proposals and determinations to add taxa or populations to the Lists of Endangered and Threatened Wildlife and plants are published in the Federal Register. Additionally, the USFWS and the USNMFS periodically publish a Notice of Review or Notice of Reclassification in the Federal Register that presents an updated list of plant and animal taxa that are regarded as candidates or proposed for possible addition to the Lists of Endangered and Threatened Wildlife and Plants. Contact the Asheville or Raleigh Ecological Services Field Offices for more information.

N.C. STATUS – ANIMALS

N.C. STATUS CODE	STATUS	DEFINITION
E	Endangered	Any native or once-native species of wild animal whose continued existence as a viable component of the state's fauna is determined to be in jeopardy or any species of wild animal determined to be an Endangered species pursuant to the Endangered Species Act. (G.S. 113-25.)
T	Threatened	Any native or once-native species of wild animal which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range, or one that is designated as a Threatened species pursuant to the Endangered Species Act. (G.S. 113-25.)

N.C. STATUS CODE	STATUS	DEFINITION
SC	Special Concern	Any species of wild animal native or once-native to North Carolina which is determined by the NCWRC to require monitoring but which may be taken under regulations adopted under the provisions of the Article. (G.S.113-25)
SR	Significantly Rare	This is a NCNHP designation. Any species which has not been listed as an Endangered, Threatened, or Special Concern species, but which exists in the state (or recently occurred in the state) in small numbers (generally 1-100 statewide populations) and has been determined by the NCNHP to need monitoring. Significantly Rare species include species of historical occurrence with some likelihood of rediscovery in the state and species substantially reduced in numbers by habitat destruction, direct exploitation, or disease. Species considered extirpated in the state, with little likelihood of rediscovery, are given no N.C. status (unless already listed by the NCWRC or NCPCP as E, T, or SC).
SR-G	---	Species is a game animal or a furbearer, and therefore (by law) cannot be listed for state protection as E, T, or SC.
WL	Watch List	This is an NCNHP designation for any other species believed to be rare and of conservation concern in the state but not warranting active monitoring at this time.

U.S. STATUS – ANIMALS

U.S. STATUS CODE	STATUS	DEFINITION
E	Endangered	A taxon that is in danger of extinction throughout all or a significant portion of its range (Public Law 93-205 87 Stat. 884).
T	Threatened	A taxon that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range (Public Law 93-205 87 Stat. 884).
C	Candidate	Taxa for which the USFWS has on file enough substantial information on biological vulnerability and threat(s) to support proposals to list them as endangered or threatened. Proposed rules have not yet been issued because this action is precluded at present by other listing activity. Development and publication of proposed rules on these taxa are anticipated. The USFWS encourages state and other federal agencies as well as other affected parties to give consideration to these taxa in environmental planning (Federal Register, 28 February 1996). Taxa formerly considered “Category 1” are now considered “Candidate.”
FSC	Federal Species of Concern	Those species that appear to be in decline or otherwise in need of conservation and are under consideration for listing or for which there is insufficient information to support listing at this time. Subsumed under the term FSC are all species petitioned by outside parties and other selected focal species identified in USFWS strategic plans, state Wildlife Action Plans, or Natural Heritage Program Lists.

U.S. STATUS CODE	STATUS	DEFINITION
BGPA	Bald and Golden Eagle Protection Act	In the 9 July 2007 Federal Register (72:37346-37372), the bald eagle was declared recovered and removed (delisted) from the Federal List of Threatened and Endangered Wildlife. After delisting, the Bald and Golden Eagle Protection Act (Eagle Act)(16U.S.C. 668-668d) becomes the primary law protecting bald eagles. The Eagle Act prohibits take of bald and golden eagles and provides a statutory definition of "take" that includes "disturb." The USFWS has developed National Bald Eagle Management Guidelines to provide guidance to land managers, landowners, and others as to how to avoid disturbing bald eagles. For additional information please see http://www.fws.gov/migratorybirds/baldeagle.htm.
EXP	Experimental Population	A taxon listed as experimental (either essential or nonessential). Experimental, nonessential populations of endangered species (e.g., red wolf) are treated as threatened species on public land, for consultation purposes, and a species proposed for listing on private land.
P_	Proposed	Species proposed in the Federal Register as a status different from its current federal status.
T (S/A)	Threatened due to Similarity of Appearance	Section 4 (e) of the USESA authorizes the treatment of a species (subspecies or population segment) as endangered or threatened even though it is not otherwise listed as endangered or threatened if (a) the species so closely resembles in appearance an endangered or threatened species that enforcement personnel would have substantial difficulty in differentiating between the listed and unlisted species, (b) the effect of this substantial difficulty is an additional threat to an endangered or threatened species, and (c) such treatment of an unlisted species will substantially facilitate the enforcement and further the policy of the USESA [Federal Register 4 November 1997, Volume 62(213):59605-59623].
T-4(d)	Threatened with a 4(d) Rule	Section 4(d) of the ESA allows special regulations for threatened species that modify normal ESA protections when it is determined that such a modification is necessary and advisable to provide for the conservation of that species. A 4d rule is specific to the particular plant or animal for which it was created. For additional information, see http://www.fws.gov/midwest/endangered/mammals/nlba/.

Ranking System

Natural Heritage Programs and the NatureServe Network have developed a consistent method for evaluating the relative imperilment of both species and ecological communities. These assessments led to the designation of a conservation status rank. These ranks provide an estimate of extinction risk. Conservation rank values have been assigned over the past 30 years by the NCNHP, NatureServe, and a large number of collaborators in government agencies, universities, natural history museums, botanical gardens, and other conservation organizations. This information has been developed primarily to help in guiding conservation and informing environmental planning and management.

Conservation ranks are either state (S) or global (G) and are based on a one-to-five scale, ranging from critically imperiled (S1 or G1) to demonstrably secure (S5 or G5). These assessments are based on the best available information, considering a variety of factors such as abundance, distribution, population trends, and threats. Global ranks apply to the status of a species throughout its range. The system is widely used by nationwide agencies and organizations, as the best available scientific and objective assessment of a species' rarity throughout its range.

A rank involving two numbers indicates uncertainty of rank. For example, an S2S3 or a G2G3 rank indicates that the species may be S2 or S3 (or G2 or G3), but that existing data do not allow that determination to be made.

N.C. RANK – ANIMALS

N.C. RANK	NUMBER OF EXTANT OCCURRENCES	DESIGNATION	DESCRIPTION
S1	1-5	Critically Imperiled	Critically imperiled due to extreme rarity or some factor(s) making it especially vulnerable to extirpation (local extinction) from the state. Typically 5 or fewer occurrences or very few remaining individuals (<1,000).
S2	6-20	Imperiled	Imperiled due to rarity or some factor(s) making it very vulnerable to extirpation from the state. Typically 6 to 20 occurrences or few remaining individuals (1,000 to 3,000).
S3	21-100	Vulnerable	Vulnerable to extinction either because rare or uncommon, found only in a restricted range (even if abundant at some locations), or due to other factors making it vulnerable to extirpation. Typically 21 to 100 occurrences or between 3,000 to 10,000 individuals.
S4	101-1,000	Apparently Secure	Apparently secure and widespread, usually with more than 100 occurrences and more than 10,000 individuals.
S5	1,001+	Secure	Common, widespread, and abundant. Essentially ineradicable under present conditions. Typically with considerably more than 100 occurrences and more than 10,000 individuals.
SH	0?	Historical	Of historical occurrence, with some expectation that it may be rediscovered. Its presence may not have been verified in the past 20 years. Upon verification of an extant occurrence, SH-ranked elements would typically receive an S1 rank. Note: an element is not automatically assigned an SH (or SX) rank if it has not been verified in the past 20 years; some effort must have been made to locate or relocate occurrences.
SX	0	Presumed Extirpated	Believed to be extirpated. Has not been located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered.
SU	Unknown	Unrankable	Currently unrankable due to lack of information or substantially conflicting

N.C. RANK	NUMBER OF EXTANT OCCURRENCES	DESIGNATION	DESCRIPTION
			information about status or trends. More information is needed.
SNR	Unknown	Not Ranked	Statewide rank not yet assessed.
SNA	N/A	Not Applicable	A conservation status rank is not applicable because the element is not a suitable target for conservation for one of these reasons: • Hybrid – an interspecific hybrid without conservation value; • Exotic Origin – not native to North Carolina; • Accidental/Nonregular – outside usual range and not regularly found in North Carolina; • Not Confidently Present – never documented as present in NC; • Synonym – the taxon is not recognized by the NCNHP.
S_B	1-?	Breeding	Rank of the breeding population in the state. Used for migratory species only. Ex: Bachman's sparrow (*Peucaea aestivalis*) is S3B,S2N).
S_N	1-?	Nonbreeding	Rank of the nonbreeding population in the state. Used for migratory species only. Ex: Bachman's sparrow.
S_?	---	Uncertain	Denotes inexact or uncertain numeric rank.

GLOBAL RANK – ANIMALS

GLOBAL RANK	NUMBER OF EXTANT POPULATIONS	DESIGNATION	DESCRIPTION
G1	1-5	Critically Imperiled	Critically imperiled globally because of extreme rarity or because of some factor(s) making it especially vulnerable to extinction. Typically five or fewer occurrences or very few remaining individuals (<1,000) or acres (<2,000) or linear miles (<10).
G2	6-20	Imperiled	Imperiled globally because of rarity or because of some factor(s) making it very vulnerable to extinction. Typically 6 to 20 occurrences or few remaining individuals (1,000 to 3,000) or acres (2,000 to 10,000) or linear miles (10 to 50).
G3	21-100	Vulnerable	Vulnerable globally either because very rare throughout its range, found only in a restricted range (even if abundant at some locations), or other factors making it vulnerable to extinction. Typically 21 to 100 occurrences or between 3,000 and 10,000 individuals.

GLOBAL RANK	NUMBER OF EXTANT POPULATIONS	DESIGNATION	DESCRIPTION
G4	101-1,000	Apparently Secure	Uncommon but not rare (although it may be rare in parts of its range, particularly on the periphery) and usually widespread. Apparently not vulnerable in most of its range, but possibly cause for long-term concern. Typically more than 100 occurrences and more than 10,000 individuals.
G5	1,001+	Secure	Common, widespread, and abundant (although it may be rare in parts of its range, particularly on the periphery). Not vulnerable in most of its range. Typically with considerably more than 100 occurrences and more than 10,000 individuals.
GH	0?	Historical	Known only from historical occurrences, but with some expectation that it may be rediscovered. May still be extant; further searching is needed.
GX	0	Presumed Extinct	Believed to be extinct throughout its range (e.g., passenger pigeon) with virtually no likelihood that it will be rediscovered. Not located despite intensive searches of historical sites and other appropriate habitat.
GU	Unknown	Unrankable	Currently unrankable due to lack of information or due to substantially conflicting information about status or trends; need more information.
GNR	Unknown	Not Ranked	Global rank not yet assessed.
G_T_	---	Subspecies or Variety Rank	As an example, G4T1 would apply to a subspecies of a species with an overall rank of G4, but the subspecies warranting a rank of G1.
G_?	---	Uncertain	Denotes inexact or uncertain numeric rank.
G_Q	---	Questionable Taxonomy	Taxonomic classification that may reduce conservation priority. Distinctiveness of this entity as a taxon at the current level is questionable. Resolution of this uncertainty may result in change from a species to a subspecies or inclusion of this taxon in another taxon, with the resulting element having a lower-priority conservation status rank.

Description of Federal and State Ranks & Status Codes

GLOBAL RANK - The global or world-wide rank of a species which is a non-legal rank indicating the rarity and vulnerability of a species

G1	Extremely rare and critically imperiled in the world with five or fewer occurrences, or very few remaining individuals, or because of some special condition where the species is particularly vulnerable to extinction
G2	Very rare and imperiled within the world, six to twenty occurrences, or few remaining individuals, or because of some factor(s) making it vulnerable to extinction
G3	Rare and uncommon in its range or found locally in a restricted range, generally from 21-100 occurrences
G4	Widespread, abundant, and apparently secure globally, but with cause for long-term concern
G5	Demonstrably widespread and secure globally
GH	Of historical occurrence throughout its range, e.g. formally part of the established biota, with the expectation that it may be rediscovered
GU	Can not be ranked using available information
GX	Believed to be extirpated throughout its range
HYB	Hybrid within its range in Tennessee
SSYN	Synonym for another species
_Q	Questionable taxonomy (GRANKs only)
_T#	Subspecific taxon rank (GRANKs only)

STATE RANK - The state rank of a species in Tennessee. Like the G_rank this is a non-legal rank indicating the rarity and vulnerability of a species at the state level.

S1	Extremely rare and critically imperiled in the state with five or fewer occurrences, or very few remaining individuals, or because of some special condition where the species is particularly vulnerable to extinction
S2	Very rare and imperiled within the state, six to twenty occurrences, or few remaining individuals, or because of some factor(s) making it vulnerable to extinction
S3	Rare and uncommon in the state, from 21-100 occurrences
S4	Widespread, abundant, and apparently secure within the state, but with cause for long-term concern
S5	Demonstrably widespread and secure in the state
SH	Of historical occurrence in Tennessee, e.g. formally part of the established biota, with the expectation that it may be rediscovered
SU	Can not be ranked using available information
SX	Believed to be extirpated from the state
S#S#	Denotes a “range rank” because the rarity of the species is uncertain (e.g. S1S3)
S?, S_?	Unranked at this time or rank uncertain
SE	Exotic species established in the state
SE#	Exotic numeric (e.g. the Asian clam *Corbicula fluminea* would be SE5)
SP	Potentially occurring in Tennessee, but not yet documented by DNH
_N	Occurs in Tennessee in a non-breeding status (mostly applies to vertebrates)

Description of Federal and State Ranks & Status Codes

_B	Breeds in Tennessee
SA	Accidental or casual in the state (several birds)
SR	Reported from the state, but insufficient data to assign rank
SRF	Reported falsely from the state
HYB	Hybrid within its range in Tennessee
SSYN	Synonym for another species
_Q	Questionable taxonomy (GRANKs only)
_T#	Subspecific taxon rank (GRANKs only)

FEDERAL STATUS - The federal listing under the U.S. Endangered Species Act

LE, Listed Endangered	Taxon is threatened by extinction throughout all or a significant portion of its range
E/SA,Endangered by Similarity of Appearance	Taxon is treated as an endangered species because it may not be easily distinguished from a listed species
LT, Listed Threatened	Taxon is likely to become an endangered species in the foreseeable future
T/SA,Threatened by Similarity of Appearance	Taxon is treated as a threatened species because it may not be easily distinguished from a listed species
PE, Proposed Endangered	Taxon proposed for listing as endangered
PT, Proposed Threatened	Taxon proposed for listing as threatened
C, Candidate species* **	Taxon for which the USFWS has sufficient information to support proposals to list the species as threatened or endangered, and for which the Service anticipates a listing proposal
(PS) Partial Status (based on taxonomy)	Taxon which is listed in part of its range, but for which Tennessee subspecies are not included in the Federal designation
(PS:status) Partial Status (based on political boundaries)	Taxon which is listed in part of its range, but for which Tennessee populations are not included in the Federal designation e.g. (PS:LE)
(XN) Non-essential experimental population in portion of range	Taxon which has been introduced or re-introduced in an area from which it has been extirpated, and for which certain provisions of the Act may not apply

Description of Federal and State Ranks & Status Codes

STATE STATUS -The legal listing in Tennessee

E, Endangered	Any species or subspecies whose prospects of survival or recruitment within the state are in jeopardy or are likely to become so within the foreseeable future
T, Threatened	Any species or subspecies that is likely to become an endangered species within the foreseeable future
D, Deemed in Need of Management	Any species or subspecies of nongame wildlife which the executive director of the TWRA believes should be investigated in order to develop information relating to populations, distribution, habitat needs, limiting factors, and other biological and ecological data to determine management measures necessary for their continued ability to sustain themselves successfully. This category is analogous to "Special Concern."
S, Special Concern	Any species or subspecies of plant that is uncommon in Tennessee, or has unique or highly specific habitat requirements or scientific value and therefore requires careful monitoring of its status.

Additional Modifiers for Plants

PE, Proposed Endangered	Any species or subspecies of plant nominated by the Scientific Advisory Committee to be added to the list of Tennessee's endangered species. After approval by the commissioner of the Dept. of Environment & Conservation and the concurrence of the commissioner of Agriculture, these plants will formally become State endangered.
PT, Proposed Threatened	Any species or subspecies of a plant nominated by the Scientific Advisory Committee to be added to the list of Tennessee threatened species. After a public hearing, these plants will formally become State threatened.
E-PT, Endangered-Proposed Threatened	Species which are currently on the state list of endangered plants, but are proposed by the Scientific Advisory Committee to be down-listed to threatened. After approval by the commissioner of the Dept. of Environment & Conservation and the concurrence of the commissioner of Agriculture, these plants will formally become State threatened.
E-PS, Endangered Proposed Special Concern	Species which are currently on the state list of endangered plants, but are proposed by the Scientific Advisory Committee to be down-listed to special concern. After approval by the commissioner of the Dept. of Environment & Conservation and the concurrence of the commissioner of Agriculture, these plants will formally become State special concern.
T-PE, Threatened Proposed Endangered	Species which are currently on the state list of threatened plants, but are proposed by the Scientific Advisory Committee to be listed on the state endangered list. After approval by the commissioner of the Dept. of Environment & Conservation and the concurrence of the commissioner of Agriculture, these plants will formally become State endangered.

Description of Federal and State Ranks & Status Codes

T-PS, Threatened Proposed Special Concern	Species which are currently on the state list of threatened plants, but are proposed by the Scientific Advisory Committee to be down-listed to special concern. After a public hearing, these plants will formally become State special concern.
P, Possibly Extirpated	Species or subspecies that have not been seen in Tennessee for the past 20 years. May no longer occur in Tennessee.
C, Commercially Exploited	Due to large numbers being taken from the wild and propagation or cultivation insufficient to meet market demand. These plants are of long-term conservation concern, but the Division of Natural Heritage does not recommend they be included in the normal environmental review process.

Department of Conservation and Recreation

Definitions of Abbreviations used on Natural Heritage Resource Lists

The following ranks are used by the Virginia Department of Conservation and Recreation to set protection priorities for natural heritage resources. Natural Heritage Resources, or "NHR's," are rare plant and animal species, rare and exemplary natural communities, and significant geologic features. The criterion for ranking NHR's is the number of populations or occurrences, i.e. the number of known distinct localities; the number of individuals in existence at each locality or, if a highly mobile organism (e.g., sea turtles, many birds, and butterflies), the total number of individuals; the quality of the occurrences, the number of protected occurrences; and threats.

- **S1** - Critically imperiled in the state because of extreme rarity or because of some factor(s) making it especially vulnerable to extirpation from the state. Typically 5 or fewer populations or occurrences; or very few remaining individuals (<1000).
- **S2** - Imperiled in the state because of rarity or because of some factor(s) making it very vulnerable to extirpation from the state. Typically 6 to 20 populations or occurrences or few remaining individuals (1,000 to 3,000).
- **S3** - Vulnerable in the state either because rare and uncommon, or found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extirpation. Typically 21 to 100 populations or occurrences (1,000 to 3,000).
- **S4** - Apparently secure; Uncommon but not rare, and usually widespread in the state. Possible cause of long-term concern. Usually>100 populations or occurrences and more than 10,000 individuals.
- **S5** - Secure; Common, widespread and abundant in the state. Essentially ineradicable under present conditions. Typically with considerably more than 100 populations or occurrences and more than 10,000 individuals.
- **S#B** - Breeding status of an animal within the state
- **S#N** - Non-breeding status of animal within the state. Usually applied to winter resident species.
- **S#?** - Inexact or uncertain numeric rank.
- **SH** - Possibly extirpated (Historical). Historically known from the state, but not verified for an extended period, usually > 15 years; this rank is used primarily when inventory has been attempted recently.
- **S#S#**- Range rank; A numeric range rank, (e.g. S2S3) is used to indicate the range of uncertainty about the exact status of the element. Ranges cannot skip more than one rank.
- **SU** - Unrankable; Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
- **SNR**- Unranked; state rank not yet assessed.
- **SX** - Presumed extirpated from the state. Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered.
- **SNA**- A conservation status rank is not applicable because the element is not a suitable target for conservation activities.

Global Ranks are similar, but refer to a species' rarity throughout its total range. Global ranks are denoted with a "G" followed by a character. Note GX means the element is presumed extinct throughout its range, not relocated despite intensive searches of historical sites/appropriate habitat, and virtually no likelihood that it will be rediscovered. A "Q" in a rank indicates that a taxonomic question concerning that species exists. Ranks for subspecies are denoted with a "T". The global and state ranks combined (e.g. G2/S1) give an instant grasp of a species' known rarity.

These ranks should not be interpreted as legal designations.

FEDERAL STATUS

The Division of Natural Heritage uses the standard abbreviations for Federal endangerment developed by the U.S. Fish and Wildlife Service, Division of Endangered Species and Habitat Conservation.

LE - Listed Endangered	**LT** - Listed Threatened	**PE** - Proposed Endangered	**PT** - Proposed Threatened
C - Candidate (formerly C1 - Candidate category 1)	**E(S/A)** - treat as endangered because of similarity of appearance	**T(S/A)** - treat as threatened because of similarity of appearance	**SOC** - Species of Concern species that merit special concern **(not a regulatory category)**

STATE LEGAL STATUS

The Division of Natural Heritage uses similar abbreviations for State endangerment:

LE - Listed Endangered	**PE** - Proposed Endangered	**SC** - Special Concern - animals that merit special concern according to VDGIF (**not a regulatory category**)
LT - Listed Threatened	**PT** - Proposed Threatened	**C** - Candidate

For information on the laws pertaining to threatened or endangered species, please contact:

- U.S. Fish and Wildlife Service for all **FEDERALLY** listed species;
- Department of Agriculture and Consumer Services, Plant Protection Bureau for **STATE listed plants and insects**
- Department of Game and Inland Fisheries for all other **STATE listed animals**

CONSERVATION SITES RANKING

Brank is a rating of the significance of the conservation site based on presence and number of natural heritage resources; on a scale of 1-5, 1 being most significant. Sites are also coded to reflect the presence/absence of federally/state listed species:

CONSERVATION SITE RANKS	LEGAL STATUS OF SITES
B1 - Outstanding significance	FL - Federally listed species present
B2 - Very High significance	SL - State listed species present
B3 - High significance	NL - No listed species present
B4 - Moderate significance	
B5 - Of general Biodiversity significance	

Virginia Department of Conservation and Recreation
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Please send website comments to **web@dcr.virginia.gov**
Address general inquiries to **pco@dcr.virginia.gov**

Listed Plant Species Known to Occur within 50-feet of TVA ROWs

State-and Federally-Listed Plants known to Occur within 50-feet of TVA ROWs

STATE	SCIENTIFIC NAME	COMMON NAME	STATE RANK	STATE STATUS	FEDERAL STATUS	BASIC EO RANK
MS	Adiantum capillus-veneris	Southern Maidenhair Fern	S2	SLNS		H - Historical
MS	Aesculus glabra	Ohio Buckeye	S2	SLNS		E - Verified extant (viability not assessed)
MS	Agalinis oligophylla	Ridge-stem False-foxglove	S2	SLNS		A - Excellent estimated viability
AL, GA	Agastache nepetoides	Yellow Giant-hyssop	S1	SLNS (AL), SPCO (GA)		E - Verified extant (viability not assessed)
AL	Allium speculae	Little River Canyon Onion	S2	SLNS		E - Verified extant (viability not assessed)
TN	Allium stellatum	Glade Onion	S1	E		H - Historical
TN	Amelanchier sanguinea	Round-leaved Serviceberry	S2	T		E - Verified extant (viability not assessed)
TN	Apios priceana	Price's Potato-bean	S3	E	LT	D - Poor estimated viability
TN	Arabis hirsuta	Western Hairy Rock-cress	S1	T		E - Verified extant (viability not assessed)
TN	Arnoglossum plantagineum	Fen Indian-plantain	S2	T		E - Verified extant (viability not assessed)
MS	Asarum canadense	Canada Wild-ginger	S3	SLNS		E - Verified extant (viability not assessed)
TN	Asclepias purpurascens	Purple Milkweed	S1	S		E - Verified extant (viability not assessed)
TN	Astragalus bibullatus	Pyne's Ground Plum	S1	E	LE	AC - Excellent, good, or fair estimated
AL, TN	Astragalus tennesseensis	Tennessee Milk-vetch	S1S2	SLNS (AL), S (TN)		E - Verified extant (viability not assessed)
TN	Aureolaria patula	Spreading False-foxglove	S3	S		E - Verified extant (viability not assessed)
GA	Baptisia australis var. aberrans	Tall Blue Wild Indigo	S2	SPCO		E - Verified extant (viability not assessed)
KY	Baptisia bracteata var. leucophaea	Cream Wild Indigo	S3	S		E - Verified extant (viability not assessed)
KY	Bartonia virginica	Screwstem	S2	T		E - Verified extant (viability not assessed)
TN	Berberis canadensis	American barberry	S2	S		AC - Excellent, good, or fair estimated
AL	Bigelowia nuttallii	Nuttall's Rayless Golden-rod	S3	SLNS		E - Verified extant (viability not assessed)
AL	Blephilia subnuda	Smooth Blephilia	S1S2	SLNS		E - Verified extant (viability not assessed)
MS	Camassia scilloides	Wild Hyacinth	S2	SLNS		E - Verified extant (viability not assessed)
KY	Carex decomposita	Epiphytic Sedge	S2	T		C - Fair estimated viability
TN	Carex hitchcockiana	Sedge	S1	T		H? - Possibly historical
KY	Carya aquatica	Water Hickory	S2S3	T		E - Verified extant (viability not assessed)
MS	Chelone glabra	White Turtlehead	S3	SLNS		E - Verified extant (viability not assessed)
TN	Chelone obliqua	Red Turtlehead	S1	S		F - Failed to find
TN	Chrysogonum virginianum	Green-and-gold	S2	T		E - Verified extant (viability not assessed)
TN	Clematis glaucophylla	Whiteleaf Leatherflower	S1	S		E - Verified extant (viability not assessed)
AL	Comandra umbellata	Bastard Toad-flax	S1	SLNS		E - Verified extant (viability not assessed)
KY	Coreopsis pubescens	Downy Coreopsis	S2S3	S		Not ranked
AL	Coreopsis pulchra	Woodland Tickseed	S2	SLNS		E - Verified extant (viability not assessed)
KY	Corydalis sempervirens	Pale Corydalis	S3?	S		E - Verified extant (viability not assessed)
AL	Cotinus obovatus	American Smoke-tree	S2	SLNS		E - Verified extant (viability not assessed)
MS	Cuphea viscosissima	Blue Waxweed	S1	SLNS		E - Verified extant (viability not assessed)

STATE	SCIENTIFIC NAME	COMMON NAME	STATE RANK	STATE STATUS	FEDERAL STATUS	BASIC EO RANK
TN	Cyperus plukenetii	Plukenet's Cyperus	S1	S		E - Verified extant (viability not assessed)
TN	Cypripedium reginae	Showy Lady-slipper	S1	E		E - Verified extant (viability not assessed)
AL, TN	Dalea foliosa	Leafy Prairie-clover	S1	SLNS (AL), E (TN)	LE	E - Verified extant (viability not assessed)
AL, GA	Dalea gattingeri	Gattinger Prairie-clover	S3	SLNS (AL), SPCO (GA)		H? - Possibly historical (AL); E - Verified extant (viability not assessed) (GA)
AL	Delphinium alabamicum	Alabama Larkspur	S2	SLNS		E - Verified extant (viability not assessed)
KY	Delphinium carolinianum	Carolina Larkspur	S1S2	T		E - Verified extant (viability not assessed)
TN	Delphinium exaltatum	Tall Larkspur	S2	E		E - Verified extant (viability not assessed)
AL, TN	Desmodium ochroleucum	Creamflower Tick-trefoil	S1S2	SLNS (AL), E (TN)		E - Verified extant (viability not assessed)
TN	Diamorpha smallii	Small's Stonecrop	S1S2	E		E - Verified extant (viability not assessed)
AL	Dicentra cucullaria	Dutchman's Breeches	S2	SLNS		E - Verified extant (viability not assessed)
MS	Diplazium pycnocarpon	glade fern	S2S3	SLNS		E - Verified extant (viability not assessed)
AL	Draba cuneifolia	Wedge-leaf Whitlow-grass	S1	SLNS		E - Verified extant (viability not assessed)
TN	Drosera brevifolia	Dwarf Sundew	S2	T		E - Verified extant (viability not assessed)
NC, TN	Dryopteris cristata	crested woodfern	S3	W1 (NC), T (TN)		E - Verified extant (viability not assessed)
MS	Echinacea purpurea	Eastern Purple Coneflower	S3	SLNS		E - Verified extant (viability not assessed)
MS	Eleocharis erythropoda	Bald Spikerush	SNR	SLNS		E - Verified extant (viability not assessed)
TN	Elymus svensonii	Svenson's Wild-rye	S2	T		E - Verified extant (viability not assessed)
AL	Eriogonum harperi	Harper's Umbrella-plant	S1	SLNS		E - Verified extant (viability not assessed)
TN	Erythronium rostratum	Yellow Trout-lily	S2	S		E - Verified extant (viability not assessed)
TN	Eupatorium godfreyanum	Godfrey's Thoroughwort	S1	S		E - Verified extant (viability not assessed)
TN	Eupatorium leucolepis	White-bract Thoroughwort	S1	E		H? - Possibly historical
AL	Eurybia spectabilis	Showy Aster	S1	SLNS		E - Verified extant (viability not assessed)
MS	Evax prolifera	Big-head Evax	S1	SLNS		E - Verified extant (viability not assessed)
TN	Evolvulus nuttallianus	Evolvulus	S3	S		H? - Possibly historical
TN	Festuca paradoxa	Cluster Fescue	S1	S		E - Verified extant (viability not assessed)
AL	Frasera caroliniensis	American Columbo	S2	SLNS		E - Verified extant (viability not assessed)
TN	Fuirena squarrosa	Hairy Umbrella-sedge	S1	S		B - Good estimated viability
TN	Gaylussacia dumosa	Dwarf Huckleberry	S3	T		E - Verified extant (viability not assessed)
AL, TN	Helianthus eggertii	Eggert's Sunflower	S1	SLNS (AL), S (TN)	DM	E - Verified extant (viability not assessed)
AL	Helianthus longifolius	Longleaf Sunflower	S1S2	SLNS		E - Verified extant (viability not assessed)
TN	Helianthus occidentalis	naked-stem sunflower	S2	S		E - Verified extant (viability not assessed)
MS	Hybanthus concolor	Green Violet	S3	SLNS		H - Historical
KY	Hydrocotyle ranunculoides	Floating Pennywort	S1S2	E		E - Verified extant (viability not assessed)
GA	Hypericum dolabriforme	Straggling St. John's-wort	S3	SPCO		E - Verified extant (viability not assessed)

STATE	SCIENTIFIC NAME	COMMON NAME	STATE RANK	STATE STATUS	FEDERAL STATUS	BASIC EO RANK
GA	Hypericum sphaerocarpum	Barrens St. Johnswort	S1	SPCO		E - Verified extant (viability not assessed)
TN	Iris prismatica	Narrow Blue Flag	S2S3	T		E - Verified extant (viability not assessed)
AL	Isoetes butleri	Butler's Quillwort	S2	SLNS		E - Verified extant (viability not assessed)
TN	Isoetes melanopoda	Blackfoot Quillwort	S1S2	E		E - Verified extant (viability not assessed)
AL	Isotria verticillata	Large Whorled Pogonia	S2	SLNS		D - Poor estimated viability
AL	Jamesianthus alabamensis	Alabama Jamesianthus	S3	SLNS		H? - Possibly historical
AL, KY, MS, TN	Juglans cinerea	Butternut	S1	SLNS (AL), T (KY), SLNS (MS), T (TN)		E - Verified extant (viability not assessed) (AL, KY, TN); H? - Possibly historical (MS)
TN	Lachnanthes caroliana	Red Root	S1	E		E - Verified extant (viability not assessed)
AL	Lathyrus venosus	Smooth Veiny Peavine	S1	SLNS		E - Verified extant (viability not assessed)
AL	Leavenworthia alabamica	Alabama Glade-cress	S2	SLNS		E - Verified extant (viability not assessed)
AL	Leavenworthia crassa	Fleshy-fruit Gladecress	S2	SLNS	LE	E - Verified extant (viability not assessed)
GA	Leavenworthia exigua var. exigua	Glade Cress	S2	T		E - Verified extant (viability not assessed)
AL	Leavenworthia uniflora	Michaux Leavenworthia	S2	SLNS		E - Verified extant (viability not assessed)
TN	Lespedeza angustifolia	Narrowleaf Bushclover	S2	T		E - Verified extant (viability not assessed)
TN	Lesquerella perforata	Spring Creek Bladderpod	S1	E	LE	E - Verified extant (viability not assessed)
TN	Liatris cylindracea	Slender Blazing-star	S2	T		E - Verified extant (viability not assessed)
TN	Lilium philadelphicum	Wood Lily	S1	E		E - Verified extant (viability not assessed)
MS	Lilium superbum	Turk's Cap Lily	S3S4	SLNS		E - Verified extant (viability not assessed)
MS	Lobelia appendiculata	Ear-flower Lobelia	S2S3	SLNS		H? - Possibly historical
TN	Ludwigia sphaerocarpa	Globe-fruited Ludwigia	S1	T		E - Verified extant (viability not assessed)
TN	Lycopodiella alopecuroides	Foxtail Clubmoss	S2	T		E - Verified extant (viability not assessed)
TN	Lysimachia fraseri	Fraser Loosestrife	S2	E		E - Verified extant (viability not assessed)
AL	Marshallia mohrii	Mohr's Barbara's Buttons	S3	SLNS	LT	E - Verified extant (viability not assessed)
KY	Matelea carolinensis	Carolina Anglepod	S1?	E		E - Verified extant (viability not assessed)
MS	Matelea obliqua	Climbing Milkweed	S2	SLNS		E - Verified extant (viability not assessed)
MS	Menispermum canadense	Canada Moonseed	S3	SLNS		E - Verified extant (viability not assessed)
TN	Muhlenbergia torreyana	Torrey Muhly	S1	E		E - Verified extant (viability not assessed)
AL	Nestronia umbellula	Nestronia	S2	SLNS		C - Fair estimated viability
TN	Oenothera macrocarpa ssp. macrocarpa	Missouri Evening-primrose	S2	T		H - Historical
KY	Oenothera perennis	Small Sundrops	S1S2	E		E - Verified extant (viability not assessed)
KY, TN	Onosmodium hispidissimum	Hairy False Gromwell	S1	E (KY, TN)		E - Verified extant (viability not assessed)
AL	Onosmodium molle ssp. subsetosum	False Gromwell	S1	SLNS		E - Verified extant (viability not assessed)
AL, GA	Ophioglossum engelmannii	Limestone Adder's-tongue	S2S3	SLNS (AL), SPCO (GA)		E - Verified extant (viability not assessed)
MS	Osmorhiza longistylis	Smoother Sweet-cicely	S3	SLNS		E - Verified extant (viability not assessed)
TN	Palamocladium leskeoides	Palamocladium	S1	T		H - Historical

STATE	SCIENTIFIC NAME	COMMON NAME	STATE RANK	STATE STATUS	FEDERAL STATUS	BASIC EO RANK
GA, MS, TN	Panax quinquefolius	American ginseng	S3	SPCO (GA), SLNS (MS), S-C (TN)		E - Verified extant (viability not assessed) (GA, MS, TN); AC - Excellent, good, or fair estimated viability (Dickson CO, TN)
TN	Panicum hemitomon	Maidencane	S2	S		E - Verified extant (viability not assessed)
AL	Paysonia densipila	Duck River Bladderpod	S1	SLNS		E - Verified extant (viability not assessed)
AL	Pediomelum subacaule	Tuberous Scurfpea	S2	SLNS		E - Verified extant (viability not assessed)
MS	Penstemon tenuiflorus	Beard-tongue	S3	SLNS		H? - Possibly historical
AL, KY, TN	Phemeranthus calcaricus	Limestone Fame-flower	S2	SLNS (AL), E (KY), S (TN)		E - Verified extant (viability not assessed) (AL, KY, TN); AC - Excellent, good, or fair estimated viability (Maury CO, TN)
TN	Phemeranthus mengesii	Fame-flower	S2	T		E - Verified extant (viability not assessed)
AL, TN	Phemeranthus teretifolius	Roundleaf Fameflower	S1	SLNS (AL), T (TN)		E - Verified extant (viability not assessed)
TN	Plantago cordata	Heartleaved Plantain	S1	E		E - Verified extant (viability not assessed)
TN	Platanthera cristata	Yellow-crested Orchid	S2S3	S		E - Verified extant (viability not assessed)
TN	Platanthera integra	Yellow Fringeless Orchid	S1	E		H? - Possibly historical
AL	Platanthera integrilabia	White Fringeless Orchid	S2	SLNS	LT	E - Verified extant (viability not assessed)
TN	Pogonia ophioglossoides	Rose Pogonia	S2	E		E - Verified extant (viability not assessed)
TN	Polygala mariana	Maryland Milkwort	S1	S		H - Historical
TN	Polygala nuttallii	Nuttall's Milkwort	S1	E		E - Verified extant (viability not assessed)
TN	Polygonum arifolium	Halberd-leaf Tearthumb	S1	T		E - Verified extant (viability not assessed)
MS	Polytaenia nuttallii	Prairie Parsley	S2	SLNS		E - Verified extant (viability not assessed)
KY	Pontederia cordata	Pickerel Weed	S1S2	T		H - Historical
MS	Ponthieva racemosa	Shadow-witch Orchid	S2	SLNS		AB - Excellent or good estimated viability
KY	Potamogeton pulcher	Spotted Pondweed	S1S2	T		B - Good estimated viability
TN	Prenanthes barbata	Barbed Rattlesnake-root	S2	S		D? - Possibly poor estimated viability
AL	Pycnanthemum curvipes	Mountain-mint	S1?	SLNS		E - Verified extant (viability not assessed)
MS	Pycnanthemum muticum	Mountain-mint	S2S3	SLNS		E - Verified extant (viability not assessed)
MS	Quercus macrocarpa	Bur Oak	S2	SLNS		E - Verified extant (viability not assessed)
MS	Rhamnus lanceolata	Lance-leaved Buckthorn	S2	SLNS		B - Good estimated viability
TN	Rhynchospora inexpansa	Nodding Beakrush	S1	S		E - Verified extant (viability not assessed)
TN	Rhynchospora perplexa	Beakrush	S2	T		H? - Possibly historical
TN	Ribes curvatum	Granite Gooseberry	S1	T		E - Verified extant (viability not assessed)
TN	Ribes missouriense	Missouri gooseberry	S2	S		E - Verified extant (viability not assessed)
AL	Rudbeckia heliopsidis	Sun-facing Coneflower	S2	SLNS		E - Verified extant (viability not assessed)
TN	Sabatia capitata	Rose-gentian	S2	E		E - Verified extant (viability not assessed)
TN	Sacciolepis striata	Gibbous Panic-grass	S1	S		E - Verified extant (viability not assessed)
AL	Sarracenia oreophila	Green Pitcher Plant	S2	SLNS	LE	B - Good estimated viability

STATE	SCIENTIFIC NAME	COMMON NAME	STATE RANK	STATE STATUS	FEDERAL STATUS	BASIC EO RANK
TN	Schisandra glabra	Bay Starvine	S2	T		E - Verified extant (viability not assessed)
AL, TN	Schoenolirion croceum	Sunnybell	S2	SLNS (AL), T (TN)		E - Verified extant (viability not assessed) (AL, TN); AB - Excellent or good estimated viability (Maury CO, TN)
TN	Scutellaria montana	Large-flowered Skullcap	S4	T	LT	E - Verified extant (viability not assessed)
TN	Sedum nevii	Nevius' Stonecrop	S1	E		H - Historical
AL	Selaginella arenicola ssp. riddellii	Spikemoss	S2	SLNS		H - Historical
AL	Selaginella rupestris	Spikemoss	S2	SLNS		E - Verified extant (viability not assessed)
TN	Silene caroliniana ssp. pensylvanica	Wild Pink	S1S2	T		H? - Possibly historical
TN	Silene ovata	Ovate Catchfly	S2	E		E - Verified extant (viability not assessed)
AL, TN	Silphium brachiatum	Cumberland Rosinweed	S2	SLNS (AL), E (TN)		E - Verified extant (viability not assessed)
AL	Silphium mohrii	Mohr's Rosin-weed	S1	SLNS		E - Verified extant (viability not assessed)
AL, TN	Silphium pinnatifidum	Prairie-dock	S1	SLNS (AL), T (TN)		E - Verified extant (viability not assessed)
TN	Solidago gattingeri	Gattinger's Goldenrod	S1	E		E - Verified extant (viability not assessed)
TN	Spiranthes lucida	Shining Ladies'-tresses	S1S2	T		H? - Possibly historical
MS	Spiranthes magnicamporum	Great Plains Ladies'-tresses	S2	SLNS		A - Excellent estimated viability
TN	Spiranthes ochroleuca	Yellow Nodding Ladies'-tresses	S1	E		H - Historical
TN	Stellaria fontinalis	Water Stitchwort	S3	S		E - Verified extant (viability not assessed)
AL	Stewartia ovata	Mountain Camellia	S2S3	SLNS		E - Verified extant (viability not assessed)
MS	Symphyotrichum ericoides	White Heath Aster	S2	SLNS		E - Verified extant (viability not assessed)
AL	Symphyotrichum georgianum	Georgia Aster	S3	SLNS		E - Verified extant (viability not assessed)
KY	Trepocarpus aethusae	Trepocarpus	S3	S		E - Verified extant (viability not assessed)
TN	Tsuga caroliniana	Carolina Hemlock	S3	T		H? - Possibly historical
TN	Utricularia subulata	Zigzag Bladderwort	S1	T		E - Verified extant (viability not assessed)
TN	Veratrum woodii	Ozark Bunchflower	S1	E		E - Verified extant (viability not assessed)
MS	Viburnum acerifolium	Mapleleaf Viburnum	S1	SLNS		F - Failed to find
AL, GA	Viola egglestonii	Eggleston's Violet	S1	SLNS (AL); SPCO (GA)		E - Verified extant (viability not assessed)
TN	Xyris laxifolia var. iridifolia	Yellow-eyed-grass	S2	T		E - Verified extant (viability not assessed)
TN	Zanthoxylum americanum	Northern Prickly-ash	S2	S		E - Verified extant (viability not assessed)
TN	Zigadenus glaucus	White Camas	S1	E		X? - Possibly extirpated
TN	Zigadenus leimanthoides	Death-camas	S2	T		E - Verified extant (viability not assessed)
KY	Zizaniopsis miliacea	Southern Wildrice	S1S2	T		E - Verified extant (viability not assessed)

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Appendix K – TVA ROW Crossings in U.S. Forest Service Lands

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Table K-1. Total TVA Transmission Line Crossings and Total ROW Area in U.S. Forest Service Lands by State.

State	Transmission Line Crossings	Total ROW (acres)
Alabama	1	391
Georgia	3	430
Kentucky	1	388
Mississippi	4	1,908
North Carolina	4	1,166
Tennessee	5	1,359
Total	**18**	**5,642**

Table K-2. Total TVA Transmission Line Crossings and Total ROW Area in the Chattahoochee-Oconee National Forests (Georgia) by County.

County	Transmission Line Crossings	Total ROW (acres)
Catoosa	1	60
Walker	1	82
Whitfield	1	58
Fannin	1	50
Union	1	180
Total	**5**	**430**