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Boone Dam Seepage Remediation
Vegetation Management – Herbicide Use

Supplemental Environmental Assessment
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LIST OF ACRONYMS

Acronym	Definition
BMP	best management practices
CFR	Code of Federal Regulations
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FONSI	Finding of No Significant Impact
HUC	Hydrologic Unit Code
IRRM	Interim Risk Reduction Measure
mgd	million gallons per day
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
PA	Programmatic Agreement
RLMP	Reservoir Land Management Plan
SHPO	State Historic Preservation Officer
TDEC	Tennessee Department of Environment and Conservation
TVA	Tennessee Valley Authority
TWRA	Tennessee Wildlife Resources Agency
USFWS	U.S. Fish and Wildlife Service

CHAPTER 1 – PURPOSE AND NEED FOR ACTION

1.0 INTRODUCTION

In January 2016, TVA completed an Environmental Assessment (EA) considering its proposal to address and remediate seepage occurring at TVA's Boone Dam, which is a multipurpose dam on the South Fork Holston River on the border between Sullivan and Washington Counties in upper East Tennessee. The EA concluded that TVA's proposal to construct a composite seepage barrier along the crest of the dam embankment and the associated construction activities on TVA's reservation and adjoining and nearby TVA lands would not result in significant environmental impacts. The EA addressed managing vegetation that would grow in exposed shoreline areas during the extended drawdown of the reservoir.

The 2016 EA stated that:

> *TVA proposes to implement a Vegetation Management Plan to manage the successional vegetation on much of the exposed reservoir bottom. TVA would work with private landowners to manage this growth with annual or periodic mowing or bushwhacking. When approved by the landowner, TVA would use mechanical means, including tractors with bush hog attachments, extendable hydraulic arms, and other equipment to ensure safety. Mowing may occur from small barges along the reservation where access may be too hazardous. Mowing vegetation on the exposed reservoir bottom would not be intended to eliminate the vegetation. Such vegetation may also be beneficial, by enhancing wildlife habitat, reducing erosion during the drawdown, and improving fish habitat after the reservoir is returned to normal water levels. TVA's two primary objectives are to remove tree species from the newly exposed reservoir bottom areas that normally do not establish due to season pool levels and to avoid having trees mature during the drawdown period to heights that would create navigation and public safety problems once the waters are returned to normal levels.*

In preparation of conducting these activities, TVA tested and demonstrated several mechanical methods of vegetation management for their efficiency, ease of delivery, and maneuverability on steep slopes. TVA also evaluated the methods considering worker safety and the level of ground disturbance caused by the mechanical equipment. TVA determined that skid steer mounted mulchers/bush whackers were most suitable for the mechanical removal of vegetation. Tractors and excavators equipped with long reach or side arm equipment were found to be unsafe on many slopes and increased rutting and soil disturbance. In 2019, working with landowners and stakeholders, TVA began clearing vegetation on exposed reservoir bottom areas around the reservoir. TVA identified areas for treatment, concentrating clearing activities in embayments with dense vegetation growth as well as areas identified by the public and stakeholders. In 2019, TVA mechanically mulched over 650 acres of vegetation in the reservoir bottom areas. In 2020, to date, over 500 additional acres have been mechanically mulched.

During 2019, TVA found that the mechanical treatments were unlikely to be adequate to treat all areas within the exposed reservoir bottom that need treatment, particularly in areas that are difficult to access (e.g., areas with steep slopes, rock outcrops, or bluffs). TVA also determined that vegetation growth within areas in which TVA did not propose mechanized vegetation

removal, such as those areas with sensitive resources, was greater than anticipated and that other means that do not result in ground disturbances were necessary to manage vegetation growth. TVA is therefore proposing to expand the suite of acceptable vegetation removal and management methods to include the use of herbicides, which kill or damage plants by inhibiting or disrupting basic plant processes. TVA has identified herbicides registered with the U.S. Environmental Protection Agency (EPA) for use in these areas. Formulations of the herbicides Imazapyr and Triclopyr have been approved for use within aquatic and riparian settings. TVA proposes to mix the products with a surfactant and marker dye and apply the mixture in accordance with the manufacturers' label directions.

1.1 BACKGROUND

TVA's Boone Dam is a multi-purpose dam on the South Fork Holston River, on the border between Sullivan and Washington Counties in Tennessee. Completed in 1952, the dam is 160 feet high and stretches 1,697 feet across the South Fork Holston River, impounding the 4,500-acre Boone Reservoir and providing a winter flood storage capacity of 81,580 acre-feet. Including 8 miles of island shoreline, Boone Reservoir has 131 miles of shoreline, with 83 percent of the land designated for private development. Some farmland still exists around the reservoir but the majority of land has been developed with reservoir-front real estate properties and gated communities (TVA 2002). The vast majority of land underlying the reservoir, where TVA conducts vegetation management activities, is privately owned.

In October 2014, a small sinkhole and seepage was discovered at the base of the dam that indicates a potential risk to the integrity of a section of the dam's earthen embankment. TVA responded to the discovery by taking immediate interim risk reduction measures (IRRMs) for the protection of public safety. These measures included repairing the small sinkhole, constructing a tailrace filter to minimize further deterioration of the dam, closing the dam reservation (areas managed for the purpose of supporting operation and maintenance of the dam and associated infrastructure) to the public, installing a network of sensors to monitor the dam, and lowering the pool elevation to between 1,350 and 1,355 feet, which is roughly 10 feet below normal winter pool levels. As part of the IRRMs, TVA also began interim operations at Boone Dam that included lower reservoir levels, limited seasonal reservoir pool fluctuation, modified releases into the tailwater for hydropower generation, 24-hour inspection, and modified flood control operations. The change in operations was integral to the continued operation of the dam. TVA also promptly began a detailed study of the cause of the seepage and potential alternatives for remediation of Boone Dam.

In 2015, after extensive investigation, TVA initiated an EA to review its proposal to remediate the seepage of water at Boone Dam by constructing a composite seepage barrier descending from or near the crest of the dam embankment into the foundation soils, epikarst, and underlying bedrock beneath the dam. The composite seepage barrier would be constructed in stages and consist of extensive injected grout columns as well as an excavated and filled concrete diaphragm wall. The composite seepage barrier would reduce movement of water through the dam's foundation and underlying bedrock, and would make the reoccurrence of seepage connection from the reservoir unlikely. The EA also addressed the extended reservoir drawdown during the 5 to 7 year project timeframe and identified the need to manage vegetation growth in the reservoir drawdown area during the project timeframe. TVA issued the

Final EA and Finding of No Significant Impact (FONSI) in January 2016; these documents are incorporated herein by reference.

As described in the 2016 EA, TVA generally maintains the current reservoir water levels of Boone Reservoir between 1350 and 1355 feet elevation; these water levels will be maintained for the remainder of the project, except under special conditions or extreme rain events or to conduct testing. The underground cutoff wall that will stop the seepage is expected to be completed in the spring of 2021. According to TVA's project plan, TVA will then begin fluctuating lake levels above the 1355-foot elevation, with return to normal operations in July 2022.

1.2 PURPOSE AND NEED FOR ACTION

The purpose for the proposed action is to reduce successional vegetation growth in certain areas of the exposed Boone Reservoir bottom that are difficult and unsafe to access or have sensitive resources. TVA's primary objective is to remove or impair the growth of tree species from some reservoir bottom areas that normally do not establish due to seasonal pool levels, in order to reduce the amount of vegetation growing to heights that would create navigation and public safety problems, once the reservoir waters are returned to normal levels. As noted above, TVA has found that mechanized vegetation treatments are insufficient to address all of the problematic vegetation growth occurring in the lakebed, especially in areas that have limited access. TVA also needs a vegetation management option that minimizes and avoids ground disturbance in other areas of the reservoir that have sensitive resources, wherein mechanized treatments are unsuitable.

Addressing public safety is also an underlying need associated with TVA's seepage remediation project addressed in its 2016 EA (Section 1.3). The seepage remediation project will address the risk to public safety and welfare posed by seepage flows occurring under the Boone Dam, as well as the instability of the dam's earthen embankment. In fulfillment of TVA's statutory mission, the proposal would allow TVA to return the Boone Dam and reservoir to normal operations.

1.3 RELATED ENVIRONMENTAL REVIEWS

As previously stated, this EA will supplement the Final EA completed by TVA in January 2016. The 2016 EA states that TVA will work with private property owners to reduce vegetation growth within the reservoir and identifies a suite of mechanical equipment that may be utilized. In the 2016 EA, TVA found that the successional vegetation would have beneficial effects to natural and cultural resources but that management of vegetation was needed to reduce public safety and navigation concerns once waters return to normal operating levels and to address some concerns raised by private property about undesirable visual effects. The 2016 EA states that TVA's vegetation management plan would not remove all vegetation growing in the reservoir bottom.

TVA has previously supplemented the 2016 EA; the first supplemental EA, completed by TVA in February 2019, addressed changes to how TVA would restore the dam's crest after construction of the cutoff wall is completed; how TVA would use the nearby Earl Light Tract for construction

support actions; and how TVA would dispose of construction spoils (TVA 2019a). The first supplemental EA did not address management of vegetation growing in the reservoir bottoms.

In addition to the 2016 EA and first supplemental EA, three other environmental reviews are relevant to TVA's proposal:

- *TVA Reservoir Operations Study* and associated Programmatic Environmental Impact Statement (EIS). This study was completed in 2004 to review the policy that guides the day-to-day management of the Tennessee River and reservoir system. (TVA 2004)
- *Northeastern Tributary Reservoirs Land Management Plan Final EIS*. The Boone Reservoir Land Management Plan (RLMP), included in this Final EIS, addresses TVA's management of approximately 880 acres of public lands around the reservoir, including approximately 84 acres of two tracts TVA is using as Construction Support Areas (the Earl Light Tract and Tract 22R). The RLMP EIS was a source of information in the 2016 Final EA on the affected environment and potential environmental impacts. (TVA 2010)
- *Aquatic Plant Management Program Final Supplemental Environmental Impact Statement.* The current practices of TVA's Aquatic Plant Management Program are outlined in TVA's 1993 Supplemental EIS addressing the control of nuisance aquatic vegetation in TVA reservoirs. The 1993 supplement addressed populations of watermilfoil, hydrilla, spiny naiad, and other species and is a supplement to the 1972 EIS for control of Eurasian watermilfoil within TVA reservoirs (TVA 1993).

1.4 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT

Pursuant to the National Environmental Policy Act (NEPA) and implementing regulations promulgated by the Council on Environmental Quality (40 CFR 1500–1508), federal agencies are required to evaluate the potential environmental impacts of any proposals for major federal actions. TVA prepared this analysis to supplement its previous assessment of the potential consequences of TVA's actions on the environment and human health in accordance with NEPA and TVA's guidelines for implementing NEPA (TVA 2020).

This supplemental EA analyzes potential environmental impacts associated with adding herbicide applications to the suite of vegetation management actions that TVA may implement to reduce emergent vegetation growing in portions of the Boone Reservoir bottom wherein mature vegetation may pose navigation or safety issues when waters are returned to normal levels after the seepage remediation project. While the impacts associated with vegetation management were analyzed in TVA's 2016 Final EA, TVA did not address herbicidal use specifically. Essentially, this analysis addresses issues relating to use of the selected herbicides in the reservoir bottom and whether significant environmental impacts may result from its proposed use.

TVA seeks to minimize redundant or repetitive analysis and focus the supplemental analysis only on issues or impacts that have potential to be significant. The analysis in this Supplemental EA does not address the reservoir operations of Boone Reservoir, which was a focus of the 2016 Final EA. TVA is not proposing modifications to reservoir operations.

1.5 CONSULTATION REQUIREMENTS AND NECESSARY PERMITS

As described in the 2016 Final EA, TVA must complete consultation and secure any necessary permits prior to undertaking the proposed actions. Because TVA's seepage remediation began in 2016, consultation and permits have been previously obtained.

Consultation with the Tennessee Historical Commission on the impact of federal actions on Tennessee historic and archaeological sites is required under Section 106 of the National Historic Preservation Act (NHPA). In 2015, TVA consulted with interested federally recognized Indian tribes on impacts of the seepage remediation project on areas that may be of religious and cultural significance to them. Because no additional areas would be impacted under TVA's new proposal, TVA did not consult again with tribes regarding its proposal (TVA 2015a).

TVA has concluded that the proposed action would not require additional consultation with the U.S. Fish and Wildlife Service (USFWS) under Section 7 of the Endangered Species Act.

TVA has obtained numerous permits during the project that are associated with ground disturbing construction occurring at or near the dam reservation (see TVA's 2019 supplemental EA). The use of herbicides to control vegetation would fall under the State of Tennessee Department of Environment and Conservation (TDEC) General Permit for Discharges from Application of Pesticides (TNP100000). TVA would submit a notice of intent to TDEC prior to treating this previously untreated area. The contractor hired to conduct herbicide treatments would be required to provide application logs and records to TVA at the end of the calendar year for annual reporting to the State of Tennessee. Those applying the herbicide would possess applicable licenses/certification.

1.6 PUBLIC NOTIFICATION

TVA completed this supplemental EA in June 2020, and posted the document for public viewing on TVA's webpage: www.tva.gov/nepa. TVA notified interested officials, organizations (e.g., Boone Lake Association, Boone Dam Repair Coalition, National Wild Turkey Federation), and government agencies, including TDEC and Tennessee Wildlife Resources Agency (TWRA). TVA also provided notice to recipients of TVA's monthly project newsletter.

CHAPTER 2 – ALTERNATIVES CONSIDERED

2.0 DESCRIPTION OF ALTERNATIVES CONSIDERED

In this supplemental EA, TVA will evaluate changes to the Action Alternative that was analyzed in the 2016 EA. The alternative incorporating these changes is the Proposed Action described below. TVA will also analyze the No Action Alternative, which is based on proceeding with the project as described in the 2016 EA.

2.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, TVA would continue to implement vegetation management on portions of the exposed Boone Reservoir bottom utilizing mechanical means, as analyzed in the 2016 EA. Herbicide applications would not be used. Vegetation management activities would occur in portions of the reservoir bottom until water levels are raised beginning in Spring 2021. As stated in the 2016 EA, TVA would not eliminate all vegetation growing in the reservoir bottoms. As noted above, since 2016, TVA has identified areas in the reservoir bottom where mechanical vegetation treatments are unsuitable. In addition to TVA activities, given that the majority of reservoir bottom areas is private property, many landowners would continue to clear vegetation on their property during the drawdown period.

TVA would continue to coordinate with TWRA, the agency responsible for boater safety on the reservoir, to address safety and navigation on the reservoir and provide sufficient notice and information to the public and boaters about hazards that may be present once TVA raises reservoir water levels. TVA would provide information to the public through a variety of media, including through public outreach, ongoing discussions with stakeholders, social media, and direct communications with area residents and those that recreate on Boone Reservoir. Once water levels are raised, TVA would assist TWRA in identifying hazards and navigation concerns.

2.2 TVA'S PROPOSED ACTION – HERBICIDE USE FOR VEGETATION MANAGEMENT

Under the proposed action, TVA would expand the suite of acceptable vegetation removal and management methods to include the use of two EPA-approved herbicides in liquid forms, mixed with a surfactant and marker dye, to control successional vegetation growing in certain areas of the exposed Boone Reservoir bottom. Mechanical as well as herbicide treatments of vegetation would occur until reservoir water levels are raised beginning in Spring 2021, with normal operations planned for 2022.

TVA proposes to use a mixture of herbicides to treat approximately 600 acres of Boone Reservoir. Treatments would begin in June 2020 and would take place over a period of two to four months, through late summer 2020. TVA has identified over 500 acres for herbicide treatments that have proven to be unsuitable for or inaccessible with mechanical vegetation removal equipment (see Attachments A and B, with herbicide use areas shown in blue). TVA also proposes to apply the herbicide mixture in some areas (up to approximately 100 acres, as

determined necessary) where mechanical treatments have previously occurred, to inhibit new growth that would occur prior to inundation of the drawdown area in 2021. Mechanical treatments would continue at the same time, and TVA projects that more than 300 acres of reservoir bottom will be mechanically treated in 2020. Similar to the No Action Alternative, given that the majority of reservoir bottom areas are private property, many landowners would continue to clear vegetation on their property during the drawdown period.

While TVA would treat more areas of vegetation under this alternative, TVA would not eliminate all vegetation growing in the reservoir bottoms. As under the No Action Alternative, TVA would continue to coordinate with TWRA to address safety and navigation on the reservoir. This coordination would include providing notification and information to the public of potential hazards that may be present in the reservoir when TVA raises water levels. TVA would provide information to the public through a variety of media, including through public outreach, ongoing discussions with stakeholders, social media, and direct communications with area residents and those that recreate on Boone Reservoir. Once water levels are raised, TVA would assist TWRA in identifying hazards and navigation concerns.

2.2.1 Project Description

Qualified contractor support personnel would conduct the herbicide treatments. TVA would require that the contractor be licensed by the State of Tennessee to apply the herbicides. All persons employed by the contractor that apply herbicides must be certified as an applicator by the State of Tennessee. Proof of certification of each applicator would be reviewed by TVA.

The contractor would apply a combination of a mixture of EPA-approved herbicides to target the types of vegetation growth observed in the reservoir. Each acre of vegetation would be sprayed with approximately 100 gallons of the herbicide solution; the solution would be 1 gallon of the herbicide solution mixed with 99 gallons of water. The herbicide combination includes the herbicides Imazapyr, Triclopyr, an organic surfactant, and a marking dye:

- The herbicide product Alligare Imazapyr 4 SL (“Imazapyr”) would be used to target the woody growth as well as function as some pre-emergent growth deterrent.

- The herbicide product Alligare Triclopyr 3 or Garlan 3A for Triclopyr (“Triclopyr”) would be used to target Honey Locust trees growing in the reservoir bottom.

- Alligare Methylated Seed Oil (MSO) 1 (“surfactant”) is an organic surfactant that would be used to improve herbicide effectiveness. Surfactants (short for “surface-acting agents”) are chemical compounds that reduce the surface tension of water, thereby increasing the penetration, coverage, and overall effectiveness of an herbicide on the target vegetation.

- Alligare Super Marking Dye 1 (“marking dye”) would be used to assist workers in visually identifying where vegetation has been treated; the food-grade dye would persist for a day or so.

Specific treatments of sites would be chosen by TVA's contractor at each treatment location based on the nature of the terrain, stages of plant growth, and on whether sensitive resources are present or nearby. Depending on site access and other logistical considerations determined by TVA, the herbicide mixture would be applied to emergent vegetation from a sprayer mounted on a utility task vehicle (UTV). The UTVs would be equipped with 100-gallon spray tanks outfitted with engine-driven pumping systems.

When areas are inaccessible, spraying of shoreline vegetation would occur from a boat or barge on reservoir waters or the boat or barge would be docked as close as possible to the shore and hoses would be used from the UTV on the boat or barge on to the shoreline. Where it is possible and appropriate for the UTV to be used on the shoreline, work crews would utilize UTVs with hand wands and boom sprayers to traverse and spray target zones. Each UTV would carry a hose reel with 200 feet of hose that would be pulled by workers across the ground. Stationary loading and pumping sites would be positioned strategically along the water's edge to facilitate loading. Containments and BMPs would be implemented to minimize risk of spills. Boomless sprayers (called Boominators), which function like booms, would be used to improve the accuracy and efficacy of spraying.

UTVs would not be used in areas with sensitive natural and cultural resources, to minimize harm to such resources. Spot treatment application methods would be utilized where feasible to reduce potential harm to non-target areas or vegetation. In addition to wheeled UTVs used on the shoreline, backpack sprayers that are capable of applying liquid herbicide to small areas may be used on shores that prove to be inaccessible by boat or wheeled vehicles.

All application equipment would be rinsed at the last treatment site of the day prior to the equipment being removed from the reservoir or upon completion of vegetation treatments from the shoreline. Similarly, all containers would be disposed of according to state and federal requirements.

TVA would notify private landowners in advance of vegetation treatments so that they may opt out of the vegetation management (either herbicidal or mechanical) application on their private property. The contractor would be responsible for posting signs (with minimum dimensions of 8.5 by 11 inches) prior to and/or during the application of herbicides. Signs would be posted at trees, docks or similar structures at locations clearly visible from the water and along the shoreline at lot locations visible to users that access the water from land. The signs would include information relating to the herbicide mixture that would be used, including the herbicide names, date of treatment, water use restrictions, contact information for TVA and the contractor, and other information specified by TVA. All posting would be done to correctly match treatment protocol.

TVA has recently used Imazapyr, approved by the EPA for aquatic use in 2003, in several reservoirs to control aquatic vegetation. The herbicide is also used to control a broad range of weeds in terrestrial ecosystems. Imazapyr is considered to be practically non-toxic to fish, invertebrates, birds and mammals (EPA 2005). Imazapyr is broken down in the water by light and has a half-life ranging from three to five days. In soils, Imazapyr is broken down by

microbes, and persists with a half-life of one to five months and does not bind to sediments. Chronic toxicity tests for Imazapyr indicate that it is not carcinogenic, mutagenic, or neurotoxic, nor does it cause reproductive or developmental toxicity. The herbicide is not a suspected endocrine disrupter (EPA 2005).

The form of Trilopyr to be used is Triclopyr triethylamine salt (TEA), which was approved by the EPA in 1979 (reregistered in 1997) for terrestrial use and registered for aquatic uses in 2002. Triclopyr TEA is considered to be practically non-toxic to mammals, bees, freshwater fish and invertebrates and practically non-toxic to slightly toxic to birds (EPA 1998: BPA 2000). It is broken down in the water by light and has a half-life ranging from three to five days. The half-life of Triclopyr in water with light is around 1 day and 142 days without light (EPA 2014). In soils, Triclopyr is broken down by microbes and has a half-life ranging from 8 to 46 days (NPIC 2018). The EPA found that safety standards had been met under the Food Quality Protection Act and that there is a reasonable certainty that no harm will result to humans from aggregate exposure to the herbicide or its residues. When used in accordance with labeling, Triclopyr would not pose unreasonable risks of adverse effects to humans or the environment (EPA 1998).

The methylated seed oil surfactant and the marker dye are practically non-toxic to humans or to terrestrial and aquatic species. Ingredients used for the marker dye include various food dyes approved by the U.S. Food and Drug Administration (BPA 2000).

2.2.2 Summary of Proposed Mitigation Measures and TVA Commitments

Under the proposed action, TVA would implement numerous commitments, best management practices (BMPs) and mitigation measures to ensure that the proposal does not result in a significant environmental impact. In addition to these, TVA would continue to implement the mitigation measures identified in its 2016 Final EA and associated FONSI and the 2019 Supplemental EA and FONSI to ensure that adverse impacts on the environment are avoided, minimized or mitigated. All applicable permits would be acquired; therefore, associated permit-related mitigation measures and best management practices (BMPs) would be implemented to further minimize impacts.

To address potential impacts to sensitive resources, TVA would apply the following restrictions on the use of the herbicides:

- To avoid potential impacts to bat species, TVA will avoid herbicide use within 200 feet of two cave entrances to reduce the potential for herbicide inputs into sensitive cave/karst systems. There would be no clearing of vegetation within a 200-foot radius of documented caves.
- To avoid potential impacts to the bald eagle nests, TVA would avoid implementing any activities within 660 feet of nests while eagles are actively using them.
- To minimize soil disturbance and protect sensitive cultural resources present in the reservoir bottom, TVA would continue to avoid the use of heavy equipment to treat vegetation. Herbicides would be applied by personnel using backpack sprayers or from boats on the reservoir waters.

TVA would only apply the herbicide formulations at the specified rate per acre and according to all label precautions and specifications. Personnel applying the herbicides would be properly trained and certified and would wear appropriate personal protective equipment as prescribed by the product labels. All labeled guidelines and precautions would be followed and implemented and detailed records would be kept of all applications, per general permit requirements. Spot treatment of vegetation would occur when possible.

TVA would also require best management practices (BMP) and standard procedures associated with the herbicide use, including the following:

- Proper labeling of herbicide containers and availability of safety data sheets for all active chemicals used on a particular job site.
- Containers and other application debris would be disposed of properly per the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) regulations.
- When there is a possibility of affecting home sites, other personal property, lawns, or ornamentals, a reasonable buffer zone of at least 10 feet wide would remain untreated at the upper contours of the zones.
- The use of herbicides would be limited where there is a water intake, consistent with label directions for application and distance from water intake requirements.
- Incorporation of random safety and equipment checks to ensure public safety.
- When fueling or maintenance activities must occur in the field, absorbent pads and mobile containment pans would be placed under all equipment. Equipment would not be left unattended during these activities to avoid unplanned events such as spills or leaks. Servicing would be done with care to avoid leakage, spillage, and subsequent water contamination. Oil waste, filters, or other litter would be collected and disposed of properly. Equipment servicing and chemical or fuel storage would be limited to locations greater than 200 feet from sinkholes, fissures, or areas draining into known sinkholes, fissures, or other karst features.
- Care would be taken to minimize product spillage. If spillage occurs, clean-up using appropriate mitigation products would commence immediately. Other related BMPs include:
    - Herbicide containers would be brought to the project areas in original packaging.
    - When not in use and at night they would be securely stored.
    - Only herbicide product planned for the day would be handled and added to the materials to be transported to the application sites for the day.
    - These products would be stored in watertight containers during transportation to spray sites.
    - A plastic containment pan would be placed under the area where herbicides are poured for mixtures
    - Herbicides would be added before the 100-gallon tank is half-full and would be monitored at all times by the applicator to avoid the possibility of overfilling.

- Visual observations after the application of herbicides/pesticides should be conducted to ensure that these applications did not cause unanticipated impacts on non-target organisms, species or water quality.
- Spraying would not be conducted during weather (wind, rain, etc.) that would adversely impact efficacy and would be conducted to minimize unintentional spray drift or storm water:
  - Spraying would not be conducted during inclement weather (wind, rain, etc.) that would adversely impact efficacy.
  - An official weather forecast that occurs 12 hours prior to commencement of a "spray day" would be used for a "Spray / No Spray" determination.
  - No spraying would commence on a day that begins with a forecasted rain chance of 50% are greater.
  - If rain were "radar indicated", all spray activities would cease 6 hours prior to the forecasted arrival of the weather event.
- All application equipment would be rinsed at the last treatment site of the day prior to the equipment being removed from the reservoir or upon completion of vegetation treatments from the shoreline. Similarly, all disposable herbicide containers carried to a treatment site would be triple rinsed and the rinse would be applied prior to leaving the treatment site.

2.3 ALTERNATIVES CONSIDERED BUT NOT CARRIED FORWARD

TVA also considered other alternatives to address vegetation treatments needed to address growth in inaccessible areas or areas with sensitive resources. Numerous alternatives are available to TVA, including consideration of other herbicide products and/or herbicide mixtures and applying herbicides in other areas within the reservoir. However, each of these alternatives were problematic in a variety of ways, as they created safety issues, introduced unacceptable risks or uncertainties, or would be ineffective in addressing the vegetation growth. The alternatives considered by TVA but not carried forward from further analysis are summarized below.

TVA considered using a single herbicide to treat the vegetation to reduce or eliminate potential environmental risks associated with the mixture of herbicides. TVA initially identified Imazapyr as a potential herbicide to treat the 600-acre project area. Approved for both terrestrial and aquatic settings, TVA reviewed its effectiveness on the variety of tree species in the reservoir bottom and determined that the product would be ineffective on many of the species. TVA could not identify a single herbicide product that would effectively treat all of the species present and would be appropriate for the environmental setting.

TVA also considered using a pre-emergent herbicide product to prevent seed germination to suppress new growth of vegetation occuring in treatment areas. TVA reviewed whether the herbicide agent Flumioxazin, previously approved by EPA for use in aquatic settings, could be added to the proposed mixture of herbicides. Flumioxazin is known to be more toxic than other herbicides. After careful consideration, TVA specialists found that the potential impacts of using the herbicide in the reservoir bottom setting were uncertain and difficult to properly assess. The

uncertainties introduced unacceptable risk of potential impacts to water quality and the aquatic ecosystem. TVA assessed whether other pre-emergent herbicides would be appropriate in the setting and did not identify another pre-emergent herbicide that would be acceptable for use.

TVA also considered managing the vegetation in the 600-acre project area by hand. Under this alternative, workers would utilize hand tools, including chain saws, to manually remove the problem vegetation. TVA determined that the work would be too hazardous in many of these areas, posing risks to workers, and the resources and time required to hand-clear approximately 600 acres greatly exceeded those associated with mechanical or herbicide treatments.

TVA also considered whether to utilize herbicide treatments to continue to suppress growth occuring in areas previously mulched, or other areas where vegetation is growing and has raised public concern. After extensive discussion, TVA determined that spraying other areas within the reservoir bottom was unnecessary, given that mulching has proven to be effective in managing vegetation growth in those areas. In addition, TVA did not consider an alternative that would increase herbicide applications to more than 600 acres in order to ensure that the potential environmental impacts associated with the actions (described in Chapter 3 of the EA) are not significant.

2.4 ENVIRONMENTAL ISSUES AND COMPARISON OF ALTERNATIVES

The issues addressed in this supplemental EA are limited to those associated with the use of the proposed herbicide mixture to manage emergent vegetation growing in portions of the Boone reservoir bottom. The primary issues under consideration would be Terrestrial Ecology; Aquatic Ecology; Threatened and Endangered Species; Surface Water Resources; Historic and Cultural Resources; and Health and Safety.

Table 2-1 compares the impacts to these resources of the No Action Alternative and the Proposed Action. As noted above, impacts from implementing the No Action Alternative have been addressed by TVA in the 2016 Final EA analysis of its remediation proposal. The comparison of impacts is limited only to those resources and issues that would be potentially impacted by modifications proposed by TVA to the Boone Dam seepage remediation project.

Table 2-1: Comparison of Impacts of the No Action Alternative and the Proposed Action

Resource Area	Impacts from the No Action Alternative (*Proposed Action of the 2016 Final EA*)	Impacts from Proposed Action
Terrestrial Ecology	Mechanical vegetation management practices continue, with fewer impacts to terrestrial resources due to less acreage treated. Untreated vegetation benefits wildlife species by providing habitat.	Direct impacts to vegetation from herbicide use, resulting in inhibited growth or mortality. Loss of habitat for wildlife species. Herbicide is unlikely to adversely affect birds, mammals and bees. Untreated vegetation benefits wildlife species by providing habitat.
Aquatic Ecology	Impacts to littoral habitat where vegetation is removed and equipment traverses the terrain. Untreated shoreline vegetation would continue to grow, benefitting aquatic species that rely on the littoral habitat zone.	Because more vegetation would be removed, more littoral habitat would be impacted than under the No Action Alternative. Impazapyr and Triclopyr are approved for aquatic use by the EPA, which reduces the potential for adverse effects on aquatic ecosystems. Applicators would apply the herbicide according to TVA's BMPs and standard procedures, and to guidance on the manufacturers' label.
Surface Water Resources	Impacts to surface water for vegetative management would not change from current conditions.	TVA would use a mixture of herbicides specified and approved for use in aquatic environments or in riparian/streamside zones. Proper implementation and application of the products would be expected to have no significant impacts to surface water quality when administered by qualified professionals and as directed by the product label.
Historic and Cultural Resources	Vegetation management would not occur in areas with sensitive cultural resources.	Herbicide use would occur in areas with sensitive cultural resources. Herbicide would be applied manually, with backpack sprayers or with hoses stretched from outside areas of potential effect, to ensure these resources are not adversely affected.

Health & Safety	TVA would continue to work with TWRA to address hazards in the reservoir and continue its mechanical vegetation management activities to address successional vegetation growth in many areas of the reservoir. Because not all vegetation would be removed prior to normal operations resuming, boating/recreation access would continue to be limited and restricted in areas of untreated vegetation in the short term, which represents a major impact to boaters and some property owners.	Herbicides would be applied in a manner to ensure employee safety. Applicators must be trained, licensed, and follow manufacturers' label instructions, EPA guidelines, and respective state regulations and laws. Because herbicide use would result in vegetation removal or inhibited growth in more areas than the No Action Alternative, there would be fewer safety and navigation hazards once normal operations resume compared to the No Action Alternative. Because not all vegetation would be removed prior to normal operations resuming, boating/recreation access would continue to be limited and restricted in areas of untreated vegetation in the short term, which represents a major impact to boaters and some property owners. TVA would continue to work with TWRA to address hazards in the reservoir.

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CHAPTER 3

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the existing environmental conditions of the environmental resources that may be affected if the Proposed Action or the No Action Alternative is implemented. The chapter also describes the potential environmental effects that could result from implementing the No Action Alternative and Proposed Action. As noted above, the analysis of impacts focuses on resources affected by the changes proposed by TVA and is intended to supplement the environmental analyses of the 2016 Final EA.

3.1 TERRESTRIAL ECOLOGY

3.1.1 Affected Environment

In the 2016 Final EA, TVA provided information about the terrestrial species and habitat occurring within the Boone Reservoir project area. As described therein, lowland communities are those adjacent to Boone Reservoir and include bottomland hardwood forests and wetland communities (e.g., scrub/shrub wetlands and exposed mudflats). Bottomland hardwood forests occur in floodplains above and below the dam, as well as along terraces, natural levees, and back-lying sloughs. Dominant tree species found in these forests include black gum, red maple, river birch (*Betula nigra*), sycamore (*Platanus occidentalis*), sweet gum, tulip poplar, water oak (*Quercus nigra*), and willow oak (Q. phellos). Communities closer to water may support trees that are more adapted to wetter soils, such as bald cypress (*Taxodium distichum*), black gum (*Nyssa sylvatica*), black willow (*Salix nigra*), box elder (*Acer negundo*), cottonwood (*Populus deltoides*), and green ash (*Fraxinus pennsylvanica*), among others (TVA 2010). Lowland communities attract shorebirds and waterfowl and can support a variety of other common birds.

The vegetation that has grown within the Boone Reservoir since 2015 is primarily these bottomland and wetland habitats, although, given the dewatering of these areas, some gradual succession to more upland communities has occurred. Upland habitat includes hardwood and mixed evergreen-deciduous forest types, which accounts for 84 percent of the TVA Boone Unit (TVA 2002), as discussed in the 2016 EA. Common tree species that have grown in the reservoir bottom during the drawdown period include sycamore, paulownia, black locust, and black willow.

Habitat for terrestrial animal wildlife in the action areas proposed for herbicide treatment around Boone Reservoir are generally comprised of dense, early successional habitats (e.g. young forests). These areas include young trees that were not bushogged in previous years due to difficulty in accessing the areas or sensitive resources nearby. Approximately 600 acres of this is habitat that has the potential to be treated with approved herbicides. Common species of wildlife that may utilize these lowland areas are described in the Boone Dam Seepage Remediation EA and include white-tailed deer (*Odocoileus virginianus*), raccoon, beaver, eastern chipmunk (*Tamias striatus*), stripped skunk (Mephitis mephitis), white-footed mouse (*Peromyscus leucopus*), southern flying squirrel (*Glaucomys volans*), and gray squirrel (*Sciurus*

carolinensis) (TVA 2002, TVA 2010). As discussed in the 2016 EA, common reptiles and woodland salamanders may also be present.

Review of the TVA Regional Natural Heritage database in March 2020 indicated that no additional caves or other unique or important terrestrial habitats were identified within three miles of the project area than those previously addressed in the Boone Dam Seepage Remediation EA. One new osprey nest was recovered from this same database search. The nest is approximately 0.8 miles from proposed herbicide treatment areas.

Review of the US Fish and Wildlife Service's (USFWS) Information for Planning and Consultation (IPaC) resulted in 13 additional migratory birds of conservation concern that have the potential to occur in the project area and that were not previously reviewed in the Boone Dam Seepage Remediation EA: bald eagle (*Haliaeetus leucocephalus*), black-billed cuckoo (*Coccyzus erythropthalmus*), bobolink (*Dolichonyx oryzivorus*), Canada warbler (*Cardellina canadensis*), cerulean warbler (*Dendroica cerulea*), golden eagle (*Aquila chrysaetos*), golden-winged warbler (*Vermivora chrysoptera*), Kentucky warbler (*Oporornis formosus*), prairie warbler (*Dendroica discolor*), red-headed woodpecker (*Melanerpes erythrocephalus*), rusty blackbird (*Euphagus carolinus*), wood thrush (*Hylocichla mustelina*), and yellow-bellied sapsucker (*sphyrapicus varius*). Of these species, vegetated areas to be treated with herbicide may provide habitat for golden-winged warbler, Kentucky warbler, prairie warbler, and rusty blackbird.

3.1.2 Environmental Consequences

3.1.2.1 No Action Alternative

Under the No Action Alternative, TVA's vegetation management actions would be as described in the 2016 Final EA and would include mechanical treatments only. The impacts associated with the No Action Alternative would be the same as those analyzed in Chapter 3.6.2.2 of the 2016 Final EA for the original proposal. All vegetation not treated by mechanical means would remain in place and continue to grow. Terrestrial wildlife communities would continue to use these areas until reservoir levels are returned to normal levels. No significant impacts to wildlife would occur as a result of Alternative A.

3.1.2.2 Proposed Action

Under Alternative B, up to approximately 600 acres of Boone Reservoir would be treated with an herbicide mixture beginning in June 2020. Herbicide use would directly and adversely affect treated vegetation, resulting in inhibited growth or mortality, as intended. Use of herbicide would occur within approximately 500 acres that are inaccessible to machinery. TVA would also apply herbicide in some areas (up to approximately 100 acres, as determined necessary) where mechanical treatments have previously occurred, to treat new growth that would occur prior to inundation of the drawdown area in 2021. As under the No Action alternative, vegetation in the drawdown zone would be inundated once normal reservoir operations resume, resulting in eventual mortality of vegetation.

The EPA has determined there are no risks of concern to terrestrial birds, mammals, and bees from Imazapyr using both acute and chronic toxicity data (EPA 2005; BPA 2000). While some mobile wildlife is expected to flush when disturbed by noises from boats or human presence, immobile young or slower moving wildlife may choose to attempt to hide in place instead. This would expose them directly to the herbicide by either direct dermal application, inhalation, or ingestion if prey or foraging material has been sprayed. Contact with Imazapyr is practically non-toxic to birds and mammals, and slightly toxic to bees, and contact with Triclopyr TEA is practically non-toxic to mammals and bees, and practically non-toxic to slightly toxic to birds (BPA 2000; EPA 1998; EPA 2005). Toxicity of Imazapyr and Triclopyr to reptiles is unknown. Direct application of Garlon®3A (44.4% triclopyr TEA salt) and technical imazapyr acid to water do not cause a significant acute toxicity hazard to bullfrog tadpoles (Trumbo and Waligora 2009). Given that the herbicides would be applied consistent with manufacturer's labels and BMPs would be applied, the potential for significant impacts to populations of these species is low. The methylated seed oil surfactant and the marker dye are practically non-toxic to terrestrial species (BPA 2000).

Of the 13 migratory birds of conservation concern identified by the U.S. Fish and Wildlife Service, vegetated areas to be treated with herbicide may provide habitat for golden-winged warbler, Kentucky warbler, prairie warbler, and rusty blackbird all of whom can utilize forest edges, dense second growth, and scrub habitat. Herbicide application is proposed from June to December of 2020, but the majority of it would occur from early summer to late summer. Rusty blackbird is only found in this region during late fall-early spring months therefore this species has a lower likelihood to be in the action area during herbicide application. However, golden-winged warbler, Kentucky warbler, and prairie warbler are present in the region spring-fall and could be nesting in the action area during the time of herbicide application. As discussed above mobile birds would be expected to flush when disturbed by noises from boats or human presence. However, eggs/nestlings would remain in place potentially exposing them directly to the herbicide mixture. Because application of either herbicide would only occur once and because Imazapyr is practically non-toxic to birds and contact with Triclopyr is practically non-toxic to slightly toxic to birds, the potential for significant impacts to migratory birds of conservation concern is low (BPA 2000; EPA 1998).

Based on the EPA's data, contact with Imazapyr should not cause adverse effects to birds, mammals, and bees (BPA 2000). Another study determined that several forms of imazapyr and triclopyr, including those proposed for use here, would not cause a significant toxicity hazard to amphibians (Trumbo and Waligora 2009). Toxicity of Imazapyr to other invertebrates and reptiles is unknown. Individual invertebrates (except bees) and reptiles that have established territories along the water in these regrowth areas could be adversely affected by Imazapyr. However, it is expected that any movement into this regrowth habitat is likely a result of relatively recent expansion/increase of existing populations. While potential mortality of individuals in these areas due to herbicide may cause decreases in numbers of local populations, these decreases are not expected to be significant as overall populations of common wildlife will remain stable across the region.

Habitat for all species of wildlife would be altered as vegetation dies. However, habitat availability in these areas is in some ways temporary as the reservoir draw up will inundate these areas in coming years. Alteration of habitat in this way may deter wildlife from nesting, foraging, or borrowing in these areas in future months resulting in fewer individuals remaining in areas to be flooded when the reservoir returns to normal summer pool levels.

The one newly reported osprey nest is a sufficient distance from any proposed herbicide treatment (0.8 miles) such that presence of boats, humans, or herbicide associated with this action would not affect this nest.

Two caves exist within 200 feet of proposed herbicide locations. TVA will restrict herbicide use within 200 feet of cave entrances to reduce the potential for herbicide inputs into sensitive cave/karst systems.

Cumulative effects of the project on common wildlife species are expected to be negligible. As noted above, TVA would continue implementing vegetation management by mechanical means until water levels are returned to normal in 2021. The removal of additional vegetation in these areas could result in cumulative impacts, particularly when the areas treated by herbicide are adjacent to those mechanically treated. Proposed actions would permanently remove existing scrub habitat for common, habituated wildlife. The future return of reservoir operations (2021) would result in a permanent loss of habitat in these areas, given that the reservoir waters would flood the areas, at least through much of the year. Suitable habitat exists in the surrounding landscape, outside of the Boone Reservoir drawdown areas.

3.2 AQUATIC ECOLOGY

3.2.1 Affected Environment

In the 2016 Final EA, TVA provided a description of the aquatic habitat and common aquatic species in Boone Reservoir (see Section 3.7.1). Therein, TVA explains that habitat in the near-shore (littoral) zone is the most productive region of the reservoir, and that the availability of submerged cover (e.g., submersed vegetation, rocks, logs and brush) within this zone is especially important to many fish species. Shoreline land use can greatly influence the quality and productivity of the littoral habitat. For example, undeveloped shorelines often are accompanied by a wooded riparian zone and so fallen trees and brushy cover tend to be more widely present. In the past, TVA has rated the shoreline habitat in Boone Reservoir as “fair” during Shoreline Aquatic Habitat Index surveys.

After Boone Reservoir water levels were lowered in 2015 by TVA, the littoral habitat area of the reservoir was dewatered and aquatic species reliant on the littoral habitat were displaced to the new shoreline. Shoreline vegetation adjacent to the reservoir contributes to the function of littoral habitat by providing cover and shading reservoir waters. Since 2015, TVA reservoir operations have been relatively consistent, allowing the establishment of a new littoral habitat area. As discussed in the 2016 EA, new littoral habitat forms in areas where the bottom

topography is amenable along the exposed reservoir bottom. The newly developed littoral habitat would not be subjected to the annual cycle of winter drawdown.

3.2.2 Environmental Consequences

3.2.2.1 No Action Alternative

Under the No Action alternative, TVA would continue to remove vegetation from areas of the reservoir drawdown zone with mechanical equipment. The littoral habitat in these areas would be directly impacted, as vegetation is removed and equipment traverses the terrain. Shoreline vegetation that has not been treated or removed since the 2015 drawdown would continue to grow; in these areas of shoreline, aquatic species that rely on the littoral habitat zone would continue to benefit from the vegetation growth.

3.2.2.2 Proposed Action

Under TVA's Proposed Action, TVA would use herbicides to treat vegetation growth within a portion of Boone Reservoir. Because additional areas with vegetation would be treated under the Proposed Action, there would be more littoral habitat impacted under the Proposed Action than the No Action Alternative.

Under the proposal, TVA would use the herbicide Imazapyr and Triclopyr with a surfactant and a marker dye. TVA selected this herbicide mixture for treatments of areas within the Boone Reservoir drawdown area because the two herbicides have been approved for aquatic use by the EPA. Imazapyr, Triclopyr, the surfactant, and marker dye are practically non-toxic (the EPA's lowest toxicity category) to fish and invertebrates (EPA 1998; BPA 2000; EPA 2005). While TVA does not propose to treat aquatic plant species, using herbicides approved for aquatic uses would reduce the potential effects on aquatic ecosystems from treating shoreline vegetation adjacent to or near reservoir waters, resulting from spray drift or surface runoff. The herbicide would be applied according to TVA's standard procedures as well as adherence to guidance on the manufacturers' label.

Treatments with herbicides near surface waters pose potential risks to non-target aquatic organisms. Those risks include loss of spawning and feeding habitat, and fish, invertebrate, and non-target plant kills. Oftentimes, mixtures of two or more herbicides with surfactants are applied. In those cases, risk uncertainties increase since toxic adverse effects can be antagonistic, additive, or synergistic. In order to reduce toxicity risks to the fullest extent possible, appropriate herbicides were carefully selected and treatment acreage was minimized. The selected herbicides include products with active ingredients Imazapyr and Triclopyr. Along with adherence to BMPs, no significant impacts due to aquatic toxicity are expected.

The use of heavy equipment such as UTVs on land to assist in herbicide applications has the potential to result in some rutting or increase erosion, increasing the potential for soil erosion that may result in localized and minor sedimentation of reservoir waters, particularly during storm events, adversely affecting aquatic ecosystems.

TVA's removal of vegetation by mechanical means in other portions of the reservoir result in greater cumulative adverse impacts to littoral habitat of the reservoir. The effects on the habitat would be temporary, however, given that TVA plans to return reservoir operations to normal and these habitats would be inundated by reservoir waters. Future reservoir operations would allow these areas to return to a more normal condition, influenced primarily by normal reservoir operations by TVA.

3.3 THREATENED AND ENDANGERED SPECIES

3.3.1 Affected Environment

As discussed in the 2016 EA, no federally protected plant species are known to occur within a 5-mile radius of the Boone Reservoir. Seven species considered sensitive by the State of Tennessee have been recorded within the 5-mile radius. Two of these species, the American bayberry (*Berberis canadensis*) and piratebush (*Buckleya distichophylla*), are historic records dating back to before Boone Dam was constructed (TVA 2015b). American bayberry grows best on rocky slopes and was last observed by TVA in 1934 on a bluff near the Highway 37 Bridge crossing in the upper South Holston arm of the reservoir. Piratebush also prefers rocky slope habitats and was last recorded by TVA in 1949 on a bluff overlooking the Watauga River about three miles upstream from the confluence with the South Fork Holston River. More recent records include three state-threatened species: Carolina pink (*Silene caroliniana ssp. pensylvanica*), American fly-honeysuckle (*Lonicera canadensis*), and butternut (*Juglans cinerea*); as well as two species of special concern, northern white cedar (*Thuja occidentalis*) and branching whitlow grass (*Draba ramosissima*). These species are most often associated with rocky habitats or along wooded slopes, with all but butternut recorded at multiple locations within 5 miles of the reservoir (TVA 2016).

No federally protected aquatic species have been recorded within Boone Reservoir. TVA surveys and data indicate that one federally endangered terrestrial species (Gray bat, *Myotis grisescens),* one state threatened species and two rare species identified by the State of Tennessee occur within 3 miles of Boone Reservoir. Additionally, five species that have not been documented by TVA could possibly exist in the Boone Unit, including the federally listed Indiana bat (listed endangered) and northern long-eared bat (listed threatened). Additional information about these species are included in section 3.8 of the 2016 EA.

A review of the terrestrial animal species in the TVA Regional Heritage database in March 2020 result in records of one additional state-listed species (Virginia rail) within three miles of the project footprint. Records of two new bald eagle nests also came out of this review. Both bald eagle nests are active as of May 2020 and one of these nests is immediately adjacent to an area proposed for herbicide treatment. Records of one additional common barn owl were also recovered. This nest is approximately 370 feet from proposed actions but the record is from 1969. Descriptions of the Virginia rail's habitat requirements are below. Descriptions of habitat requirements for previously identified terrestrial animal species of concern can be found in the Boone Dam Seepage Remediation EA. Since the 2015 TVA database review some species

have had regulatory changes made to their state status or ranks, including barn owl, common raven, northern long-eared bat, and southeastern shrew. Terrestrial animal species of conservation concern resulting from the 2015 and 2020 TVA database searches and updated statuses for this SEA are combined in Table 3-1.

Table 3-1. Federally listed terrestrial animal species reported from Sullivan and Washington Counties, Tennessee and other species of conservation concern documented within three miles of Boone Dam Remediation and Reservoir Drawdown Herbicide Use for Vegetation Management Supplemental Environmental Assessment [1]

Common Name	Scientific Name	Status[2]	
		Federal	State (Rank[3])
Birds			
Bald eagle	*Haliaeetus leucocephalus*	DM	D(S3)
Barn owl	*Tyto alba*	--	--(S3)
Common raven	*Corvus corax*	--	--(S2)
Virginia rail	*Rallus limicola*	--	--(S1B,S3N)
Mammals			
Gray bat	*Myotis grisescens*	LE	E(S2)
Indiana bat[4]	*Myotis sodalis*	LE	E(S1)
Northern long-eared bat[5]	*Myotis septentrionalis*	LT	T(S1S2)
Least weasel	*Mustela nivalis*	--	--(S2)
Southern bog lemming	*Synaptomys cooperi*	--	D(S4)
Southeastern shrew	*Sorex longirostris*	--	--(S4)

[1] Source: TVA Regional Natural Heritage Database, extracted 03/06/2020; USFWS Information for Planning and Conservation (IPaC) resource list (https://ecos.fws.gov/ipac/), accessed 03/07/2020.

[2] Status Codes: D = Deemed in Need of Management; DM = Delisted but still being Monitored; E = Endangered; LE = Listed Endangered; LT = Listed Threatened; T = Listed Threatened.

[3] State Ranks: S1 = Critically Imperiled; S2 = Imperiled; S3 = Rare; S4 = Apparently Secure; S#B = status of breeding population

[4] Federally listed species not known from Sullivan or Washington Counties, but whose range overlaps the action area.

[5] Federally listed species known from Sullivan and Washington Counties, but not within three miles of the action area.

Virginia rail use shallow, emergent wetlands with emergent vegetation such as cattails, reeds, and deep grasses. They can use wetlands as small as those found along roadside ditches or as large as those along lakes and reservoirs (NatureServe 2020). The one record of this species that was recovered from the TVA database search is from a wetland used during migration, approximately 0.8 miles from proposed actions. Suitable habitat for this species likely exists in coves around Boone Reservoir and could occur in areas proposed for herbicide treatment.

3.3.2 Environmental Consequences

3.3.2.1 No Action Alternative

Under the No Action Alternative, TVA would continue to implement vegetation management utilizing mechanical means, as described in the 2016 EA. Herbicides would not be utilized. All vegetation would remain in place and continue to grow. No direct, indirect, or cumulative impacts to threatened or endangered terrestrial species would occur as a result of Alternative A.

3.3.2.2 Proposed Action

Under Alternative B, up to 600 acres of Boone Reservoir would be treated with herbicide from April through December of 2020. While maps show large sections proposed for herbicide, use of herbicide within these areas would be restricted to areas where large woody plants (trees) are actually growing. TVA would also apply herbicide in some areas where mechanical treatments have previously occurred, to reduce new growth that would occur prior to inundation of the drawdown area. The EPA has determined there are no risks of concern to terrestrial birds, mammals, and bees from Imazapyr using both acute and chronic toxicity data (EPA 2005). As noted above, Triclopyr TEA is practically non-toxic to mammals and bees, and practically non-toxic to slightly toxic to birds (BPA 2000; EPA 1998; EPA 2005). The surfactant and marker dye are also practically non-toxic to terrestrial and aquatic species (BPA 2000).

Areas proposed for herbicide treatment have dense woody stems/young trees that are in danger of becoming navigation hazards after the reservoir returns to normal summer pool levels. In areas where trees have grown the largest, the dominant species are sycamore, paulownia, black locust, and black willows. While many trees are small (3 inches in diameter or less), a few trees have grown up to 8 inches in diameter. Typically, these larger trees appear to be sycamores.

Trees of this size and age are not large enough to sustain nests of bald eagles and do not have holes large enough to house barn owls. Dense scrub and open water are not suitable foraging habits for barn owl. As mentioned above, the new record of this species that appeared in recent database searches is a historical record from 1969 and is no longer extant. With no potential for nesting in the action area and lack of suitable foraging habitat, it is not expected that barn owls would be impacted by the proposed actions. While bald eagles do forage over Boone Reservoir, the EPA has determined that Imazapyr and Triclopyr cause no risk of concern for fish like those upon which bald eagles might forage. Since the Boone Dam Seepage Remediation EA was published, two new records of bald eagle nests have been documented in Sullivan and Washington Counties. One of these nests is immediately adjacent to an area initially proposed for herbicide use. In order to comply with the National Bald Eagle Management Guidelines (USFWS 2007), all potentially disturbing activities would be avoided within 660 feet of active bald eagle nests. Both new nests were determined to be active in March 2020. To address potential impacts to the nests, TVA would avoid implementing any activities within 660 feet of nests while eagles are still actively using them.

Emergent wetlands with emergent vegetation such as cattails, reeds, and grasses would not be targeted for herbicide treatment. Therefore, it is not expected that Virginia rail would come in direct contact with the herbicide. No suitable habitat for common raven exists in the areas proposed for herbicide treatment. Due to the lack of suitable habitat to be impacted, TVA has determined that populations of Virginia rails and common ravens would not be significantly impacted by the proposed actions.

Suitable habitat for least weasel, southern bog lemming, and southeastern shrew does occur in the action area. The only record of least weasel in the area is from a specimen captured by a cat in 1971. Similarly, the only record of a southeastern shrew is also from 1971. The record of southern bog lemming from the area is even older (1964). While this does not negate the potential for these species to occur in the area, it does suggest they are not commonly found in the area and are less likely to be in the action area at the time of proposed actions than other common species. Should individuals occur in the action area at the time of herbicide application, most individuals of these species are expected to flush when disturbed by noises from boats or human presence. However, some individuals including immobile young may choose to attempt to hide in place instead. This would expose them directly to the herbicide by either direct dermal application, inhalation, or ingestion if prey or foraging material has been sprayed. Based on the EPA's data, contact with Imazapyr and Triclopyr should not cause adverse effects to mammals (EPA 1998; EPA 2005). Following application of herbicide, habitat for these species would be altered as vegetation dies. However, habitat availability in these areas is in some ways temporary as the reservoir draw up will inundate these areas in coming years. Alteration of habitat in this way may deter these species from nesting, foraging, or borrowing in these areas in future months resulting in fewer individuals remaining in areas to be flooded when the reservoir returns to normal summer pool levels. Based on EPA toxicity results and the rarity of the species in the area, TVA has determined that the proposed actions are not expected to significantly impact populations of least weasel, southern bog lemming, and southeastern shrew.

Areas proposed for herbicide treatment do not offer suitable summer roosting habitat for Indiana bat or northern long-eared bat. Trees are not large enough, old enough, and of the typical species to have suitable cracks, crevices, or suitable exfoliating bark. However, these areas may provide suitable foraging habitat for both species. Boone Reservoir itself is also part of the action area, as herbicide would be applied at the edge of the water. The reservoir is used as foraging habitat for both Indiana bat and northern long-eared bat, as well as gray bat. As mentioned above, based on the EPA's data, contact with Imazapyr and Triclopyr should not cause adverse effects to mammals (EPA 1998; EPA 2005). Studies have also indicated that Imazapyr does not bio accumulate in mammalian systems (Tu et al. 2004).

A number of activities associated with the proposed project were addressed in TVA's programmatic consultation with the U.S. Fish and Wildlife Service on routine actions and federally listed bats in accordance with ESA Section 7(a)(2) and completed in April 2018. For those activities with potential to affect bats, TVA committed to implementing specific conservation measures. These activities and associated conservation measures are identified in Attachment B (TVA Bat Strategy Project Screening Form), and TVA would require BMPs

when storing or resupplying chemicals or fuels and servicing vehicles along shoreline areas and riparian and streamside zones to prevent these items from reaching a watercourse. In addition, TVA would avoid use of herbicide within 200 feet of two cave entrances to reduce the potential for herbicide inputs into sensitive cave/karst systems. There would be no clearing of vegetation within a 200-foot radius of documented caves. With the implementation of the identified conservation measures, proposed actions would not significantly impact gray bat, Indiana bat, or northern long-eared bat.

3.4 SURFACE WATER RESOURCES

Since TVA issued the 2016 Final EA, TVA and its construction contractor have developed more specific information relating to the management of water during construction of the cutoff wall. Impacts to surface water quality were addressed in the Final EA, Section 3.3.2.

3.4.1 Affected Environment

As stated in the January 2016 EA, the Boone Project is located within two 8-digit Hydrologic Unit Code (HUC) watersheds: HUC 06010102 (South Fork Holston) and HUC 06010103 (Watauga). Boone Dam impounds portions of the South Fork Holston and Watauga Rivers. TVA operates two dams upstream of Boone Reservoir on the Watauga River. Boone Dam is approximately 30 miles downstream from South Holston Dam, 25 miles downstream from Wilbur Dam (Watauga River), and 10 miles upstream from Ft. Patrick Henry (FPH) Dam.

Boone Reservoir is operated by TVA to meet a variety of purposes, including power production, flood control, recreation, water supply management, water quality, and aquatic habitat. These purposes are consistent with the designated uses assigned by the State of Tennessee for this portion of the South Fork Holston River, including domestic water supply, industrial water supply, fish and aquatic life, trout stream, recreation, livestock watering and wildlife, and irrigation. (TDEC 2013).

Precipitation in the form of rain and snow falling directly on surface outcrops of the aquifer units provides the primary water recharge for the Valley and Ridge aquifer. Average annual precipitation in eastern Tennessee is approximately 80 inches. Average annual runoff in the area is 30 inches, a portion of which recharges the shallow aquifers. Annual groundwater recharge is estimated at 13 inches in Tennessee, where precipitation and ground permeability is high.

Boone Reservoir supports only one permitted water withdrawal. TVA permitted Bristol-Bluff City's water withdrawal in 1998, before TVA Section 26a permits included a maximum withdrawal volume. Bristol-Bluff City's application package to TVA states that the intake would support a new water treatment plant that was initially capable of treating 2.0 million gallons per day (mgd) and expandable to 3.0 in the future. The most recent withdrawal data from 2010 state reporting data show that Bristol-Bluff City withdrew an annual average of 0.85 mgd. TVA does not have minimum operating levels for this withdrawal. In addition, TVA does not guarantee any level of water quality or elevation, and the permittee is responsible for ensuring that the intake is low enough to stay underwater during droughts or drawdowns.

There are no TVA-permitted surface water intakes between Boone Dam and FPH Dam. However, Boone is operated in part to meet the 800-cfs required minimum flow downstream of FPH, which is required to meet the water supply needs at the Eastman Chemical Company facility in Kingsport, Tennessee.

The TDEC has established water quality standards and designated uses for streams and lakes across the state, and issues periodic reports on waterbodies not meeting these standards and uses. Generally, characteristics considered during the assessments are temperature, dissolved oxygen (DO), pH, nutrients, sedimentation, siltation, loss of habitat and contaminants. As part of this program, TDEC issues a list of impaired waters called the "303d list," referring to Section 303d of the federal Clean Water Act. Waterbodies are added to this list when they do not support all designated uses because of water quality issues. As noted above, TDEC classifies the South Fork Holston and Watauga Rivers in Boone Reservoir for domestic water supply, industrial water supply, fish and aquatic life, trout stream recreation, livestock watering and wildlife, and irrigation (TDEC 2013). TDEC classifications for South Fork Holston and Watauga Rivers in Boone Reservoir have not changed since the 2016 EA.

The 2018 303d list included impaired segments within the South Fork Holston watershed, including Boone Reservoir and the South Fork Holston River. Boone Reservoir also is listed for elevated concentrations of polychlorinated biphenyls and chlordane in the sediments. These levels have resulted in a fish consumption advisory for the reservoir (TDEC 2018). Other segments of the South Fork Holston River are listed due to elevated levels of mercury in fish or habitat loss due to stream flow alterations and thermal alterations. The elevated mercury levels are attributed to atmospheric deposition, while the stream flow alterations and thermal modifications are attributed to TVA impoundments.

3.4.2 Environmental Consequences

3.4.2.1 No Action Alternative

Under the No Action alternative, herbicides would not be used in the drawdown areas of the reservoir and TVA would continue to implement vegetation control through the current management program. This current management program for these areas in the drawdown areas would only include mechanical controls. Therefore, impacts to surface water for vegetative management would not change from current conditions. In the 2016 Final EA, section 3.3.2.2, TVA stated the seepage remediation proposal has the potential to impact surface water supply and that vegetation growth within the reservoir bottom during drawdown would reduce sedimentation of reservoir waters.

3.4.2.2 Proposed Action

Under Alternative B, up to 600 acres of Boone Reservoir would be treated with herbicides beginning in 2020. While maps show large sections proposed for herbicide, use of herbicide within these areas would be restricted to areas where large woody plants (trees) are actually growing.

Vegetative aquatic plants can have positive effects on water bodies by reducing wave action erosion on shorelines, providing a food source for aquatic fish species, and providing cover and protection for fish species. Treatment and removal of these plants reduce or eliminate these benefits. However, invasive or nuisance species can choke out more desirable vegetation species and impact the water quality of the water body and in the case of the Boone Reservoir drawdown can cause tree growth that would be detrimental to navigation and could impact boat traffic and safety.

Herbicide application control techniques involve establishing the desirable application method determined after considering the impacts on public safety, environmental safety, and the site characteristics of the area to be treated. The application techniques include a range of tools that vary in the volume and type of herbicide used and in the intensity of their application. Generally, herbicides used by TVA can be liquid, granular, pellets, or powder; can be applied aerially or by ground equipment; and may be selectively applied (spot treatment) or broadcast depending on the site requirements, species present, and condition of the vegetation. TVA is proposing to use the herbicide mixture in liquid form, applied by land by spray backpack or mounted on an UTV, or by boat, sprayed to the shoreline vegetation.

Under this alternative, UTV's would be equipped with 100-gallon spray tanks outfitted with appropriate engine-driven pumping systems, containing an herbicide solution of approximately 99 gallons of water and 1 gallon of herbicide mixture. Each UTV would also carry a hose reel with 200 feet of hose that will be "pulled" by applicators on the ground. Stationary loading and pumping sites would be positioned strategically along the water's edge to facilitate loading and spraying using containments and BMPs to minimize risk of spills. Applicators would use boomless sprayers called "Boominators" which function like booms, but are more accurate and more efficient. With more flexibility and adjustability, these sprayers can be configured to spray straight down or other configurations. Spot treatment application methods would also be utilized where feasible to reduce broadcast spraying.

Generally, improper use of herbicides to control vegetation could result in runoff, leaching or drift to streams and subsequent surface and ground water quality and aquatic impacts. Runoff of herbicides could occur with any of the herbicide application techniques listed above, however it would be minimized with the more limited application, such as spot, localized and human broadcast application. However, as stated above, TVA would use only herbicides with specific label approval for use in aquatic environments or in riparian/streamside zones within these buffer zones.

Drift of herbicides could occur when spray or pellets are carried offsite by unforeseen weather or wind conditions into adjacent streams. However it would be minimized with the more limited application, such as spot, localized and human broadcast application.

In some areas, TVA may use mechanical or heavy equipment (e.g., UTVs or boats) for herbicide application. These land based and water based equipment require the use of fuels and lubricants. Therefore there is a potential for impacts to water quality from leaks and spills that enter nearby surface waters. Additionally, land-based equipment has the ability to increase

sediment laden storm water flows by creating rills or ruts and denuded or areas of exposed soil. This can potentially alter the natural drainage course of storm water and cause temporary and/or permanent impairment to surface water quality. Heavy equipment can also compact soil, which can increase concentrated flows and make it more difficult to implement permanent stabilization. In the case of the application of the Boone Reservoir, some broadcast application is proposed. Spot treatment where possible would reduce surface water quality impacts.

Using the selected herbicides as part of vegetation maintenance activities would comply with the TDEC General Permit for Application of Pesticides, which requires a pesticide discharge management plan (PDMP) if certain thresholds are met (TDEC 2017). For herbicide use in the Boone Reservoir area, a notice of intent would be submitted to TDEC prior to treatment of previously untreated areas.

Best management practices would be utilized to reduce impacts to non-target aquatic species and surface and groundwater resources. BMPs that minimize impacts to these resources include but are not limited to the following:

- In areas requiring chemical treatment, only EPA-registered and TVA approved herbicides would be used in accordance with label directions designed in part to restrict applications near receiving waters and to prevent unacceptable aquatic impacts.
- A certified/qualified individual should apply these products and detailed records should be kept of all applications, per general permit requirements.
- Visual observations after the application of herbicides/pesticides should be conducted to ensure that these applications did not cause unanticipated impacts on non-target organisms, species or water quality.
- The use of these projects may be limited in areas where there is a water intake. Please see specific label directions for application and distance from water intake requirements.
- Spraying would not be conducted during inclement weather that would adversely impact efficacy and would be conducted to minimize unintentional spry drift or storm water discharges.
- Care would be taken to minimize product spillage or secondary containment would be utilized where applicable.

Treatments with herbicides near surface waters pose potential risks to non-target aquatic organisms. Those risks include loss of spawning and feeding habitat, and fish, invertebrate, and non-target plant kills. Often, mixtures of two or more herbicides with surfactants are applied. In those cases, risk uncertainties increase since toxic adverse effects can be antagonistic, additive, or synergistic. In order to reduce toxicity risks to the fullest extent possible, appropriate herbicides were carefully selected and treatment acreage was minimized. The selected herbicides include products with active ingredients Imazapyr and Triclopyr. Along with adherence to BMPs, no significant impacts due to aquatic toxicity are expected.

Additionally, sinkholes and surface water bodies are surface water to groundwater aquatic features, which can sustain impacts due to degraded water quality from chemical and solid waste run-off. TVA generally protects these features by treating them just as they would a

stream and providing a buffer zone to adequately protect them. Only herbicide formulations that are noted as safe for caves/karst features should be used near these features. Proper implementation and application of these products may result in minor impacts to surface water. As described above for groundwater, beneficial indirect impacts to onsite surface water would be expected to result from the change in land use.

Proper implementation and application of these products would be expected to have no significant impacts to surface water quality when administered by qualified professionals and as directed by the product label. No cumulative impacts would be expected.

3.5 HISTORIC AND CULTURAL RESOURCES

3.5.1 Affected Environment

In the 2016 EA, TVA discussed the cultural resources that are known to be present in areas of the reservoir that have been exposed during the drawdown of the reservoir. Multiple archaeological surveys have been conducted within the current reservoir "drawdown zone" (Pietak and Holland 1998; Watkins 2014; S.D. Dean personal communication, 2014). The Pietak and Holland (1998) and Watkins (2014) surveys identified 67 archaeological sites within the drawdown zone. Of those sites, TVA determined, in consultation with the SHPO, that 31 are ineligible for the National Register for Historic Places (NRHP) and 36 are potentially eligible. Since early 2016, additional surveys have identified almost 100 additional archaeological sites within the drawdown zone.

3.5.2 Environmental Consequences

Section 106 of the NHPA requires federal agencies to consult with the respective SHPO, federally recognized Indian tribes, and other interested parties when proposed federal actions could affect historic and cultural resources, including archaeological resources, which are also protected under the Archaeological Resources Protection Act, and the Native American Graves Protection and Repatriation Act, in addition to the NHPA. Under both alternatives, due to the complexity of the undertaking, and pursuant to 36 CFR Part 800.14(b), TVA would continue to implement a Programmatic Agreement (PA) established in December 2015 with the Tennessee SHPO that stipulates how the anticipated adverse effects of the alternative would be resolved and establishes a process for phased identification, evaluation, and treatment of historic properties for unanticipated adverse effects.

For all sites in the drawdown zone that TVA and SHPO agree are NRHP-eligible or potentially NRHP-eligible, TVA would implement the same avoidance measures as it would under the Proposed Action during the 5 to 7 year drawdown duration. TVA would:

- Increase TVA Police patrols on TVA land, with a focus on the NRHP-eligible and potentially eligible sites;
- Monitor eligible/potentially eligible archaeological sites on both TVA land and private property so that increases in looting frequency and/or accelerated erosion can be noted and appropriate actions can be taken; and

- Hydro-seed archaeological sites (for erosion control) where looting and/or erosion are found to be an adverse effect.

Prior to beginning vegetation management activities, TVA also established zones within the Boone Reservoir drawdown area in which heavy equipment used to clear vegetation would not be allowed, to ensure that sensitive cultural resources would not be destroyed or disturbed.

3.5.2.1 No Action Alternative

In the 2016 EA, TVA analyzed the potential impacts associated with this alternative. This alternative would have no additional direct, indirect or cumulative effect to historic or archaeological properties. Current vegetation management would continue, and TVA would not allow equipment that is used to clear vegetation within areas where there are sensitive cultural resources.

3.5.2.2 Proposed Action

Under the Proposed Action, TVA would apply herbicide in areas with successional vegetation that is present in areas known to have sensitive cultural resources. Only some areas with sensitive cultural resources would be treated by herbicide: those areas in which vegetation has grown or may grow to a height that could result in a safety or navigation issue under reservoir operations. As discussed in the 2016 EA, vegetation growth occurring in areas where there are sensitive cultural resources is considered beneficial to the protection of the cultural sites, due to the reduction of soil erosion. The vegetation also makes it difficult for the public or artifact looters to locate sites. These benefits may be reduced in areas treated. However, because herbicide use, unlike mechanical treatment, would not entirely remove the vegetation in these places, and herbicide may only inhibit new vegetation growth, these benefits may not be reduced.

As noted in the description of the Proposed Action, TVA would continue to avoid the use of heavy equipment to treat vegetation in these areas to minimize soil disturbance and protect sensitive cultural resources present in the reservoir bottom. In these areas, personnel using backpack sprayers would apply herbicides or from boats on the reservoir waters; UTVs would not be used to treat these areas. Because of these measures, there is little potential for these resources to be damaged. Therefore, this alternative is unlikely to result in any adverse effects.

3.6 HEALTH AND SAFETY

3.6.1 Affected Environment

It is TVA's policy that employees and contractors have a site-specific health and safety plan in place prior to conducting vegetation management activities at TVA properties. The contractor site-specific health and safety plans address the hazards and controls as well as contractor coordination for various vegetation management tasks. A health and safety plan also would be required for workers responsible for operations after vegetation management is complete. The intent of the TVA safety program is to ensure that a safety management system is in place that

provides TVA employees and contract employees the opportunity to actively participate in hazard recognition and prevention of job-related safety and health hazards.

TVA continues to implement Interim Operations of Boone Reservoir with water levels below reservoir water levels during fall and winter associated with Normal Operations. The lowered water level exposes some subsurface and/or surface hazards that were not a problem at higher water levels. These hazards include tree trunks, boulders, unusually shallow areas, and other objects that have accumulated at the bottom of the reservoir. These hazards negatively affect recreational public safety, but the negative impact has diminished over time as boaters became aware of the location and nature of these hazards.

Buoy markers and barricade floats deployed on Boone Reservoir designate areas of potential hazards to recreational users and TVA continues to work with TWRA to mark any additional hazards in the reservoir that pose a threat to the health and safety of boaters. As previously discussed, vegetation growing in the reservoir bottom since 2015 has matured such that in many areas trees are maturing to heights that may pose safety and navigation issues once reservoir operations return to normal.

3.6.1.1 No Action Alternative

TVA would continue to implement the vegetation management actions addressed in the 2016 EA. The potential impacts associated with the No Action Alternative have previously been analyzed by TVA in the 2016 EA. TVA would continue to work with TWRA to address hazards in the reservoir and continue its mechanical vegetation management activities to address successional vegetation growth in many areas of the reservoir. As stated in the 2016 EA, vegetation management actions on the exposed reservoir bottom would not be intended to eliminate all vegetation in the reservoir.

As noted above, many areas are inaccessible or difficult to treat with mechanical treatments. In these areas, it is likely that mature vegetation that is untreated would continue to be hazardous or restrict navigation once reservoir water levels are returned to normal. This would be most likely closer to the shoreline and in reservoir coves (rather than in the main channel), where vegetation growth would continue to limit or restrict boating/recreation access in the short term (e.g., until vegetation dies off from being inundated by normal water levels). The continued limitations would be a major impact to boaters and affected property owners in these areas (TVA 2016).

3.6.1.2 Proposed Action

Under this alternative, herbicide use would be applied to additional areas of the reservoir drawdown zone to control undesirable or invasive species and inhibit resprouting or growth. With more areas being treated than under the No Action alternative, there would be fewer safety and navigation hazards after water levels return to normal compared to the No Action alternative. However, similar to the No Action alternative, some mature vegetation would not be treated prior to return of water levels and some hazards and navigation issues would result. Hazards would be more likely closer to the shoreline and in reservoir coves, rather than in the

main channel. To reduce the risk to boaters, TVA would continue to coordinate with TWRA to address safety and navigation on the reservoir. This coordination would include providing notification and information to the public of potential hazards that may be present in the reservoir when TVA raises water levels. TVA would provide information to the public through a variety of media, including through public outreach, ongoing discussions with stakeholders, social media, and direct communications with area residents and those that recreate on Boone Reservoir. Once water levels are raised, TVA would assist TWRA in identifying hazards and navigation concerns.

Boating and recreation access would continue to be limited and restricted in these areas in the short term, until vegetation that is inundated dies off. The inability to access these areas would represent a major impact to property owners in the vicinity that would not have reservoir access through the areas to open waters of the reservoir. The temporary economic and recreation impacts to property owners that were discussed in Sections 3.11.2 and 3.12.2 of the 2016 EA would continue in these areas for an additional period (TVA 2016). Ongoing TVA activities to remove vegetation mechanically would result in a cumulative decrease in such impacts, as would ongoing efforts conducted by private property owners and non-TVA entities to reduce the amount of vegetation in the reservoir bottom.

The selected herbicide mixture would be applied in a manner to ensure employee/contractor safety. TVA routinely uses herbicides during its operations, including transmission ROW maintenance, along with mechanical mowing and hand clearing, as an integrated form of vegetation management. TVA has experience applying herbicides by ground equipment or aerially and has applied liquid, granular, pellets, or powder forms. Under the proposed action, an herbicide mixture would be applied either from a boat on reservoir waters or from land with a sprayer carried by personnel or mounted on a UTV. All applicators must be trained, licensed, and follow manufacturers' label instructions, EPA guidelines, and respective state regulations and laws. The use of machinery (e.g., boats, UTVs) for herbicide application could involve the potential impacts described for mechanical methods.

The main potential risk to worker or public safety associated with the use of herbicide methods is exposure to the compounds (herbicides, carriers, dyes, and adjuvants). The primary concern with herbicides is their potential impacts to workers or the public resulting from exposure to active ingredients, adjuvants, and carriers through the skin, by inhalation, or by swallowing. If application is conducted according to safety protocols, the use of Imazapyr does not pose any substantial risk to humans and Triclopyr does not pose unreasonable risks of adverse effects to humans. (SERA 2011; EPA 1998). In a 2019 analysis, TVA found that Triclopyr poses a potential low risk to workers engaged in broadcast hydraulic spray applications under average exposure scenarios (TVA 2019b). The methylated seed oil surfactant and the marker dye are practically non-toxic to humans (BPA 2000).

Herbicides are designed to target biochemical processes, such as photosynthesis, that are unique to plants. Thus, they typically are not acutely toxic to humans. Spills and leaks are inherent risks when using chemicals. Herbicides may drift, run-off, or leach into waterbodies or

groundwater, thereby representing potential for secondary exposure to humans. TVA uses BMPs to minimize transport of herbicides to sensitive environmental resources that may represent a potential for secondary exposure pathways.

To address safety, TVA BMPs and safety guidelines for herbicide application include:

- Herbicide kick-off meeting is held with all herbicide contractor applicator employees before any work is started to address the following topics:
  - Chain of command between TVA and applicator when problems arise.
  - Proper use of equipment and inspection of equipment to ensure proper operation.
- To minimize soil disturbance and protect areas where sensitive cultural resources are present in the reservoir bottom, TVA would continue to avoid the use of heavy equipment to treat vegetation in these areas. Herbicides would be applied by personnel using backpack sprayers or pulling hoses from nearby UTVs or boats on the reservoir waters.
- Proper labeling of herbicide containers and availability of safety data sheets for all active chemicals used on a particular job site.
- Precautions used (restrictions) in herbicide application in proximity to crops, gardens, livestock operations, and environmentally sensitive areas.
- Incorporation of random safety and equipment checks to ensure public safety.
- All application equipment would be rinsed at the last treatment site of the day prior to the equipment being removed from the reservoir or upon completion of vegetation treatments from the shoreline. Similarly, all herbicide containers would be appropriately disposed of.

As discussed in TVA's Transmission System Vegetation Management Final Environmental Impact Statement (TVA 2019b), the EPA classifies products containing Imazapyr as category III (Low Toxicity). Imazypyr has low toxicity if individuals get residues on their skin and very low toxicity if it is eaten or inhaled. Imazapyr is considered not likely to be a human carcinogen by EPA. Imazapyr is expected to pose negligible potential risks of adverse non-cancer effects to workers and the public under conditions of average and maximum exposure. Imazapyr is not regulated as a carcinogen (WSDOT 2018). Triclopyr TEA is considered slightly toxic by oral (Toxicity Category III) and dermal (Toxicity Category III) routes of exposure, and practically non-toxic by inhalation (Toxicity Category IV) and do not cause dermal irritation. The EPA has classified triclopyr as a Group D chemical (not classifiable as to human carcinogenicity), and there is insufficient evidence to list triclopyr as a carcinogen. (EPA 1998).

Proper implementation and application of these products would be expected to have no significant impacts to human health and safety when administered by qualified professionals and as directed by the product label. No cumulative impacts would be expected.

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CHAPTER 4 - PREPARERS

4.0 LIST OF PREPARERS

The following individuals contributed to the completion of the Supplemental EA.

Name/Education	Experience	Project Role
Todd Amacker *M.S., Wildlife and Fisheries Science* *B.S., Environmental Studies*	11 years of experience in wetland restoration and fisheries/aquatic ecology	Aquatic Ecology, Threatened and Endangered Species
Adam Datillo *M.S., Forestry* *B.S., Natural Resource Conservation Management*	17 years of experience in ecological restoration and plant ecology and 10 years in botany	Terrestrial Ecology (Vegetation), Threatened and Endangered Species
Elizabeth Hamrick *M.S., Wildlife and Fisheries Science* *B.A., Biology; B.A., Anthropology*	18 years in field biology, 10 years in NEPA and ESA compliance	Terrestrial Ecology (Wildlife), Threatened and Endangered Species
Matthew Higdon *M.S., Environmental Planning* *B.A., History*	17 years in NEPA compliance and natural resources planning	NEPA Compliance, Document Preparation
R. Lesley Rogers *B.A. Environmental Studies and Biology*	18 years in environmental compliance	NEPA Compliance, Technical Review
Rick Sherrard *Ph.D., Environmental Toxicology* *B.S. and M.S., Biology*	37 years in environmnetal monitoring and aquatic toxicology	Surface Water Quality
Edward W. Wells III *M.A. and B.S., Anthropology*	17 years in cultural resource management	Historic and Cultural Resources
A. Chevales Williams *B.S., Environmental/Chemical Engineering*	14 years of experience in water quality monitoring and compliance	Surface Water Quality

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CHAPTER 5 - REFERENCES

5.0 REFERENCES

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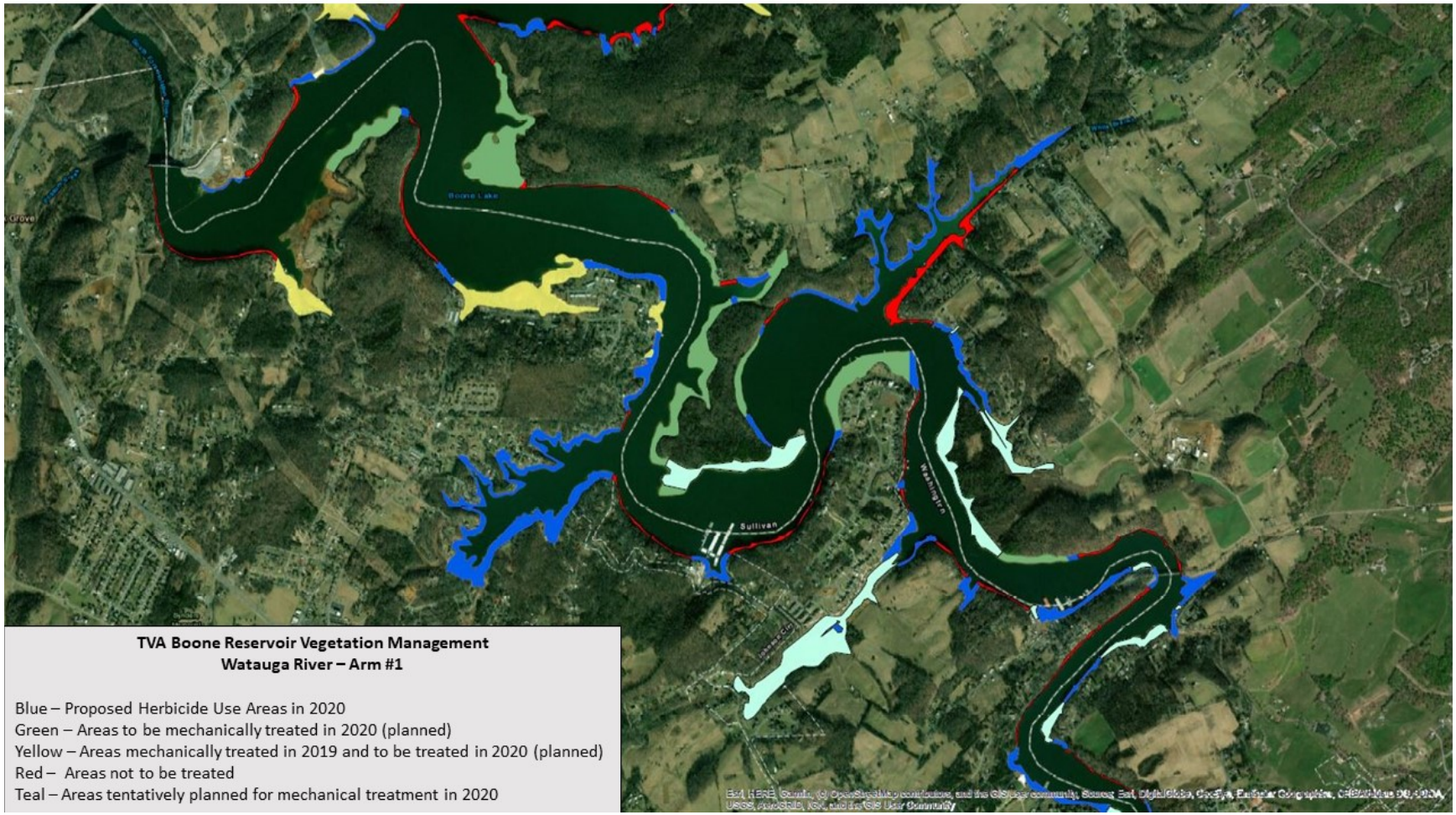
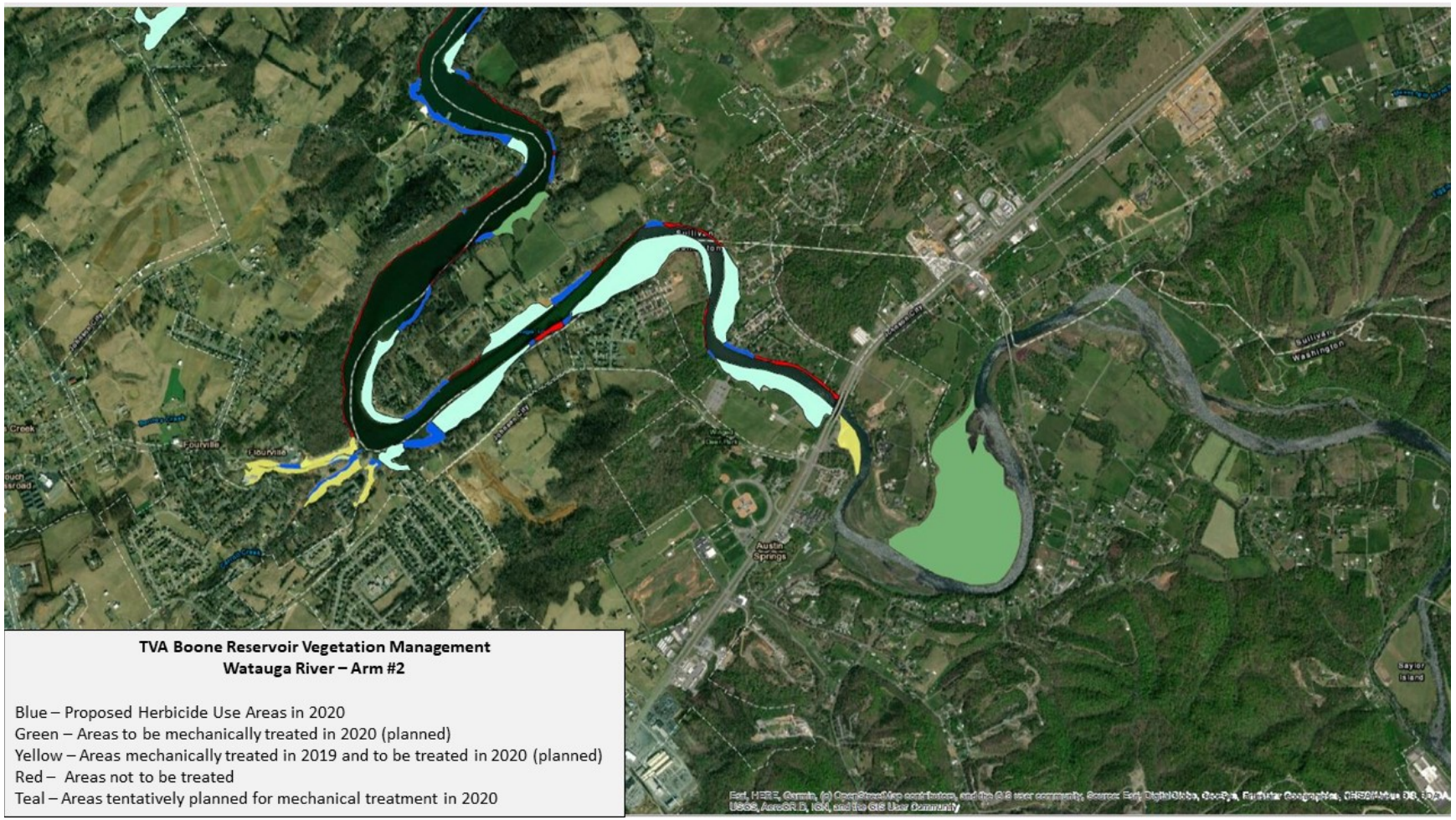
ATTACHMENT A – VEGETATION MANAGEMENT AREAS

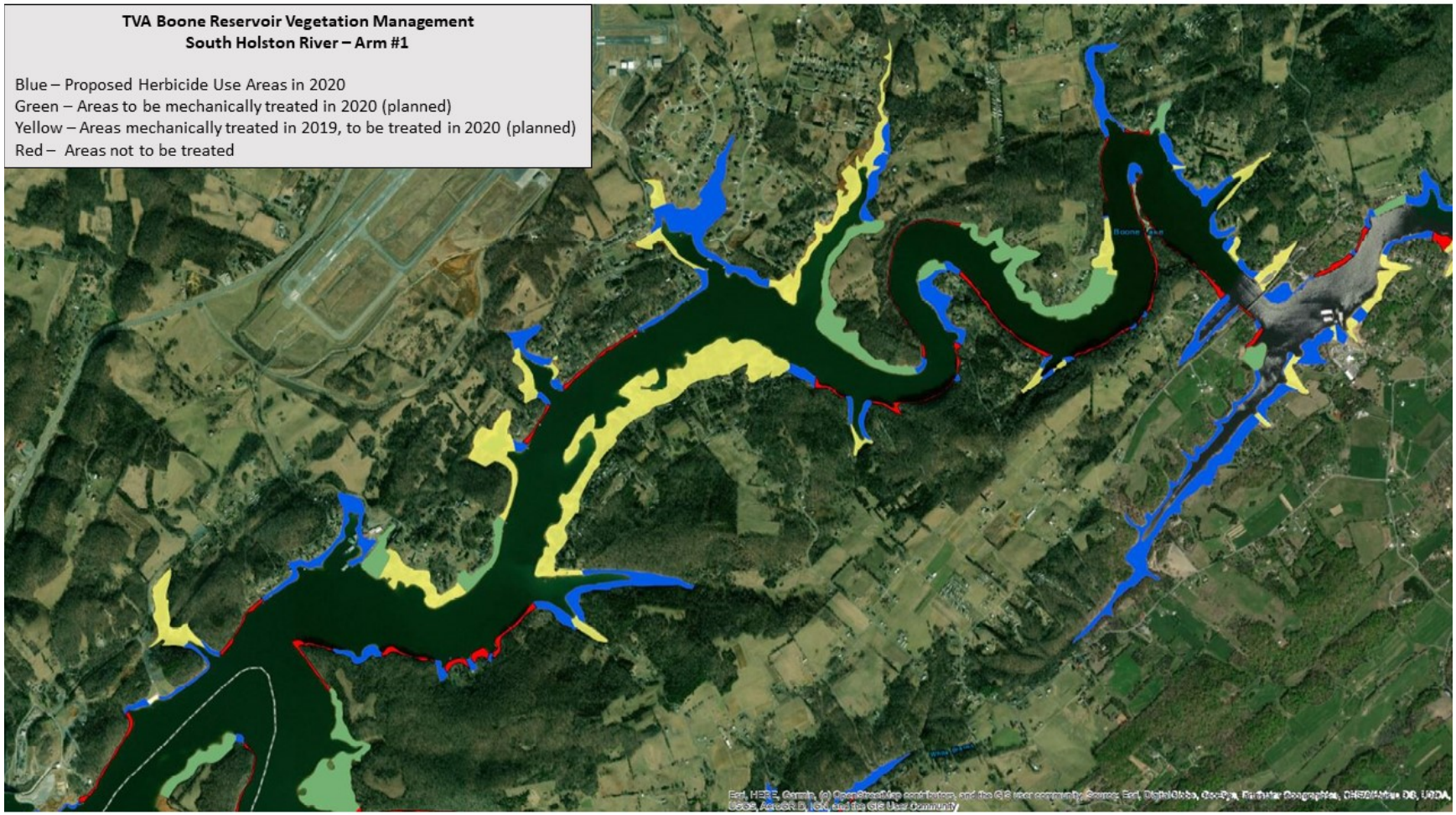
TVA Boone Reservoir Vegetation Management – Watauga River – Arm #1



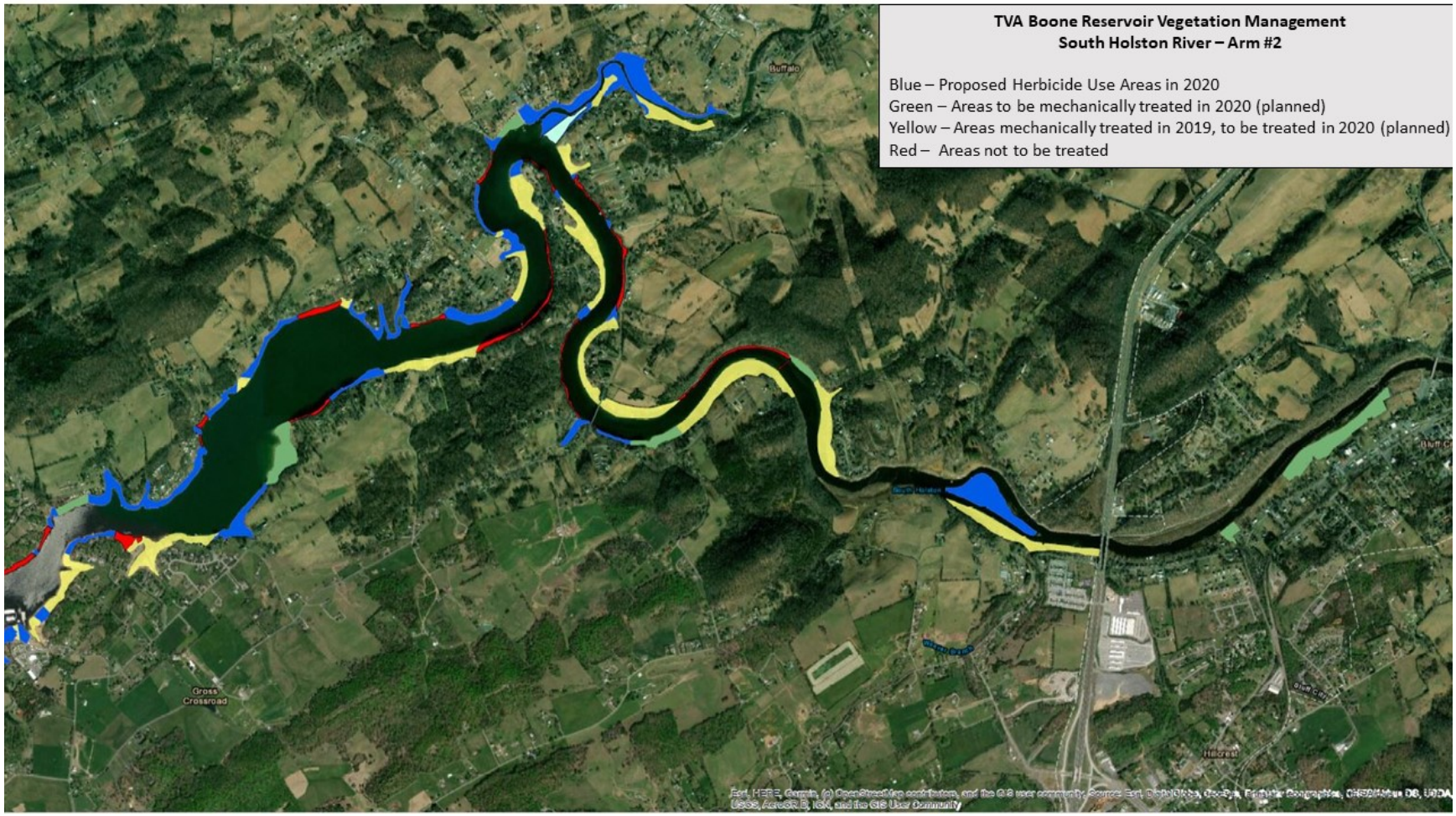
TVA Boone Reservoir Vegetation Management – Watauga River – Arm #2



TVA Boone Reservoir Vegetation Management – South Holston River – Arm #1



TVA Boone Reservoir Vegetation Management – South Holston River – Arm #2



ATTACHMENT B – TVA BAT STRATEGY PROJECT SCREENING FORM

Project Review Form - TVA Bat Strategy *(06/2019)*

*This form should **only** be completed if project includes activities in Tables 2 or 3 (STEP 2 below). This form is not required if project activities are limited to Table 1 (STEP 2) or otherwise determined to have no effect on federally listed bats. If so, include the following statement in your environmental compliance document (e.g., add as a comment in the project CEC): "Project activities limited to Bat Strategy Table 1 or otherwise determined to have no effect on federally listed bats. Bat Strategy Project Review Form NOT required." This form is to assist in determining required conservation measures per TVA's ESA Section 7 programmatic consultation for routine actions and federally listed bats.*[1]

Project Name: Boone Dam Seepage Remediation Vegetation Herbicide Supplemental EA **Date:** 03-30-2020

Contact(s): Sam Vinson **CEC#:** **Project ID:** EA2015-15

Project Location (City, County, State): Sullivan County, TN

Project Description:

The purpose for herbicide use is to manage successional vegetation growth in certain areas of the exposed Boone Reservoir bottom that are difficult to access or have sensitive resources. TVA's primary objectives are to remove or impair the growth of tree species from newly exposed reservoir bottom areas to avoid having trees mature to heights that would create navigation and public safety issues.

SECTION 1: PROJECT INFORMATION - ACTION AND ACTIVITIES

STEP 1) Select TVA Action. If none are applicable, contact environmental support staff, Environmental Project Lead, or Terrestrial Zoologist to discuss whether form (i.e., application of Bat Programmatic Consultation) is appropriate for project:

- [x] 1 Manage Biological Resources for Biodiversity and Public Use on TVA Reservoir Lands
- [ ] 2 Protect Cultural Resources on TVA-Retained Land
- [ ] 3 Manage Land Use and Disposal of TVA-Retained Land
- [ ] 4 Manage Permitting under Section 26a of the TVA Act
- [ ] 5 Operate, Maintain, Retire, Expand, Construct Power Plants
- [ ] 6 Maintain Existing Electric Transmission Assets
- [ ] 7 Convey Property associated with Electric Transmission
- [ ] 8 Expand or Construct New Electric Transmission Assets
- [ ] 9 Promote Economic Development
- [ ] 10 Promote Mid-Scale Solar Generation

STEP 2) Select all activities from Tables 1, 2, and 3 below that are included in the proposed project.

TABLE 1. Activities with no effect to bats. Conservation measures & completion of bat strategy project review form NOT required.

☐ 1. Loans and/or grant awards	☐ 8. Sale of TVA property	☐ 19. Site-specific enhancements in streams and reservoirs for aquatic animals
☐ 2. Purchase of property	☐ 9. Lease of TVA property	☐ 20. Nesting platforms
☐ 3. Purchase of equipment for industrial facilities	☐ 10. Deed modification associated with TVA rights or TVA property	☐ 41. Minor water-based structures (this does not include boat docks, boat slips or piers)
☐ 4. Environmental education	☐ 11. Abandonment of TVA retained rights	☐ 42. Internal renovation or internal expansion of an existing facility
☐ 5. Transfer of ROW easement and/or ROW equipment	☐ 12. Sufferance agreement	☐ 43. Replacement or removal of TL poles
☐ 6. Property and/or equipment transfer	☐ 13. Engineering or environmental planning or studies	☐ 44. Conductor and overhead ground wire installation and replacement
☐ 7. Easement on TVA property	☐ 14. Harbor limits delineation	☐ 49. Non-navigable houseboats

TABLE 2. Activities not likely to adversely affect bats with implementation of conservation measures. Conservation measures and completion of bat strategy project review form REQUIRED; review of bat records in proximity to project NOT required.		
☐ 18. Erosion control, minor	☐ 57. Water intake - non-industrial	☐ 79. Swimming pools/associated equipment
☐ 24. Tree planting	☐ 58. Wastewater outfalls	☐ 81. Water intakes – industrial
☐ 30. Dredging and excavation; recessed harbor areas	☐ 59. Marine fueling facilities	☐ 84. On-site/off-site public utility relocation or construction or extension
☐ 39. Berm development	☐ 60. Commercial water-use facilities (e.g., marinas)	☐ 85. Playground equipment - land-based
☐ 40. Closed loop heat exchangers (heat pumps)	☐ 61. Septic fields	☐ 87. Aboveground storage tanks
☐ 45. Stream monitoring equipment - placement and use	☐ 66. Private, residential docks, piers, boathouses	☐ 88. Underground storage tanks
☐ 46. Floating boat slips within approved harbor limits	☐ 67. Siting of temporary office trailers	☐ 90. Pond closure
☐ 48. Laydown areas	☐ 68. Financing for speculative building construction	☐ 93. Standard License
☐ 50. Minor land based structures	☐ 72. Ferry landings/service operations	☐ 94. Special Use License
☐ 51. Signage installation	☐ 74. Recreational vehicle campsites	☐ 95. Recreation License
☐ 53. Mooring buoys or posts	☐ 75. Utility lines/light poles	☐ 96. Land Use Permit
☐ 56. Culverts	☐ 76. Concrete sidewalks	

Table 3: Activities that may adversely affect federally listed bats. Conservation measures AND completion of bat strategy project review form REQUIRED; review of bat records in proximity of project REQUIRED by OSAR/Heritage eMap reviewer or Terrestrial Zoologist.		
☐ 15. Windshield and ground surveys for archaeological resources	☐ 34. Mechanical vegetation removal, includes trees or tree branches > 3 inches in diameter	☐ 69. Renovation of existing structures
☐ 16. Drilling	☐ 35. Stabilization (major erosion control)	☐ 70. Lock maintenance/ construction
☐ 17. Mechanical vegetation removal, does not include trees or branches > 3" in diameter (in Table 3 due to potential for woody burn piles)	☐ 36. Grading	☐ 71. Concrete dam modification
■ 21. Herbicide use	☐ 37. Installation of soil improvements	☐ 73. Boat launching ramps
☐ 22. Grubbing	☐ 38. Drain installations for ponds	☐ 77. Construction or expansion of land-based buildings
☐ 23. Prescribed burns	☐ 47. Conduit installation	☐ 78. Wastewater treatment plants
☐ 25. Maintenance, improvement or construction of pedestrian or vehicular access corridors	☐ 52. Floating buildings	☐ 80. Barge fleeting areas
☐ 26. Maintenance/construction of access control measures	☐ 54. Maintenance of water control structures (dewatering units, spillways, levees)	☐ 82. Construction of dam/weirs/ levees
☐ 27. Restoration of sites following human use and abuse	☐ 55. Solar panels	☐ 83. Submarine pipeline, directional boring operations
☐ 28. Removal of debris (e.g., dump sites, hazardous material, unauthorized structures)	☐ 62. Blasting	☐ 86. Landfill construction
☐ 29. Acquisition and use of fill/borrow material	☐ 63. Foundation installation for transmission support	☐ 89. Structure demolition
☐ 31. Stream/wetland crossings	☐ 64. Installation of steel structure, overhead bus, equipment, etc.	☐ 91. Bridge replacement
☐ 32. Clean-up following storm damage	☐ 65. Pole and/or tower installation and/or extension	☐ 92. Return of archaeological remains to former burial sites
☐ 33. Removal of hazardous trees/tree branches		

STEP 3) Project includes one or more activities in Table 3? ◉ **YES (Go to Step 4)** ○ **NO (Go to Step 13)**

STEP 4) Answer questions *a* through *e* below (applies to projects with activities from Table 3 ONLY)

a) Will project involve continuous noise (i.e., ≥ 24 hrs) that is greater than 75 decibels measured on the A scale (e.g., loud machinery)?

- (•) **NO** (NV2 does not apply)
- ( ) **YES** (NV2 applies, subject to records review)

b) Will project involve entry into/survey of cave?

- (•) **NO** (HP1/HP2 do not apply)
- ( ) **YES** (HP1/HP2 applies, subject to review of bat records)

c) If conducting **prescribed burning** (**activity 23)**, estimated acreage**:** _____ and timeframe(s) below; ☒ **N/A**

STATE	SWARMING	WINTER	NON-WINTER	PUP
GA, KY, TN	☐ Oct 15 - Nov 14	☐ Nov 15 - Mar 31	☐ Apr 1 - May 31, Aug 1- Oct 14	☐ Jun 1 - Jul 31
VA	☐ Sep 16 - Nov 15	☐ Nov 16 - Apr 14	☐ Apr 15 - May 31, Aug 1 – Sept 15	☐ Jun 1 - Jul 31
AL	☐ Oct 15 - Nov 14	☐ Nov 15 - Mar 15	☐ Mar 16 - May 31, Aug 1 - Oct 14	☐ Jun 1 - Jul 31
NC	☐ Oct 15 - Nov 14	☐ Nov 15 - Apr 15	☐ Apr 16 - May 31, Aug 1 - Oct 14	☐ Jun 1 - Jul 31
MS	☐ Oct 1 - Nov 14	☐ Nov 15 - Apr 14	☐ Apr 15 - May 31, Aug 1 – Sept 30	☐ Jun 1 - Jul 31

d) Will the project involve vegetation piling/burning?

- (•) **NO** (SSPC4/ SHF7/SHF8 do not apply)
- ( ) **YES** (SSPC4/SHF7/SHF8 applies, subject to review of bat records)

e) If **tree removal (activity 33 or 34)**, estimated amount: _____ ( )**ac** ( )**trees** (•)**N/A**

STATE	SWARMING	WINTER	NON-WINTER	PUP
GA, KY, TN	☐ Oct 15 - Nov 14	☐ Nov 15 - Mar 31	☐ Apr 1 - May 31, Aug 1- Oct 14	☐ Jun 1 - Jul 31
VA	☐ Sep 16 - Nov 15	☐ Nov 16 - Apr 14	☐ Apr 15 - May 31, Aug 1 – Sept 15	☐ Jun 1 - Jul 31
AL	☐ Oct 15 - Nov 14	☐ Nov 15 - Mar 15	☐ Mar 16 - May 31, Aug 1 - Oct 14	☐ Jun 1 - Jul 31
NC	☐ Oct 15 - Nov 14	☐ Nov 15 - Apr 15	☐ Apr 16 - May 31, Aug 1 - Oct 14	☐ Jun 1 - Jul 31
MS	☐ Oct 1 - Nov 14	☐ Nov 15 - Apr 14	☐ Apr 15 - May 31, Aug 1 – Sept 30	☐ Jun 1 - Jul 31

If warranted, does project have flexibility for bat surveys (May 15-Aug 15): ( ) **MAYBE** ( ) **YES** ( ) **NO**

**** For **PROJECT LEADS** whose projects will be reviewed by a Heritage Reviewer (Natural Resources Organization only), **STOP HERE**. Click File/ Save As, name form as "ProjectLead_BatForm_CEC-or-ProjectIDNo_Date", and submit with project information. Otherwise continue to Step 5. ****

SECTION 2: REVIEW OF BAT RECORDS (applies to projects with activities from Table 3 ONLY)

STEP 5) Review of bat/cave records conducted by Heritage/OSAR reviewer?

(•) **YES** ( ) **NO** (Go to Step 13)

Info below completed by:

☐ **Heritage Reviewer**	(name)		Date	
☐ **OSAR Reviewer**	(name)		Date	
☒ **Terrestrial Zoologist**	(name)	Elizabeth Hamrick	Date	Mar 30, 2020

Gray bat records: ☐ None ☒ Within 3 miles* ☐ Within a cave* ☐ Within the County

Indiana bat records: ☒ None ☐ Within 10 miles* ☐ Within a cave* ☐ Capture/roost tree* ☐ Within the County

Northern long-eared bat records: ☐ None ☐ Within 5 miles* ☐ Within a cave* ☒ Capture/roost tree* ☒ Within the County

Virginia big-eared bat records: ☒ None ☐ Within 6 miles* ☐ Within the County

Caves: ☐ None within 3 mi ☐ Within 3 miles but > 0.5 mi ☐ Within 0.5 mi but > 0.25 mi* ☐ Within 0.25 mi but > 200 feet* ☒ Within 200 feet*

Bat Habitat Inspection Sheet completed? (•) **NO** ( ) **YES**

Amount of SUITABLE habitat to be removed/burned (may differ from STEP 4e): _____ **(**( )**ac** ( )**trees)*** (•)**N/A**

STEP 6) Provide any additional notes resulting from Heritage Reviewer records review in Notes box below then . . . . . Go to Step 13

Notes from Bat Records Review (e.g., historic record; bats not on landscape during action; DOT bridge survey with negative results):

STEPS 7-12 To be Completed by Terrestrial Zoologist (if warranted):

STEP 7) Project will involve:

- ☐ Removal of suitable trees within 0.5 mile of P1-P2 Indiana bat hibernacula or 0.25 mile of P3-P4 Indiana bat hibernacula or any NLEB hibernacula.
- ☐ Removal of suitable trees within 10 miles of documented Indiana bat (or within 5 miles of NLEB) hibernacula.
- ☐ Removal of suitable trees > 10 miles from documented Indiana bat (> 5 miles from NLEB) hibernacula.
- ☐ Removal of trees within 150 feet of a documented Indiana bat or northern long-eared bat maternity roost tree.
- ☐ Removal of suitable trees within 2.5 miles of Indiana bat roost trees or within 5 miles of Indiana bat capture sites.
- ☐ Removal of suitable trees > 2.5 miles from Indiana bat roost trees or > 5 miles from Indiana bat capture sites.
- ☐ Removal of documented Indiana bat or NLEB roost tree, if still suitable.
- ☒ N/A

STEP 8) Presence/absence surveys were/will be conducted: ○ **YES** ○ **NO** ◉ **TBD**

STEP 9) Presence/absence survey results, on _____ ○ **NEGATIVE** ○ **POSITIVE** ◉ **N/A**

STEP 10) Project ○ **WILL** ◉ **WILL NOT** require use of Incidental Take in the amount of _____ ○ **acres or** ○ **trees** proposed to be used during the ○ **WINTER** ○ **VOLANT SEASON** ○ **NON-VOLANT SEASON** ■ **N/A**

STEP 11) Available Incidental Take (prior to accounting for this project) as of _____

TVA Action	Total 20-year	Winter	Volant Season	Non-Volant Season
1 Manage Biological Resources for Biodiversity and Public Use on TVA Reservoir Lands				

STEP 12) Amount contributed to TVA's Bat Conservation Fund upon activity completion: $ _____ OR ◉ **N/A**

TERRESTRIAL ZOOLOGISTS, after completing SECTION 2, review Table 4, modify as needed, and then complete section for Terrestrial Zoologists at end of form.

SECTION 3: REQUIRED CONSERVATION MEASURES

STEP 13) Review Conservation Measures in Table 4 and ensure those selected are relevant to the project. If not, manually override and uncheck irrelevant measures, and explain why in ADDITIONAL NOTES below Table 4.

Did review of Table 4 result in ANY remaining Conservation Measures in **RED**?

- ○ **NO** (Go to Step 14)
- ◉ **YES** (STOP HERE; Submit for Terrestrial Zoology Review. Click File/Save As, name form as "ProjectLead_BatForm_CEC-or-ProjectIDNo_Date", and submit with project information).

Table 4. TVA's ESA Section 7 Programmatic Bat Consultation Required Conservation Measures

The Conservation Measures in Table 4 are automatically selected based on your choices in Tables 2 and 3 but can be manually overridden, if necessary. To Manually override, press the button and enter your name.

Manual Override

Name: Elizabeth Hamrick

Check if Applies to Project	Activities Subject To Conservation Measure	Conservation Measure Description
		SSPC2 - Operations involving chemical/fuel storage or resupply and vehicle servicing will be handled outside of riparian zones (streamside management zones) in a manner to prevent these items from reaching a watercourse. Earthen berms or other effective means are installed to protect stream channel from direct surface runoff. Servicing will be done with care to avoid leakage, spillage, and subsequent stream, wetland, or ground water contamination. Oil waste, filters, other litter will be collected and disposed of properly. Equipment servicing and chemical/fuel storage will be limited to locations greater than 300-ft from sinkholes, fissures, or areas draining into known sinkholes, fissures, or other karst features.

	SSPC3 (**Power Plants only**) - Power Plant actions and activities will continue to implement standard environmental practices. These include: o Best Management Practices (BMPs) in accordance with regulations: • Ensure proper disposal of waste, ex: used rags, used oil, empty containers, general trash, dependent on plant policy • Maintain every site with well-equipped spill response kits, included in some heavy equipment • Conduct Quarterly Internal Environmental Field Assessments at each sight • Every project must have an approved work package that contains an environmental checklist that is approved by sight Environmental Health & Safety consultant. • When refueling, vehicle is positioned as close to pump as possible to prevent drips, and overfilling of tank. Hose and nozzle are held in a vertical position to prevent spillage o Construction Site Protection Methods • Sediment basin for runoff - used to trap sediments and temporarily detain runoff on larger construction sites • Storm drain protection device • Check dam to help slow down silt flow • Silt fencing to reduce sediment movement o Storm Water Pollution Prevention (SWPP) Pollution Control Strategies • Minimize storm water contact with disturbed soils at construction site • Protect disturbed soil areas from erosion • Minimize sediment in storm water before discharge • Prevent storm water contact with other pollutants • Construction sites also may be required to have a storm water permit, depending on size of land disturbance (>1ac) o Every site has a Spill Prevention and Control Countermeasures (SPCC) Plan and requires training. Several hundred pieces of equipment often managed at the same time on power generation properties. Goal is to • Minimize fuel and chemical use Ensure proper disposal of waste, ex: used rags, used oil, empty containers, general trash, dependent on plant policy • Maintain every site with well-equipped spill response kits, included in some heavy equipment • Conduct Quarterly Internal Environmental Field Assessments at each sight • Every project must have an approved work package that contains an environmental checklist that is approved by sight Environmental Health & Safety consultant. • When refueling, vehicle is positioned as close to pump as possible to prevent drips, and overfilling of tank. Hose and nozzle are held in a vertical position to prevent spillage o Construction Site Protection Methods • Sediment basin for runoff - used to trap sediments and temporarily detain runoff on larger construction sites • Storm drain protection device • Check dam to help slow down silt flow • Silt fencing to reduce sediment movement o Storm Water Pollution Prevention (SWPP) Pollution Control Strategies • Minimize storm water contact with disturbed soils at construction site • Protect disturbed soil areas from erosion • Minimize sediment in storm water before discharge • Prevent storm water contact with other pollutants • Construction sites also may be required to have a storm water permit, depending on size of land disturbance (>1ac) o Every site has a Spill Prevention and Control Countermeasures (SPCC) Plan and requires training. Several hundred pieces of equipment often managed at the same time on power generation properties. Goal is to minimize fuel and chemical use
	SSPC6 - Herbicide use will be avoided **within 200 ft of portals associated with caves, cave collapse areas, mines and sinkholes** are capable of supporting cave-associated species. 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 label requirements.
	SSPC7 - Clearing of vegetation **within a 200-ft radius of documented caves** will be limited to hand or small machinery clearing only (e.g., chainsaws, bush-hog, mowers). This will protect potential recharge areas of cave streams and other karst features that are connected hydrologically to caves.

[1]Bats addressed in consultation (02/2018), which includes gray bat (listed in 1976), Indiana bat (listed in 1967), northern long-eared bat (listed in 2015), and Virginia big-eared bat (listed in 1979).

STEP 14) Save completed form (Click File/Save As, name form as "ProjectLead_BatForm_CEC-or-ProjectIDNo_Date") in project environmental documentation (e.g. CEC, Appendix to EA) AND send a copy of form to batstrategy@tva.gov
Submission of this form indicates that Project Lead/Applicant:

Sam Vinson (name) is (or will be made) aware of the requirements below.

- Implementation of conservation measures identified in Table 4 is required to comply with TVA's Endangered Species Act programmatic bat consultation.
- TVA may conduct post-project monitoring to determine if conservation measures were effective in minimizing or avoiding impacts to federally listed bats.

For Use by Terrestrial Zoologist Only

☒ Terrestrial Zoologist acknowledges that Project Lead/Contact (name) Sam Vinson has been informed of any relevant conservation measures and/or provided a copy of this form.

☐ For projects that require use of Take and/or contribution to TVA's Bat Conservation Fund, Terrestrial Zoologist acknowledges that Project Lead/Contact has been informed that project will result in use of Incidental Take ○ ac ○ trees and that use of Take will require $ contribution to TVA's Conservation Fund upon completion of activity (amount entered should be $0 if cleared in winter).

For Terrestrial Zoology Use Only. Finalize and Print to Noneditable PDF.