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BULL RUN FOSSIL PLANT DECONTAMINATION AND DECONSTRUCTION
DRAFT ENVIRONMENTAL ASSESSMENT

Anderson County, Tennessee

Prepared by:
TENNESSEE VALLEY AUTHORITY
Knoxville, TN

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Symbols, Acronyms, and Abbreviations

AADT	annual average daily traffic
ACHP	Advisory Council on Historic Preservation
ACM	asbestos containing materials
APE	Area of Potential Effect
ARAP	Aquatic Resource Alteration Permit
BMP	best management practice
BRF	Bull Run Fossil Plant
CAA	Clean Air Act
CBG	census block group
CCR	coal combustion residuals
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2	carbon dioxide
CO_3	carbonate
CRM	Clinch River Mile
CWA	Clean Water Act
dB	decibel(s)
dBA	a-weighted decibel
DO	dissolved oxygen
EA	environmental assessment
EIS	environmental impact statement
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EPT	*Ephemeroptera*, *Plecoptera*, and *Trichoptera*
ESA	Endangered Species Act
ETSZ	East Tennessee Seismic Zone
F	Fahrenheit
FEMA	Federal Emergency Management Agency
FFCA	Federal Facilities Compliance Agreement
FHWA	Federal Highway Administration
FONSI	finding of no significant impact
FR	Federal Register
FTA	Federal Transit Administration
GHG	greenhouse gas
HPA	Habitat Protection Area
HUD	U.S. Department of Housing and Urban Development
Hz	hertz
IPaC	Information for Planning and Consultation
IRP	Integrated Resource Plan
L_{dn}	day-night sound level
L_{eq}	equivalent sound level
MOA	Memorandum of Agreement
MW	megawatt
MWe	megawatt electric
NAAQS	National Ambient Air Quality Standards
NCA5	Fifth National Climate Assessment
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NLCD	National Land Cover Dataset
NMSZ	New Madrid Seismic Zone
NO_2	nitrogen dioxide
NPDES	National Pollution Discharge Elimination System

NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
O_3	ozone
OSHA	Occupational Safety and Health Administration
PEM	palustrine, emergent
PFO	palustrine, forested
Pb	lead
PCB	polychlorinated biphenyl
PM	particulate matter
$PM_{2.5}$	particle sizes less than or equal to 2.5 microns
PM_{10}	particle sizes less than or equal to 10 microns
PUB	palustrine, unconsolidated bottom
RCRA	Resource Conservation and Recovery Act
RFFA	reasonably foreseeable future action
RM	river mile
SASZ	Southern Appalachia Seismic Zone
SCSZ	South Carolina Seismic Zone
SEA	supplemental environmental assessment
SHPO	State Historic Preservation Office
SO_2	sulfur dioxide
SR	State Route
SSSP	Site-Specific Safety Plan
SWPPP	Stormwater Pollution Prevention Plan
TENORM	Technologically Enhanced Naturally Occurring Radioactive Materials
TCA	Tennessee Code Annotated
TDEC	Tennessee Department of Environment and Conservation
TDOT	Tennessee Department of Transportation
TPO	Transportation Planning Organization
TVA	Tennessee Valley Authority
TVAR	Tennessee Valley Archaeological Research
TWRA	Tennessee Wildlife Resources Agency
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USCB	U.S. Census Bureau
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VdB	vibration decibels
WMA	Wildlife Management Area
WOTUS	Waters of the U.S.
WQC	Water Quality Certification
WWC	wet weather conveyance

CHAPTER 1 – PURPOSE AND NEED FOR ACTION

1.1 Introduction

The Bull Run Fossil Plant (BRF) is located in Anderson County, Tennessee, approximately 5 miles east of downtown Oak Ridge and 13 miles west of Knoxville (Figure 1-1). BRF is operated by the Tennessee Valley Authority (TVA) on a 750-acre reservation on the east side of Melton Hill Reservoir near Clinch River Mile (CRM) 48.

Construction of BRF began in April 1962 and was completed in June 1967 with commercial operation beginning that same month. Nameplate generating capacity (maximum capacity) for the single unit is 950 megawatts (MW) with a net generating capacity of approximately 889 megawatt electric (MWe). BRF is the only single-generator coal-fired power plant in the TVA system. BRF generates over 6 billion kilowatt-hours of electric power in a typical year, which is enough electrical energy to meet the needs of approximately 430,000 homes.

TVA entered into a Federal Facilities Compliance Agreement (FFCA) with the United States Environmental Protection Agency (EPA) that resolved a dispute over how the Clean Air Act's (CAA) New Source Review program applied to maintenance and repair activities at TVA's coal-fired power plants. TVA also entered into a judicial consent decree with the States of Alabama, Kentucky, Tennessee, and North Carolina, and three environmental advocacy groups: 1) the Sierra Club, 2) the National Parks Conservation Association, and 3) Our Children's Earth Foundation. The consent decree is substantively similar to the FFCA. These agreements (collectively called the "EPA Agreements") require TVA to reduce emissions across its coal-fired generating system and take other actions at its coal plants, including retiring some of its units.

In June 2019, TVA published the *2019 Integrated Resource Plan* (IRP), which was developed with input from stakeholder groups and the general public. The 2019 IRP evaluated six scenarios (possible futures) and five strategies (potential TVA business decisions or directions that TVA could employ in each scenario) and identified a range of potential resource additions and retirements throughout the TVA power service area, which encompasses approximately 80,000 square miles for the majority of Tennessee and parts of Alabama, Georgia, Kentucky, Mississippi, North Carolina, and Virginia. The target power supply mix adopted by the TVA Board through the 2019 IRP recommended to continue with announced plans to retire BRF and Paradise Fossil Plant in Drakesboro, Kentucky, and to evaluate retirements of up to 2,200 MW of additional coal capacity if cost-effective by 2038 (TVA 2019a).

As a large, inflexible coal unit with medium operating costs and a high forced outage rate, BRF does not fit current and likely future portfolio needs. While BRF was designed to provide baseload generation, increases in nuclear generation which produce power at a lower cost per megawatt-hour have displaced BRF for baseload generation. The retirement in 2023 of this inflexible unit with high maintenance costs would facilitate TVA's statutory mission to provide reliable power at the lowest system cost.

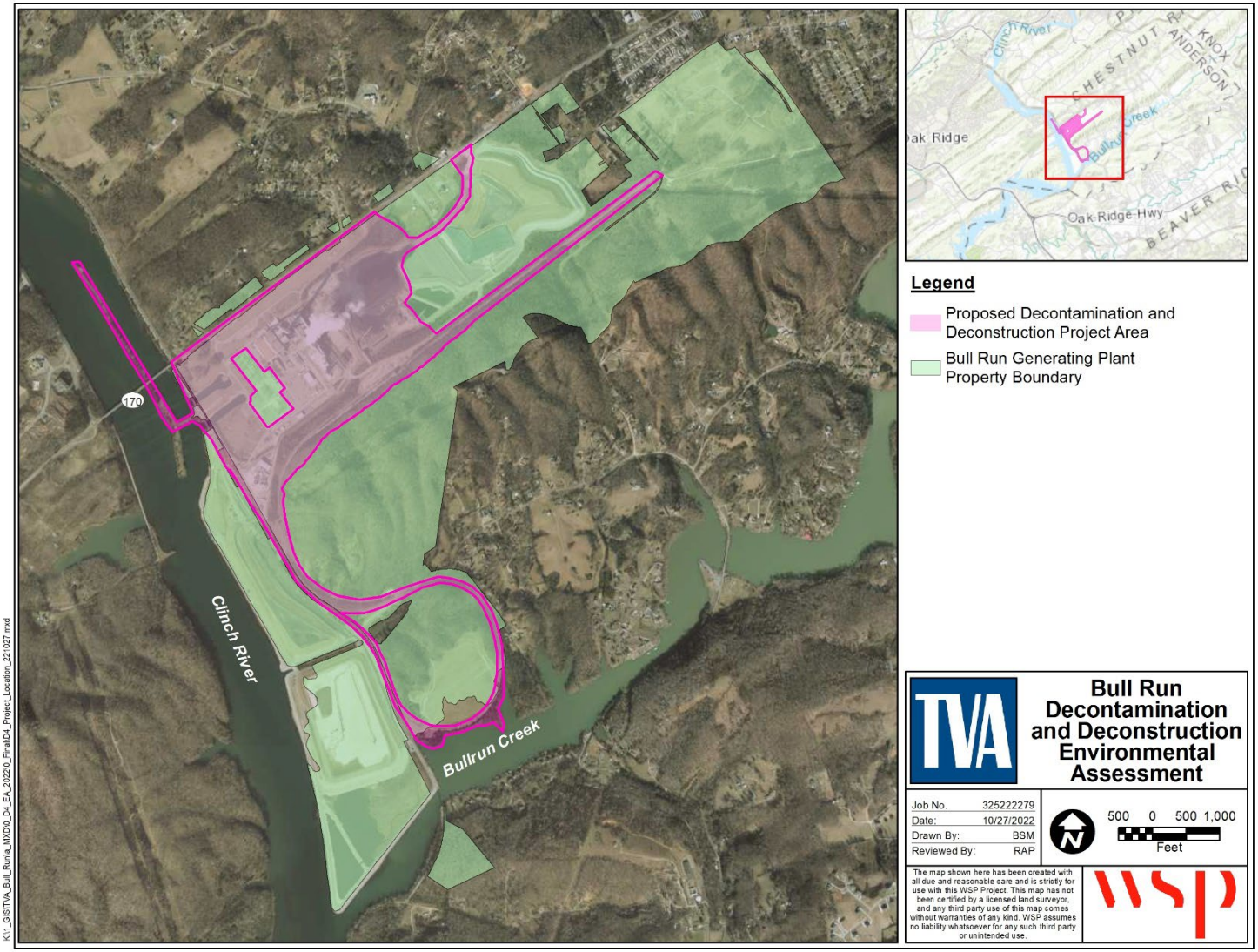


Figure 1-1. BRF Decontamination and Deconstruction Project Location

TVA evaluated the environmental impacts associated with the retirement of BRF in the *Potential Bull Run Fossil Plant Retirement Environmental Assessment* (TVA 2019c) and identified retirement of BRF as the preferred action in the Finding of No Significant Impact (FONSI) published in February 2019. In February 2019, the TVA Board of Directors approved the retirement of BRF by December 2023.

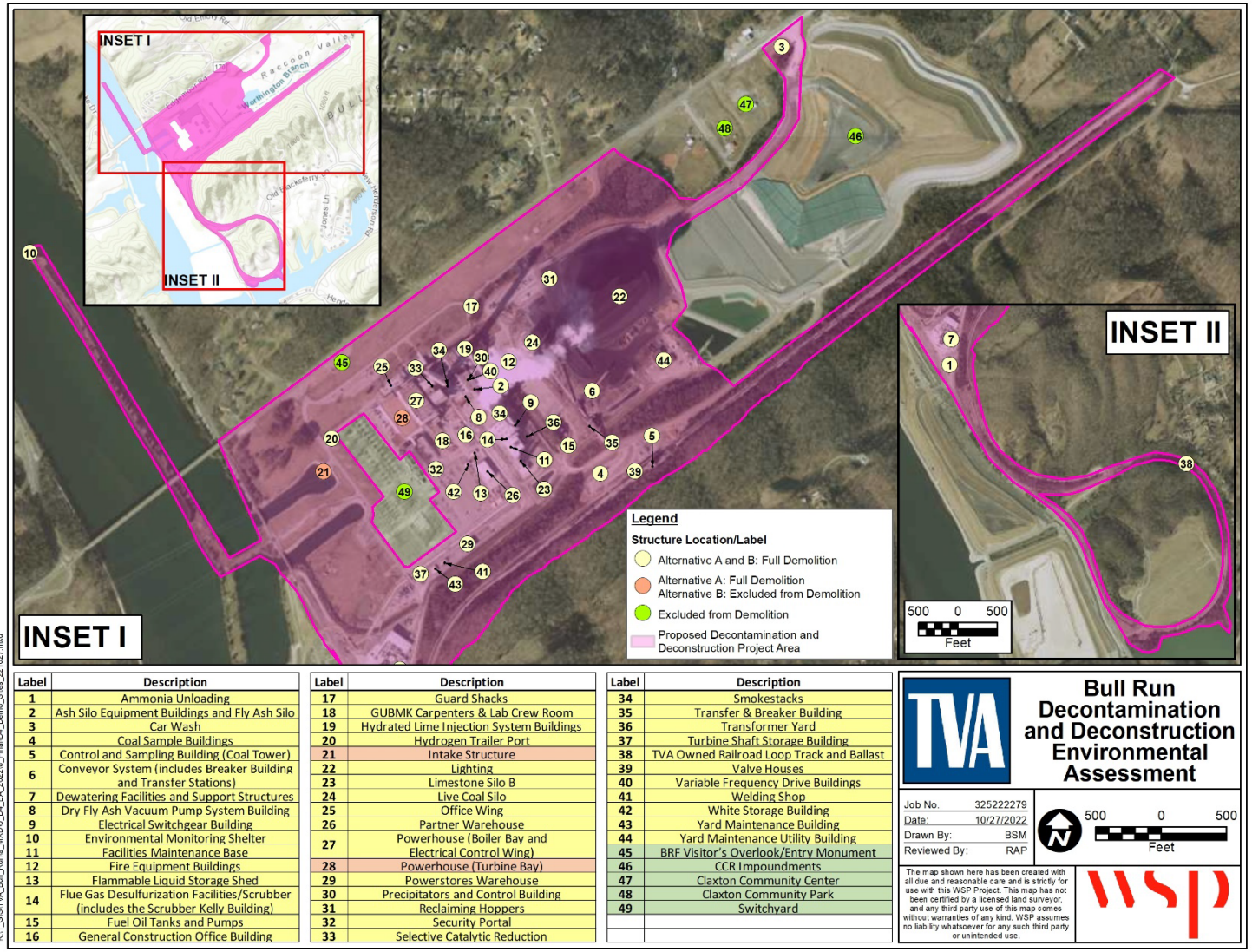
TVA is now investigating options for the future disposition of BRF including securing and maintaining the plant, securing and maintaining portions of the plant, deconstructing and demolishing the plant, or leaving the plant as is and taking no actions. Securing and maintaining part or all of the plant entails de-energizing the facilities and placing BRF in an "idle and vacant" status during which basic maintenance is continued to prevent safety and environmental issues. The decontamination and deconstruction project area for BRF is shown on Figure 1-2. The project area covers approximately 252 acres within the 750-acre BRF reservation. All or most of the buildings and structures within the project area are being considered for removal. Decommissioning activities would begin upon unit shutdown in preparation for deactivation and demolition. Decommissioning includes removal of components that may be used at other TVA sites, draining of oil/fluids from equipment, removal of ash from the boilers, removal of information technology assets, removal of plant records, etc.

TVA has prepared this Environmental Assessment (EA) pursuant to the National Environmental Policy Act (NEPA) and TVA's procedures for implementing NEPA to assess the environmental impacts of alternatives for the future disposition of BRF, including its potential decontamination and deconstruction. This EA was prepared consistent with 2020 Council on Environmental Quality's (CEQ) regulations for implementing NEPA at 40 Code of Federal Regulations (CFR) 1500-1508 (85 Federal Register [FR] 43304-43376, July 16, 2020). TVA's 2020 NEPA regulations at 18 CFR 1318 were also applied (85 FR 17434, Mar. 27, 2020). Further, the EA is consistent with CEQ's recently finalized rule (87 FR 23453, April 20, 2022) amending certain provisions of its 2020 regulations.

The impact of activities associated with the closure of the ash disposal areas were addressed in the separate NEPA reviews as described in Section 1.4, since all such activities would occur independent of the deconstruction of BRF.

1.2 Purpose and Need

The purpose of the Proposed Action is to appropriately manage disposition of the buildings and physical structures at BRF that are no longer needed for their original purpose of power generation. TVA needs to manage the disposition of the BRF site to provide necessary structures and facilities for ongoing site activities while considering capital costs, long-term operations and maintenance costs, environmental risks, safety, and security at the plant site, and making the land available for future economic development.



Label	Description
1	Ammonia Unloading
2	Ash Silo Equipment Buildings and Fly Ash Silo
3	Car Wash
4	Coal Sample Buildings
5	Control and Sampling Building (Coal Tower)
6	Conveyor System (includes Breaker Building and Transfer Stations)
7	Dewatering Facilities and Support Structures
8	Dry Fly Ash Vacuum Pump System Building
9	Electrical Switchgear Building
10	Environmental Monitoring Shelter
11	Facilities Maintenance Base
12	Fire Equipment Buildings
13	Flammable Liquid Storage Shed
14	Flue Gas Desulfurization Facilities/Scrubber (includes the Scrubber Kelly Building)
15	Fuel Oil Tanks and Pumps
16	General Construction Office Building

Label	Description
17	Guard Shacks
18	GUBMK Carpenters & Lab Crew Room
19	Hydrated Lime Injection System Buildings
20	Hydrogen Trailer Port
21	Intake Structure
22	Lighting
23	Limestone Silo B
24	Live Coal Silo
25	Office Wing
26	Partner Warehouse
27	Powerhouse (Boiler Bay and Electrical Control Wing)
28	Powerhouse (Turbine Bay)
29	Powerstores Warehouse
30	Precipitators and Control Building
31	Reclaiming Hoppers
32	Security Portal
33	Selective Catalytic Reduction

Label	Description
34	Smokestacks
35	Transfer & Breaker Building
36	Transformer Yard
37	Turbine Shaft Storage Building
38	TVA Owned Railroad Loop Track and Ballast
39	Valve Houses
40	Variable Frequency Drive Buildings
41	Welding Shop
42	White Storage Building
43	Yard Maintenance Building
44	Yard Maintenance Utility Building
45	BRF Visitor's Overlook/Entry Monument
46	CCR Impoundments
47	Claxton Community Center
48	Claxton Community Park
49	Switchyard

Figure 1-2. BRF Decontamination and Deconstruction Project Area and Demolition Sites

1.3 Decision to be Made

This EA is being prepared to inform TVA decision makers and the public about the environmental consequences of the Proposed Action. The decision TVA must make is whether to fully demolish the facility, partially demolish the facility, or take no action.

1.4 Related Environmental Reviews

Various environmental documents and materials were reviewed concerning this EA and are listed below. The contents of these documents help describe the affected environment and are incorporated by reference as appropriate.

- *Potential Bull Run Fossil Plant Retirement Final EA* (TVA 2019c) – This EA evaluated the potential retirement of BRF. TVA's proposed action was consistent with TVA's 2015 IRP and supports a low cost, reliable, risk-informed, diverse, environmentally responsible, and flexible power system.
- *Bull Run Fossil Plant Landfill Final Environmental Impact Statement (EIS)* (TVA 2016c) – This EIS was prepared to address alternatives for the future disposal of Coal Combustion Residuals (CCR) produced at BRF. It describes the need for additional storage capacity for the long-term disposal of the dry CCR materials to enable TVA to continue operations at BRF beyond 2024. In its Record of Decision, TVA decided to construct and operate a new, 120-acre landfill a short distance east of BRF.
- *Ash Impoundment Closure Final EIS Part I Programmatic NEPA Review* (TVA 2016a) – This programmatic EIS was prepared to address the closure of impoundments at all of TVA's fossil plants to support the implementation of TVA's goal to eliminate all wet CCR storage at its fossil plants.
- *Ash Impoundment Closure Final Programmatic EIS, Part II Site-Specific NEPA Review Bull Run Fossil Plant* (TVA 2016b) – In this EIS, TVA considered closure of the BRF Sluice Channel and Fly Ash Impoundment, which are part of BRF's wet CCR disposal area. The preferred closure method was closure in place.
- *Bull Run Fossil Plant Ash Impoundment Closure Project, Supplemental Environmental Assessment* (SEA) (TVA 2017) – Subsequent to the completion of the 2016 Programmatic EIS, TVA determined that there is a long-term need for wastewater treatment at BRF and revised the closure plan to support the wastewater treatment system at BRF. This supplemental document studied the expansion of the 2016 original proposed impoundment closure area and repurposing of the Stilling Impoundment.
- *Bull Run Fossil Plant Ash Impoundment Closure Project, SEA* (TVA 2018) – This SEA was developed to assess an installation of a temporary cover on a portion of the Fly Ash Impoundment at BRF, which would eliminate wet CCR storage and provide a facility for stormwater and wastewater treatment.
- *2019 Integrated Resource Plan* (TVA 2019a) – TVA's 2019 IRP provides direction for how TVA will meet the long-term energy needs of the Tennessee Valley region while fulfilling its mission of serving the Tennessee Valley by providing low-cost reliable power, environmental stewardship, and economic development.
- *Integrated Resource Plan, EIS* (TVA 2019b) – This EIS accompanied the 2019 IRP and assessed the natural, cultural, and socioeconomic impacts associated with the

implementation of the IRP. The report identified the closure of BRF as part of its strategy to provide low-cost, reliable, and clean power in an environmentally responsible manner while promoting economic development across the Tennessee Valley.

1.5 Scope of the Environmental Assessment

TVA considered the possible environmental effects of the Proposed Action and determined that potential effects to the environmental resources listed below were relevant to the decision to be made; thus, the following environmental resources are addressed in detail in this EA.

- Land Use and Prime Farmland
- Geology and Groundwater
- Surface Water
- Floodplains
- Wetlands
- Aquatic Ecology
- Wildlife
- Vegetation
- Threatened and Endangered Species
- Air Quality and Climate Change
- Hazardous Materials and Solid and Hazardous Waste
- Transportation
- Noise
- Visual Resources
- Natural Areas, Parks, and Recreation
- Cultural and Historic Resources
- Utilities and Service Systems
- Public Health and Safety
- Socioeconomics and Environmental Justice

TVA's action would satisfy the requirements of Executive Order (EO) 11988 (Floodplain Management), EO 11990 (Protection of Wetlands), EO 12898 (Environmental Justice), and EO 13751 (Invasive Species); and applicable laws including the National Historic Preservation Act (NHPA), Endangered Species Act (ESA), Clean Water Act (CWA), and CAA.

1.6 Public and Agency Involvement

TVA's public and agency involvement includes publication of a notice of availability posted on TVA's website (http://tva.com/nepa) and a 45-day public review of the Draft EA. The availability of the Draft EA was announced in newspapers that serve the Anderson County, Tennessee, area. The Draft EA was also posted on TVA's website. TVA's agency involvement includes circulation of the Draft EA to local, state, and federal agencies and federally recognized tribes, as part of the review.

1.7 Necessary Permits or Licenses and Consultation Requirements

TVA would obtain all necessary permits, licenses, and approvals required for the alternative selected. TVA anticipates the following permits or approvals would likely be required for implementing the proposed alternative:

- National Pollutant Discharge Elimination System (NPDES) permit No. TN0005410.
- Air Construction Permit and modification of existing Title V Air permit for air emissions.
- Permits associated with disposal of sewage and sanitary wastewater into a nearby municipal wastewater treatment facility.
- Aboveground storage tank registrations and permits would require updating, provided the tanks are abandoned or removed.

- Oil Spill Prevention, Control, and Countermeasure Plan or Integrated Pollution Prevention and Spill Response Plan would be updated to reflect the removal of BRF.
- During project demolition activities, TVA would modify the site operational stormwater pollution prevention plan (SWPPP) or best management practices (BMPs) plan as necessary to reflect current site conditions.
- Any work conducted in jurisdictional waters may require a CWA Section 404 permit administered by the U.S. Army Corps of Engineers (USACE) and Section 401 Water Quality Certification (WQC) administered through an Aquatic Resources Alteration Permit (ARAP) by TDEC depending on the project impacts and location.
- Notification of Demolition (State of Tennessee and/or Anderson County).
- Consistent with the Federal Emergency Management Agency (FEMA) National Flood Insurance Program, the local floodplain administrator would be contacted, when appropriate, to determine the actions necessary to ensure substantive compliance with local floodplain regulations, and thereby minimize adverse impacts to floodplains and their natural and beneficial values.

No permits or licenses would be required specifically for solid or hazardous materials transportation-related activities under any of the potential alternatives with the exception of hauling hazardous materials for the purpose of disposal offsite. The selected contractor would be responsible for ensuring necessary permits are obtained and implemented, manifests completed, and hazardous waste disposal properly reported. Other necessary permits would be evaluated based on site-specific conditions. Additionally, if new hazardous waste streams are generated during demolition, notification and registration of these must be made to TDEC.

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CHAPTER 2 – ALTERNATIVES

This chapter describes the alternatives analyzed in this EA, summarizes the environmental impacts associated with each alternative, identifies potential mitigation measures, and presents the preferred alternative.

2.1 Description of Alternatives

2.1.1 Alternative A – Full Demolition of All Structures to Three Feet Below Final Grade

Alternative A includes the proposed decontamination and demolition of the powerhouse and buildings and structures within the proposed decontamination and deconstruction project area to 3 feet below final grade. All environmental issues associated with identified structures would be assessed and abated, including the decontamination of all buildings, structures, conveyers, and tunnels associated with plant operations, to remove hazardous materials. Demolition could be conducted via mechanical deconstruction and/or explosives. Alternative A could create approximately 7,000 cubic yards of demolition debris, 9,000 cubic yards of asbestos-containing materials (ACM), and approximately 55,000 net tons of scrap metal, that would be hauled offsite to be recycled or disposed at an appropriate facility in accordance with all federal, state, and local laws and regulations. Scrap metal could also be sold to local or regional vendors. No specific disposal site has been identified at this time, and ultimate disposition site selection would be determined by the contractor.

All buildings and structures with below grade features would be backfilled, using concrete and masonry from the demolished facilities and, if needed, fill from an offsite borrow source. If there is a need for borrow material from an offsite location, borrow would be obtained from one or more previously developed or permitted commercial borrow site(s) within 100 miles of BRF; the selection of the borrow site would be left up to the contractor. TVA would perform any necessary due diligence and reviews in association with the use of such an offsite borrow source.

Temporary parking and laydown areas would all be located within the project area footprint. Laydown areas would be located within paved or graveled areas to the extent practicable, and parking of construction and personal vehicles would be within existing parking areas and within other paved or graveled areas as structures are removed. All buried utilities would be cut and capped at each building boundary within the project area and abandoned in place if they do not interfere with other ongoing projects that overlap the project footprint. The cooling water intake structure would be decommissioned and sealed. The site would be restored to grade to provide proper drainage. All disturbed areas would be covered with topsoil and seeded to establish a permanent vegetative cover or otherwise permanently stabilized.

Buildings and structures proposed for demolition include but are not limited to:

- Ammonia Unloading
- Ash Silo Equipment Buildings and Fly Ash Silo
- Car Wash
- Coal Sample Buildings

- Continuous Emissions Monitoring Systems
- Control and Sampling Building (Coal Tower)
- Conveyor System (includes Breaker Building and Transfer Stations)
- Dewatering Facilities and Support Structures
- Dry Fly Ash Vacuum Pump System Building
- Electrical Switchgear Building
- Environmental Monitoring Shelter
- Facilities Maintenance Base
- Fire Equipment Buildings
- Flammable Liquid Storage Shed
- Flue Gas Desulfurization Facilities/Scrubber (includes the Scrubber Kelly Building)
- Fuel Oil Tanks and Pumps
- General Construction Office Building
- Guard Shacks
- GUBMK Carpenters & Lab Crew Room
- Hydrated Lime Injection System Buildings
- Hydrogen Trailer Port
- Intake Structure (equipment only)
- Lighting
- Limestone Silo B
- Live Coal Silo
- Office Wing
- Partner Warehouse
- Powerhouse (includes Turbine Bay, Boiler Bay, and Electrical Control Wing)
- Powerstore’s Warehouse
- Precipitators and Control Building
- Reclaiming Hoppers
- Security Portal
- Select parking lots, slabs, and roadways
- Selective Catalytic Conduction
- Smokestacks
- Trailer
- Transfer & Breaker Building
- Transformer Yard

- Turbine Shaft Storage Building
- TVA owned railroad loop track, ties, and ballast
- Utility Building
- Valve Houses
- Variable Frequency Drive Buildings
- Welding Shop
- White Storage Building
- Yard Maintenance Building
- Yard Maintenance Utility Building
- Miscellaneous unnamed structures

The following structures and facilities are not part of this Alternative and would remain in place. Any future actions for these structures or facilities would be evaluated under a separate NEPA analysis, if necessary:

- Claxton Community Park
- Claxton Community Center
- CCR Impoundments
- BRF Visitor's Overlook/Entry Monument
- Switchyard

Under Alternative A, approximately three full time workers would be required to perform all necessary site maintenance and environmental compliance activities at BRF once the facility has been decommissioned. Personnel from other TVA facilities may be used, as necessary, to assist with performing operations and maintenance activities.

2.1.2 Alternative B – Selective Demolition of All Structures to Three Feet Below Final Grade, Retain Turbine Bay of Powerhouse and Intake Structure

Alternative B includes the actions described under Alternative A, except the turbine bay of the powerhouse and the intake structure would remain in place (Figure 1-2). The plant staff and regular maintenance activities would be greatly reduced under this alternative from current levels for the active plant, and personnel from other TVA sources would be used, as necessary, to assist with performing operations and maintenance activities for the remaining powerhouse and associated structures.

2.1.3 Alternative C – No Action Alternative

Under the No Action Alternative, TVA would not perform any deconstruction or other disposition activities at BRF. If the facility is left in the "as-is" condition, it likely would present a higher risk than Alternatives A or B for the potential to contaminate soil and groundwater as systems and structures degrade. As such, this alternative is not a reasonable alternative. However, being the No Action Alternative, it will be discussed in the EA and used as a basis for comparison to the Action Alternatives.

2.1.4 Alternatives Considered but Eliminated from Further Discussion

TVA conducted a preliminary analysis of options for disposition of BRF including securing and maintaining the plant, deconstructing/demolishing the plant, or leaving the plant as-is and taking no actions. The following alternative was considered but eliminated for the reasons discussed below. This alternative did not meet the purpose and need of TVA's proposed action or was otherwise unreasonable.

2.1.4.1 Assess, Close, and Secure BRF and Establish an Ongoing Operations and Maintenance Program

TVA considered closing, securing, and maintaining BRF. This alternative would entail de-energizing the plant and placing it in an "idle and vacant" status during which basic maintenance would continue to prevent safety and environmental issues. The primary objective of this alternative would be to de-energize all systems at BRF and minimize environmental and safety risks. All existing buildings, structures, and equipment within the decontamination and deconstruction project area (Figure 1-2) would remain in place. Retirement, decommissioning, and operations and maintenance activities associated with this alternative would include:

- Periodic roof and structural evaluations.
- Fire monitoring.

Hazardous Materials Activities:

- Initial decontamination, including abatement of asbestos containing materials in poor to fair condition and removal of loose and flaking lead-based paint, if any.
- Periodic hazardous materials condition monitoring.
- Periodic hazardous materials removal as materials deteriorate over time.

Electrical Activities:

- Maintenance of aircraft obstruction lighting required by Federal Aviation Administration regulations on the stacks.
- Maintenance of select sump pumps to prevent below-grade spaces (basements) from becoming flooded.
- Monitoring and maintenance of the power for the powerhouse electrical needs.

Leaving all structures in place with minimal decontamination could result in degradation of the facilities over time. As materials deteriorate, there is a potential for release of contaminated materials to the environment. Additionally, leaving the structures in place prevents the site from being utilized for other purposes. Therefore, for these economic and environmental considerations, TVA has eliminated this alternative from consideration.

2.2 Comparison of Alternatives

The environmental impacts of each of the alternatives under consideration are summarized in Table 2-1. These summaries are derived from the information and analyses provided in the Affected Environment and Environmental Consequences sections of each resource in Chapter 3.

Table 2-1. Summary and Comparison of Alternatives by Resource Area

Resource Area	Impacts[1] from Alternatives		
	Alternative A: Full Demolition	**Alternative B: Selective Demolition**	**Alternative C: No Action Alternative[2]**
Land Use and Prime Farmland	No adverse impacts to and no alteration of future land use. Negligible impacts to prime farmland.	Similar to Alternative A.	No impacts.
Geology and Groundwater	No impacts to geology. Short-term, minor impacts to groundwater during decontamination and deconstruction activities. Long-term, beneficial impacts associated with the removal of potential environmental contamination sources relative to Alternative C.	Similar to Alternative A.	Long-term, minor impacts due to potential contamination from degradation of structures remaining onsite.
Surface Water	Short term, minor impacts due to potential stormwater runoff during demolition activities. No impacts as a result of sealing the cooling water intake and discharge. Although alteration or fill of onsite surface waters is not expected, any potential impacts would be mitigated, and the impacts would be minor with the implementation of BMPs as well as compliance with requirements of the USACE and TDEC permitting process.	Similar to, but reduced, impacts as compared to Alternative A due to less land disturbance. No sealing of the intake under this alternative; therefore, no impacts related to the installation of bulkheads.	Long-term, minor impacts due to potential contamination from degradation of structures remaining onsite.
Floodplains	Negligible impacts.	No changes to current conditions.	Same as Alternative B.
Wetlands	Short term, minor impacts due to potential stormwater runoff during demolition activities. To the extent practicable, TVA would establish an average 30-foot buffer around the onsite delineated wetlands.	Similar to Alternative A.	No impacts.
Aquatic Ecology	Short-term, minor impacts due to potential stormwater runoff during demolition activities.	Similar to Alternative A.	Long-term, minor impacts due to potential contamination from degradation of structures remaining onsite.

Resource Area	Impacts[1] from Alternatives		
	Alternative A: Full Demolition	**Alternative B: Selective Demolition**	**Alternative C: No Action Alternative[2]**
Wildlife	Short-term, minor impacts during deconstruction activities. Coordination with U.S. Department of Agriculture (USDA) – Wildlife Services may be required to ensure compliance with federal migratory bird protections regarding birds nesting in buildings and structures proposed for demolition.	Similar to or less than Alternative A.	No adverse impacts.
Vegetation	Short-term, minor impacts to common plant communities during deconstruction activities. Long-term, minor beneficial impacts due to site restoration.	Similar to or less than Alternative A.	No impacts.
Threatened and Endangered Species	Coordination with USDA – Wildlife Services may be required to ensure compliance with federal migratory bird protections regarding osprey nests near proposed actions. With implementation of conservation measures and BMPs as described in Section 3.9.2.2, no significant impacts would occur to federally listed bats, birds of conservation concern, or listed aquatic species. No impacts to protected plant species.	Similar to or less than Alternative A.	Potential for long-term, minor impacts to threatened and endangered aquatic species due to potential soil and groundwater contamination as a result of degradation of structures remaining onsite.
Air Quality and Climate Change	Short-term, minor impacts would result from fugitive dust and emissions from equipment and vehicles during decontamination and deconstruction activities and transport of debris on public roadways. Increased carbon dioxide (CO_2) emissions associated with deconstruction and trucking operations would not increase regional greenhouse gas (GHG) levels and, therefore, would not contribute to climate change.	Similar to or less than Alternative A.	Long-term, minor impacts to air quality due to potential degradation of structures remaining onsite. No impacts on regional climate.
Hazardous Materials and Solid and Hazardous Waste	Minor impacts, as hazardous wastes would be managed in accordance with all applicable state and federal regulations.	Similar to or less than Alternative A.	Long-term, moderate impacts due to potential degradation of structures remaining onsite.

Resource Area	Impacts[1] from Alternatives		
	Alternative A: Full Demolition	**Alternative B: Selective Demolition**	**Alternative C: No Action Alternative[2]**
Transportation	Short-term, minor impacts would result from increased traffic during decontamination, demolition, and site restoration activities. Similar impacts from potential closure of local roadways and navigation on the Clinch River/Melton Hill Reservoir during blasting events.	Similar to Alternative A.	No impacts.
Noise	Short-term, minor impacts would result from decontamination and demolition activities, including the drop removal of the stacks. Short-term, minor indirect impacts to noise receptors along haul routes for transport of debris.	Similar to Alternative A.	No impacts.
Visual Resources	Short-term, minor impacts during deconstruction activities. Long-term, beneficial impacts would result from the removal of the stacks and powerhouse.	Similar to Alternative A.	Long-term, minor impacts due to potential degradation of structures remaining onsite.
Natural Areas, Parks and Recreation	Short-term, minor indirect impacts to natural areas, parks, and recreational facilities located along haul routes for debris and borrow. Short-term, minor impacts to recreational boating and fishing during decontamination and deconstruction activities.	Similar to Alternative A.	No impacts.
Cultural and Historic Resources	No impacts to National Register of Historic Places (NRHP)-listed or -eligible archaeological sites as none have been identified in the Area of Potential Effect (APE). Adverse effect on NRHP-eligible BRF. Mitigation measures will be identified through consultation with the State Historic Preservation Office (SHPO) and listed in the Memorandum of Agreement (MOA) for this project.	Similar to Alternative A.	No impacts.
Utilities and Service Systems	Short-term, minor localized impacts.	Similar to Alternative A.	No impacts.
Public Health and Safety	Short-term, minor impacts would result from demolition blasting activities. Long-term beneficial impacts from removal of potentially unsafe facilities.	Similar to Alternative A.	Long-term, minor impacts would result from the site remaining in an “as-is” condition.

Resource Area	Impacts[1] from Alternatives		
	Alternative A: Full Demolition	**Alternative B: Selective Demolition**	**Alternative C: No Action Alternative[2]**
Socioeconomics and Environmental Justice	Short-term, minor beneficial economic impacts would result from a temporary increase in employment, income, and population during deconstruction activities. Short-term, minor impacts to nearby communities if routes to haul construction debris and borrow utilize surrounding local roadways. Environmental justice populations in proximity to the project area may bear greater impacts from air and noise emissions due to the location of the project area within a low-income block group. However, these impacts would be temporary and limited to the deconstruction and decommissioning phase of the project.	Similar to or less than Alternative A.	No impacts.
Cumulative	Moderate impacts to transportation and environmental justice communities due to potential for CCR removal and other construction activities to occur concurrently.	Similar to Alternative A.	No impacts.

[1] Unless otherwise stated, impacts listed in the table are adverse effects.
[2] Impacts under the No Action Alternative are described based on leaving the facility in the "as-is" condition.

2.3 Summary of BMPs and Mitigation Measures

This section provides a summary of BMPs and mitigation measures that TVA would employ to avoid or reduce adverse impacts from the alternatives analyzed. TVA's analysis of potential impacts includes consideration of BMPs and mitigation measures implemented as required to reduce or avoid adverse effects. BMPs and mitigation measures are discussed in Chapter 3 and summarized below.

2.3.1 Mitigation Measures

- TVA would conduct extensive presence/absence surveys at least one month prior to demolition of the structures to determine if migratory birds or listed bat species are utilizing these buildings. If active nests of migratory birds are present and demolition activities must occur within the active nesting season, coordination with the USDA-Wildlife Services would be required for guidance to ensure compliance under EO 13186 [Responsibilities of Federal Agencies to Protect Migratory Birds].
- A number of activities associated with the proposed action are addressed in TVA's 2018 programmatic consultation with the USFWS on routine actions and federally listed bats in accordance with the ESA Section 7(a)(2). For those activities with potential to affect bats, TVA committed to implementing specific conservation measures. Conservation measures required for this project are identified on pages 5-7 of the TVA Bat Strategy Project Review Form (Appendix A) and would be implemented as part of the proposed action.
- If colonies of bats or other protected wildlife species are observed in buildings proposed for demolition, TVA would strive to (and in most cases anticipates being able to) accommodate seasonal modification or removal. Risk to human safety, however, would take priority. For project-specific cases in which TVA is unable to accommodate seasonal modification or removal, and federally listed bat species or other protected species are present, TVA would consult with the appropriate state and federal agencies to determine the best approach in the context of the project-specific circumstance. This may include establishment of artificial roosts before demolition of structures with bats present.
- If there is a need for borrow material from an offsite location, borrow would be obtained from one or more previously developed and permitted commercial borrow site(s) within 100 miles of BRF; the selection of the borrow site would be left up to the contractor. However, TVA would perform all necessary due diligence and consultation as required under Section 106 of the NHPA related to any offsite borrow areas.
- If determined necessary, TVA may mitigate traffic impacts by implementing measures such as controlled timing of entry and exit to the facility, establishing alternate ingress/egress routes and possible busing of workers.
- To minimize adverse impacts on natural and beneficial floodplain values, demolition and deconstruction material would be disposed of outside of the 100-year floodplain, and concrete and masonry used as backfill in the floodplain would be placed at-grade or below.

2.3.2 Best Management Practices

The following BMPs have been identified to reduce potential environmental impacts:

- TVA would minimize one-time emissions of fugitive dust from facilities expected to produce large volumes (such as demolition of the stacks) by working with the demolition contractor on a site-specific plan. The demolition contractor would be required as practicable, to remove ash and coal and limestone dust from the facilities proposed for deconstruction and demolition, prior to removal of that facility and implement dust control measures during demolition to prevent the spread of dust, dirt, and debris. These methods may include wetting equipment and demolition areas, covering waste or debris piles, using covered containers to haul waste and debris, and wetting unpaved vehicle access routes during hauling. TVA also requires onsite contractors to maintain engines and equipment in good working order. TVA would continue to follow dust control BMPs in accordance with its Title V permit and SWPPP.
- Surface water quality indirect impacts resulting from disturbance during demolition would be minimized by the use of stormwater pollution prevention BMPs to reduce the extent of disturbance and erosion as described in the project-specific SWPPP, the *Tennessee Erosion and Sediment Control Handbook-4th Edition*, 2012 (TDEC 2012), and by compliance with the requirements of the USACE permitting process. The installation of bulkheads would be conducted in accordance with BMPs intended to avoid release of sediments or contaminants to surface water. BMPs and wastewater treatment would be employed, as needed, to mitigate any pollutant discharge. The implementation of BMPs, protocols to respond to onsite spills prior to discharge, and site clean-up would help to reduce the potential for any releases to surface waters.
- To the extent practicable, TVA would establish an average 30-foot buffer around delineated wetlands and streams within and adjacent to the project area and preclude any ground disturbing actions within the buffer to avoid placing fill material into the resource and to minimize sedimentation.
- Any temporary or permanent outdoor lighting would be angled downward and away from suitable bat habitat to minimize light pollution impacts to listed bats.
- TVA would notify Anderson County prior to any demolition activities that have the potential to mobilize dust offsite. Notifications to the public would be issued prior to the use of explosives for demolition. Prior to the demolition, the area would be prepared, and the explosives contractors would establish a fall exclusion zone. During the blast event, no personnel would be allowed in the fall exclusion zone.
- To mitigate the potential for impacts to public safety, TVA would work with the demolition contractor to create a detailed site-specific plan for explosive demolition activities.
    - The demolition plan would include procedures for notifications to Anderson County for demolition activities that have the potential to mobilize dust offsite. It would also include procedures for notifications to the public, including emergency personnel and appropriate agencies, prior to the use of explosives.
    - The demolition plan may include areas of temporary closure, which could include public roads, the BRF Visitors Overlook/Entry Monument.

Additionally, boat traffic could be restricted in the area during explosive demolition activities for safety.

- The plan would be designed in accordance with all applicable safety standards and requirements and with the intent to minimize effects of vibration in the vicinity
- Explosives would be managed under the direction of a licensed blaster; 24-hour security would be provided to monitor the explosives.
- Detailed security plans related to the transport and storage of explosives and site security would be implemented in accordance with all applicable regulations.

- TVA would ensure the proper management of all solid waste and hazardous wastes generated from construction activities in accordance with applicable federal, state, and local laws and regulations. Additionally, any spills would be managed in accordance with site specific procedures for spill prevention and cleanup.
- Construction debris and wastes would be managed in accordance with federal, state, and local requirements. Prior to demolition activities, hazardous materials would require special removal, handling, and disposal by appropriately trained and licensed personnel and contractors. Dust suppression and environmental control BMPs would be employed to minimize or prevent releases of hazardous materials.
- Though not anticipated, if deconstruction activities have the potential to emit pollutants greater than acceptable thresholds in BRF's existing Title V permit, mitigation could include a request to modify the permit.

2.4 Preferred Alternative

At this time, TVA has not identified the preferred action alternative for the proposed decontamination and deconstruction of BRF. TVA will make its final decision after consideration of input from the public and the results of ongoing design and cost analyses. The Alternative which best meets the purpose and need of the project will be selected as the preferred alternative.

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CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the baseline environmental conditions (affected environment) of environmental resources in the project area and the anticipated environmental consequences (or impacts) that would occur from implementation of the alternatives described in Chapter 2. The affected environment descriptions below are based on surveys conducted by TVA, published and unpublished reports, and personnel communications with resource experts.

3.1 Land Use and Prime Farmland

3.1.1 Affected Environment

3.1.1.1 Land Use

The BRF facility is located in southern Anderson County, Tennessee, just east of the City of Oak Ridge, Tennessee. The BRF facility is in an area which has been zoned for heavy industrial use by Anderson County (Anderson County Assessor 2022). According to the Anderson County zoning code, a heavy industrial district is intended primarily for heavy manufacturing or closely related industrial uses and regulations for this zone are intended to protect against effects potentially harmful to other zones (Anderson County, TN 2015).

Residential areas to the north and northwest are within the immediate vicinity of BRF facilities, including Claxton Community Park to the northeast. The nearest single-family residential areas are located along Edgemoor Road approximately 140 feet from the northwest boundary of the project area.

As illustrated in Figure 1-1, the project area, approximately 251.8 acres on which decontamination and deconstruction activities may take place, is located entirely within the BRF boundary. Using the National Land Cover Database (NLCD) with interpretation of aerial photographs and findings of past field surveys, TVA created a map of dominant vegetation communities and other land cover types on the project area (Figure 3-1). Based on this map, the project area is characterized by industrial development (55.2 percent), herbaceous (20.9 percent), deciduous forest (20.7 percent), and open water (3.1 percent) (Dewitz 2019).

3.1.1.2 Prime Farmland

The 1981 Farmland Protection Policy Act (7 CFR Part 658) requires all federal agencies to evaluate impacts to prime and unique farmland prior to permanently converting to land use incompatible with agriculture. Prime farmland soils have the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. These characteristics allow prime farmland soils to produce the highest yields with minimal expenditure of energy and economic resources. In general, prime farmlands have an adequate and dependable water supply, a favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt and sodium content, and few or no rocks. Prime farmland soils are permeable to water and air, not excessively erodible or saturated for extended period, and are protected from frequent flooding.

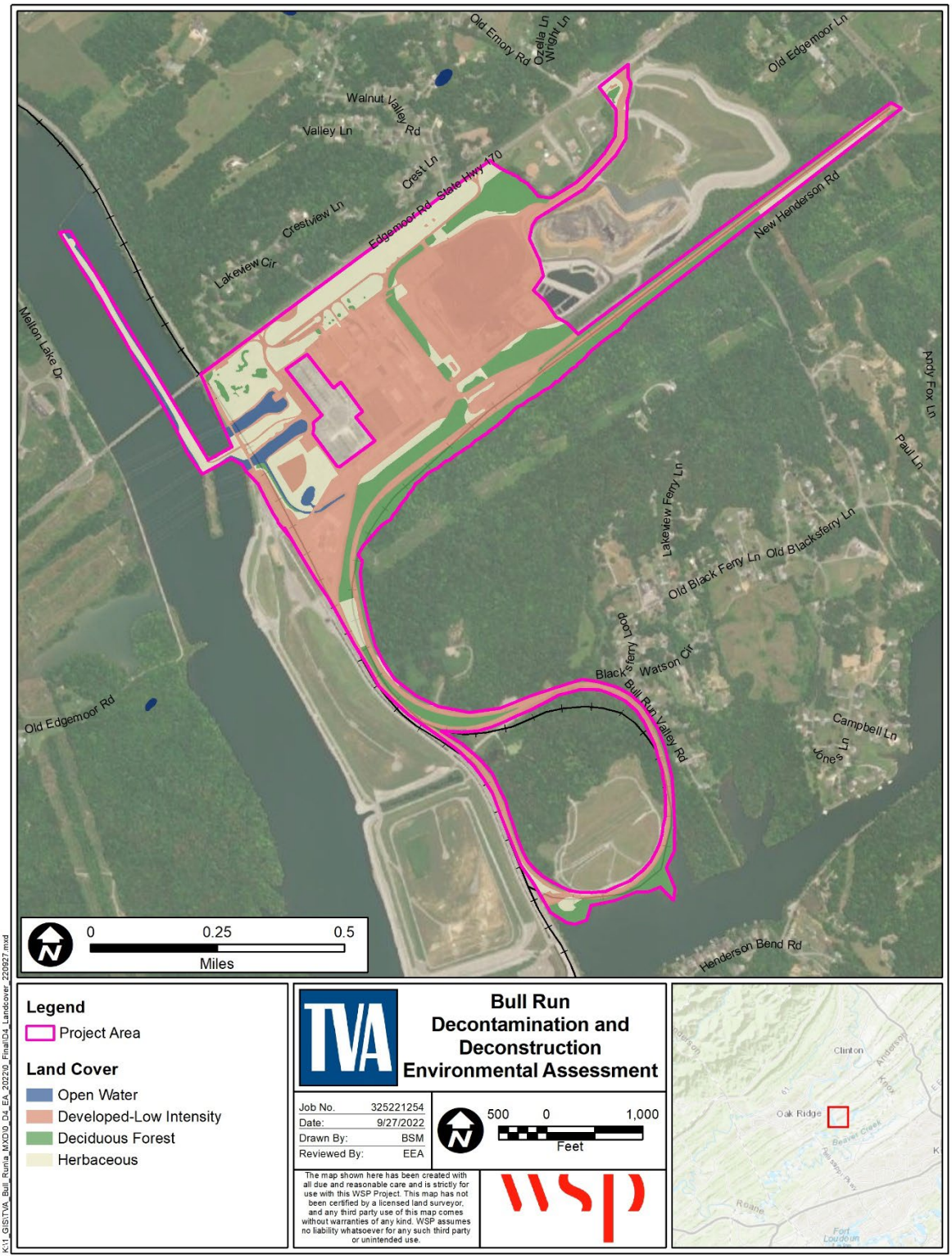

Figure 3-1. Land Cover within the BRF Decontamination and Deconstruction Project Area

Prime farmland soils within the proposed decontamination and deconstruction project area and within a 1-mile radius of BRF are summarized in Table 3-1. Of the 251.8 acres that make up the proposed project area, which includes temporary use areas, approximately 7.8 acres (3.1 percent of the total area) are considered prime farmland soils. The only mapped prime farmland soil within the project area is Whitwell loam, 1 to 4 percent slopes, occasionally flooded (USDA NRCS 2022). Overall, the prime farmland soils within the proposed project area comprise 3.1 percent of the total prime farmland soils found within a 1-mile radius of the project area.

Although some of the soils within the proposed decontamination and deconstruction project area have the physical characteristics of prime farmland, the site is federal property and the area has been zoned for heavy industrial use, thereby removing them from the prime farmland category under the Farmland Protection Policy Act and its implementing regulations.

Table 3-1. Acres of Prime Farmland Soils Mapped Within the Project Area

	Decontamination and Deconstruction Project Area	1-Mile Radius of BRF
Prime Farmland		
Prime Farmland Soils (acres)	7.8	251.8
Non-Prime Farmland Soils (acres)	244.0	6,048.7
Total (acres)	**251.8**	**6,300.5**

Source: USDA NRCS 2022
Note: Numbers are rounded to the nearest tenth digit, accounting for slight discrepancy between total and the sum of the individual items.

3.1.2 Environmental Consequences

3.1.2.1 Alternative A – Full Demolition of All Structures to Three Feet Below Final Grade

3.1.2.1.1 Land Use

Under Alternative A, all buildings and structures within the proposed project area, shown on Figure 1-2, would be decontaminated and demolished to 3 feet below final grade. All buildings and structures with below grade features would be backfilled, using concrete and masonry from the demolished facilities in addition to fill from an existing, permitted, offsite borrow source. The site would be restored to grade to provide proper drainage. The land use in the project area would be changed from a heavy industrial use to a vacant vegetated area and would become available for potential redevelopment, allowing for future industrial or other economically beneficial use. While the extent of the potential future development is unknown, it is assumed that any future development would comply with uses allowed under the current zoning designation. No adverse impacts to land use within the proposed project area are anticipated under Alternative A.

Demolition debris removed from the decontamination and deconstruction project area would be transported to an existing offsite permitted landfill or to an offsite recycling facility. Additionally, fill material used during site restoration would be obtained from a previously permitted offsite borrow area. Therefore, there would be no changes to existing land use at the disposal or borrow sites. The haul routes to the offsite landfill and borrow area would utilize previously constructed roads which are already subjected to vehicular traffic and no

new roads would need to be constructed. Therefore, there would be no indirect impacts to land use associated with disposal of demolition debris or obtaining and transporting borrow material to BRF.

3.1.2.1.2 Prime Farmland

Based on USDA Natural Resources Conservation Service (NRCS) soil mapping, there are a total of approximately 7.8 acres of prime farmland with the potential to be impacted by the proposed project. However, these prime farmland soils mapped within the proposed decontamination and deconstruction project area likely have been previously impacted by the construction and operation of existing BRF facilities and therefore, would no longer be considered prime farmland.

Areas within the BRF project area that are currently undeveloped could be temporary impacted; however, deconstruction activities on undeveloped areas would not include substantial ground disturbance activities. Upon completion of the decontamination and deconstruction activities, the area would be restored. Impacts to prime farmland under Alternative A would be insignificant due to the short-term nature of the actions, the minimal acreage affected, and the zoning of the land for industrial use.

3.1.2.2 Alternative B – Selective Demolition of All Structures to Three Feet Below Final Grade, Retain Turbine Bay of Powerhouse and Intake Structure

Impacts to land use under Alternative B would be similar to those under Alternative A. Land use would change from industrial to mostly vacant; however, the turbine bay of the powerhouse and the intake structure would remain and would be available for alternative industrial uses. Impacts to prime farmland under Alternative B would also be similar to those under Alternative A.

3.1.2.3 Alternative C – No Action Alternative

Under the No Action Alternative, TVA would not perform any decontamination, deconstruction or other disposition activities and the site would remain in its current condition. Therefore, there would be no impacts to land use or prime farmland.

3.2 Geology and Groundwater

3.2.1 Affected Environment

3.2.1.1 Geologic Setting

BRF is located within the Valley and Ridge Physiographic Province, a northeast-southwest trending series of parallel ridges with elevations up to 3,000 feet and valleys composed of folded and faulted Paleozoic sedimentary rock. The primary geomorphological features are mainly the result of differential weathering of various rock types, which include limestone, dolomite, shale, sandstone, and siltstone. Residual soil typically ranges in thickness from about 10 to 150 feet (TVA 2016b).

Major units present in the area include, from youngest to oldest, the Chickamauga Group, the Knox Group, the Conasauga Group, and the Rome Formation. All are composed primarily of Ordovician and Cambrian carbonate rocks. The Chickamauga Formation underlies the main plant area. Commonly, the bedrock of this formation consists of a heterogeneous assemblage of limestone, shaly limestone, calcareous shales, and calcareous siltstones. In this case, the bedrock below the site consists of gray, mostly fine-

to medium-grained, thin- to medium-bedded, part shaly and nodular limestone. Shallow fractures, enlarged by carbonate dissolution, are more common in this formation than any other at the site. Residuum produced from the Chickamauga is a silty clay containing variable amounts of chert. In the main plant area, most of this clayey soil has been removed and the remaining residuum is expected to range in thickness from 0 to about 25 feet (Stantec 2009).

3.2.1.2 Geologic Hazards

U.S. Geological Survey (USGS) information and geologic studies conducted by TVA indicate that the proposed site and surrounding area is known to be subject to minor to moderate seismic events; faulting and karst topography are common to the area (TVA 2016c).

3.2.1.2.1 Karst Topography

"Karst" refers to a type of topography that is formed when rocks with a high carbonate (CO_3) content, such as limestone and dolomite, are dissolved by groundwater to form sink holes, caves, springs, and underground drainage systems. Karst features such as sinkholes and springs are numerous in the Valley and Ridge province, and sinkholes have been documented throughout Anderson County (TDEC 2020). As such, BRF is located in an area known to contain karst terrain. Karst features have not been identified within the project area. In addition, no significant voids or sinkholes were encountered during a hydrogeologic investigation of the proposed BRF landfill footprint (located on TVA property approximately 0.4 miles east of BRF) in 2014, and no caves or sinkholes were observed in the vicinity of the project area during field surveys conducted in 2014 (URS 2014).

3.2.1.2.2 Seismic Events

Seismic events affecting eastern Tennessee, which includes the area within the vicinity of BRF, primarily emanate from three zones of earthquake activity: 1) the New Madrid Seismic Zone (NMSZ); 2) Southern Appalachia Seismic Zone (SASZ); and 3) South Carolina Seismic Zone (SCSZ). The most active subzone of the SASZ, the East Tennessee Seismic Zone (ETSZ), extends from northwestern Georgia through east Tennessee and is situated near the plant. Most earthquakes emanating from this subzone are low in magnitude, with the largest known event in the ETSZ registering a magnitude of 4.6, suggesting a moderate risk of damage from a seismic event (Stantec 2009). The Geologic Hazards Map of Tennessee – Environmental Geology Series No. 5 shows the plant to be in Seismic Risk Zone 2 on a scale of 1 to 3, with Zone 3 being the most active risk of seismic activity (Miller 1977).

3.2.1.2.3 Seismicity and Slope Stability

As required by the CCR Rule, TVA evaluated structural and seismic stability of the surface impoundments at BRF and concluded the safety ratings under static conditions were determined to be adequate (TVA 2018). TVA ensures that all impoundment dikes are stable under static and seismic conditions and meet appropriate safety factors through continued safety inspections of structural elements to maintain stability. All surface impoundments at BRF are subject to continued care and maintenance activities.

3.2.1.2.4 Faults

A fault is "a fracture or a zone of fractures in any material along which strata on one side have been displaced with respect to that on the other side" (TVA 2016a). Faults in the

bedrock units throughout the region are responsible for the ridge and valley topography of the area (Stantec 2009). The Bull Run Thrust Fault is located southeast of BRF and the Worthington Branch, at the top of the ridgeline.

Based on a review of the USGS Quaternary Fault Map, there are no known faults or folds producing magnitude 6 or greater earthquakes during the Quaternary Period (the past 1,600,000 years, including Holocene Epoch) within or in the vicinity of BRF (USGS 2022a).

3.2.1.3 Groundwater Hydrology

There are a total of eight principal aquifers in the state of Tennessee and none are sole source aquifers (EPA 2022c). The East Tennessee Aquifer system is composed of the Valley and Ridge and Blue Ridge aquifers and is separated from other aquifer systems in Tennessee by faulting present in the western portion of the Valley and Ridge physiographic province (Brahana et al. 1986).

Groundwater flow below BRF occurs in two zones, one shallow zone just beneath the ground surface, and a second zone at the bedrock interface (TVA 2017b). Shallow groundwater underlying BRF is present in residual silty sand and gravel layers overlying bedrock and is derived from the infiltration of precipitation and from lateral inflow along the northwest boundary of the reservation (TVA 2017b). Data from past investigations and sampling at BRF indicates that the Worthington Branch and Clinch River/Melton Hill Reservoir are the principal receptors of shallow groundwater flow from the plant area (TVA 2016c). Groundwater at the bedrock interface of the Cambrian-Ordovician carbonate aquifer primarily occurs in solution openings in carbonate rocks and in fractures in sandstones and shale, up to a depth of approximately 300 feet (Brahana et al. 1986). Similarly, the groundwater flow through the Chickamauga limestone beneath the main BRF plant area is controlled by fractures that have been enlarged by the dissolution of carbonates and shales. These fractures store and transmit large volumes of water. Because the many factures and faults in the geologic units of the Valley and Ridge province influence the flow of ground water, there is no regional groundwater flow system.

3.2.1.4 Groundwater Use

The largest use of groundwater in the TVA region is for public water supply, although it is also used for industrial and mining purposes. Over half of the state's reported daily groundwater withdrawals are for public water supplies. Sixty-six percent of the water used for irrigation and almost all the water used for domestic supply in the TVA region comes from groundwater.

TVA previously conducted a survey of domestic water supplies within 1 mile of the boundary of the BRF property in 1999 and a subsequent survey was conducted in 2014 centered on the eastern portion of the site. Under the TDEC Commissioner's Order No. OGC15-0177, TVA will perform a water use survey and sampling of groundwater and surface water that may be affected by CCR constituents associated with BRF operations within 1 mile of the center of the BRF Plant. The schedule for this survey has not been established.

A review of the TDEC Water Well Desktop Application revealed that there are 13 water wells within a 1-mile radius of the project area and 63 wells within a two-mile radius (Figure 3-2) (TDEC 2022f). Of the 13 wells reported in a one-mile radius of the project area, seven are residential, two are irrigation, and the remaining four are unclassified or "other".

TVA owns two of the four unclassified wells, which are located east of the BRF project area (TDEC 2022f). It is not known if these wells are currently being used as domestic water supplies. The upcoming water use survey will determine if there are any wells or springs that are being used for domestic purposes within the 1-mile radius of the center of the BRF Plant.

Well depths range from 500 to 700 feet below the ground surface, but most of the wells are producing water at shallow depths in the Chickamauga Formation, less than or equal to 300 feet below ground surface (TDEC 2022f). None of the residential wells are located downgradient of BRF. Most residences located northeast and northwest of BRF rely on public water provided by the Clinton Utility Board. There is no current potential for future residential development of groundwater supplies downgradient of the facility because of where the facility is situated next to the Melton Hill Reservoir; all property between the facility and surface water boundaries lies within the BRF property (TVA 2019c).

3.2.1.5 Groundwater Quality

The water quality within the East Tennessee aquifer system is generally very good throughout the area (Brahana et al. 1986). The groundwater quality at BRF is dependent on the chemical composition of the aquifer in which the water occurs. Cambrian-Ordovician carbonate rock associated with the Valley and Ridge province is known for its overall hardness, dissolved solids concentrations, and areas of high sulfide or sulfate concentrations (TVA 2016a). The fractures, solution openings, and bedding planes, developed in the carbonate rocks of the Valley and Ridge province allows for rapid local ground-water movement which can make the aquifers susceptible to contamination by human activities (Lloyd 1995).

TVA has been monitoring groundwater quality at BRF since the 1980s in accordance with TDEC requirements. TVA maintains a robust network of monitoring wells at BRF that are sampled regularly for groundwater quality, with more than 750 samples collected since 1988 (Pounds 2020). Groundwater sampling performed under TDEC or CCR Rule programs indicates exceedances of maximum contaminant levels or statistically derived upper prediction limits for one or more target analyses in wells sampled under these programs (TVA 2019c).

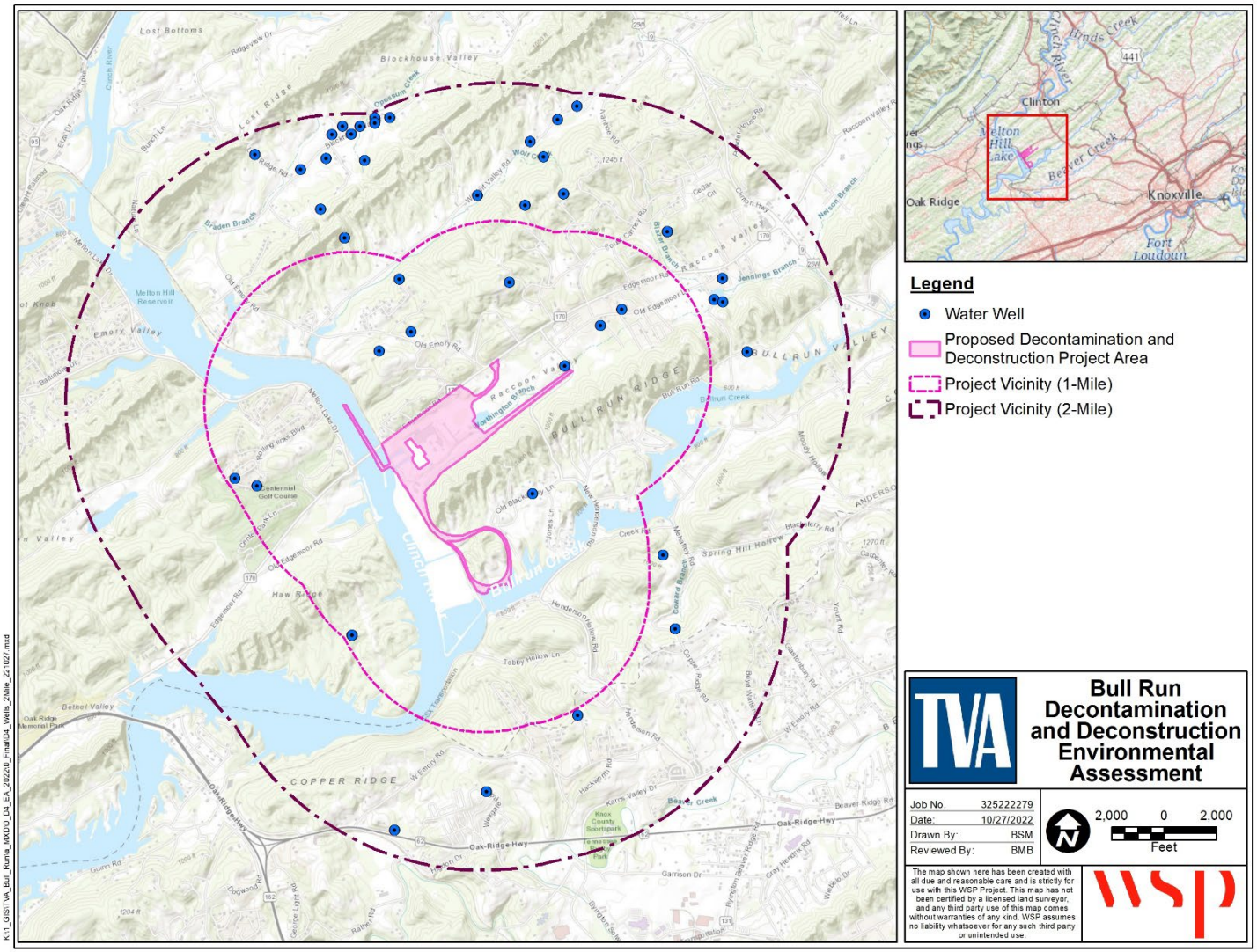

Figure 3-2. Water Wells in the Vicinity of BRF

3.2.2 Environmental Consequences

3.2.2.1 Alternative A – Full Demolition of All Structures to Three Feet Below Final Grade

Under Alternative A, all identified aboveground structures would be deconstructed to a depth of approximately 3 feet below final grade employing mechanical deconstructive or explosive techniques. All below-grade building areas would be backfilled, and the site would be restored to grade while providing proper drainage.

Given the limited depth of excavation, bedrock at the site would not be impacted. All groundwater monitoring wells within the decontamination and deconstruction project area will be avoided. Deconstruction activities associated with decontamination and demolition at BRF have the potential to release constituents that may impact shallow groundwater. However, it is not expected to impact the deeper the Chickamauga limestone beneath the main BRF plant area. BMPs would be used in accordance with the *Tennessee Erosion and Sediment Control Handbook* (TDEC 2012) during the decontamination and deconstruction activities to limit potential impact to the groundwater. In the long term, potential sources of environmental contamination associated with the buildings and structures at BRF would be removed through the decontamination and demolition of BRF. Decontamination and demolition would therefore limit the potential for contamination of groundwater from these sources and would have a positive impact on groundwater quality relative to Alternative C. Therefore, the impact to groundwater would be minor.

3.2.2.2 Alternative B – Selective Demolition of All Structures to Three Feet Below Final Grade, Retain Turbine Bay of Powerhouse and Intake Structure

Under Alternative B, impacts to groundwater and geology would be the same as those described for Alternative A and would be minor. As described for Alternative A, removal of structures on BRF even with the retention of the turbine bay of the powerhouse and the intake structure would have a positive impact on groundwater relative to Alternative C.

3.2.2.3 Alternative C – No Action Alternative

Under the No Action Alternative, TVA would not perform any decontamination or deconstruction activities and the site would remain in its current condition. There would be no impacts to geology associated with Alternative C. However, as all structures would remain in place, there would be a higher potential for long-term impacts to groundwater quality because of the higher risk of contamination as the structures degrade. Overall, the potential impacts of this alternative on groundwater would be minor, but they would be greater than those under Alternatives A and B.

3.3 Surface Water

3.3.1 Affected Environment

3.3.1.1 Surface Water

BRF is located on a 750-acre reservation on the east side of Melton Hill Reservoir at CRM 48. The site is located in Anderson County, Tennessee, in the Lower Clinch River (06010207) 8-digit hydrologic unit code subbasin. The project area boundary borders the Clinch River on Melton Hill Reservoir to the west and Bullrun Creek to the south along the rail loop.

Melton Hill Reservoir extends almost 57 miles along the Clinch River, upstream from Melton Hill Dam to Norris Dam. The reservoir provides nearly 193 miles of shoreline and 5,470 acres of water surface for recreation. Melton Hill is a run-of-river reservoir, meaning that water is passed through the reservoir without being stored long term. The water level typically fluctuates less than two feet daily (between elevation 793 and 795) (TVA 2022d). Bullrun Creek flows into the Clinch River/Melton Hill Reservoir at approximate CRM 46.7. The portion of Bullrun Creek that is adjacent to the project area is impounded and part of the reservoir.

To identify surface waters within the project area boundaries, TVA completed onsite delineations in July 2022 to identify and map streams and other surface waters that could be affected by the project. Streams and wet weather conveyances (WWCs) were identified and mapped based on applicable USACE and TDEC guidance, including TDEC Hydrologic Determination assessments.

Based on the field delineation, several surface waters are located within the project area. The Clinch River/Melton Hill Reservoir comprise the intake and discharge canals located along the western end of the BRF facility. Additionally, five perennial or intermittent streams and two WWCs were identified within the project area (Table 3-2 and Figure 3-3).

Table 3-2. Stream and WWC Features within the Project Area

Feature ID	Feature Type	Length within Project Area (feet)	Latitude & Longitude Start[1] (decimal degrees)	Latitude & Longitude End[1] (decimal degrees)
Clinch River/ Melton Hill Reservoir	River/ Reservoir	1,432	36.018853 -84.159244	36.017877 -84.161455
E001	WWC/Ephemeral Stream	1,563	36.024512 -84.152605	36.023008 -84.155456
E002	WWC/Ephemeral Stream	121	36.010888 -84.149960	36.010578 -84.150100
S001	Intermittent Stream	162	36.025555 -84.148720	36.025233 -84.149096
S002	Perennial Stream	1,651	36.023008 -84.155456	36.019625 -84.153635
S003	Perennial Stream	4,182	36.021215 -84.149534	36.015457 -84.159557
S004	Perennial Stream	466.40	36.009228 -84.153208	36.010050 -84.154643
S005	Intermittent Stream	125	36.010319 -84.153261	36.009883 -84.153486

[1]Start and end refer to the locations where the features begin and end within the project area. These coordinates do not represent the entirety of the features unless the feature occurs entirely within the project boundary.

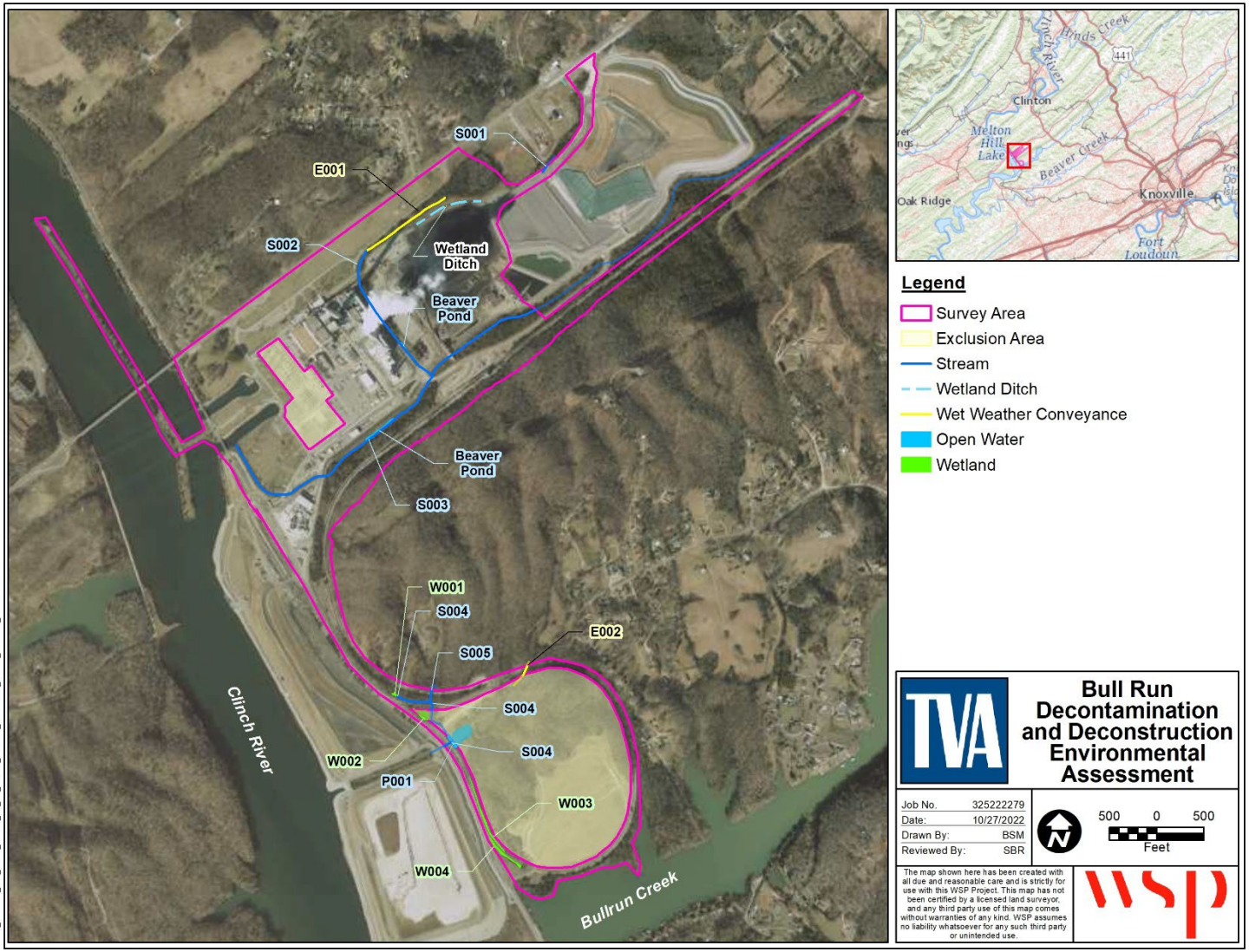

Figure 3-3. Surface Waters within the BRF Decontamination and Deconstruction Project Area

3.3.1.2 Water Quality

The Clinch River from CRM 46.7 to 50.7 is classified by TDEC for the following uses: domestic water supply, industrial water supply, fish and aquatic life, recreation, livestock watering and wildlife, irrigation, and navigation. Bullrun Creek from River Mile (RM) 0.0 (confluence with Clinch River) to RM 1.0 is classified by TDEC for the following uses: fish and aquatic life, recreation, livestock watering and wildlife, and irrigation (TDEC 2019b).

Water quality standards or criteria are established for each of these uses with the most stringent associated with domestic water supply and fish and aquatic life. TDEC assesses the water quality status of the streams, rivers, and lakes annually. Additionally, the federal CWA requires all states to identify all waters where required pollution controls are not sufficient to attain or maintain applicable water quality standards and to establish priorities for the development of limits based on the severity of the pollution and the sensitivity of the established uses of those waters. States are required to submit reports to the EPA. The term “303(d) list” refers to the list of impaired and threatened streams and water bodies identified by the state. Clinch River/Melton Hill Reservoir, including the lower portion of Bullrun Creek, is included in TDEC’s 303(d) list as impaired due to chlordane and polychlorinated biphenyls (PCBs) with the potential impairment source as contaminated sediments (TDEC 2022c).

TVA has assessed the ecological condition of Melton Hill Reservoir every two years since 1994. Ecological health evaluations focus on five indicators: dissolved oxygen (DO), chlorophyll, sediment quality, benthic macroinvertebrate community (bottom life), and the fish assemblage. TVA monitors three locations on Melton Hill Reservoir: the deep, still water near the dam (forebay, CRM 24.0); the middle part of the reservoir (CRM 45.0); and the riverlike area at the upper end of the reservoir (inflow, CRM 59.0). Only bottom life and the fish assemblage are assessed at the inflow monitoring location. The overall ecological condition of Melton Hill Reservoir rated at the upper end of the “fair” range in 2018. Melton Hill has rated “fair” most years. Higher ratings (“good”) in 2006, 2010, and 2016 were contributed to two indicators, chlorophyll and bottom life, scoring near the upper end of their historic ranges. In 2016, fish community scores were also at the upper end of their historic ranges, which contributed to the reservoir’s higher overall score (TVA 2022e).

3.3.1.3 Industrial and Stormwater Discharges

BRF has several existing wastewater streams that are permitted under NPDES Permit TN0005410, which authorizes BRF to discharge to the Clinch River at CRM 46.3. Effluent from the plant includes ash transport water, coal pile runoff, low volume wastes, stormwater runoff, miscellaneous equipment cooling and lubricating water from Outfall 001, main condenser cooling water, miscellaneous equipment cooling and lubricating water and roof drains from Outfall 002, intake screen backwash water through Outfall 004, and operation of the cooling water intake structure. Discharges are limited and monitored by TVA as outlined in the permit conditions (TN0005410).

TDEC issued a draft of a Modification of NPDES Permit No. TN0005410 on August 30, 2022, due to revisions to Steam Electric effluent limitation guidelines per 40 CFR 423, including additional subcategories and reporting requirements resulting from TVA’s decision in 2019 to retire BRF in 2023 (TDEC 2022b).

Following activities associated with the retirement of BRF in 2023, coal burning operations would cease resulting in a substantial reduction of wastewater discharges into the Clinch

River/Melton Hill Reservoir from Outfalls 001 and 002. Discharge flows upon retirement would come from fire protection water, main station sumps/unwatering sumps, and stormwater flows. Additionally, withdrawals of cooling water would be eliminated. Management of the onsite stormwater and process wastewater is currently routed to a new onsite non-CCR process water basin through the lined conveyance channel to enable the proper handling and treatment of the waste streams.

Stormwater discharges from BRF are permitted under TDEC's General Permit for Stormwater Discharges associated with Industrial Activity, Permit No. TNR053185 (expiration 06/20/2025). BRF's permitted outfalls discharge to the Clinch River and Worthington Branch.

3.3.2 Environmental Consequences

3.3.2.1 Alternative A – Full Demolition of All Structures to Three Feet Below Final Grade

As discussed in Section 2.1.1, Alternative A includes the proposed decontamination and deconstruction of the buildings and structures within the proposed project area to 3 feet below final grade. Following these activities, disturbed areas would be covered with topsoil and seeded or otherwise permanently stabilized.

Wastewaters generated during the implementation of Alternative A may include construction stormwater runoff, dewatering of work areas, domestic sewage, non-detergent equipment washings, and dust control.

3.3.2.1.1 Potential Alteration of Surface Waters

The USACE regulates the placement of fill material into waters of the U.S. (WOTUS) pursuant to Section 404 of the CWA (33 United States Code [USC] 1344). Any work conducted in jurisdictional waters could trigger permitting requirements under the CWA and/or the Tennessee Water Quality Control Act. Actions may require a Section 404 permit administered by the USACE and/or Section 401 WQC or ARAP administered through TDEC's permitting program depending on the project impacts and location. However, no existing streams and other surface waters onsite would be altered or filled by project activities. To the extent practicable, TVA would establish an average 30-foot buffer around the delineated streams and preclude any ground disturbing actions within the buffer to avoid placing fill material into the streams and minimize sedimentation.

Minor indirect impacts could occur to surface waters within and adjacent to the project area. Mitigation measures, such as turbidity curtains in adjacent waters, would be considered to help mitigate any indirect impacts that may result from sedimentation in receiving streams. With the implementation of BMPs, as well as compliance with the requirements of the USACE and TDEC permitting programs, impacts to surface water would be minor. In the event CWA permits are required, any applicable compensatory mitigation for impacts to streams and/or other surface waters would be identified through the permitting process.

3.3.2.1.2 Construction-related Stormwater and Other Discharges

Demolition activities have the potential to temporarily affect surface water via stormwater runoff. TVA would comply with all appropriate state and federal permit requirements. TVA would obtain coverage under the General Permit for Stormwater Discharges Associated with Construction Activities (TDEC 2021) prior to beginning demolition. This permit requires

the development of a project-specific SWPPP. Surface water impacts resulting from disturbances during demolition would be mitigated by the use of stormwater pollution prevention BMPs to minimize the extent of disturbance and erosion. The Tennessee Erosion and Sediment Control Handbook would be referenced to ensure BMPs used during demolition are appropriate (TDEC 2012). Stormwater would discharge either to the existing permitted stormwater discharge points or designated construction stormwater outfalls.

BMPs would be installed, inspected, and maintained for the duration of demolition and restoration as needed to avoid contamination of surface water adjacent to the proposed decontamination and deconstruction project area. All proposed project activities would be conducted in a manner to ensure that waste materials are contained and the introduction of pollution materials to the receiving waters would be avoided. Monitoring of current industrial stormwater outfalls would continue throughout the demolition process, with modifications as necessary and approved by TDEC, if applicable. Therefore, only temporary, minor impacts to surface water quality would be expected due to surface water runoff from the demolition site.

Portable toilets would be provided for the additional construction workforce as needed. These toilets would be pumped out regularly, and the sewage would be transported by tanker truck to a publicly owned wastewater treatment works that accepts pump out. There would be no discharge to adjacent surface water, and therefore, no impacts to surface water quality are expected.

Alternative A would potentially release fugitive dust to adjacent surface waters during demolition activities. This action would result in the generation of fugitive dust and debris, which would then be subject to potential erosion and transport to adjacent surface water. BMPs to control and minimize fugitive dust would be described in the project's SWPPP.

To seal the cooling water intake and discharge, bulkheads may be installed, and the work would be conducted in accordance with BMPs intended to avoid release of sediments or contaminants to surface water. The installation process would not be expected to cause adverse impacts to surface water quality as long as the proper BMPs are utilized. Once decontamination and deconstruction are completed and deconstructed areas are restored, impacts associated with deconstruction activities and construction stormwater runoff would cease. With the implementation of appropriate BMPs and compliance with all federal, state, and local regulations and guidelines, only temporary, minor impacts to surrounding surface waters are expected from deconstruction and demolition activities.

3.3.2.1.3 Long-term Industrial and Stormwater Discharges

With the coal-fired units no longer in operation after December 2023, the only significant remaining flows at BRF would be stormwater flows and some ancillary process water flows, like sump discharges and equipment washdowns. Any remaining minor flows would be directed to treatment systems such as the non-CCR process water basin as necessary to comply with the BRF NPDES permit and the CCR Rule. BMPs and wastewater treatment would be employed, as needed, to mitigate any pollutant discharge.

Stormwater would continue to be discharged from current or new permitted stormwater outfalls. BMPs and mitigation measures would be employed, as needed, to mitigate any adverse pollutant discharges. The specific characteristics of future discharges are unknown at this time. However, the total loadings to the Clinch River should decrease from current generating conditions, which would lead to beneficial impacts.

There would be no ongoing potential for direct discharges of chemicals, hazardous waste, or solid waste, because all equipment, structures, and contaminated soil would be removed from the decontamination and deconstruction area. There would be no requirement for periodic inspections, maintenance, or BMPs to ensure that any contaminated equipment would not impact surface water quality.

With the use of proper BMPs and compliance with all federal, state, and local regulations and guidelines, surface water impacts associated with Alternative A would be expected to be short-term and minor.

3.3.2.2 Alternative B – Selective Demolition of All Structures to Three Feet Below Final Grade, Retain Turbine Bay of Powerhouse and Intake Structure

Implementation of Alternative B would have similar impacts to surface waters as Alternative A. In the short term, potential runoff from these areas would not contribute to stormwater impacts, as there would be less land disturbance. Additionally, the cooling water intake and discharge would not be sealed; therefore, there would be no impacts related to the installation of bulkheads. Consequently, impacts under Alternative B would be short-term and minor, and are expected to be less than those under Alternative A.

3.3.2.3 Alternative C – No Action Alternative

Under the No Action Alternative, it is assumed that TVA would be required to continue operating some sumps and stormwater systems at the retired facility. TVA would continue to restrict access to BRF, perform periodic inspections and critical maintenance as needed, and conduct environmental monitoring and reporting as required by existing permits. Leaving the facility in place would present a higher risk of impacts to surface water than Alternatives A or B based on the potential for unpermitted releases of sediment, chemicals, and solid waste.

Permits would continue to be renewed with applicable monitoring requirements included. Permits and associated pollution prevention plans would be modified to indicate the changes from current conditions. The scope of this document does not include the long-term management of the onsite CCR surface water impoundments. Discharge of the sumps and stormwater have been rerouted away from the CCR surface water impoundments to ensure these discharges are still appropriately handled through the TDEC NPDES permit program. Minor impacts are anticipated with this alternative as long as facilities are maintained.

3.4 Floodplains

3.4.1 Affected Environment

A floodplain is the relatively level land area along a stream or river that is subject to periodic flooding. The area subject to a one percent annual chance of flooding (100-year flood) in any given year is normally called the 100-year floodplain. It is necessary to evaluate development in the 100-year floodplain to ensure that the project is consistent with the requirements of EO 11988, Floodplain Management.

The proposed BRF decontamination and deconstruction project would be located on the Clinch River on Melton Hill Reservoir between CRM 46.7 to 48.5, left descending bank, and Bullrun Creek RM 0.5 to 1.0, right descending bank, in Anderson County, Tennessee.

At this location, the 100-year flood elevations vary along the Clinch River and are presented in Table 3-3. The drainage area of Bullrun Creek is approximately 104 square miles (USGS 2022b); the drainage area of the Clinch River just upstream of the confluence with Bullrun Creek is approximately 3,100 square miles (USGS 2022b). Because the drainage area of the Clinch River at Bullrun Creek is far greater than the drainage area of Bullrun Creek, the 100-year flood elevations on the Clinch River would govern water surface elevations in a 100-year flood.

Table 3-3. Flood Elevations along the Clinch River and Bullrun Creek

Stream Reach	100-Year Flood Elevation	500-Year Flood Elevation
Bullrun Creek Miles 0.5 to 1.0	797.2	797.9
Clinch River Mile 46.7	797.2	797.9
Clinch River Mile 48.5	797.3	798.2

Based on FEMA Flood Insurance Rate Map Panel number 47001C0245G, effective 5/4/2009, the intake channel, intake structure, and discharge channel, as well as the outlet of Worthington Branch where it drains into the discharge channel are located within the 100-year floodplain (Zone AE). The remaining facilities shown in Figure 1-2 are located outside the 100-year floodplain of the Clinch River and Bullrun Creek.

3.4.2 Environmental Consequences

As a federal agency, TVA adheres to the requirements of EO 11988 (Floodplain Management). The objective of EO 11988 is “to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative….” (EO 11988). The EO is not intended to prohibit floodplain development in all cases, but rather to create a consistent government policy against such development under most circumstances (U.S. Water Resources Council 1978). The EO requires that agencies avoid the 100-year floodplain unless there is no practicable alternative.

3.4.2.1 Alternative A – Full Demolition of All Structures to Three Feet Below Final Grade

Alternative A would include the decontamination and deconstruction to 3 feet below final grade of the powerhouse and buildings and structures within the project area shown in Figure 1-2. With the exception of portions of the intake structure (including a small fuel tank), intake tunnel, and discharge tunnel, all the facilities proposed to be removed under this alternative are located outside of 100-year floodplains. Demolition of the facilities outside the floodplain and above the 100-year flood elevation would have no effect on floodplains, which would be consistent with EO 11988.

The intake and discharge tunnels would be abandoned in place by most likely installing bulkheads inside the tunnels, which are located underground, inland of the intake structure. Capping underground tunnels inland of the intake and discharge channels would have no impact on flood elevations and would therefore be consistent with EO 11988.

Equipment removal from the top of the intake structure would be located above the 100-year flood elevation, which would have no impact on flood elevations, and would therefore be consistent with EO 11988. A fuel tank is located underneath and to the side of the intake structure. The exact elevation of the fuel tank and its adjoining containment wall are not known; however, should they be located within the 100-year floodplain, they are designed to be floodable, which minimizes adverse impacts. The tank, piping, and controls would be removed as part of the decontamination and deconstruction project; therefore, it would be consistent with EO 11988. The traveling intake screens are located within the 100-year floodplain. The screens allow water to flow through, and their removal would have a de minimis impact on flood elevations, which would therefore be consistent with EO 11988.

Melton Hill Reservoir does not have flood storage; therefore, the TVA Flood Storage Loss Guideline does not apply.

To minimize adverse impacts on natural and beneficial floodplain values, the following mitigation measures would be implemented:

- Standard BMPs would be used during demolition and deconstruction activities
- Demolition and deconstruction material would be disposed of outside of 100-year floodplains

Based upon implementation of the above mitigation measures, the proposed deconstruction and demolition of BRF under Alternative A would have no significant impact on floodplains and their natural and beneficial values.

3.4.2.2 Alternative B – Selective Demolition of All Structures to Three Feet Below Final Grade, Retain Turbine Bay of Powerhouse and Intake Structure

Alternative B includes the actions described under Alternative A, except that the turbine bay of the powerhouse and the equipment on top of the intake structure and traveling screens would remain in place. The fuel tank would be removed as described in Alternative A.

The turbine bay of the powerhouse is located outside of 100-year floodplains; therefore, leaving it in place would cause no changes to current conditions within the floodplain. The equipment on top of the intake structure and traveling screens would remain in place, which would also cause no changes to current conditions within the floodplain. Fuel tank removal would have the same impacts as described in Alternative A.

3.4.2.3 Alternative C – No Action Alternative

Under the No Action Alternative, all existing buildings, structures, and equipment within the proposed decontamination and deconstruction project area would remain in place and would result in no changes to the existing conditions found within the local floodplains. Therefore, there would be no physical changes to the current conditions found within the local floodplains. Therefore, the impacts to the floodplain would be the same as Alternative B.

3.5 Wetlands

3.5.1 Affected Environment

Wetlands are those areas inundated or saturated by surface or groundwater such that vegetation adapted to saturated soil conditions are prevalent. Examples include bottomland

forests, swamps, wet meadows, isolated depressions, shallow embayments, and shoreline fringe wetland along the edges of watercourses, impoundments, or lake systems. Wetlands provide many societal benefits such as toxin absorption and sediment retention for improved downstream water quality, stormwater impediment and attenuation for flood control, shoreline buffering for erosion protection, and provision of fish and wildlife habitat for commercial, recreational, and conservation purposes.

The USACE regulates the placement of fill material into WOTUS including wetlands, pursuant to Section 404 of the CWA (33 USC 1344). Additionally, EO 11990 (Protection of Wetlands) requires federal agencies to avoid, to the extent possible, adverse impacts to wetlands and to preserve and enhance their natural and beneficial values.

TVA completed onsite delineations of wetlands with the project area in July 2022 to identify and map surface water resources, including wetlands, that could be affected by the project. Wetlands were identified and mapped in accordance with the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region* (Regional Supplement) (USACE 2012).

Four potentially jurisdictional wetlands (W001, W002, W003, and W004), a wetland ditch feature, and one pond (P001) were identified and delineated during the field survey within the project area (Table 3-4 and Figure 3-3).

Wetlands within the project area are located south of the main facility adjacent to the rail loop. Linear herbaceous wetlands are dominated by cattails, sedges, and rushes and occur within swales adjacent to the railroad bed along the rail loop. Additionally, two small, forested wetlands are located at the top of the rail loop, as shown in Figure 3-3. Dominant species include black willow, red maple, and green ash with an herbaceous layer of rushes, poison ivy, and Japanese stiltgrass. The wetland ditch identified on Figure 3-3 is a linear manmade ditch containing hydrophytic vegetation, including cattails. The ditch was likely constructed to collect stormwater runoff from the coal yard and is therefore not likely to be considered a jurisdictional wetland by the USACE. There is also an approximately 1.4-acre pond inside the rail loop; however, only a small portion of the pond (0.03 acre) falls within the project area.

Table 3-4. Wetlands and Open Water Features within the Project Area

Wetland ID	Wetland Type[1]	Size Within Project Area (acres)	Potential Jurisdictional Status[2]	Latitude[3] (decimal degrees)	Longitude[3] (decimal degrees)
W001	PFO	0.02	J	36.010095	-84.154750
W002	PFO	0.03	J	36.009544	-84.153780
W003	PEM	0.15	J	36.005565	-84.151213
W004	PEM	0.13	J	36.005770	-84.151218
P001	PUB	0.03	J	36.008785	-84.152539
Wetland Ditch	DITCH	0.13	Non-J	36.024390	-84.151970

Wetland ID	Wetland Type[1]	Size Within Project Area (acres)	Potential Jurisdictional Status[2]	Latitude[3] (decimal degrees)	Longitude[3] (decimal degrees)

[1]PEM = Palustrine, emergent
PFO = Palustrine, forested
PUB = Palustrine, unconsolidated bottom

[2]J = USACE Jurisdictional – USACE is responsible for final jurisdictional determination WOTUS decisions for wetlands
Non-J = USACE Non-Jurisdictional

[3]Latitude and longitude coordinates are representative of general center points of delineated wetland features

3.5.2 Environmental Consequences

3.5.2.1 Alternative A – Full Demolition of All Structures to Three Feet Below Final Grade

Implementation of Alternative A would have no long-term impacts to wetlands, as wetlands within the vicinity of project activities would be avoided. No wetland fill is proposed. Potential minor indirect impacts during the demolition process could include erosion and sedimentation from stormwater runoff into nearby wetlands. BMPs and site-specific erosion control plans would be implemented to minimize this potential. To the extent practicable, TVA would establish an average 30-foot buffer around the delineated wetlands and preclude any ground disturbing actions within the buffer to avoid placing fill material into the wetlands and minimize sedimentation. Therefore, indirect impacts to wetland areas due to construction activities would be short-term and minor.

3.5.2.2 Alternative B – Selective Demolition of All Structures to Three Feet Below Final Grade, Retain Turbine Bay of Powerhouse and Intake Structure

Implementation of Alternative B would have similar potential impacts to wetlands as Alternative A. There are no wetlands delineated near the turbine bay of the powerhouse or the intake structure; therefore, there would be no change in the impacts as described for Alternative A.

3.5.2.3 Alternative C – No Action Alternative

The No Action Alternative would not result in impacts to wetlands, because the decontamination and deconstruction project area would remain in its current condition.

3.6 Aquatic Ecology

3.6.1 Affected Environment

BRF is located on the Melton Hill Reservoir, an area of the Clinch River that is impounded by the Melton Hill Dam (TVA 2016c). Other water resources in the vicinity of the plant include Bullrun Creek, a stream that flows into the Clinch River directly downstream of BRF at CRM 46.7. Surface water features delineated within the project area are described in Section 3.3. Operations of the plant utilize the Clinch River/Melton Hill Reservoir for water intake and discharge.

3.6.1.1 Habitat Quality

TVA assesses the ecological health of its reservoirs on a cyclical basis and has assessed Melton Hill Reservoir every two years since 1994. The ecological health of Melton Hill

Reservoir is assessed based upon indicators of DO, chlorophyll, sediment quality, benthic macroinvertebrate community, and fish assemblage. Health ratings include good, fair, and poor (from high to low), and an overall reservoir rating and score are provided based on the combined health ratings from all measured reservoir locations. In 2018, the overall ecological health condition of Melton Hill Reservoir was in the 'fair' range (TVA 2022b).

A 2016 biological monitoring survey of the reservoir found that the shoreline habitat was 'poor' in the reach downstream of BRF (i.e., the downstream reach) and fair in the reach upstream of BRF (i.e., the upstream reach). No aquatic macrophytes were observed in the upstream reach (TVA 2017a). The presence of aquatic macrophytes, however, varies from year to year depending on flow conditions and other factors. The downstream reach also had substrate of algae, aquatic macrophytes, and clay while the upstream reach also had substrates of gravel, bedrock, and sand (TVA 2017a).

During the 2016 survey, water temperatures in the Clinch River/Melton Hill Reservoir within the thermal plume were at least 3.6°F above the upstream ambient surface water temperature. Downstream increased ambient temperature could also be related to warm inflow from nearby tributary streams in addition to the thermal plume, as evidenced by increased temperatures observed when BRF was not in operation (TVA 2017a; TVA 2019c). Water quality monitoring during the 2016 biological survey found that conductivity, DO, and pH were found to be within acceptable ranges both upstream and downstream from BRF (TVA 2017a).

In 2018, DO ratings were in the 'good' range. DO has rated 'good' at the mid-reservoir location all years monitored and typically has rated 'good' at near the Melton Hill Dam unless there was an extended dry period, which reduced flows through the reservoir (TVA 2022b). Chlorophyll content rated 'fair' to 'good' in 2018 (TVA 2022b). Sediment quality rated 'good' in 2018, as no PCBs or pesticides were detected and concentrations of metals (i.e., arsenic and copper) were within acceptable ranges (TVA 2022b).

3.6.1.2 Benthic Macroinvertebrate Community

During the 2016 biological survey of Clinch River/Melton Hill Reservoir in the vicinity of BRF, the macroinvertebrate community was sampled within and upstream and downstream of the thermal plume created by plant thermal discharge. Downstream of the thermal plume, an average of 13.6 taxa were collected, while an average of 15.9 taxa were collected within the plume, and an average of 10.7 taxa were collected at the upstream of the thermal plume (TVA 2017a).

Diversity of certain taxa of aquatic macroinvertebrates, such as *Ephemeroptera*, *Plecoptera*, and *Trichoptera* (EPT) taxa is indicative of good habitat and water quality conditions. In the 2016 biological survey, the average number of EPT taxa collected below and within the plume were 1.2 and 1.0, respectively, and the average number of EPT taxa collected upstream was 0.6 (TVA 2017a). The average proportion of oligochaetes in each sample was high at all three sampling sites. The samples from the site below the thermal plume contained an average of 36.1 percent oligochaetes, samples within the plume contained an average of 30.4 percent oligochaetes, and upstream site samples contained an average of 51 percent oligochaetes (TVA 2017a). Average macroinvertebrate densities excluding chironomids and oligochaetes ranged from 1,116.7 square meters at the downstream sites to 4,343.3 square meters at the upstream site, which is indicative of good water quality conditions (TVA 2017a). Data collected from sites within and below the thermal plume downstream from BRF produced a good Reservoir Benthic

Macroinvertebrate Index score of 29, and data from the upstream site produced a slightly lower good score of 27 (TVA 2017a).

A 2010 survey of the mussel community in the Clinch River/Melton Hill Reservoir adjacent to BRF found only four mussels, consisting of three common species, the mapleleaf, fragile papershell, and threehorn wartyback (Third Rock Consultants 2010). No shellfish subject to entrainment or impingement occur in the vicinity of the BRF intake (TVA 2007; TVA 2016c).

3.6.1.3 Fish Community

In 2018, a total of 47 fish species were observed in the Melton Hill Reservoir (TVA 2022b). Abundant fish species collected in the reservoir include bluntnose minnow, spotfin shiner, green sunfish, largemouth bass, bluegill, common carp, channel catfish, and Mississippi silverside (TVA 2015).

In sampling of the fish community between 2001 and 2016, in all surveys except the 2016 biological assessment, more native species have been collected downstream of BRF than upstream. In 2016, 31 native species were collected in the downstream reach, 32 native species were collected in the upstream reach, and five non-native species were collected in both reaches (TVA 2017a). Species diversity in the transition zone of Melton Hill Reservoir is limited due to the cooler water released from Norris Reservoir (TVA 2015).

In the 2016 assessment of the biological community, the Reservoir Fish Assemblage Index score for the downstream reach was found to be 46, while the score for upstream sampling locations was found to be 42. This indicates that the fish community in the downstream reach exhibited an ecological structure and balance equal to or better than that of the control reach upstream (TVA 2017a). During this assessment, fish in the downstream reach from BRF had a higher occurrence of anomalies, indicating less favorable environmental conditions (TVA 2017a). The downstream reach was also found to have fewer occurrences of pollutant tolerant species than the upstream reach (TVA 2017a).

An entrainment study for BRF was conducted in 2013-2015. Entrainment occurs when organisms small enough to pass through intake screens (i.e., plankton, fish eggs and larvae, benthic organisms, and small fish) of the cooling water intake structures enter the condenser circulation water system (Chow et al. 1981). During the 2013-2015 entrainment characterization study, samples were taken from transects near the intake structures and within the reservoir. A total of 571 and 339 fish eggs were collected from the intake and reservoir transects combined during years one (2013) and two (2014), respectively. The total number of fish larvae collected were notably different between year one (1,024 total) and year two (76,185 total). Variation across years is likely attributed to differences in flow and water temperatures. Total taxa across years one and two were similar, with 15 species collected in year one and 18 species collected in year two. Approximately 20.3 million fish eggs and 535 million fish larvae were estimated to pass the BRF during the study years, while an estimated 10.4 million fish eggs and 488 million fish larvae were entrained over the two-year study period. Therefore, total annual entrainment was estimated at 51.5 percent for fish eggs and 91.1 percent for fish larvae. High densities of fish larvae collected in intake samples indicate that spawning and nursery areas are present just upstream of the intake structures (TVA 2019c).

An impingement study for BRF was conducted in 2005-2007. Impingement occurs when organisms too large to pass through the intake screens (i.e., large fish or shellfish) are physically impacted through direct contact with intake screens (Chow et al. 1981). During

this impingement study, samples were collected weekly from the BRF cooling water intake screens. In total, 8,006 fish were collected in year one (2005) of the study and 22,390 fish were collected during year two (2006). Estimated total impingement of fish for each year were 56,042 for year one and 156,730 for year two. Total number of species collected across years (23 species in year one and 21 species in year two) were similar. The increase between years was due to the tripling of threadfin shad impingement from 41,769 in year one to 152,971 in year two. Survival of impinged fish to harvestable size or to provide forage was estimated at 3,174 and 6,216 across years one and two, respectively (TVA 2007).

The retirement of BRF in 2023 will result in long-term minor positive impacts on the fish community, as entrainment and impingement will no longer occur, thereby eliminating a source of mortality of fish eggs, fish larvae, and fish (TVA 2019c).

3.6.1.4 Melton Hill Reservoir Fishery

Melton Hill Reservoir is a popular location for recreational fishing. Important recreational fish species in the reservoir include muskellunge, striped bass, largemouth bass, smallmouth bass, bluegill, redear sunfish, striped bass, yellow bass, white bass, crappie, catfish, rock bass, walleye, and sauger (Tennessee Wildlife Resources Agency [TWRA] 2022). Thermal effluent from BRF attracts fish during cooler months, which provides a unique fishing opportunity in Melton Hill Reservoir from early winter to late spring (TVA 2019c). In the 2014 biological surveys of the Clinch River/Melton Hill Reservoir performed by TVA, 17 commercially valuable and 20 recreationally valuable fish species were collected near CRM 45.0 and 10 commercially valuable and 16 recreationally valuable species were collected near CRM 52.0 (TVA 2015). TDEC has issued a fish consumption advisory for Melton Hill Reservoir due to PCB contamination (TDEC 2019a).

The retirement of BRF in 2023 will result in long-term minor negative impacts on the Melton Hill Reservoir fishery, as the loss of the warm-water thermal effluent has been shown to increase abundance of target game fishes, such as muskellunge, within the reservoir (TVA 2019c).

3.6.2 Environmental Consequences

3.6.2.1 Alternative A – Full Demolition of All Structures to Three Feet Below Final Grade

Under Alternative A, all intake and discharge tunnels would be abandoned in place by installing bulkheads. Therefore, no in-water work is anticipated. Potential indirect impacts to aquatic resources could result from stormwater runoff during demolition activities. Increased sedimentation and erosion as a direct result of demolition activities may result in temporarily increased turbidity and decreased water quality within the Clinch River/Melton Hill Reservoir. This disturbance could extend into the convergence with nearby Bullrun Creek. Increases in turbidity can result in loss of benthic habitats, smothering of aquatic macroinvertebrates, and loss of fish habitat (Bilotta and Brazier 2008). Surface water runoff from demolition activities would be mitigated through the implementation of storm water erosion controls in accordance with a SWPPP, which would be prepared for this project. Monitoring of current industrial storm water outfalls would continue throughout the demolition process, with modifications as directed by the SWPPP. Therefore, only short-term, minor impacts to aquatic ecology of Clinch River/Melton Hill Reservoir would be expected due to surface water runoff during demolition.

Aquatic resources are likely to remain as described in Subsection 3.6.1. The removal of potentially hazardous structures and materials from BRF decreases the likelihood of potential leakage of pollutants or heavy metals into the Clinch River/Melton Hill Reservoir. Therefore, there would be negligible long-term impacts to aquatic habitats, fish, macroinvertebrates, or the recreational fishery under this alternative.

3.6.2.2 Alternative B – Selective Demolition of All Structures to Three Feet Below Final Grade, Retain Turbine Bay of Powerhouse and Intake Structure

Under Alternative B, decontamination and selective demolition of BRF would occur. Under this alternative, the existing intake structure would be left in-place in "as-is" condition; therefore, no in-water work is anticipated. Impacts to aquatic habitats under Alternative B would be similar to those expected to occur under Alternative A.

3.6.2.3 Alternative C – No Action Alternative

Under the No Action Alternative, the facility would be left "as-is" and conditions would remain as described in Section 3.6.1. Under this alternative, there would be no work within the Clinch River/Melton Hill Reservoir. However, potential leakage of hazardous chemicals or heavy metals could result in localized, negative impacts to habitat quality and downstream aquatic communities. These impacts have the potential to result in long-term adverse impacts to the Clinch River aquatic communities, including the Melton Hill Reservoir recreational fishery. Pollutants such as heavy metals can adversely impact the survivability and physiological processes (i.e., growth, reproduction, immune and endocrine system function, development), and behavior of aquatic organisms (Baby et al. 2011). Therefore, under this alternative, there would be long-term, indirect, and adverse impacts on the aquatic ecology of the Clinch River/Melton Hill Reservoir in the vicinity of BRF.

3.7 Wildlife

3.7.1 Affected Environment

The decontamination and deconstruction project area has been heavily disturbed and altered for many years due to the construction and operation of BRF. However, there are several areas of herbaceous (approximately 53 acres) and forested (approximately 52 acres) habitat within the project area. More information on wildlife species that may use these habitat areas is included in Appendix B.

Some wildlife species are known to use man-made structures opportunistically. Common mammals, birds, and reptiles have been observed using parts of buildings abandoned or used infrequently by humans. Several species of bats commonly found in this region such as big brown bats and eastern red bats may roost in abandoned, dark, or quiet areas of buildings (Harvey 1992). A single bat was observed by BRF staff roosting near the edge of a culvert located south of the coal pile at BRF in the summer of 2016 (S. Stagnolia, Personal Communication). It is likely that this was a transitionally roosting bat. Field surveys in May 2020 did not detect bats nor signs (e.g., guano or staining) that bats were using or previously had used this culvert. Birds, both migratory and year-round residents, may also roost in buildings or areas of buildings that are used infrequently.

The forested areas within the project area include small forest stands in the northwestern portion of the reservation, the narrow forest fragment that bisects the powerhouse buildings and the coal yard, and other forested strips along the rail line and on either side of the coal yard. These areas are mature forest, but they are very dense with Chinese privet and

Japanese honeysuckle in the understory. Several species of birds use forest edges and fragments in this region. Where there are snags and pockets of less dense understory, there may be moderate quality foraging and roosting habitat for several species of bat, as well as habitat for small mammals and reptiles.

Fields within the project area are almost entirely comprised of mowed grass or otherwise heavily disturbed mowed herbaceous habitat. These areas do not offer suitable habitat for rare wildlife species, but they can be used by common species. Emergent and palustrine wetlands and saturated WWCs within field settings provide habitat for common amphibians and reptiles.

Review of the TVA Regional Natural Heritage database in May 2022 indicated that three caves are known to occur within 3 miles of the project area, the closest of which is approximately 2.2 miles away. In addition, one colonial wading bird colony has been documented 1.3 miles from the project area. Field surveys in May 2022 also documented a colony of cliff swallows actively nesting on the sides of the water intake structure.

Review of the USFWS Information for Planning and Consultation (IPaC) database (USFWS 2022) indicated that several migratory bird species of concern have the potential to occur in the project area. These include bald eagle, Canada warbler, eastern whip-poorwill, Kentucky warbler, prairie warbler, prothonotary warbler, red-headed woodpecker, rusty blackbird, and wood thrush. There are sections of forested habitats throughout the project area that offer suitable habitat for one or more of these bird species.

3.7.2 Environmental Consequences

3.7.2.1 Alternative A – Full Demolition of All Structures to Three Feet Below Final Grade

Alternative A would result in disturbance and displacement of common and habituated wildlife in the project area due to the permanent removal of some structures and pavement demolition. Noise disturbance is expected to be short-term and not above levels normally encountered by wildlife in and around BRF. Displaced wildlife may move into adjacent areas with similarly disturbed habitat common around the project area. It is likely that common, opportunistic foragers such as raccoons, possums, rats, and mice would enter the remaining structures in an attempt to find food or shelter. Direct effects from building demolition activities may occur to some individuals that may be immobile during the time of deconstruction (i.e., juvenile animals or eggs), especially if during breeding/nesting seasons. However, because the project area is fragmented and disturbed, and faunal communities residing there are considered common, adverse impacts during project activities would be minor.

In May 2022, all buildings with the potential to be demolished under this alternative were surveyed and assessed for potential future use by wildlife. At the time of the survey, most buildings were still being used for plant operations, and few wildlife were observed except for nesting osprey, discussed in Subsection 3.9, and an active colony of cliff swallows using the side of the intake structure. Only the equipment on the top of the intake structure (e.g., motors) is proposed for demolition, and the area on the concrete structure where the swallows are nesting would not be disturbed. Any actions associated with the project that may substantially disturb this colony, such as removal of pumps and screens, would be performed while nests are inactive. Therefore, impacts to the nesting colony would be minor.

Surveys did determine that several buildings may offer potentially suitable habitat for bats or other wildlife species once buildings are vacated. An extensive survey of these buildings, particularly the warehouses, utility buildings, and powerhouse, would be performed at least one month prior to deconstruction to determine if they are being used migratory birds or other protected wildlife. If the timing of deconstruction/demolition activities cannot be modified to avoid nesting seasons of migratory birds observed during future surveys, coordination with USDA – Wildlife Services would be required for guidance to ensure compliance under EO 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds). If colonies of bats or other protected wildlife species are observed in buildings proposed for demolition, TVA would coordinate with the appropriate state and federal agencies to minimize impacts.

All migratory birds of conservation concern identified by the USFWS IPaC database require forested habitat for some or all of their life history. No tree removal is proposed under this alternative; therefore, impacts to these species are not anticipated. Potential impacts to the bald eagle are discussed in Subsection 3.9 (Threatened and Endangered Species).

The closest known caves are greater than 2 miles away. No impacts to these cave habitats are expected because of the substantial distance from proposed actions. Implementation of Alternative A would have no long-term impacts to wetland habitats as wetlands within the project area would be avoided. Potential minor indirect impacts during demolition could include erosion and sedimentation from stormwater runoff into nearby wetland or stream habitat. BMPs and site-specific erosion control plans would be implemented to minimize this potential. Therefore, indirect impacts to wildlife species that use wetland habitats would be short-term and minor.

3.7.2.2 Alternative B – Selective Demolition of All Structures to Three Feet Below Final Grade, Retain Turbine Bay of Powerhouse and Intake Structure

Because the turbine bay of the powerhouse and the entire intake structure would be retained under Alternative B, impacts to wildlife would be similar to or less than those described for Alternative A. The intake structure would be left in “as is” condition under this alternative; consequently, the barn swallow colony that nests on the intake structure would not be affected.

3.7.2.3 Alternative C – No Action Alternative

Under the No Action Alternative, TVA would not perform any deconstruction or other disposition activities at BRF. If the facility is left in the “as-is” condition under this alternative, common mammals and resident and migratory birds would opportunistically use the buildings and structures at BRF for shelter or foraging. Some would occasionally enter buildings to find food, while swallows and other birds that nest on man-made structures would continue to use rafters, support beams, lighting fixtures, poles, and building corners as nesting sites. It is likely under Alternative C that use of buildings by nesting birds and mammals would increase due to reduced human disturbance in the project area. Terrestrial animals would either not be affected or may benefit from the removal of human disturbance.

3.8 Vegetation

3.8.1 Affected Environment

BRF is located within the Southern Limestone Dolomite Valleys and Low Rolling Hills subdivision of the Southwestern Appalachian Ecoregion of Tennessee. Dominated by

cherty clay, lands within this ecotype historically supported mixed deciduous/evergreen forest but many lands on gentler slopes have been converted to agricultural uses such as cropland and pasture. Plant communities in the vicinity of BRF include areas of herbaceous vegetation and mixed evergreen-deciduous forests (Griffith et al. 2001).

Within a 5-mile radius of BRF, land cover is primarily deciduous forest (22,832 acres or 33 percent), hay/pasture (10,746 acres or 16 percent) and developed, low intensity lands (9,554 acres or 14 percent) (Figure 3-4 and Table 3-5) (Dewitz 2019). The predominant land cover types mapped within the BRF decontamination and deconstruction project area include developed, low intensity (139 acres or 55 percent), herbaceous (53 acres or 21 percent), deciduous forest (52 acres or 21 percent) and open water (8 acres or three percent) (Figure 3-1 [in Section 3.1] and Table 3-5). No unique plant communities are expected to be present within the proposed project area at BRF.

Wooded areas within BRF are mostly upland and are concentrated around the rail line. Planted Virginia pine trees dominate small forest stands in the northwestern portion of the BRF reservation and the narrow forest fragment that bisects the powerhouse buildings and the coal yard within the project area. Common canopy species in the other forested areas include tree of heaven, tulip poplar, eastern red cedar, red maple, sycamore, Persian silk tree, American elm, sassafras, catalpa, northern red oak, hackberry, chinkapin oak, black willow, and green ash. Dominant shrub species include multiflora rose, Bradford pear, blackberry, autumn olive, persimmon, elderberry, box elder, Chinese privet, and redbud. Common herbaceous species include ragweed, Queen Anne’s lace, plantain, dandelion, pokeweed, thistle, Johnson grass, morning glory, common mullein, Japanese stiltgrass, and common milkweed. Woody vines like kudzu, Japanese honeysuckle, poison ivy, Virginia creeper, greenbriar, and trumpet vine are also common. Forested wetlands within BRF contain canopy trees like black willow and sweetgum over shrubs of green ash, red maple, sweetgum, box elder, sycamore and an herbaceous layer, which includes common rush, Japanese stiltgrass, and poison ivy (Wood 2022).

Herbaceous lands within BRF are mostly upland and are in maintained turf. While data on species found within areas of mowed turf in the project area are unavailable, old field areas presumably possess some of the same herbaceous species, especially graminoids. Common species observed in previous surveys of old field areas at BRF include Bermuda grass, Johnson grass, narrow-leaf plantain, perennial ryegrass, orchard grass, Queen Anne’s lace, smooth brome, tall fescue, and sericea lespedeza (TVA 2016b). Herbaceous wetlands within BRF contain scattered shrubs of black willow and green ash over narrow-leaved cattail, shallow sedge, and common rush (Wood 2022).

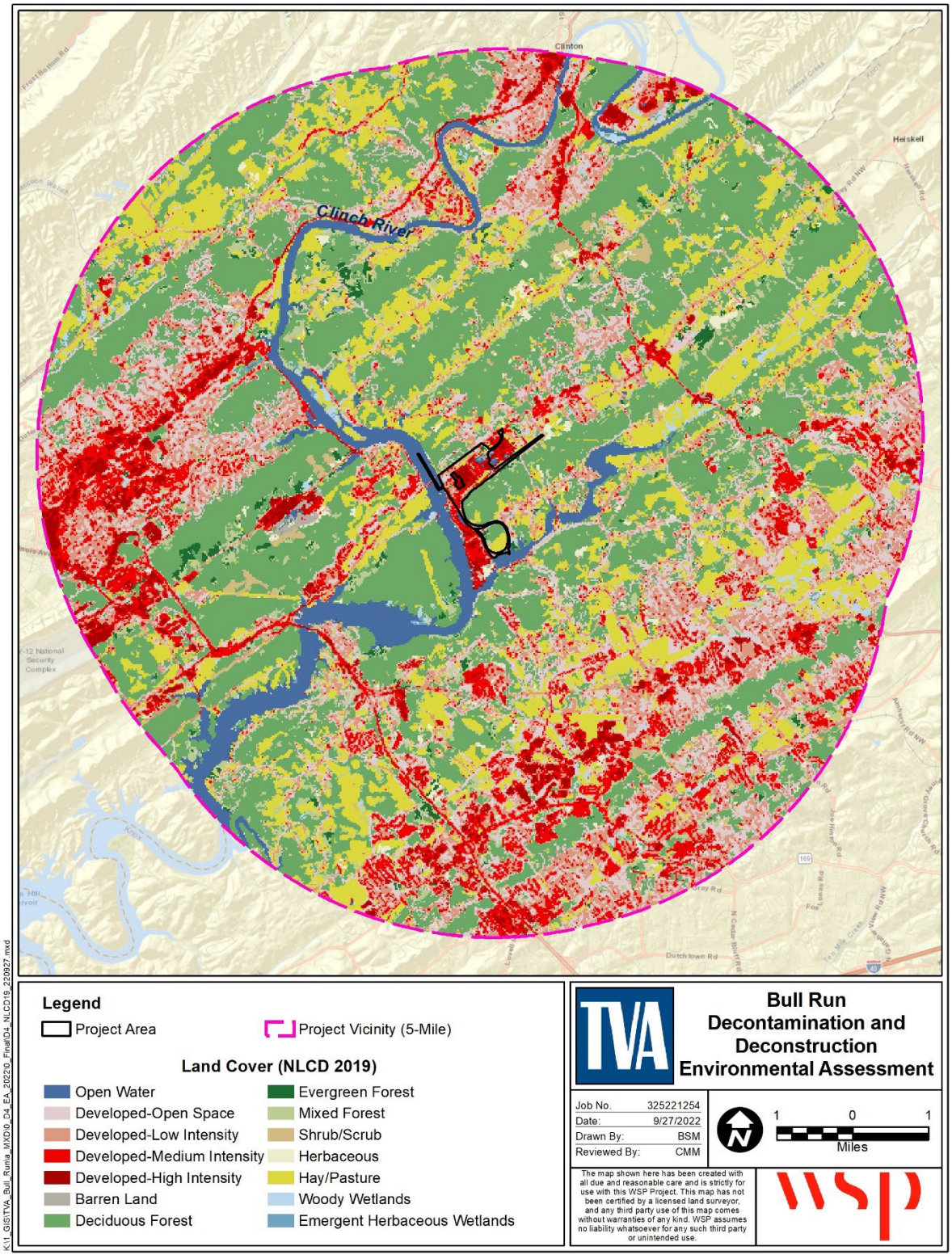

Figure 3-4. NLCD Land Cover within 5 Miles of the BRF Decontamination and Deconstruction Project Area

Table 3-5. Land Cover Within the Project Area and the Region (acres)

Land Use Type	Decontamination and Deconstruction Project Area	5-Mi Radius
Evergreen Forest		570.9
Mixed Forest		2,843.2
Herbaceous	52.7	653.8
Barren Land		152.8
Emergent Herbaceous Wetlands		70.7
Hay/Pasture		10,745.7
Shrub/Scrub		533.6
Developed, High Intensity		1,769.5
Developed, Medium Intensity		5,945.8
Developed, Low Intensity	139.0	9,554.0
Developed, Open Space		9,432.0
Deciduous Forest	52.2	22,832.4
Open Water	7.9	2,649.7
Woody Wetlands		456.7
Cultivated Crops		
Total	**251.9**	**68,230.7**

Source: Dewitz 2019

3.8.2 Environmental Consequences

3.8.2.1 Alternative A – Full Demolition of All Structures to Three Feet Below Final Grade

Implementation of Alternative A would result in direct and indirect impacts to vegetation during deconstruction activities. Direct impacts from demolition activities would include mechanical injury or removal and would be permanent. However, the vegetation found in these areas is composed of common, non-native weeds and early successional species that have little conservation value. Indirect, temporary impacts may include deposition of dust on terrestrial vegetation or sedimentation and erosion that could negatively affect aquatic vegetation in the intake channel or the Clinch River/Melton Hill Reservoir. Overall, potential impacts are negligible relative to the abundance of similar cover types within the vicinity.

If construction laydown occurs on unpaved areas, vegetation would be impacted mostly by storage of equipment and materials during construction. Direct impacts from storage and movement of materials would likely result in disturbance of soil and destruction of plants growing in traffic paths or directly under stored materials. Post-construction, these areas would revert to their original use; therefore, the impact to any vegetation present would be short-term and minor.

Project-related demolition would result in localized disturbances of surface areas that have the potential to increase establishment of invasive plants. In addition, borrow soil potentially brought in from one or more previously developed or permitted offsite commercial borrow site(s) has the potential to introduce invasive plant seed and tissue that could spread onsite. However, these sites are all currently disturbed and are characterized by weedy,

early successional species. Impacts would be minimized as the site would be revegetated using native or non-invasive species as outlined in the *Tennessee Erosion and Sediment Control Handbook* (TDEC 2012).

Potential indirect impacts on vegetation adjacent to the haul roads to transport borrow material to BRF or to transport materials to landfill(s) would include deposition of fugitive dust during transportation. Additionally, invasive plant seeds contained within borrow soil have the potential to spread along the haul route during transport. BMPs such as covered loads and equipment maintenance would be implemented as appropriate to minimize impacts. Therefore, indirect adverse impacts to vegetation along haul routes would be minor.

Following completion of the deconstruction, disturbed areas would be reseeded with native or non-invasive vegetation or otherwise permanently stabilized, potentially replacing ruderal, non-native existing plant communities. This would constitute a minor beneficial impact to vegetation.

3.8.2.2 Alternative B – Selective Demolition of All Structures to Three Feet Below Final Grade, Retain Turbine Bay of Powerhouse and Intake Structure

Under Alternative B, impacts to vegetation would be similar, but slightly less, than those described above under Alternative A. As the turbine bay of the powerhouse and the intake structure would remain, there would be less overall land disturbance, movement of materials, soil disturbance, and dust creation.

3.8.2.3 Alternative C – No Action Alternative

Under the No Action Alternative, TVA would not perform any deconstruction or other disposition activities at BRF. As a result, no new work would be conducted that would result in the loss or disturbance of vegetation, and therefore no project-related environmental impacts to vegetation would occur under this alternative. The few vegetated areas in the project area would continue to be dominated by non-native and early successional species indicative of disturbed habitats. Any changes occurring in the vegetation onsite would be the result of other natural or anthropogenic factors and would not be the result of adoption of the No Action Alternative.

3.9 Threatened and Endangered Species

3.9.1 Affected Environment

The ESA (16 USC §§ 1531-1543) was passed to conserve the ecosystems upon which endangered and threatened species depend, and to conserve and recover those species. An endangered species is defined by the ESA as any species in danger of extinction throughout all or a significant portion of its range. A threatened species is likely to become endangered within the foreseeable future throughout all or a significant part of its range. Critical habitats, essential to the conservation of listed species, also can be designated under the ESA. The ESA establishes programs to conserve and recover endangered and threatened species and makes their conservation a priority for Federal agencies. Section 7 of the ESA requires federal agencies to consult with the USFWS when their proposed actions may affect endangered or threatened species or their critical habitats.

The State of Tennessee provides protection for species considered threatened, endangered, or deemed in need of management within the state other than those federally

listed under the ESA. The listings are handled by the TDEC; additionally, the Tennessee Natural Heritage Program and TVA both maintain databases of species that are considered threatened, endangered, special concern, or tracked in Tennessee. Table 3-6 lists the federally and state-listed species that have the potential to occur in the project area. Appendix B includes full descriptions of these species and their preferred habitats.

Table 3-6. Federally Listed Terrestrial Species Reported from Anderson County, Tennessee and Other Species of Conservation Concern Documented Within 3 Miles of the Project Area

Common Name	Scientific Name	Status[1]		Suitable Habitat Present[3]
		Federal	State (Rank[2])	
Birds				
Bald eagle	*Haliaeetus leucocephalus*	DM	D (S3)	P (foraging only)
Osprey	*Pandion haliaetus*	--	-- (S3)	Y
Mammals				
Gray bat[4]	*Myotis grisescens*	E	E (S2)	P
Indiana bat[4]	*Myotis sodalis*	E	E (S1)	P
Little brown bat	*Myotis lucifugus*	--	T (S3)	P
Northern long-eared bat[4]	*Myotis septentrionalis*	T, PE	T (S1S2)	P
Tricolored bat	*Perimyotis subflavus*	PE	T (S2S3)	P
Amphibians				
Hellbender[5]	*Cryptobranchus alleganiensis*	PS	E (S3)	N
Insects				
Monarch butterfly	*Danaus plexippus*	C	-- (S4)	P

Source: TVA Regional Natural Heritage Database (TVA 2022c) and USFWS Information for Planning and Consultation (USFWS 2022) (https://ecos.fws.gov/ipac/), extracted May 5, 2022.

[1] Status Codes: DM = Delisted, recovered, and still being monitored; D = Deemed in Need of Management; E = Endangered; T = Threatened; PE = Proposed Endangered; PS = Partial Status.

[2] State Ranks: S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable; S4 = Apparently Secure.

[3] Habitat Codes:
Y = Yes, species has been documented in existing habitats within proposed decontamination and deconstruction project area boundary, laydown areas, and/or the light use area, and suitable habitat is present
N = No, no records of species within proposed project areas and no suitable habitat is present
P = Potentially suitable habitat is present, but no records of species in proposed project areas

[4] Federally listed species known from Anderson County, Tennessee, but not within three miles of the project footprint.

[5] A subpopulation of hellbender found in the Ozarks of Missouri and Arkansas is federally listed. Species of hellbender found in Anderson County, Tennessee are not federally listed.

3.9.1.1 Terrestrial Animals

A review of the TVA Natural Heritage Project Database in May 2022 indicated that there are records of three Tennessee state-listed terrestrial animal species (hellbender, osprey, and little brown bat), one federally proposed endangered species (tricolored bat), and one federally protected species (bald eagle) within 3 miles of the project area (TVA 2022c).

Three federally listed terrestrial animal species (gray bat, Indiana bat, and northern long-eared bat) have been reported from Anderson County, Tennessee (Table 3-6). Review of the USFWS IPaC online database identified one additional candidate species (monarch butterfly) that has the potential to occur in the project area (USFWS 2022). Thus, impacts to this species have also been evaluated. No designated critical habitats have been documented within a 3-mile radius of BRF.

A field survey by TVA terrestrial zoologists in May 2022 determined that of the several buildings within the project area, particularly warehouses and utility buildings, may provide potential roosting habitat for bats or migratory birds after buildings are left vacant.

Bald eagles, which are protected under the Bald and Golden Eagle Protection Act (USFWS 2013), are routinely spotted foraging over the Clinch River/Melton Hill Reservoir adjacent to BRF. However, no bald eagle nests were observed during the field survey on the project area in May 2022, and the closest known nest is approximately 2.4 miles away. Four active osprey nests were documented within the project area during the field survey, and foraging habitat for osprey is present in the Clinch River/Melton Hill Reservoir.

Suitable summer roosting habitat for the gray bat may exist in buildings left open and abandoned during the decommissioning process, and foraging habitat for this species exists in the project area over wet low-lying areas south of the switchyard and over the Clinch River/Melton Hill Reservoir. Foraging and moderate summer roosting habitat for the Indiana bat, northern long-eared bat, tricolored bat, and little brown bat exists in the project area in and around trees, the Clinch River/Melton Hill Reservoir, and in wet low-lying areas south of the switchyard. Similar to the gray bat, suitable habitat for these species also may exist in buildings left open and abandoned during the decommissioning process.

Suitable nesting habitat for the hellbender is no longer thought to occur in the reach of the Clinch River/Melton Hill Reservoir that is adjacent to BRF or in any of the mainstems of rivers with TVA impoundments. No suitable habitat for hellbenders occurs in the project area.

Herbaceous areas in the project area are routinely mowed grassy areas that do not provide host plant or foraging habitat for monarch butterfly. Occasional flowering plants may still occur in low areas alongside roads or railroad tracks, or around wet areas southwest of the switchyard. However, these areas do not comprise a substantial amount of available habitat. This species was not observed on BRF during the May 2022 field survey.

3.9.1.2 Aquatic Animals

A review of the TVA Natural Heritage Database indicated records of 16 federally and/or state-listed aquatic species (six fish and 10 mollusks) within 10 miles of BRF (TVA 2022c). Review of the USFWS IPaC website identified seven additional federally listed aquatic species potentially in the vicinity of BRF (USFWS 2022). These species included six mollusk species and one aquatic snail. A list of the aquatic threatened and endangered species that are found or may potentially occur within a 10-mile radius of BRF can be found in Table 3-7.

Table 3-7. Federally and State Listed Aquatic Species Within 10 Miles of BRF and/or with Potential to Occur Near BRF

Common Name	Scientific Name	Status[1]		Documented in 10-mi radius
		Federal	State (Rank[2])	
Mollusks				
Alabama Lampmussel	*Lampsilis virescens*	E	E (S1)	No
Birdwing Pearlymussel	*Lemiox rimosus*	E	E (S1)	Extirpated
Cracking Pearlymussel	*Hemistena lata*	E	E (S1)	Extirpated
Dromedary Pearlymussel	*Dromus dromas*	E	E (S1)	Extirpated
Fanshell	*Cyprogenia stegaria*	E	E (S1)	No
Finerayed Pigtoe	*Fusconaia cuneolus*	E	E (S1)	Historical[3]
Orange-foot Pimpleback	*Plethobasus cooperianus*	E	E (S1)	Historical
Pink Mucket	*Lampsilis abrupta*	E	E (S2)	Extirpated
Ring Pink	*Obovaria retusa*	E	E (S1)	No
Rough Pigtoe	*Pleurobema plenum*	E	E (S1)	No
Rough Rabbitsfoot	*Quadrula cylindrica strigillata*	E	E (S2)	No
Sheepnose Mussel	*Plethobasus cyphyus*	E	-- (S2)	No
Shiny Pigtoe Pearlymussel	*Fusconaia cor*	E	E (S1)	Historical
Slabside Pearlymussel	*Pleuronaia dolabelloides*	E	E (S2)	Historical
Spectaclecase	*Cumberlandia monodonta*	E	E (S2S3)	Historical
White Wartyback	*Plethobasus cicatricosus*	E	E (S1)	Historical
Fish				
Yellowfin Madtom	*Noturus flavipinnis*	T	T (S1)	Extirpated
Slender Chub	*Erimystx chani*	T	T (S1)	No
Spotfin Chub	*Erimonax monachus*	T	T (S2)	Yes
Highfin Carpsucker	*Carpiodes velifer*	--	D (S2S3)	Historical
Tennessee Dace	*Chrosomus tennesseensis*	--	D (S3)	Yes
Flame Chub	*Hemitremia flammea*	--	D (S3)	Yes
Blue Sucker	*Cycleptus elongatus*	--	T (S2)	Historical
Aquatic Snail				
Anthony's Riversnail	*Athearnia anthonyi*	E	E (S1)	No

Sources: TVA 2022c, USFWS 2022, NatureServe 2022, TDEC 2016

[1] Status Codes: E = Listed endangered; T = Listed threatened; -- = Not listed; D = Deemed in need of management

[2] Rank Codes: S1 = Extremely rare and critically endangered; S2 = Very rare and imperiled; S3 = Vulnerable

[3] Historical records are those observations that are greater than 25 years old.

A total of ten listed mollusk species have been recorded with a 10-mile vicinity of BRF. None of the listed mollusk species were observed during the 2016 biological characterization survey (TVA 2017a), and no individuals or populations of these species are

considered present in the Clinch River/Melton Hill Reservoir near BRF (TVA 2022b). A 2010 mussel survey of the riverfront adjacent to BRF did not find evidence of presence of any state-listed or federally listed threatened or endangered mussel species (Third Rock Consultants 2010).

Four federally and/or state-listed fish species have been recorded within a 5-mile radius of BRF (TVA 2019c). The spotfin chub has been verified within a 5-mile radius of BRF. The blue sucker, a state threatened species, has been classified as possibly historical in the vicinity of BRF, and the yellowfin madtom has been extirpated. Suitable habitat for the Tennessee dace, a state-listed species in need of management, does not exist in the Clinch River/Melton Hill Reservoir in the vicinity of BRF (TVA 2022b).

Flame chub, a state listed species in need of management, primarily occupies spring-fed tributaries (NatureServe 2022), and, therefore, is unlikely to be found in the Clinch River/Melton Hill Reservoir in the vicinity of BRF, but it does have the potential to occupy the nearby Bullrun Creek.

3.9.1.3 Plants

A review of the TVA Regional Natural Heritage database indicated that no federally listed vascular plant species, or associated designated critical habitat, are known to occur on or within a 5-mile radius of BRF (TVA 2022c). A total of 16 species of plants listed by the TDEC as threatened, endangered, or species in need of management in Tennessee are known to occur within Anderson County (TDEC 2022d). Of those, 11 species plus American ginseng (*Panax quinquefolius*) are known to occur within 5 miles of BRF (TVA 2022c).

Preferred habitat for each species and the possibility of habitat within the proposed decontamination and deconstruction project area is addressed in Table 3-8. Lands associated with the BRF project area have been extensively disturbed by current and/or previous land use. These areas are currently used for industrial purposes and do not contain intact, high-quality native plant communities (TVA 2016b; Wood 2022). No sensitive species or associated habitat are expected to be present within the BRF project area.

Table 3-8. Habitat Requirements for State-Listed Plant Species' Records within Anderson County

Common Name	Scientific Name	Habitat Requirements	Status*	Present in 5-mile Vicinity of Project Area[1]	Habitat within Project Area**
American ginseng	*Panax quinquefolius*	Slopes of shaded, rich woodlands[2]	S-CE	Y	N
Branching whitlow-wort	*Draba ramosissima*	Bluffs, rocky woods[4]	S	Possibly Historical	N
Butternut	*Juglans cinerea*	Rich mesic woods and streambanks[4]	T	Y	N
Copper iris	*Iris fulva*	Swamps, marshes, wet woods[4]	T	Y	N
Hairy willow-herb	*Epilobium ciliatum*	Moist to wet meadows, springs and bogs[4]	T	Historical	N
Heartleaf meehania	*Meehania cordata*	Wooded mountain slopes[2]	T	N	N
Large-leaved grass-of-parnassus	*Parnassia grandifolia*	Wet woods and fens[4]	S	N	N
Mountain witch-alder	*Fothergilla major*	Dry woods, thickets, riverscour cobble bars[4]	T	Y	N
Naked-stem sunflower	*Helianthus occidentalis*	Barrens, prairies[4]	S	Possibly Historical	N
Northern bush-honeysuckle	*Diervilla lonicera*	Dry woods and thickets, streambanks, rocky slopes[4]	T	Y	N
Nutall's Waterweed	*Elodea nuttallii*	Lakes, streams, small rivers[4]	S	Y	N
Prairie goldenrod	*Solidago ptarmicoides*	Cedar glades and barrens[4]	E	Possibly Historical	N
Spreading false-foxglove	*Aureolaria patula*	Calcareous ledges and bluffs[4]	S	Y	N
Sullivantia	*Sullivantia sullivantii*	Moist shaded cliffs[3]	E	N	N
Tall larkspur	*Delphinium exaltatum*	Open woodlands, rich woods, rocky slopes, glades, prairies[2]	E	Y	N
Torrey's mountain mint	*Pycnanthemum torreyi*	Barrens[3]	E	Y	N
Tubercled rein-orchid	*Platanthera flava var. herbiola*	Swamps and floodplains[3]	T	N	N

Source:
[1] TVA 2022c
[2] NatureServe 2022
[3] TDEC 2022d
[4] Chester 2015

*Status:
S = State Special Concern Species
S-CE = State Special Concern Species – Commercially exploited
E = State Endangered Species
T = State Threatened Species

**Habitat Codes:
Y = Yes, species has been documented in existing habitats in proposed project areas, and suitable habitat is present
N = No, no records of species within proposed project areas, and no suitable habitat is present

3.9.2 Environmental Consequences

3.9.2.1 Alternative A – Full Demolition of All Structures to Three Feet Below Final Grade

Under Alternative A, osprey, gray bat, Indiana bat, little brown bat, northern long-eared bat, and tricolored bat have the potential to be impacted by the proposed actions. No suitable habitat for hellbender would be affected by the proposed actions. Therefore, this species would not be impacted. In addition, there is not a substantial amount of habitat available for monarch butterflies in the project area and there is an abundance of suitable herbaceous habitat in the vicinity of the site (see Table 3-5); therefore, impacts to this species are expected to be minor.

One bald eagle nest exists approximately 2.4 miles from the project area. Due to distance from proposed actions, this nest would not be impacted. BMPs would be used near the Clinch River/Melton Hill Reservoir to minimize impacts to potential foraging habitat for bald eagles, and proposed actions are in compliance with the *National Bald Eagle Management Guidelines*. Therefore, bald eagles are not expected to be significantly impacted under Alternative A.

Four osprey nests are located within 660 feet of the project area. If the timing of deconstruction and demolition activities within 660 feet of these nests cannot be modified to avoid nesting seasons, coordination with USDA – Wildlife Services would be required for guidance to ensure compliance under the EO 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds). Therefore, the proposed actions are not likely to adversely affect the osprey.

No caves for gray bat, Indiana bat, little brown bat, northern long-eared bat, or tricolored bat exist in the project area or would be impacted by the proposed actions. No tree removal is anticipated in association with this alternative. Therefore, no forested summer roosting or foraging habitat for Indiana bat, little brown bat, northern long-eared bat, or tricolored bat would be impacted. Aquatic foraging habitat exists for these species over the Clinch River/Melton Hill Reservoir and along wetlands and streams within and adjacent to the project area. BMPs would be used around all bodies of water; therefore, impacts to aquatic foraging habitat for bats are expected to be minor. Several buildings proposed for demolition offer potential roosting habitat for listed bats, depending on construction, light exposure, ingress/egress points, and temperature. No bats or evidence of bats was observed during preliminary building surveys; however, extensive interior surveys of buildings with potential for bat roosting were not performed. TVA would conduct presence/absence surveys at least one month prior to demolition of buildings and structures to determine if listed bat species are utilizing them. The culvert where a bat was observed in 2016 would not be impacted by project activities.

A number of activities associated with the proposed decontamination and deconstruction project, including building demolition, were addressed in TVA's programmatic consultation with the USFWS 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 on pages 5-7 of the TVA Bat Strategy Project Screening Form (Appendix A) and need to be reviewed and/or implemented as part of the proposed project. Should colonies of state-listed bats be found roosting in buildings

proposed for demolition, no deconstruction/demolition activities would occur until the bats have migrated out and appropriate Tennessee state agencies have been consulted. With adherence to identified conservation measures, survey requirements, and avoidance/consultation requirements proposed actions are not likely to adversely affect gray bat, Indiana bat, little brown bat, northern long-eared bat, and tricolored bat.

As discussed in Subsection 3.6, impacts to aquatic habitats under Alternative A are expected to be negligible. Therefore, there would likely be negligible impacts to any aquatic threatened and endangered species. As there are no extant populations of mussels in the vicinity of BRF, demolition activities would have no impacts on threatened or endangered mussel species. Potential impacts to threatened or endangered fish species are limited to flame chub and spotfin chub, which are the only aquatic federal or state-listed threatened and endangered species that have the potential to occur in the vicinity of BRF. However, there would be no direct impacts to aquatic resources within the project area, and indirect impacts would be short-term and minor because surface water runoff from demolition activities would be mitigated through the implementation of storm water erosion controls in accordance with a SWPPP.

Under Alternative A, existing ruderal vegetation of low conservation value would be impacted within BRF. However, because no sensitive plant species or associated suitable habitat is known from the project area, no impacts to threatened and endangered plants or other plant species of concern are anticipated as a result of project activities.

3.9.2.2 Alternative B – Selective Demolition of All Structures to Three Feet Below Final Grade, Retain Turbine Bay of Powerhouse and Intake Structure

Because the turbine bay of the powerhouse and the entire intake structure would be retained under Alternative B, impacts to threatened and endangered species would be similar to or less than those described for Alternative A.

3.9.2.3 Alternative C – No Action Alternative

Under the No Action Alternative, TVA would not perform any deconstruction or other disposition activities at BRF. If the facility is left in “as-is” condition, buildings, soil, and vegetation would remain in their current state. Ospreys currently nesting on transmission towers would continue to be avoided or nearby actions minimized with guidance from USDA – Wildlife Services when necessary for compliance. Threatened and endangered terrestrial plants and animals and their habitats would not be affected under Alternative C. Degradation of aquatic habitats, as outlined in Subsection 3.6.2.3, have the potential to result in minor, indirect, long-term impacts on flame chub and spotfin chub populations should they occur in the vicinity of BRF.

3.10 Air Quality and Climate Change

3.10.1 Affected Environment

The study area for air quality is defined as Anderson County, Tennessee. However, given that air emissions cross county lines, the assessment here can be considered to apply to air quality effects over larger areas downwind of the facility. For purposes of climate assessment, the study area is Anderson County with respect to local climate conditions, and with respect to GHG emissions, the study area is the global environment.

3.10.1.1 Air Quality

The CAA requires the EPA to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. The CAA identifies two types of NAAQS, primary and secondary. Primary NAAQS provide public health protection, including protecting the health of sensitive populations such as asthmatics, children, and the elderly. Secondary NAAQS provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings (EPA 2022e).

The EPA has specified NAAQS for six principal pollutants, which are called criteria pollutants, and air quality is measured primarily by the concentrations of the six criteria pollutants within a region. The criteria pollutants are ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), lead (Pb), sulfur dioxide (SO_2), and particulate matter (PM) which includes two subcategories: particles less than 10 microns in diameter (PM_{10}) and particles less than 2.5 microns in diameter ($PM_{2.5}$) (EPA 2022e).

EPA designates compliance status for the NAAQS through a formal rulemaking process involving publication of proposed and final rules in the Federal Register. For each pollutant for which there is a NAAQS, EPA designates an area as attainment, nonattainment, or maintenance. A maintenance area is a geographical area that has a history of non-attainment with a particular NAAQS but is currently meeting that NAAQS. Part of the redesignation process requires that the state or local agency with responsibility for managing air quality in the area must submit for EPA approval a plan to maintain compliance with the NAAQS for which the area was in nonattainment status.

Anderson County is an attainment or maintenance area for all criteria pollutants (EPA 2022f). However, all or part of the County has been in nonattainment status for two pollutants in the past 20 years. On September 27, 2017, Anderson County was redesignated by the EPA from a nonattainment to a maintenance area for the 2006 NAAQS for $PM_{2.5}$. On August 12, 2015, parts of Anderson County were redesignated from nonattainment to maintenance for the 8-hour 2008 ozone standard. The parts of Anderson County that achieved maintenance status for the 8-hour 2008 ozone standard include U.S. Census Bureau (USCB) Tract 213.02, in which BRF is located, and Tract 202 of the 2000 Census (EPA 2022a).

The primary mechanisms for causing potential effects to local air quality considered in this assessment are associated with the demolition of buildings and structures and transportation-related activities. Both activities generate fugitive dust, which is commonly measured by the size of PM. Air quality standards of measure for dust are PM_{10} and $PM_{2.5}$. In addition, exhaust from internal combustion engines used to power trucks and demolition equipment result in emissions that can affect local air quality, particularly if the engines are not properly maintained.

3.10.1.2 Climate Change and Greenhouse Gases

Climate trends and data in the region of BRF are described in the Potential Bull Run Fossil Plant Retirement Final EA (TVA 2019c).

The EPA defines climate change as *"any significant change in the measures of climate lasting for an extended period of time."* In other words, climate change includes major changes in temperature, precipitation, or wind patterns, among others, that occur over

several decades or longer. These changes are caused by a number of natural factors as well as anthropogenic (i.e., human-related) activities (EPA 2022b).

Climate change is primarily a function of excessive CO_2 in the atmosphere. CO_2 is the primary GHG emitted through human activities. Activities associated with the proposed action that produce CO_2 are primarily related to emissions from fossil-fuel-powered equipment (e.g., bulldozers, loaders, haulers, trucks, generators) used during the proposed activities. Forested areas that absorb and store CO_2 from the atmosphere via a process known as carbon sequestration help to reduce levels of CO_2 in the atmosphere. No forested areas would be directly or indirectly impacted under either of the proposed alternatives.

Additional GHGs that contribute to climate change include hydrofluorocarbons used in refrigeration equipment; sulfur hexafluoride used as a gaseous dielectric medium for high-voltage (1-kilovolt and above) circuit breakers, switchgears, and other electrical equipment; and methane. These gases can be released to the atmosphere through seal leaks, especially from older equipment, as well as during equipment manufacturing, installation, servicing, and disposal (EPA 2022d).

3.10.2 Environmental Consequences

3.10.2.1 Alternative A – Full Demolition of All Structures to Three Feet Below Final Grade

Under Alternative A, short-term, direct air contaminants and GHG emissions would occur due to the generation of fugitive dust and use of vehicles and equipment in the demolition process and through the transport of demolition debris and borrow material. The proposed demolition activities would be subject to federal, state (Tennessee Division of Air Pollution Control), and county (Anderson County) regulations which impose permitting requirements and specific standards for expected air emissions.

Fugitive dust emissions from demolition activities are typically deposited on the property where the structures being demolished are located. Theoretical drift distance, as a function of particle diameter and mean wind speed, has been computed for fugitive dust emissions. Results indicate that, for a typical mean wind speed of 10 miles per hour, particles larger than about 100 microns are likely to settle out within 20 to 30 feet from the point of emission. Particles that are 30 to 100 microns in diameter are likely to settle within a few hundred feet from the point of emission. Smaller particles, particularly PM_{10} and $PM_{2.5}$, have much slower gravitational settling velocities and are much more likely to have their settling rate retarded by atmospheric turbulence, and thus be transported offsite (EPA 1995).

Direct emissions of fugitive dusts would be generated by general demolition activities, but these emissions would be temporary, and the majority of PM would settle within the immediate vicinity of BRF. The closest structure to public receptors is the car wash, which is located in the northeast corner of the project area approximately 665 feet southeast of the nearest residence and approximately 450 feet northeast of Claxton Community Center. Given the distance from the plant, these receptors would not be impacted by fugitive dust emissions. Under Alternative A, there would also be an intense, short-term release of fugitive dust associated with the removal of the stacks or structures by dropping with explosives. Fugitive dust would be released in an uncontrolled manner and would likely be released within a span of minutes, after which these emissions would cease. Dropping the stacks or structures via explosives would likely produce the most PM of any site activity, with the highest potential to travel off the demolition site.

To minimize potential fugitive dust mobilization associated with explosive demolition of stacks or structures, the demolition contractor would be required to remove ash from the facilities proposed for deconstruction and demolition prior to removal of that facility and implement dust control measures during demolition to prevent the spread of dust, dirt, and debris. These methods may include wetting equipment within demolition areas, covering waste or debris piles, using covered containers to haul waste and debris, and wetting unpaved vehicle access routes during hauling. TVA also requires onsite contractors to maintain engines and equipment in good working order.

Site preparation and vehicular traffic over paved and unpaved roads at the site would result in the emission of fugitive dust during active deconstruction, demolition debris removal, and restoration activities. The largest fraction of fugitive dust emissions would be deposited onsite within the demolition site boundaries. If necessary, emissions from open demolition areas and paved/unpaved roads could be mitigated by spraying water on the roadways to reduce fugitive dust emissions.

Combustion of gasoline and diesel fuels by internal combustion engines (vehicles, generators, demolition equipment, etc.) would generate local emissions of PM, CO, NO_2, SO_2, volatile organic compounds, and CO_2, during the site preparation, demolition, and restoration periods. However, new emission control technologies and fuel mixtures have significantly reduced vehicle and equipment emissions. Additionally, it is expected that all vehicles would be properly maintained, which would also reduce emissions.

Demolition debris and any scrap metal would be transported to an offsite vendor, landfill, or recycling facility by truck. The transport of demolition debris and scrap metal by truck during decontamination and deconstruction activities would require the use of up to five truckloads (10 truck trips) per day to transport the material offsite. The materials would be transported along existing roadways in the vicinity of BRF for a period of up to 24 months. In addition, the need for borrow material for site restoration would require the transport of approximately 55 truckloads (up to 110 truck trips) per day of borrow from a previously developed or permitted borrow site within 100 miles of BRF. The borrow would be intermittently transported along existing roadways during the site restoration period of approximately 12 months. The total amount of air emissions associated with this vehicular traffic would be temporary and minor in comparison to traffic in the region and would not adversely affect local air quality. Mitigation measures including implementing BMPs for controlling fugitive dust and proper maintenance of vehicles for controlling emissions would further reduce impacts.

The use of vehicles and demolition equipment in the activities associated with Alternative A including offsite vehicle operations (such as debris disposal, the transport of borrow, and workforce transportation) would result in a minor temporary increase in CO_2 emissions. There would also be a small risk of a release of pollutants and/or GHGs associated with handling and removal of refrigeration and electrical equipment during deconstruction and demolition activities. Such emission levels are expected to be *de minimis* in comparison to the regional and world-wide volumes of GHGs. Therefore, local and regional GHG levels would not be adversely impacted by emissions from demolition activities.

Overall, implementation of Alternative A would have a minor and temporary impact on air quality and no direct or indirect impact on regional climate change.

3.10.2.2 Alternative B – Selective Demolition of All Structures to Three Feet Below Final Grade, Retain Turbine Bay of Powerhouse and Intake Structure

Under Alternative B, air quality and climate change impacts from all demolition activities, excluding air emissions associated with removal of the turbine bay and intake structure, would be the same as under Alternative A.

Under Alternative B, emissions of fugitive dust would be less than Alternative A as these two structures would not be demolished and removed. Furthermore, the duration of these emissions would be slightly shorter than that associated with Alternative A. Overall, Alternative B is expected to have a minor and temporary impact on air quality and no direct or indirect impact on regional climate change.

3.10.2.3 Alternative C – No Action Alternative

Under the No Action Alternative, TVA would not perform any decontamination, deconstruction or other disposition activities and the site would remain in its current condition. There would be no impacts to air quality or climate change associated with demolition activities or transport of demolition debris and borrow material.

Over the long term, indirect adverse impacts to air quality could occur due to the release of petroleum fuels, volatile organic compounds, hydrofluorocarbons, or other contaminants from leftover equipment within the BRF site. Sulfur hexafluoride could be released from electrical equipment. If such releases occur, they would be limited to the amount of gas in a specific container and would be expected to be negligible. The deterioration of hazardous materials not removed from the facility such as asbestos, lead paint, and dust could also result in the release of contaminants to the air. These would be limited to the amount of hazardous material remaining at the facility, would likely occur slowly over time due to degradation, and would be expected to be negligible. Overall, impacts to air quality would be minor and would have no impact on regional climate change.

3.11 Hazardous Materials and Solid and Hazardous Waste

3.11.1 Affected Environment

In general, hazardous materials include substances that, because of their quantity, concentration, or physical, chemical, or infectious characteristics, may present substantial danger to public health or the environment when released into the environment. Hazardous materials are regulated under a variety of federal laws including Occupational Safety and Health Administration (OSHA) standards, Emergency Planning and Community Right to Know Act, the Resource Conservation and Recovery Act (RCRA), the Comprehensive Environmental Response, Compensation and Liability Act of 1980, and the Toxic Substances Control Act.

RCRA regulations define what constitutes a hazardous waste and establishes a “cradle to grave” system for management and disposal of hazardous wastes. Universal wastes are a subset of hazardous wastes that are widely generated. Universal wastes include batteries, lamps and high intensity lights, and mercury thermostats. Universal wastes may be managed in accordance with the RCRA requirements for hazardous wastes or by special, less stringent provisions.

Solid waste consists of a broad range of materials that include refuse, sanitary wastes, contaminated environmental media, scrap metals, nonhazardous wastewater treatment

plant sludge, nonhazardous air pollution control wastes, various nonhazardous industrial waste, and other materials (solid, liquid, or contained gaseous substances). Solid waste is regulated by the EPA and RCRA Subtitle D. Each state is required to ensure the federal regulations for solid waste are met and may implement more stringent requirements.

Special waste is a solid waste, other than a hazardous waste, that requires special handling and management to protect public health or the environment. In some states, special wastes may include sludges, bulky wastes, pesticide wastes, industrial wastes, combustion wastes, friable asbestos, and certain hazardous wastes exempted from RCRA Subtitle C requirements. Any of these wastes, if generated, would be disposed of as required by state and federal regulations.

BRF is considered a small quantity generator of hazardous waste by TDEC, generating less than 2,200 pounds of hazardous waste per calendar month. The primary hazardous wastes currently generated include small quantities of waste paint, waste paint solvents, paper insulated lead cable, mercury contaminated debris, debris from sandblasting and scraping, paint chips, solvent rags used to clean electric generating equipment, Coulomat (used for removing moisture from oil) and liquid-filled fuses (TVA 2016c, 2019b).

3.11.2 Environmental Consequences

3.11.2.1 Alternative A – Full Demolition of All Structures to Three Feet Below Final Grade

Under Alternative A, all buildings and structures within the proposed project area would be decontaminated and demolished to 3 feet below final grade. Based on results of hazardous material surveys at similar TVA plants, solid and hazardous wastes that can reasonably be expected to be generated during deconstruction include:

- ACM
- Mercury in equipment switches and flow meters
- Lead-containing materials
- PCBs in transformers and other oil-filled equipment
- Remnant coal and Coal Combustion Residuals
- Materials such as glaze, caulk, building siding, roofing materials, electrical cable, cable trays, etc.
- Other construction waste (e.g., concrete, scrap metal, etc.)
- Universal waste (fluorescent light bulbs, batteries, etc.)
- Aboveground storage tanks and underground storage tanks
- Containerized petroleum products or chemicals
- Chlorinated fluorocarbons (Freon) from equipment
- Radioactive sources from equipment
- Out of date surplus materials
- Various oils and fuels

- Antifreeze
- Batteries in bulk and associated fixtures including deep cycle series uninterruptible
- Power supply batteries and lead batteries from emergency lighting
- Loose combustible debris (tenant debris)
- Street lighting
- Heavy metals
- Batteries
- Creosote (in railroad ties)
- Technologically Enhanced Naturally Occurring Radioactive Materials (TENORM)

Implementation of this alternative would result in removal and disposal of potential contaminant sources, as defined above, in accordance with local, state, and federal regulations. A hazardous materials survey would be completed prior to demolition to estimate the specific types and quantities of wastes generated during demolition. Hazardous materials and special waste that would be addressed prior to demolition would likely include ACMs, used oil, lead-containing materials, aboveground storage tanks, TENORM, and other hazardous materials identified during the hazardous materials survey. TENORM can be exposed to the accessible environment as a result of human activities, such as manufacturing, mineral extraction, or water processing. Radiation screening for TENORM would be conducted in areas of the plant that are most likely to have it, such as equipment surfaces, pipes, drains, refractory brick, and residual ash, among others. Levels of TENORM would be expected to be minimal and, if present, TVA would determine the best use and proper disposal of all hazardous materials from the project area. Specific oil stains or areas that may contain materials of concern would be addressed prior to demolition as well.

Along with TVA BMPs, materials determined to be waste would be evaluated (e.g., waste determinations) and managed (e.g., inspections, container requirements, permitted transport) in accordance with applicable federal and state rules, including TDEC Solid and Hazardous Waste Rules and Regulations as described in TDEC Division of Solid Waste Management Rule 0400 Chapters 11 and 12, respectively. Prior to demolition activities, hazardous waste, PCBs, ACM, lead paint, and universal waste would require special removal, handling, labeling, and disposal by appropriately trained and licensed personnel and contractors. These materials would be disposed of at a facility designed and permitted to receive hazardous materials. Additionally, if new hazardous waste streams are generated during demolition, notification and registration of these must be made to the TDEC Division of Division of Solid Waste Management. Brick, block, and concrete demolition debris not contaminated by ACM or other hazardous materials could be used as clean fill in the basements and lower levels of the facility. Removed materials would be transported to a landfill or other approved disposal facility. Thus, direct impacts would be minor due to the limited potential for hazardous waste to be discharged and/or released into the environment under this alternative.

Demolition activities would create demolition debris and scrap metal that would be hauled to a permitted landfill or recycling facility. Although a specific landfill has not been identified, given that material would be disposed in a permitted landfill that has the capacity to receive waste materials, and the potential that scrap metal would be recycled, it is expected that

disposal of demolition debris would have a negligible effect on the long-term ability to meet disposal needs of the region.

This alternative is likely to have short-term impacts to the local environment through the release of fugitive dust during demolition and removing material to the landfill. However, implementation of the mitigation measures of dust suppression and environmental controls outlined in the guidance would minimize potential impacts. Due to the temporary nature of the operations, use of permitted disposal facilities, and trained and experienced contractors and personnel, environmental impacts from waste handling and disposal are not anticipated.

3.11.2.2 Alternative B – Selective Demolition of All Structures to Three Feet Below Final Grade, Retain Turbine Bay of Powerhouse and Intake Structure

This alternative would be similar to Alternative A in that contaminated demolition debris and hazardous wastes would be hauled by truck to a landfill designed to receive such waste and operated by a company under TVA contract. The retention of the turbine bay of the powerhouse and intake structure would result in a negligible decrease in the amount of material that would be hauled offsite. Possible short-term impacts to the local environment through the release of fugitive dust during demolition and while removing material to the landfill would be minimized through mitigation measures, including dust suppression and environmental controls. Due to the temporary nature of the operations and the use of permitted disposal facilities, along with trained and experienced contractors and personnel, environmental impacts from waste handling and disposal are not anticipated.

Degradation over time of the remaining structures and material that is incorporated into the remaining structures, such as lead-based paint on metal structures, wiring, and plumbing (copper and lead), may not be removed. Over time, any environmental and safety issues resulting from the degradation of these remaining materials would be addressed when such issues are identified. These indirect impacts would be minor due to the limited potential for hazardous waste to be discharged and/or released into the environment under this alternative. Overall, the impacts to hazardous materials and solid waste under Alternative B would be minor.

3.11.2.3 Alternative C – No Action Alternative

Under the No Action Alternative, TVA would not perform any decontamination or deconstruction activities. Peeling lead-based paint, failing concrete, buckling floor tiles, and deteriorating asbestos and ACM could pose a hazard risk, may result in potential releases to the environment (e.g., through leaching to soils, surface water, or groundwater), and would be likely to have long-term, moderate impacts.

Concerns regarding trespassing and vandalism under this alternative would also be higher than with Alternatives A and B. The presumed presence of materials that could be salvageable might attract trespassers who could be exposed to potential contaminants or physical injury.

3.12 Transportation

3.12.1 Affected Environment

BRF is served by highway and railway modes of transportation. The transportation network surrounding BRF contains roads and bridges, rail lines and navigable waterways. BRF is served by one CSX rail line to the south of the site.

Nearby, major interstates include I-75 and I-40. State highways provide ample access in the immediate vicinity of BRF. Principal access at BRF is via State Route (SR) 170 (Edgemoor Road), which is two lanes wide. U.S. 25W, a four-lane roadway, is approximately 2.5 miles east of BRF. West of U.S. 25W, SR 170 is known as Edgemoor Road. East of U.S. 25W, SR 170 becomes Raccoon Valley Road (see Figure 3-6 in Section 3.15), which is two lanes wide and continues to I-75 approximately 9 miles to the east of BRF.

The Annual Average Daily Traffic (AADT) on the roadways in the immediate vicinity of BRF for SR 170 (Edgemoor Road) and SR 170 (Raccoon Valley Road) are indicated in Table 3-9.

Table 3-9. Average Daily Traffic Volumes (2018-2021) on Roadways in Proximity to BRF

Roadway	AADT 2018	2019	2020	2021
SR 170 (Edgemoor Road) between BRF and US 25W/SR 9	15,200	16,134	19,218	15,286
SR 170 (Edgemoor Road) between Oak Ridge Highway and BRF (just west of the Clinch River/Melton Hill Reservoir)	15,109	15,612	17,421	15,981
SR 170 (Raccoon Valley Road) just east of US 25W	4,475	4,925	4,995	4,347
SR 170 (Raccoon Valley Road) just west of Heiskell Road	3,868	3,833	3,989	3,767

Source: Knoxville Regional Transportation Planning Organization (TPO) 2022

The data in Table 3-9 includes traffic resulting from operation of the plant. AADT data for roads in the vicinity of the plant would be lower following the retirement of BRF (anticipated to occur in 2023).

3.12.2 Environmental Consequences

3.12.2.1 Alternative A – Full Demolition of All Structures to Three Feet Below Final Grade

Traffic generated during decontamination and deconstruction activities would consist of the shipment of goods and equipment, the construction workforce, transport of demolition debris from the facility to an offsite landfill or recycling operation, and transport of borrow material from an offsite location to the project area.

The construction workforce traveling to and from BRF would contribute to the traffic on the local transportation network. TVA estimates that the workforce needed for decontamination would range in size from 50 to 150 personnel over a 12-month period. The deconstruction workforce would range from 50 to 100 personnel over an approximately 18- to 24-month period which could overlap the decontamination work phase. Therefore, assuming a peak

workforce of 250 and one person per commuting vehicle, there would be a daily morning inbound traffic volume of up to 250 vehicles and a daily outbound traffic volume of up to 250 vehicles. Although workers would access BRF from SR 170, these motorists would eventually disperse throughout the transportation network and use interstate highways or major arterial roadways as much as possible. The traffic volume generated by the construction workforce would be relatively minor and would only occur for up to 24 months. Further, following plant retirement, the traffic volumes on SR 170 would decrease. Therefore, the traffic volume generated by the construction workforce would be temporary and minor.

Construction-related vehicles (e.g., dozers, cranes, backhoes, graders, loaders, etc.) would be delivered to the decontamination and deconstruction area on flatbed trailers during both the mobilization and demobilization stages of the project, causing an increase in truck traffic in the vicinity. However, as this increase would primarily occur during the mobilization and demobilization phases, impacts to the surrounding transportation network are not anticipated.

Decontamination, deconstruction, and restoration activities would also result in increased truck traffic on surrounding roadways. Anticipated traffic increases from transport of demolition debris and borrow are shown in Table 3-10.

Demolition debris, ACM, and scrap metal that would be hauled offsite to be recycled or disposed of at an appropriate facility in accordance with all federal, state, and local regulations. Scrap metal could also be sold to local or regional vendors. No specific disposal site has been identified at this time and ultimate disposition site selection would be determined by the demolition contractor. Masonry debris would be used for fill material for the basements at the site with any excess hauled to an offsite landfill or recycling facility by truck to one or more previously permitted commercial landfills. Material could also be hauled to an offsite hazardous waste landfill. If hauled by truck, TVA estimates that up to five trucks per day would utilize local roads and arterial and interstate highways to transport demolition debris to a permitted landfill within 20 miles of BRF during the decontamination and deconstruction phase, equating to a temporary (24 months) increased daily traffic count of 10 truck trips in the vicinity of the BRF site. Because the extent of additional truck trips is minor, with forecasted traffic increases of less than 0.3 percent on area roadways, the impact of transport of demolition debris to the surrounding roadway network would be minor.

Table 3-10. Traffic Impacts Associated with Alternative A

Roadway	2021 AADT[1]	Traffic Increase Demolition Debris	Traffic Increase (Percent)	Traffic Increase-Borrow	Traffic Increase (Percent)
SR 170 (Edgemoor Road) between BRF and US 25W/SR 9	15,286	15,296	0.07%	15,396	0.71%
SR 170 (Edgemoor Road) between Oak Ridge Highway and BRF (just west of the Clinch River/Melton Hill Reservoir)	15,981	15,991	0.06%	16,091	0.68%
SR 170 (Raccoon Valley Road) just east of US 25W	4,347	4,357	0.23%	4,457	2.47%

Roadway	2021 AADT[1]	Traffic Increase Demolition Debris	Traffic Increase (Percent)	Traffic Increase-Borrow	Traffic Increase (Percent)
SR 170 (Raccoon Valley Road) just west of Heiskell Road	3,767	3,777	0.26%	3,877	2.84%

Source: Knoxville TPO 2022

TVA estimates up to 300,000 cubic yards of borrow material would be needed to support site restoration. The estimated number of daily truckloads (of borrow material) using tandem dump trucks with a capacity of 15 cubic yards would be approximately 55 truckloads (110 truck trips) per day over a period of not more than 12 months. Borrow would be hauled by truck from one or more previously permitted commercial sites within 100 miles of BRF. Although the exact location of borrow sites is not known, it is assumed that haul routes would use arterial or interstate roadways whenever possible. However, it would be necessary for haul routes to utilize SR 170 to access BRF. The transport of borrow to support site restoration would occur after decontamination and deconstruction is compete and as such the traffic associated with the hauling of borrow material would be offset by the reduction in traffic that would be experienced with the cessation of demolition and deconstruction activities. Because the extent of additional truck trips is minor, with forecasted traffic increases of less than three percent on area roadways, the impact of transport of borrow material on the surrounding roadway network would be minor and temporary.

Under Alternative A, the stacks and certain structures would be demolished via explosives, the use of which would necessitate increased security measures that would affect transportation in the immediate vicinity of the project area. During blasting events, select public roadways could be closed for public safety and to facilitate site security. River traffic may be restricted as well due to the potential for demolition debris to fall into the river. Traffic closures would vary from approximately three hours before and up to three hours after the blast. The closures would not affect a large number of local residents due to the sparse population in the area. The demolition contractor would create a detailed plan for road closures that would be coordinated with affected parties, including emergency personnel.

Therefore, given the minor, temporary and localized impact associated with increased traffic on SR 170, the impact of Alternative A on transportation would be minor.

3.12.2.2 Alternative B – Selective Demolition of All Structures to Three Feet Below Final Grade, Retain Turbine Bay of Powerhouse and Intake Structure

Under Alternative B, transportation impacts from demolition activities would be similar to those described for Alternative A. The exclusion of the turbine bay and intake structure from demolition would result in a slightly smaller amount of debris material that would have to be hauled to an offsite landfill and borrow material brought onsite. Furthermore, the duration of traffic associated with project activities would be slightly shorter than that associated with Alternative A. Overall, Alternative B is expected to have a minor and temporary impact on transportation.

3.12.2.3 Alternative C – No Action Alternative

Under the No Action Alternative, TVA would not perform any decontamination or deconstruction activities, and the site would remain in its current condition. Therefore, there would be no effect on traffic and transportation in proximity to the site.

3.13 Noise

3.13.1 Affected Environment

3.13.1.1 Noise

Noise is unwanted or unwelcome sound usually caused by human activity and added to the natural acoustic setting of a locale. It is further defined as sound that disrupts normal activities and diminishes the quality of the environment. Community response to noise is dependent on the intensity of the sound source, its duration, the proximity of noise-sensitive land uses, and the time of day the noise occurs (i.e., higher sensitivities would be expected during the quieter overnight periods). Affected receptors are specific (e.g., schools, churches, or hospitals) or broad (e.g., nature preserves or designated districts) areas in which occasional or persistent sensitivity to noise above ambient levels exists.

BRF is bordered by wooded ridges on the north and south, a partially wooded valley to the east, and the Clinch River/Melton Hill Reservoir on the west. Residential areas to the north and northwest are within the immediate vicinity of BRF facilities, including Claxton Community Park to the northeast. The nearest single-family residential areas are located along Edgemoor Road approximately 140 feet from the northwest boundary of the project area. Residential areas are located north, south, and east of the project area, and the Claxton Community Park is located adjacent to BRF to the north along Edgemoor Road. The partially wooded hills across the river are used for residential and recreational purposes. The residences closest to the plant and therefore most affected by plant noise are located along Edgemoor Road approximately 140 feet from the northwest boundary of the project area.

3.13.1.2 Noise Metrics

Sound is measured in logarithmic units called decibels (dB). The “pitch” (high or low) of the sound is a description of frequency, which is measured in Hertz (Hz). A normal human ear can usually detect sounds that fall within the frequencies from 20 Hz to 20,000 Hz. However, humans are most sensitive to frequencies between 500 Hz to 4,000 Hz. Given that the human ear cannot perceive all pitches or frequencies of sound, noise measurements are typically weighted to correspond to the limits of human hearing. This adjusted unit of measure is known as the A-weighted decibel (dBA), which filters out sound in frequencies above and below human hearing. A noise level change of 3 dBA or less is barely perceptible to average human hearing; however, a 5-dBA change in noise level is clearly noticeable. The noise level associated with a 10-dBA change is perceived as being twice as loud; whereas the noise level associated with a 20-dBA change is considered to be four times as loud and would therefore represent a “dramatic change” in loudness.

Environmental noise refers to outdoor noise near a community. A continuous source of noise is rare for long periods of time and is typically not a characteristic of environmental noise. To account for sound fluctuations, environmental noise is commonly described in terms of the equivalent sound level, or L_{eq}. The equivalent sound level is the constant noise level that conveys the same noise energy as the actual varying instantaneous sounds over

a given period. Fluctuating levels of continuous, background, or intermittent noise heard over a specific period are averaged as if they had been a steady sound. The day-night sound level (L_{dn}), expressed in dBA, is the 24-hour average noise level with a 10-dBA correction penalty for the hours between 10 p.m. and 7 a.m. to account for the increased sensitivity of people to noises that occur at night.

3.13.1.3 Ambient Sound Levels

Noise levels continuously vary with location and time. In general, noise levels are high around major transportation corridors, along highways, railways, airports, industrial facilities, and construction activities. Sounds from a source spread out as they travel from the source, and the sound pressure level diminishes with distance. In addition to distance attenuation, the air absorbs sound energy; atmospheric effects (wind, temperature, precipitation) and terrain/vegetation effects also influence sound propagation and attenuation over distance from the source. An individual's sound exposure is determined by measurement of the noise that the individual experiences over a specified time interval.

Common indoor and outdoor noise levels are listed in Table 3-11. Typical background day-night noise levels for rural areas are anticipated to range between an L_{dn} of 35 and 50 dB, whereas higher-density residential and urban areas background noise levels range from 43 dB to 72 dB (EPA 1974).

Table 3-11. Common Indoor and Outdoor Noise Levels

Common Outdoor Noises	Sound Pressure Levels (dB)	Common Indoor Noises
	110	Rock Band at 5 m (16.4 ft)
Jet Flyover at 300 m (984.3 ft)		
	100	Inside Subway Train (New York)
Gas Lawn Mower at 1 m (3.3 ft)		
	90	Food Blender at 1 m (3.3 ft)
Diesel Truck at 15 m (49.2 ft)		Garbage Disposal at 1 m (3.3 ft)
	80	Shouting at 1 m (3.3 ft)
Gas Lawn Mower at 30 m (98.4 ft)	70	Vacuum Cleaner at 3 m (9.8 ft)
Commercial Area		Normal Speech at 1 m (3.3 ft)
	60	Large Business Office
	50	Dishwasher Next Room
Quiet Urban Daytime		
	40	Small Theater, Large Conference Room
Quiet Urban Nighttime		Library

Common Outdoor Noises	Sound Pressure Levels (dB)	Common Indoor Noises
Quiet Suburban Nighttime		
	30	
		Bedroom at Night
Quiet Rural Nighttime		Concert Hall (Background)
	20	
		Broadcast and Recording Studio
	10	
		Threshold of Hearing
	0	

Source: Federal Highway Administration (FHWA) 2018

3.13.1.4 Regulations

Anderson County, Tennessee has established quantitative noise-level regulations specifying environmental noise level limits based on the land use of the property receiving the noise. Per the Anderson County Zoning Ordinance, Residential (R-1) districts have the most stringent regulations and noise cannot exceed 60 dBA during daytime hours (7a.m. to 10 p.m.) or 55 dBA during the night (10 p.m. to 7 a.m.), measured at the closest adjacent property line. As noted in Section 3.1, BRF is located in an area which has been zoned for heavy industrial use by Anderson County. Allowable noise levels from areas zoned for heavy industrial use cannot exceed 80 dBA. Construction activities are exempt from the noise regulations (Anderson County, TN 2015).

Agencies of the federal government have established noise guidelines for the purpose of protecting citizens from potential hearing damage and from various other adverse physiological, psychological, and social effects associated with noise. According to the U.S. Department of Housing and Urban Development (HUD) criteria, residential units and other noise-sensitive land uses are “clearly unacceptable” in areas where the L_{dn} exposure exceeds 75 dBA, “normally unacceptable” in regions exposed to noise between 65 and 75 dBA, and “normally acceptable” in areas exposed to noise of 65 dBA or less (HUD 1985). For outdoor activities, the EPA recommends an L_{dn} of 55 dBA as the sound level below which there is no reason to suspect that the general population would be at risk from any of the effects of noise. This level is not regulatory goals but are “intentionally conservative to protect the most sensitive portion of the American population” with “an additional margin of safety” (EPA 1974).

3.13.1.5 Sources of Noise

Industrial activities, transportation noise, and construction noise are common sources of environmental noise emanating from BRF (TVA 2019c). Off-site sources of noise are primarily derived from road traffic and rail traffic, although the majority of transportation noise surrounding BRF results from road traffic (TVA 2005). Road traffic noise is generated by the volume of traffic, the speed of traffic, and the number of trucks in the flow of the traffic. Doubling the number of noise sources (i.e., vehicles) increases the L_{eq} by

approximately 3 dB, which is usually the smallest change that people can detect (FHWA 2018). Noise related to rail traffic may be influenced by speed of the engine, or type of engine, wagons, and rails (Berglund and Lindvall 1995). At BRF, rail operations are conducted at very low speeds and likely result in relatively low noise emissions.

3.13.1.6 Vibration

Construction and demolition activities, including the operation of heavy machinery, construction-related vehicles, and blasting, can create ground vibration. There are three primary types of receivers that can be adversely affected by ground vibration: people, structures, and equipment. Ground vibrations and ground noise can cause annoyance to people who live or work near sources of vibration. Additionally, if the vibration amplitudes are high enough, there is the possibility of physical and cosmetic damage to structures and the possibility of interference with the functioning of sensitive machinery. The length of time and strength of vibration varies with the equipment used. For example, the vibration from blasting has a high amplitude and short duration, whereas vibration from grading or highway traffic is lower in amplitude but longer in duration (Caltrans 2020). The Federal Transit Administration (FTA) developed a noise and vibration impact assessment manual for estimating vibrations generated by common transportation and construction sources, possible damage levels, and dampening distances. Figure 3-5 presents typical levels of ground-borne vibration at 50 feet for a variety of common transportation and construction equipment. At 50 feet from the source, community annoyance begins at a velocity level of 70 vibration decibels (VdB) for frequent events. Damage to structures occurs at 100 VdB for one-time activities such as blasting operations (FTA 2018).

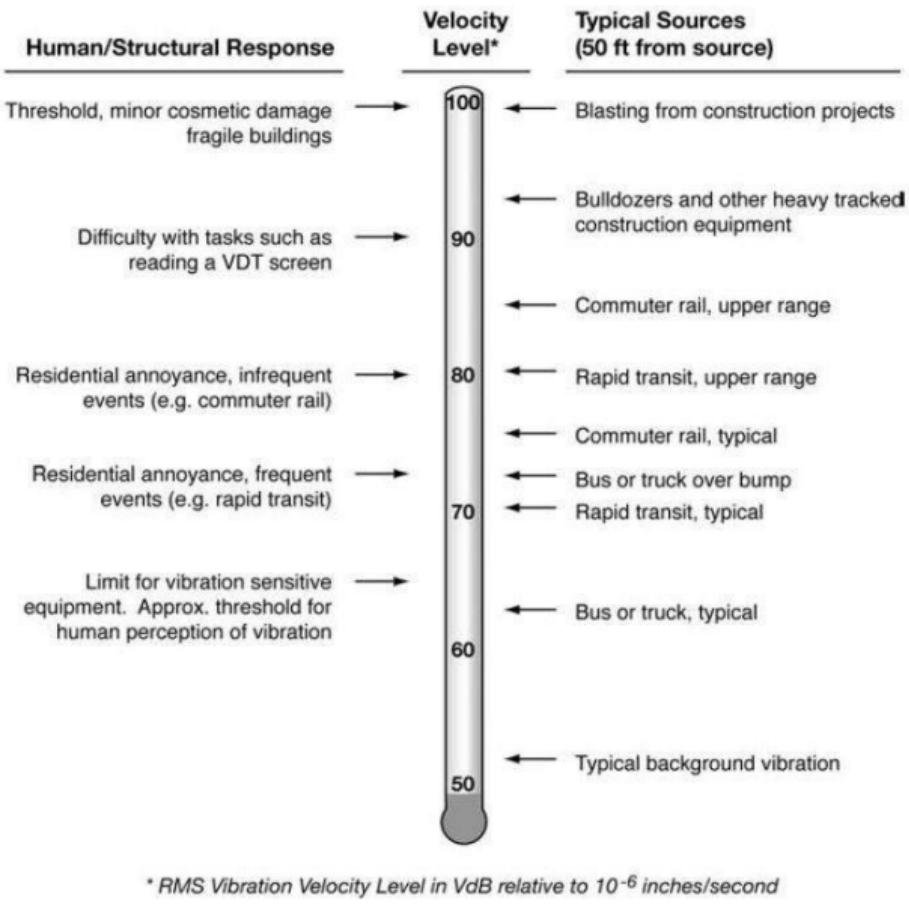

Figure 3-5. Typical Levels of Ground Borne Vibration

3.13.2 Environmental Consequences

3.13.2.1 Alternative A – Full Demolition of All Structures to Three Feet Below Final Grade

Decommissioning and decontamination of the plant would last approximately 12 months, whereas deconstruction would last approximately 18 to 24 months. This would be followed by a restoration period of approximately 12 months. Work would occur during daytime hours, between 6:00 a.m. and 6:00 p.m., up to seven days a week. Noise impacts under this alternative would be associated with the site decontamination and deconstruction, workforce vehicle traffic, transport of deconstruction debris offsite, and transport of borrow material to BRF.

During the decontamination and demolition phases, noise would be generated by a variety of construction equipment and vehicles including front-end loaders, dozers, excavators, graders, and dump/haul trucks. Typical noise levels from this equipment are expected to be 85 dBA or less at a distance of 50 feet from the construction equipment (FHWA 2016).

The closest sensitive receptors to facilities being demolished within the main plant area are residences on the north side of Edgemoor Road near the northwest boundary of the project

area. The distances between sensitive receptors and facilities to be demolished are shown in Table 3-12.

Table 3-12. Distance Between Demolition Activities and Sensitive Receptors

Structure to be Demolished	Sensitive Receptor	Distance to Nearest Sensitive Receptor
Guard Shack	Residence	576 feet
Car Wash	Claxton Community Park	672 feet
Car Wash	Residence	673 feet
Reclaiming Hoppers	Residences	692 feet
Hydrated Lime Injection System Buildings	Residence	726 feet
Hydrogen Trailer Port	Residence	747 feet
Office Wing	Residence	791 feet
Transfer Stations and Support Structures	Residence	826 feet
Smokestack (800 feet tall)	Residence	840 feet
Control and Sampling Building (Coal Tower)	Residence	893 feet
Precipitators and Control Building	Residence	919 feet
Powerhouse	Residence	920 feet

Based on straight line noise attenuation, it is estimated that noise levels would attenuate to 62.4 dBA at Claxton Community Park, 672 feet from the nearest structure to be demolished (car wash), and 63.8 dBA at the nearest residence, 576 feet northwest of the nearest structure to be demolished (guard shack). Noise levels at sensitive receptors would most likely be lower in the field compared to calculated values, as objects and topography would cause further noise attenuation. The remaining sensitive receptors in Table 3-12 represent the ten closest sensitive receptors to structures to be demolished at BRF, all of which are increasingly further away than those receptors previously mentioned. Therefore, all subsequent receptors in Table 3-12 would be expected to experience fewer noise impacts than Claxton Community Park from the car wash. Claxton Community Park is located within the BRF property boundary and therefore falls within the I-2 Industrial zoning designation (Anderson County Assessor 2022). Despite construction noise being exempt from the Anderson County noise ordinance requirements, noise levels from demolition and deconstruction are expected to fall below the guidelines established by Anderson County for industrial properties.

Use of construction equipment during decontamination and demolition activities may occasionally and temporarily result in noise levels that exceed the Anderson County guideline of 60 dBA for daytime specific residential zoned noise levels, the EPA noise guideline of 55 dBA, and the HUD guideline of 65 dBA. However, as previously stated, the

Anderson County zoning ordinance exempts construction noise. In addition, construction noise would generally be intermittent and limited to daylight hours, avoiding adverse impacts to the adjacent residents and the Claxton Community Park, during evening or nighttime hours. To reduce noise impacts from construction, there are various mitigation options that may be considered for application by the contractor. Examples of this mitigation (New York City Department of Environmental Protection 2018) are listed below:

- Equipping construction equipment with the manufacturer's noise-control devices and maintaining these devices in effective operating condition.
- Utilizing quiet equipment or methods to minimize noise emissions during an activity, when possible.
- Operating equipment with internal combustion engines at the lowest operating speed to minimize noise emissions, when possible and practical.
- Closing engine housing doors during operation of the equipment to reduce noise emissions from the engine.
- Avoiding equipment engine idling.
- Utilizing quieter, less-tonal back-up alarms on construction equipment. These alarms should comply with all applicable safety restrictions, such as OSHA standards.

Given the temporary and intermittent nature of noise associated with deconstruction and demolition activities and implementation of mitigation measures to reduce noise levels at the site boundary, impacts to adjacent residences and the Claxton Community Park from the proposed action would be minor.

Should explosive demolition be used to remove the stacks and other structures, noise would be generated both from the explosion and from the collapse of the stack/structures onto the ground. The noise associated with the explosive drop removal of the stacks and certain structures would be temporary, short-term events. Due to the isolated nature of the explosive drop removal of the stacks and structures, the noise produced by explosive stack demolition cannot be included in the continuous, background, or intermittent noise categories that constitute equivalent sound level, L_{eq}, and are used in determining community sensitivity associated with L_{dn}. For example, a jet flyover at 1,000 feet has a high sound pressure level of approximately 105 dBA, but in most environments, is not a recurring event that would contribute to typical noise levels. Similarly, a single explosive blast event may be equivalent to a thunderclap (120 dBA) at the source, whereas ongoing noise generated by heavy equipment used during demolition activities would fall under the standard continuous, background, and intermittent noise category that determines L_{eq} and associated community sensitivity (AZTEC 2021).

Explosive demolition activities would be single occurrences that would be temporary and short-term. The noise associated with the collapse of the structures would follow closely behind and be perceived as a single noise event. Notifications to the public, including area emergency services, would be issued prior to the use of explosives for demolition. With warning to the public prior to blasting activities, residents would be prepared for a single loud noise; therefore, direct impacts to noise levels in the area associated with blasting would be minor and temporary.

Removal of the stacks and structures would also result in vibrations at the surface in the immediate vicinity when they are felled. Additional vibrations would be generated throughout the course of demolition from the operation of land moving equipment. However, these vibrations would not cause structural or cosmetic damage or be perceptible to members of the public. Vibrations from explosive demolition events, however, could potentially affect nearby structures. If deemed necessary during development of the demolition plan, TVA would evaluate the potential for vibration impacts. TVA would use site-specific data provided by the blasting contractor to prepare a vibration model simulating the effects of discharge of the explosives or vibrations due to the stacks hitting the ground. The model results would be compared to thresholds developed by the U.S. Bureau of Mines for vibration damage (Siskind et al. 1980). The study would assess structures within a 0.5-mile radius of the stacks/structures to be explosively demolished. The installation of imported fill, dirt binder, and geofabric, or modifying the timing of detonation of charges could also serve as a form of noise/vibration control.

Seismologic analyses carried out at recent demolitions of other tall industrial chimneys in the U.S. strongly suggest that the vibrations would not result in measurable effects on nearby structures (Protec 2013). These seismological analyses were conducted to measure the effects from demolition-related vibrations on standing structures in the vicinity of chimney demolitions. In each case, vibrations were below the recommended limits set by the U.S. Bureau of Mines Report (Siskind et al. 1980). The report authors concluded the vibrations from the demolitions would not cause damage to structures as close as 526 feet from the blast area. Vibrations resulting from the demolition of BRF stacks are anticipated to be of similar or lesser magnitude than those discussed in the report, as the heights of the BRF stacks fall within the height range of those in the report. To add further protection, TVA would require the demolition contractor to develop and implement a demolition plan to minimize vibration effects at BRF and in the vicinity. Due to the temporary nature of the operation, implementation of the demolition plan, the site's industrial location, noise and vibration effects on the environment are expected to be short-term and minor.

There is a potential for indirect noise impacts associated with a temporary increase in traffic related to the workforce vehicle traffic, transport of deconstruction debris offsite, and transport of borrow material to BRF. TVA estimates that the workforce needed for decontamination would range in size from 50 to 150 personnel over a 12-month period. The demolition workforce of approximately 50 to 100 personnel would be needed for approximately 18 to 24 months which could overlap the decontamination work phase. Assuming one person per commuting vehicle, there would be a maximum daily morning inbound traffic volume of up to 250 vehicles and a daily outbound traffic volume of up to 250 vehicles during these periods. The workforce traffic noise would only occur twice per day as workers are entering and leaving the project site and would eventually be dispersed among the surrounding roadways. Traffic associated with the transport of borrow material would occur after decontamination and demolition is completed; thus, the traffic associated with hauling of borrow material would be offset by the reduction in traffic that would be experienced with the cessation of demolition and deconstruction activities. In accordance with Table 3-10 in Section 3.12, traffic associated with the decontamination and demolition of BRF would comprise a small proportion of the overall area traffic volume and, consequently, traffic noise in the vicinity of the roadways. Therefore, traffic related to the decontamination and demolition of BRF would have minor and temporary impacts on transportation-related noise in the area.

In summary, given the minor, temporary and intermittent noise emissions associated with the implementation of Alternative A and the implementation of mitigation measures designed to minimize noise and vibration impacts, impacts from noise would be minor.

3.13.2.2 Alternative B – Selective Demolition of All Structures to Three Feet Below Final Grade, Retain Turbine Bay of Powerhouse and Intake Structure

Noise impacts under this alternative would be similar to those under Alternative A and would be minor.

3.13.2.3 Alternative C – No Action Alternative

Under the No Action Alternative, TVA would not perform any deconstruction or other decontamination activities and the site would remain in its current condition. There would be no impacts from noise or vibration.

3.14 Visual Resources

3.14.1 Affected Environment

This assessment provides a review and classification of the visual attributes of existing scenery, along with the anticipated attributes resulting from the proposed action. The classification criteria used in this analysis are adapted from a scenic management system developed by the U.S. Forest Service (USFS) and integrated with planning methods used by TVA (USFS 1995). Potential visual impacts to cultural and historic resources are not included in this analysis as they are assessed separately in Section 3.16.

The visual landscape of an area is formed by physical, biological, and man-made features that combine to influence both landscape identifiability and uniqueness. Scenic resources within a landscape are evaluated based on a number of factors that include scenic attractiveness, integrity and visibility. Scenic attractiveness is a measure of scenic quality based on human perceptions of intrinsic beauty as expressed in the forms, colors, textures, and visual composition of each landscape. Scenic integrity is a measure of scenic importance based on the degree of visual unity and wholeness of the natural landscape character. The varied combinations of natural features and human alterations both shape landscape character and help define their scenic importance. The subjective perceptions of a landscape's aesthetic quality and sense of place is dependent on where and how it is viewed.

Scenic visibility of a landscape may be described in terms of three distance contexts: foreground, middleground, and background. In the foreground, an area within 0.5 miles of the observer, individual details of specific objects are important and easily distinguished. In the middleground, from 0.5 to 4 miles from the observer, object characteristics are distinguishable, but their details are weak, and they tend to merge into larger patterns. In the distant part of the landscape, the background, details, and colors of objects are not normally discernible unless they are especially large, standing alone, or have a substantial color contrast. In this assessment the background is measured as 4 to 10 miles from the observer. Visual and aesthetic impacts associated with a particular action may occur as a result of the introduction of a feature that is not consistent with the existing viewshed. Consequently, the character of an existing site is an important factor in evaluating potential visual impacts.

For this analysis, the affected environment includes the proposed decontamination and deconstruction project area, which includes temporary laydown areas, as well as the physical and biological features of the landscape. The existing BRF facility is located just east of the City of Oak Ridge, along the bank of the Clinch River/Melton Hill Reservoir in Anderson County. The surrounding area is representative of ridge and valley topography, with BRF and other development located in the valleys. Forested areas within Haw Ridge Park are visible to the southwest. To the north, east, southeast, and west are residential areas, including the Claxton Community Park to the northeast, and pockets of forested landscape.

The BRF stacks and associated steam plumes, landfills, dry fly ash stack, ash ponds, and transmission lines are the dominant elements in the existing landscape that are visible to residents, motorists on nearby roadways, and visitors to nearby parks and recreation areas within the foreground and middleground. Within the immediate vicinity of the plant site, the landscape character is a mix of residential and open areas with minimal commercial development. The steam plume from the stacks is prominent from middleground and background distances when the plant is operating. Based on the above characteristics, the scenic attractiveness of the affected environment is considered to be common, whereas the scenic integrity is considered to be low to moderate. The rating for scenic attractiveness is due to the ordinary or common visual quality. The scenic integrity has been lowered by the industrial nature of the BRF facility and surrounding residential development. However, in the background these alterations are not substantive enough to dominate the view of the landscape. Based on the criteria used for this analysis, the overall scenic value class for the affected environment is considered to be fair to good.

3.14.2 Environmental Consequences

3.14.2.1 Alternative A – Full Demolition of All Structures to Three Feet Below Final Grade

Under Alternative A, TVA would decontaminate and deconstruct the powerhouse and buildings and structures within the project area to 3 feet below final grade. Minor visual impacts may occur during the decontamination and deconstruction of the facilities. During the decontamination and deconstruction phase there would be additional visual discord due to an increase in personnel and equipment in the area. Impacts from additional vehicular traffic are expected to be minor as the roads are used for residential access and access to the BRF facility. The increase in visual discord would be temporary and only last until all activities have been completed by TVA.

Although only the stacks are currently visible from most vantage points in the area, cranes and other tall and colorful equipment may be visible at BRF during deconstruction activities. Observers and recreationists using the Clinch River/Melton Hill Reservoir, Claxton Community Park, the Melton Lake Greenway, and Haw Ridge Park would likely be able to see the construction equipment operating at the stacks and the powerhouse facilities as these are the tallest structures. However, because of the screening effect of terrain associated with the forested bluff lines, visibility of the proposed project site by residents to the north, east, southeast, and west is expected to be limited. Additionally, due to the temporary nature of the activities, visual impacts during demolition of the facilities would be considered minor.

Removal of the BRF stacks and structures under Alternative A would enhance the visual environment of the foreground, middleground, and background distances due to the

removal of an industrial object from a generally rural viewscape. The stacks and powerhouse are visible as a major visual intrusion to many residents in the surrounding area and recreationists in the Clinch River/Melton Hill Reservoir, Melton Lake Greenway, and Haw Ridge Park. The overall long-term impacts of this alternative would be beneficial, but minor, due to the number of observers in the area around BRF.

3.14.2.2 Alternative B – Selective Demolition of All Structures to Three Feet Below Final Grade, Retain Turbine Bay of Powerhouse and Intake Structure

Under Alternative B, actions as described under Alternative A would occur, except that the turbine bay of the powerhouse and the full intake structure would remain in-place. Minor impacts could occur over time if the remaining few structures begin to deteriorate. These impacts would be mitigated by the general maintenance measures to address safety-related issues and would be minor. Visual impacts under this alternative during demolition activities would be less than those described in Alternative A, as there would be fewer total structures to be demolished; therefore, impacts to residents and recreationists would still be minor. The turbine bay and intake structure would still be visible to many residents in the surrounding area and to recreationists using the Clinch River/Melton Hill Reservoir and surrounding parks. However, as the stacks, the tallest structures at BRF, would be removed under this alternative, there would be the same beneficial, but minor, impact to the overall viewscape.

3.14.2.3 Alternative C – No Action Alternative

Under the No Action Alternative, no decontamination or deconstruction activities would occur, and there would be no impact to visual resources. As TVA would only perform critical maintenance as needed, minor adverse impacts to visual resources would occur over time as the buildings at BRF begin to deteriorate.

3.15 Natural Areas, Parks, and Recreation

3.15.1 Affected Environment

3.15.1.1 Managed and Natural Areas

Natural areas include managed areas such as Wildlife Management Areas (WMAs), National Wildlife Refuges and Habitat Protection Areas, ecologically significant sites, and Nationwide Rivers Inventory streams. Managed areas include lands held in public ownership that are managed by an entity (e.g., TVA, National Park Service [NPS], USFS, state or county) to protect and maintain certain ecological and/or recreational features. Ecologically significant sites are tracts of privately owned land that are recognized by resource biologists as having significant environmental resources or identified tracts on TVA lands that are ecologically significant, but not specifically managed by TVA's Natural Areas Program. The Nationwide Rivers Inventory is a listing of more than 3,200 free-flowing river segments in the U.S. that are believed to possess one or more outstandingly remarkable natural or cultural values judged to be of more than local or regional significance. Designated Nationwide Rivers Inventory segments are thus potential candidates for inclusion in the federally recognized National Wild and Scenic River System. This section addresses managed and natural areas that are on, immediately adjacent to (within a 0.5-mile radius), or within the region of the proposed decontamination and deconstruction project area (within a 3-mile radius).

A review of the TVA Natural Heritage Project database identified 23 managed and natural areas, a segment of Clinch River Nationwide Rivers Inventory, and a segment of Clinch River State Scenic River within 3 miles of the project area (Table 3-13; Figure 3-6).

Five managed or natural areas occur within 0.5 miles of the project area. The Bethel Valley Embayment TVA Habitat Protection Area (HPA) is located 0.4 miles southwest of the project area and is listed as having high significance as a scenic and biologically diverse site. Chestnut Ridge Bluff TVA HPA, a 7-acre bluff covered in deciduous forest, is located approximately 0.4 miles northwest of the project area. Wolf Creek Embayment TVA HPA is just over an acre and is located 0.5 miles northwest of the project area. TVA HPAs are managed to protect threatened and endangered species, state-listed species, or unusual/exemplary biological communities or geologic features.

Haw Ridge Park, located within the bend of the Clinch River/Melton Hill Reservoir across from and downstream of BRF, is owned and managed by the City of Oak Ridge and contains over 30 miles of trails used for mountain biking, hiking, and horseback riding. The 762-acre park is an undeveloped area covered by hardwoods, and a cedar barrens community is located along one of the trails. The forest supports more than forty varieties of wildflower, including one endangered plant (Friends of Haw Ridge Park 2022). Chestnut Ridge Park, located 0.4 miles northwest of the project area, is a forested, approximately 1.5-acre green space adjacent to several residences and the Clinch River/Melton Hill Reservoir.

The NPS lists the Clinch River in Anderson County below Norris Dam, including a portion in the vicinity of BRF, on the Nationwide Rivers Inventory (NPS 2022). Under a 1979 Presidential Directive, and related CEQ procedures, all federal agencies must seek to avoid or mitigate actions that would adversely affect one or more Nationwide Rivers Inventory segments. A section of the Clinch River, from Melton Hill Dam upstream to the Pellissippi Parkway, is designated a Class III Partially Developed River Area under the Tennessee Scenic Rivers Program (TDEC 2022a). A partially developed river is defined by TDEC as rivers or sections of rivers that are free flowing, unpolluted and with shorelines and vistas essentially more developed (TDEC 2022e). The Tennessee Scenic Rivers Program is a voluntary community-based partnership intended to preserve and protect the free flowing, unpolluted and outstanding scenic, recreational, geologic, botanical, fish, wildlife, historic or cultural values of selected rivers or river segments in the state.

Table 3-13. Managed and Natural Areas Within 3 Miles of the Decontamination and Deconstruction Project Area

Natural Area	Size (acres)	Distance from Project Area (miles)
Haw Ridge Park	762.2	0.3
Chestnut Ridge Park	1.6	0.4
Bethel Valley Embayment TVA Habitat Protection Are	3.6	0.4
Chestnut Ridge Bluff TVA Habitat Protection Area	7.6	0.4
Wolf Creek Embayment TVA Habitat Protection Area	1.4	0.5
Bull Run Park	9.2	0.6
Pumping Station Embayment Slope TVA Habitat Protection Area	4.2	0.7
Brushy Valley Park	8.0	0.8
Lower Bull Run Bluffs TVA Habitat Protection Area	4.4	1.0
Railroad Slope TVA Habitat Protection Area	2.4	1.0
Pine Ridge Bluff TVA Habitat Protection Area	5.0	1.1
Upper Bull Run Bluffs TVA Habitat Protection Area	12.3	1.4
Oak Ridge Municipal Park	7.7	1.4
Emory Valley Greenway	8.6	1.5
Pilot Knob Bluff TVA Habitat Protection Area	2.8	2.0
Bull Run Wetland TVA Habitat Protection Area	2.8	2.1
Palisades Subdivision Embayment TVA Habitat Protection Area	16.3	2.4
University Of Tennessee Arboretum/State Wildlife Observation Area	374.7	2.4
Worthington Cemetery Cedar Barrens TVA Ecological Study Area	20.4	2.4
Oak Ridge Reservation Solway Bend Bluffs	13.9	2.6
Oak Ridge National Laboratory Reservation	32,848.6	2.6
Three Bend Scenic and Wildlife Refuge	3,209.2	2.7
Lost Bottom Park	16.8	2.7

Source: TVA 2022c

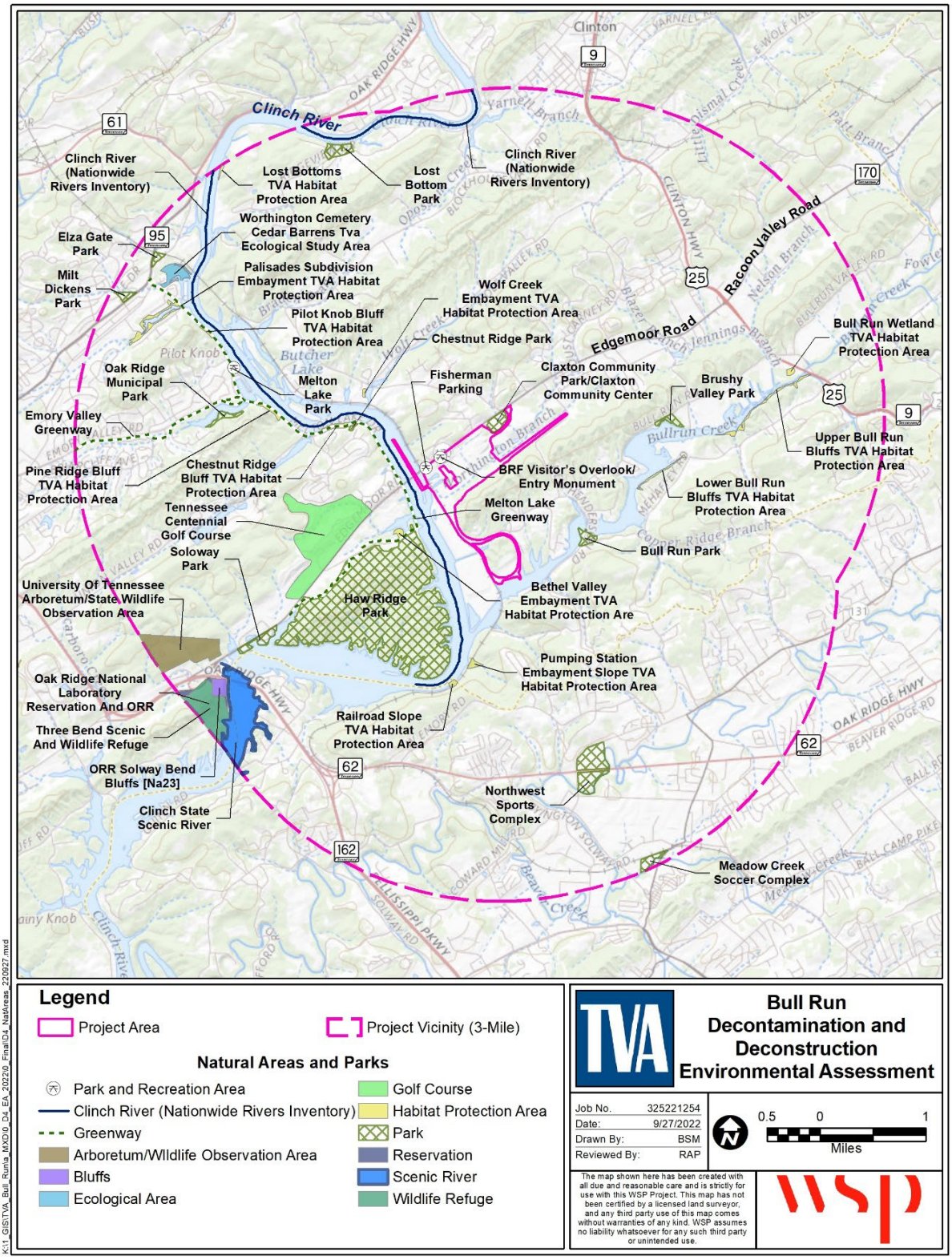

Figure 3-6. Natural Areas, Parks, and Recreation Facilities within 3 Miles of the Decontamination and Deconstruction Project Area

3.15.1.2 Parks and Recreation

Parks and developed recreation facilities include open areas, boat ramps, community centers, swimming pools, and other public places. Parks and recreation facilities that are on, immediately adjacent to (within a 0.5-mile radius), or within the region of the proposed decontamination and deconstruction project area (within a 3-mile radius) are shown on Figure 3-6.

Several parks and recreational areas that are near or adjacent (within 0.5 miles) to BRF are described below. Claxton Community Park, a public park that is leased by the community from TVA and includes a community center, playground, picnic shelter, and athletic fields, is on TVA property adjacent to the northern edge of the plant boundary. A paved parking area (labeled as "Fisherman Parking" on Figure 3-6) with a capacity of 11 vehicles is located at the northwest corner of the BRF reservation adjacent to Edgemoor Road and just east of the Edgemoor Road bridge. This parking area is used primarily by anglers for walk-in access to the Clinch River/Melton Hill Reservoir. There is also a scenic overlook of BRF and entry monument on TVA property along Edgemoor Road with a capacity for seven vehicles approximately 300 feet northeast of the BRF parking area entrance (TVA 2019c).

Four miles of the 6-mile Melton Lake Greenway run along the shoreline of the Clinch River/Melton Hill Reservoir from Oak Ridge Turnpike (SR 95) south to Haw Ridge Park. About 0.5 miles of this greenway is on the shoreline directly across from BRF. The Oak Ridge Rowing Association's Melton Lake Rowing Venue is located at Melton Hill Park and hosts national rowing competitions (TVA 2019c). Rowing events such as camps, collegiate rowing races, regattas, and other events occur throughout the year, and many of these events begin at Melton Lake Park, with the course moving downriver adjacent to the project area.

The Tennessee Centennial Golf Course is a public 18-hole golf course, driving range, and clubhouse located on 220 acres along Edgemoor Road approximately 0.5 miles southwest and across the Clinch River/Melton Hill Reservoir from BRF. Centennial Golf Course has been designated a "Certified Audubon Cooperative Sanctuary" by Audubon International for its high standards protecting the environment and preserving the natural heritage of golf (The Golf Wire 2013).

3.15.2 Environmental Consequences

3.15.2.1 Alternative A – Full Demolition of All Structures to Three Feet Below Final Grade

Under Alternative A, there would be no direct impacts to natural areas, parks, and recreational facilities from onsite decontamination and deconstruction activities, given the existing industrial setting of the project location and the distance between these areas and the project area. However, indirect impacts could occur on natural areas, parks, and recreational facilities that are within 0.5 miles of the project area. These indirect impacts would include construction noise, visual intrusions, and stormwater runoff, which would be minimized through the use of standard construction BMPs and coordination with land managers of nearby areas.

Under this alternative, demolition debris and scrap metal would be hauled by truck to an offsite landfill or recycling facility and borrow material may be hauled to BRF. The exact haul routes for demolition debris and borrow material are not known. While haul routes

would use arterial or interstate roadways whenever possible, it may be necessary for some routes to utilize local roads within the vicinity of BRF, including Edgemoor Road. Therefore, there is potential for indirect impacts to natural areas, parks, and recreational facilities within the vicinity of BRF, especially to Claxton Community Park and other sites along Edgemoor Road, associated with increased traffic, noise, and potential fugitive dust from the transport vehicles during the deconstruction and site restoration phases. The Visitors Overlook/Entry Monument on BRF property (see Figure 3-6) would be temporarily closed to the public during demolition activities.

Impacts would be negligible to natural areas and recreational facilities along arterial and interstate roadways where the additional truck traffic would not have a substantial impact on existing traffic volume or, consequently, traffic noise or fugitive dust emissions. On the lower functioning roadways closest to BRF, increased traffic would be temporary and would likely resemble traffic patterns that were present when the plant was operational. Due to the short-term nature of the transport of demolition debris offsite and borrow material onsite, indirect impacts to natural areas, parks, and recreational facilities under Alternative A would be short-term and minor.

Deconstruction activities could cause some temporary shifts in recreational boating and fishing in the waters immediately adjacent to the plant, but any impacts would be minor due to the short duration of demolition and coordination efforts by TVA with recreational organizations (i.e., Oak Ridge Rowing Association) that utilize sections of the Clinch River/Melton Hill Reservoir.

3.15.2.2 Alternative B – Selective Demolition of All Structures to Three Feet Below Final Grade, Retain Turbine Bay of Powerhouse and Intake Structure

Under Alternative B, direct and indirect impacts to managed and natural areas, parks, and recreational facilities would be similar to those described under Alternative A.

3.15.2.3 Alternative C – No Action Alternative

Under the No Action Alternative, TVA would not perform any decontamination or deconstruction activities at BRF, and the project area and vicinity would remain in its current condition. Therefore, there would be no impacts to natural areas, parks, or recreation.

3.16 Cultural and Historic Resources

3.16.1 Affected Environment

3.16.1.1 Regulatory Framework for Cultural Resources

Cultural resources or historic properties include archaeological sites, districts, buildings, structures, and objects, as well as locations of important historic events. Federal agencies, including TVA, are required by the NHPA (16 USC 470) and by NEPA to consider the possible effects of their undertakings on historic properties. Undertaking means any project, activity, or program, and any of its elements, which has the potential to have an effect on a historic property and is under the direct or indirect jurisdiction of a federal agency or is licensed or assisted by a federal agency. An agency may fulfill its statutory obligations under NEPA by following the process outlined in the regulations implementing Section 106 of NHPA at 36 CFR Part 800. Additional cultural resource laws that protect historic resources include the Archaeological and Historic Preservation Act (16 USC 469-

469c), Archaeological Resources Protection Act (16 USC 470aa-470mm), and the Native American Graves Protection and Repatriation Act (25 USC 3001-3013).

Section 106 of the NHPA requires that federal agencies consider the potential effects of their actions on historic properties and to allow the Advisory Council on Historic Preservation (ACHP) an opportunity to comment on the action. Section 106 requires identifying historic properties in the APE, assessing adverse effects, resolving adverse effects on historic properties. This process is carried out in consultation with the SHPO in the state where the project is located and other interested consulting parties, including federally recognized Indian tribes (Tribes) with an interest in the project area.

Cultural resources are considered historic properties if they are listed or eligible for listing in the NRHP. The NRHP eligibility of a resource is based on the Secretary of the Interior's criteria for evaluation (36 CFR 60.4), which state that significant cultural resources possess integrity of location, design, setting, materials, workmanship, feeling, association, and:

a. Are associated with events that have made a significant contribution to the broad patterns of our history; or
b. Are associated with the lives of persons significant in our past; or
c. Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic value; or
d. Have yielded, or may yield, information (data) important in prehistory or history.

If the agency determines (in consultation) that the undertaking's effect on a historic property would diminish any of the qualities that make it eligible for the NRHP (based on the criteria for evaluation at 36 CFR Part 60.4, above), the effect is said to be adverse. Examples of adverse effects would be ground disturbing activity in an archaeological site or erecting structures within the viewshed of a historic building in such a way as to diminish the structure's integrity of feeling or setting. Resolution of adverse effects may consist of avoidance (such as choosing a project alternative that does not result in adverse effects), minimization (such as redesign to lessen the effects), or mitigation. Adverse effects to archaeological sites are typically mitigated by means of excavation to recover the important scientific information contained within the site. Mitigation of adverse effects to historic structures sometimes involves thorough documentation of the structure by compiling historic records, studies, and photographs. Agencies are required to consult with SHPOs, Tribes, and others throughout the Section 106 process and to document adverse effects to historic properties resulting from agency undertakings.

3.16.1.2 Area of Potential Effect

The APE is the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if such properties exist.

For Alternative A and Alternative B, the APE consists of the BRF decontamination and deconstruction project area, which totals approximately 252 acres and is shown in Figure 1-2. For Alternative C (No Action Alternative), NHPA Section 106 would not be triggered and there would be no APE, as TVA would not be proposing any activities with potential to affect historic properties at BRF.

3.16.1.3 Previous Cultural Resources Investigations in the APE

TVA has conducted eight archaeological surveys at BRF over the past four decades, and these have included areas within the APE. Table 3-14 summarizes these previous investigations. Four were completed prior to 1990, and four were conducted between 2004 and 2019. For the earlier surveys, either no report or very brief reports were generated, making it difficult to assess the adequacy of the effort. None of those surveys identified cultural resources. The four surveys carried out since 2004 are summarized in reports that meet current survey and reporting guidelines and were submitted to the SHPO and Tribes for review. These modern archaeological surveys overlap one another to some extent. Approximately 380-400 acres within BRF have been affected by deep and extensive ground disturbance; these areas were not surveyed as they lack potential for archaeological sites.

Table 3-14. Previously Completed Archaeological Surveys at BRF

Survey Year	Report Title or Area Surveyed	Surveyor	Acres
1975	Two proposed borrow areas (no report on file)	Motlow State Community College	Unknown
1980	Archaeological Survey of Proposed Dry Ash Disposal Area – Bullrun Steam Plant	J.H. Polhemus	Approx. 22
1984	An Archaeological Reconnaissance Near Bull Run Steam Plant (1,000-foot extension of Rail Road, crossing New Henderson Road)	C.M. Hubbard	Approx. 1
1989	Archaeological Reconnaissance, Proposed Asbestos Land Fill, Bull Run Steam Plant, Anderson County, Tennessee	Julia Elmendorf	9
2005	Phase I Archaeological Survey of a 4-Acre Borrow Area at the Bull Run Fossil Plant in Anderson County, Tennessee (bound with a report titled Phase I Archaeological Survey of An Approximately 105-Acre Tract and 2.6 Miles of Shoreline for Proposed Scrubber Site and Barge Loading Facility for Kingston Steam Plant in Roane County, Tennessee)	TRC	4
2011	Phase I Archaeological Survey of the Bull Run Fossil Plant Site J Proposed Boring Locations and Access Routes, Anderson County, Tennessee	TRC	115, plus five bore hole locations
2012	Phase I Cultural Resources Survey of Thirty Tracts Associated with the Bull Run fossil Plant Coal Combustion Products (CCP) Property Acquisition Project, Anderson County, Tennessee	TRC	114.5
2019	A Phase I Archaeological Survey of Selected Tracts within the Tennessee Valley Authority's Bull Run Fossil Plant in Anderson County, Tennessee	Tennessee Valley Archaeological Research (TVAR)	497

The surveys performed prior to 2012 identified no archaeological sites or cemeteries within the APE. Although four archaeological sites have been identified at BRF, these are all located outside the APE, and all four sites were likely destroyed by the construction of coal ash landfills in the 1960s.

TVA's most recent survey at BRF, in 2019, was completed pursuant to the Archaeological Resources Protection Act and Section 110 of the NHPA and included 497 acres, which encompasses the APE and additional areas of BRF. With this survey, all undeveloped/undisturbed land within the APE has been examined with an archaeological survey that meets current SHPO and TVA guidelines. This survey identified two previously unrecorded archaeological sites (40AN269 and 40AN270), and 49 non-site localities. The non-site localities consist of modern artifacts that lack archaeological significance and were not given archaeological site numbers by the Tennessee Division of Archaeology. Sites 40AN269 and 40AN270 are both mid-20th century historic house sites that lack associated structural remains. Site 40AN269 is adjacent to the southern border of the APE but is not within the APE. Site 40AN270 is in the APE, in a narrow strip of land between a rail line and a coal ash landfill. TVA determined that both sites are ineligible for listing in the NRHP, and the Tennessee SHPO agreed, in consultation. Therefore, as documented by these archaeological surveys and TVA's Section 106 consultation, the APE contains no NRHP-eligible archaeological sites or cemeteries.

In 2011, TVA conducted a survey of the architectural APE, which identified 12 previously unrecorded architectural resources over 50 years old. Evaluations of these resources determined that they are ineligible for the NRHP because of their lack of architectural distinction; loss of integrity caused by modern alterations and/or damage; and the inability to associate the houses and/or their original owners with an important historical event or series of events. TVA consulted with the Tennessee SHPO, who agreed with the findings.

In 2019 TVA completed an inventory and NRHP assessment of BRF. During background research conducted prior to the site visit, TVA learned that the Tennessee Department of Transportation (TDOT) recommended BRF eligible for listing in the NRHP during a road construction project, and SHPO agreed. However, TDOT's study included no on-site examination of the facilities. TVA's own NRHP inventory did include interior and exterior examination of all structures and buildings at BRF. Based on this study, TVA determined that BRF is eligible for listing in the NRHP under Criterion A, with significance at the local level in the areas of engineering and industry. TVA will consult with the Tennessee SHPO regarding the study findings and TVA's eligibility determination.

3.16.2 Environmental Consequences

3.16.2.1 Alternative A – Full Demolition of All Structures to Three Feet Below Final Grade

Alternative A would not impact NRHP-listed or -eligible archaeological sites as TVA has identified none in the APE. Alternative A would result in an adverse effect on NRHP-eligible BRF through the demolition of buildings and structures that contribute to the property's eligibility. Upon reaching agreement with the Tennessee SHPO regarding BRF eligibility and TVA's finding of adverse effect, TVA will consult further with SHPO to identify mitigation measures. Once TVA and the SHPO have agreed on appropriate mitigation measures, these will be listed in an MOA that TVA will execute with SHPO. TVA will also notify the ACHP of the adverse effect finding and provide them with a copy of the executed MOA.

3.16.2.2 Alternative B – Selective Demolition of All Structures to Three Feet Below Final Grade, Retain Turbine Bay of Powerhouse and Intake Structure

Under Alternative B, impacts to cultural and historic resources would be similar to those described above under Alternative A.

3.16.2.3 Alternative C – No Action Alternative

Under the No Action Alternative, the proposed project would not be implemented and no impacts on cultural or historic resources would be anticipated. Therefore, there would be no direct, indirect, or cumulative impacts to archaeological sites or historic architectural properties listed in, or eligible for listing in, the NRHP. While natural ecological processes and anthropogenic disturbances would continue, changes would not result from the proposed project.

3.17 Utilities and Service Systems

3.17.1 Affected Environment

Current utilities and service systems at BRF include drinking water, process wastewater and cooling water, sanitary wastewater, electrical, fiber optics, and compressed air. The switchyard, non-CCR process water basin, BRF Visitor's Overlook/Entry Monument, and the Claxton Community Center and Park would remain and stay active at BRF under all alternatives.

3.17.2 Environmental Consequences

3.17.2.1 Alternative A – Full Demolition of All Structures to Three Feet Below Final Grade

Implementation of Alternative A would require that all aboveground utilities and service systems be removed. All buried utilities would be cut and properly abandoned in place. Only safety-necessitated utilities, including lighting, security, and fire protection, would be active and would be re-routed prior to demolition. Utilities constructed of hollow pipe, including the existing intake structure, would be decommissioned by placing a mechanical cap or plug and/or concrete in an open end. Sanitary sewer lines and lift stations would be cleaned as deemed necessary and closed in place. Utilities would be abandoned in place. Manholes and catch basins would be demolished to 3 feet below final grade. The firewater loop, including hydrants around the switchyard would be maintained during deconstruction and may require cutting/capping to maintain system integrity while isolating from the domestic loop where connected. Overall, the impacts of Alternative A on utilities and service systems are expected to be minor. No impacts would be anticipated beyond the decontamination and deconstruction project area.

3.17.2.2 Alternative B – Selective Demolition of All Structures to Three Feet Below Final Grade, Retain Turbine Bay of Powerhouse and Intake Structure

Under Alternative B, impacts to utilities and service systems would be similar to those described for Alternative A and would be minor and localized. Utilities required to power the turbine bay of the powerhouse would be retained under this alternative, and the existing intake structure would be left in-place in "as-is" condition. Services to remain would be re-routed prior to demolition. Personnel from other TVA sources would be used, as necessary, to assist with performing monitoring and maintenance of the intake structure and power for turbine bay electrical needs.

3.17.2.3 Alternative C – No Action Alternative

Under the No Action Alternative, the facility would remain in place to degrade from its current condition. With the exception of active utilities, only utilities necessitated by safety, such as lighting, security, and fire protection, would be active on the BRF site.

If the facility remains in "as-is" condition, it would likely present a higher risk than Alternatives A and B, as utilities would not be maintained and would degrade over time, resulting in the potential to contaminate soil and groundwater. Impacts related to the No Action Alternative would occur over the long term and are expected to be minor.

3.18 Public Health and Safety

3.18.1 Affected Environment

Public health and safety encompass the occupational and environmental health and safety of employees at BRF as well as members of the public living and working in locations surrounding BRF. The plant is in an area that supports industrial land use. Residential properties and commercial businesses are located on all but the west side of the BRF property, as the western edge of the property is located along the Clinch River/Melton Hill Reservoir. The closest residence is located north of Edgemoor Road. Claxton Community Park is located within TVA property, adjacent to the BRF facility on the north side. BRF is surrounded by chain link security fence. Public and vehicle access to BRF is controlled with secure gates at three entrances along Edgemoor Road. The office wing is accessed through a secured door.

3.18.1.1 Occupational Health and Safety

Occupational health and safety regulations are designed to eliminate personal injuries and illnesses from occurring in the workplace. These laws may be comprised of both federal and state statutes. OSHA is the main statute protecting the health and safety of workers in the workplace. OSHA regulations are presented in Title 29 CFR Part 1910 (29 CFR 1919). A related statute, 29 CFR 1926, contains health and safety regulations specific to the construction industry. The Tennessee Department of Labor and Workforce Development has adopted federal OSHA standards contained in 29 CFR Parts 1910 and 1926 pursuant to Tennessee Code Annotated (TCA) Section 50-3-201.

Operation and maintenance activities at the existing BRF facility reflect a safety-conscious culture and are performed consistent with OSHA and TVA standards and requirements. TVA also maintains guidance which workers must follow when performing operational or maintenance activities. Personnel at BRF create a culture of safety by implementing safety practices, training, and control measures that reduce or eliminate occupational hazards. The safety record of BRF shows only two OSHA recordable cases reported over the past ten years (USDOL 2022).

Safety programs and BMPs established at BRF to minimize the potential of safety incidences include but are not limited to the following:

- Hazard Analysis
- Management of Change
- Spill and Emergency Response Plan
- Standard Operating Procedures

- Safety Reviews
- Compliance Audits
- Training
- Incident Investigations

TVA implements a contractor safety program that ensures a safety management system is in place for contract employees to actively participate in hazard recognition and control. Contractors must submit a Site-Specific Safety Plan (SSSP) in accordance with TVA guidelines and are audited by TVA based on their execution of the SSSP and adherence to TVA safety expectations (TVA 2020a). TVA also expects employees to follow safety guidelines outlined in the TVA Safe Work Requirements Manual which includes safety rules for tasks often performed during operation or maintenance activities (TVA 2020b).

3.18.1.2 Environmental Health and Safety

Environmental health and safety requirements aim to mitigate health hazards or contamination in the form of emissions or discharges that have the potential to affect the public and the environment. Environmental health and safety requirements also dictate how to respond if a hazardous situation or emergency did occur. Potential off-site hazards and emergency response plans are discussed with local emergency management agencies. These programs are audited by TVA no less than once every three years and by EPA periodically (TVA 2016c). Applicable regulations and administrative codes prescribe monitoring requirements for emergency management, environmental health, drinking water, water and sewage, pollution discharge, air pollution, hazardous waste management and remedial action.

Wastes generated by the decontamination and deconstruction of the plant can pose a health hazard. Wastes including solid wastes, hazardous waste, liquid wastes, discharges, and air emissions are managed in accordance with applicable federal, state, and local laws and regulations and all applicable permit requirements. Furthermore, waste reduction practices are employed including recycling and waste minimization. TVA is committed to complying with all applicable regulations, permitting, and monitoring requirements.

3.18.2 Environmental Consequences

3.18.2.1 Alternative A – Full Demolition of All Structures to Three Feet Below Final Grade

Under Alternative A, decontamination and deconstruction would result in the lowest risk to soil and groundwater, as contaminants and potential sources of contamination would be removed from the site. Decontamination activities would last approximately 12 to 18 months and deconstruction would last approximately 18 to 24 months and may overlap with the decontamination phase. This would be followed by a restoration period of approximately 12 months. All decontamination and deconstruction activities would be performed in accordance with OSHA and TVA requirements. Hazardous materials associated with the existing buildings and structures would be removed and discarded in accordance with applicable federal, state, and local requirements.

As part of the structure removal, the stacks and certain structures would be demolished via explosives. Minor increases in risk to worker safety would occur under this alternative due to the use of explosives. However, risks would be minimized through implementation of

safety measures. TVA would develop a detailed blasting plan to protect workers and neighboring properties prior to any blasting activities. The plan would identify the specifications or rules that clearly define the performance and safety requirements of the work. Explosives would be managed under the direction of a licensed blaster. Prior to demolition of the stacks and structures, the area would be prepared, and a targeted fall zone and circular fall exclusion zone would be established. During the blast event, no personnel would be allowed in the fall exclusion zone. A fall exclusion zone area would provide a sufficient safety buffer for debris and dust control around the area as well as a control zone for any unlikely change in the intended fall direction. The plan would also delineate proper hearing protection for workers in the vicinity of the blast and would ensure that the use, transportation, and storage of explosives is being conducted in accordance with all applicable or relevant regulations, including 29 CFR 1926.900, Blasting and the Use of Explosives; 49 CFR Parts 171-179, Highways and Railways and 49 CFR Parts 390-397 Motor Carriers (transportation); and 27 CFR Part 55, Commerce in Explosives (storage). Site security on the day of the event would be strictly enforced, and trespassing would not be tolerated. Notifications to the public would be issued prior to the use of explosives for demolition.

Public health and safety concerns related to hazardous materials would be low under this alternative. The potential for contaminants from the facility to reach soil and groundwater would be almost nonexistent. Emergency response plans are in place in the case of spills or discharges during decontamination and demolition and removal of potential sources of contamination will reduce environmental safety concerns associated with long term storage or use of hazardous and regulated materials.

Potential contaminants removed prior to structure deconstruction would be hauled to an offsite landfill. Brick, block, and concrete demolition debris not contaminated by asbestos or other hazardous materials would be used as clean fill onsite. Other demolition debris would be hauled by truck to an offsite landfill within 20 miles of BRF or to an offsite recycling facility. The materials would be transported along existing roadways in the vicinity of BRF for a period of approximately 18 months. In addition, site restoration would require the transport of borrow material from a previously developed or permitted borrow site within 100 miles of BRF for a period of approximately 12 months. These hauling activities would cause an increase in truck traffic to and from the facility intermittently during the construction and restoration periods. Increased traffic could lead to a slightly higher risk of traffic accidents in the BRF vicinity during decontamination, demolition, and restoration phases of the project due to the increase in the number of vehicle miles traveled on surrounding roadways. This increase in vehicle miles is a factor in injury and fatal traffic crash rates. Therefore, there would be a temporary minor impact related to increased traffic and driver safety.

Trespassing and vandalism would not be a notable issue under this alternative due to the implementation of an adequate security presence, either manned or passive (cameras and sensors) as well as fencing. The BRF overlook along Edgemoor Road would be closed during deconstruction to prevent onlookers from stopping to watch the deconstruction activities.

During deconstruction, customary industrial safety standards as well as the establishment of appropriate BMPs and job site safety plans would describe how job safety would be maintained during the project. These BMPs and site safety plans address the implementation of procedures to ensure that equipment guards, housekeeping, and personal protective equipment are in place; the establishment of programs and procedures

for lockout, right-to-know, confined space, hearing conservation, forklift operations, excavations, grading and other activities; the performance of employee safety orientations and regular safety inspections; and the development of a plan of action for the correction of any identified hazards. It is TVA policy that all contractors have in place a site-specific health and safety plan prior to conducting construction activities on TVA property. Trained, experienced, and certified/accredited safety professionals would be onsite throughout the decontamination and demolition of BRF. One safety professional would be onsite full time and dedicated to safety program implementation, monitoring, enforcement, reporting, and compliance.

Use of BMPs, safety procedures, and security measures along with ongoing environmental maintenance activities would minimize possible public health and safety impacts. Therefore, impacts to public health and safety under Alternative A are expected to be minor and short-term.

3.18.2.2 Alternative B – Selective Demolition of All Structures to Three Feet Below Final Grade, Retain Turbine Bay of Powerhouse and Intake Structure

Under Alternative B, impacts to public health and safety would be similar to or less than those described above under Alternative A because fewer structures would be deconstructed and, thus, less potential for risks to health and safety. Some hazardous and regulated materials may be retained onsite in association with the turbine bay and intake structure under this alternative; however, these materials would continue to be stored and handled in accordance with all federal, state, and local requirements, which greatly reduce associated health and safety risks.

3.18.2.3 Alternative C – No Action Alternative

Under the Alternative C, TVA would not perform any decontamination or deconstruction activities at BRF. If the facility remains in “as-is” condition, it likely would present a higher potential safety risk than Alternative A or B to contaminate soil and groundwater as systems and structures degrade. In addition, the risk of trespassing and injury to trespassers would likely increase due to a perception that salvageable materials are present on the site as well as the increased level of environmental contaminants. TVA would maintain security at the facility due to remaining structures. TVA would also periodically assess the condition of remaining site facilities as they deteriorate. Due to the site location and distance to the nearest residences, effects on safety to the public would be minor.

3.19 Socioeconomics and Environmental Justice

3.19.1 Affected Environment

The BRF facility is located in southern Anderson County, Tennessee, along the east bank of the Clinch River/Melton Hill Reservoir. For the socioeconomic and environmental justice analysis, the study area is a 10-mile radius from the BRF facility. The study area is primarily composed of Anderson and Knox counties. The 10-mile radius also includes small portions of Loudon, Morgan, and Roane counties; therefore, these counties and the state of Tennessee are included as appropriate secondary geographic areas of reference. Comparisons at multiple spatial scales provide a more detailed characterization of populations that may be affected by the proposed actions, including any environmental justice populations (e.g., minority and low-income). Anderson County is a mix of rural land interspersed with municipal development, including the cities of Oak Ridge, Clinton, and Oliver Springs. Knox County is predominantly urban including the cities of Knoxville, Powell,

Karns, and Farragut, interspersed with rural lands. Demographic and economic characteristics of populations within the study area were assessed using the most recent USCB data available, including 2020 Decennial Census counts (USCB 2022a) for total population and racial characteristics, and 2016-2020 American Community Survey 5-year estimates (USCB 2022b) for the remaining datasets.

3.19.1.1 Demographics and Housing

The population within the study area is primarily composed of residents of Anderson and Knox counties along with small portions of Loudon, Morgan, and Roane counties. Morgan County has the smallest population at 21,035 while Knox County has the largest population at 478,971. The urbanization of Knoxville and Oak Ridge in Knox and Anderson counties contribute to the higher populations urbanizing those counties. Collectively, Anderson and Knox counties have a total population of 556,094, which is approximately 8.0 percent of the total population of the State of Tennessee (Table 3-15).

Table 3-15. Demographic Characteristics

	Anderson County	Knox County	Loudon County	Morgan County	Roane County	Tennessee
Population[1,2]						
Population, 2020 estimate	76,513	466,184	53,169	21,538	53,331	6,772,268
Population, 2020	77,123	478,971	54,886	21,035	53,404	6,910,840
Persons under 18 years, 2020	21.1%	21.0%	19.4%	19.2%	18.7%	22.3%
Persons 65 years and over, 2022	19.9%	15.8%	26.3%	18.0%	22.7%	16.4%
Housing and Income[1]						
Housing units, 2020	35,057	207,611	23,393	9,055	25,690	2,996,127
Median household income, 2020	$52,338	$59,250	$61,664	$41,701	$55,578	$54,833

Sources: [1]USCB 2022b; [2]USCB 2022a

Populations throughout the study area are predominantly of working age as most of the populations for each county fall within 18 and 65 years of age. The study area population is older in comparison to the State of Tennessee, as the percentage of individuals under 18 for each of the counties is less than the state percentage of 22.3. Anderson County has the highest percentage of individuals under 18 at 21.1 percent. All counties except for Knox County have more people 65 years and older than the state (16.4 percent) with Loudon County having the highest percentage (26.3 percent). Knox County has the lowest percentage (15.8 percent) of individuals 65 years and older.

Anderson and Knox counties are primarily developed for residential and rural residential land uses. Land immediately adjacent to the BRF facility is composed of agricultural, residential, and commercial land uses (Anderson County Assessor 2022). Housing units within the study area range from 9,055 in Morgan County to 207,611 in Knox County, accurately reflecting the population differences between each county. Collectively, Anderson and Knox counties have 242,668 housing units, which is approximately eight percent of the housing units in the state. The state-wide median household income in Tennessee is $54,833 (Table 3-15). Median household incomes in each county in the study area range from $41,701 in Morgan County to $61,664 in Loudon County. The median household income of Anderson County is $52,338, which is $2,495 lower than that of the

state, whereas the median household income of Knox County is $59,250, or $4,417 higher than the state.

3.19.1.2 Economic Conditions

Employment characteristics for the project area are summarized in Table 3-16. The total employed civilian population in each county ranges between 7,197 in Morgan County to 233,540 in Knox County. Unemployment in Anderson County (3.0 percent), Knox County (2.7 percent), and Loudon County (2.0 percent) is less than the state unemployment rate of 3.3 percent. Morgan and Roane counties each have an unemployment rate of 3.3 percent, which is the same as the state. Based on data from the U.S. Bureau of Labor Statistics, between January and April of 2022, unemployment in the Knox and Anderson counties averaged 2.8 percent, which is 0.5 percent lower than the statewide average of 3.3 percent over the same period (USBLS 2022).

Combined, Anderson and Knox counties have a total population of 265,960 employed individuals in the civilian labor force. Approximately 4.4 percent of the combined civilian labor force within Knox and Anderson counties is unemployed, which is lower than the unemployment rate of the civilian labor force for the State of Tennessee (5.3 percent).

Table 3-16. Employment Characteristics of the Resident Labor Force

	Anderson County	Knox County	Loudon County	Morgan County	Roane County	Tennessee
Population Over 16 years	62,065	379,072	44,045	17,949	44,825	5,437,242
Civilian Labor Force						
Employed	32,420	233,540	23,059	7,197	22,969	3,147,330
Unemployed	1,892	10,321	861	601	1,471	177,361
Subtotal	34,312	243,861	23,920	7,798	24,440	3,324,691
Unemployment						
Percent of Total Population	3.0%	2.7%	2.0%	3.3%	3.3%	3.3%
Percent of Civilian Labor Force	5.5%	4.2%	3.6%	7.7%	6.0%	5.3%

Source: USCB 2022b

The top five most prevalent sectors of civilian employment in Anderson County, Knox County, Roane County, and in the State of Tennessee include: Education, Health Care, and Social Assistance; Professional, Scientific, and Management, and Administrative and Waste Management Services; Retail Trade; Manufacturing; and Arts, Entertainment, Recreation, Accommodation, and Food Services (Table 3-17). Most of the workforce within Loudon County (18.8 percent) is employed within the Manufacturing sector, whereas the most prevalent occupations in Anderson, Knox, Morgan, and Roane counties occur in the Education, Health Care, and Social Assistance sector with percentages of 22.4, 25.0, 22.1, and 22.9, for each county respectively. The Education, Health Care, and Social Assistance sector is also the largest employer within the State of Tennessee at 22.6 percent of the workforce (USCB 2022b).

Table 3-17. Largest Employers by Sector

Sector	Anderson County	Knox County	Loudon County	Morgan County	Roane County	Tennessee
Education, Health Care, and Social Assistance	22.4%	25.0%	16.2%	22.1%	22.9%	22.6%
Professional, Scientific, Management, and Administrative Services, and Waste Management Services	15.9%	12.7%	10.9%	10.6%	14.6%	9.9%
Retail Trade	10.7%	13.3%	11.7%	10.7%	14.0%	11.6%
Manufacturing	10.5%	7.9%	18.8%	11.1%	9.7%	12.9%
Arts, Entertainment, Recreation, Accommodation and Food Services	8.6%	9.9%	8.4%	8.6%	7.7%	9.6%
Construction	8.0%	6.6%	8.6%	11.0%	6.3%	6.6%
Transportation and warehousing, and Utilities	6.1%	4.9%	7.7%	6.5%	6.8%	6.8%
Other Services, except Public Administration	5.2%	4.1%	4.3%	5.2%	4.2%	4.8%
Finance, Insurance, Real Estate, Rental and Leasing	4.7%	6.8%	4.1%	1.3%	3.6%	5.9%
Public Administration	4.3%	3.2%	3.5%	10.2%	5.5%	4.2%
Wholesale Trade	2.1%	2.9%	2.0%	0.5%	1.8%	2.5%
Information	1.1%	2.2%	1.3%	0.7%	1.8%	1.6%
Agriculture, forestry, fishing, hunting, and mining	0.4%	0.5%	2.4%	1.5%	1.3%	1.0%

Source: USCB 2022b

3.19.1.3 Environmental Justice

On February 11, 1994, President Clinton signed EO 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations). EO 12898 mandates some federal-executive agencies to consider environmental justice as part of their NEPA analyses. Environmental justice has been defined as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income (EPA 2018) and ensures that minority and low-income populations do not bear disproportionately high and adverse human health or environmental effects from federal programs, policies, and activities. In addition, on January 27, 2021, President Biden issued EO 14008 (Tackling the Climate Crisis at Home and Abroad). Amongst other objectives, the EO calls for the federal government to make environmental justice a defining feature of the response to climate crisis by developing programs, policies, and activities to address current and historic injustices, and by investing and building a clean energy economy that spurs economic opportunity for disadvantaged communities. For these reasons, TVA routinely considers environmental justice impacts as part of the project decision-making process.

Guidance for addressing environmental justice is provided by the CEQ Environmental Justice Guidance under NEPA (CEQ 1997). The CEQ defines minority as any race and ethnicity, as classified by the USCB, that is: Black or African American; American Indian or Alaska Native; Asian; Native Hawaiian and Other Pacific Islander; some other race (not mentioned above); two or more races; or an individual whose ethnicity is Hispanic or Latino (CEQ 1997).

Identification of minority populations requires analysis of individual race and ethnicity classifications as well as comparisons of all minority populations in the region. Minority populations exist if either of the following conditions is met:

- The minority population of the impacted area exceeds 50 percent of the total population.
- The ratio of minority population is meaningfully greater (i.e., greater than or equal to 20 percent) than the minority population percentage in the general population or other appropriate unit of geographic analysis (CEQ 1997).

The nationwide poverty level is determined annually by the USCB and varies by the size of family and number of related children under 18 years of age. The 2021 USCB Poverty Threshold for an individual under the age of 65 is an annual income of $14,097, and for a family of four it is an annual household income of $27,949 (USCB 2022c). For the purposes of this assessment, low-income individuals are those whose annual household income is less than two times the poverty level. More encompassing than the base poverty level, this low-income threshold, also used by the EPA in their delineation of low-income populations, is an appropriate measure for environmental justice consideration because current poverty thresholds are often too low to adequately capture the populations adversely affected by low-income levels, especially in high-cost areas (EPA 2017). According to EPA, the effects of income on baseline health and other aspects of susceptibility are not limited to those below the poverty thresholds. For example, populations having an income level from one to two times the poverty level also have worse health overall than those with higher incomes (Centers for Disease Control and Prevention 2011). A low-income environmental justice population exists if either of the following two conditions is met:

- The low-income population exceeds 50 percent of the total population.
- The ratio of low-income population significantly exceeds (i.e., by greater than or equal to 20 percent) that of the general population or other appropriate geographic areas of analysis.

According to CEQ guidance, U.S. Census data are typically used to determine minority and low-income population percentages in the affected area of a project to conduct a quantitative assessment of potential environmental justice impacts. The geographic unit used in the analysis to identify any environmental justice communities of concern is the census block group (CBG). Figure 3-7 identifies the CBGs within the study area that meet the specified criteria as environmental justice minority populations or low-income populations.

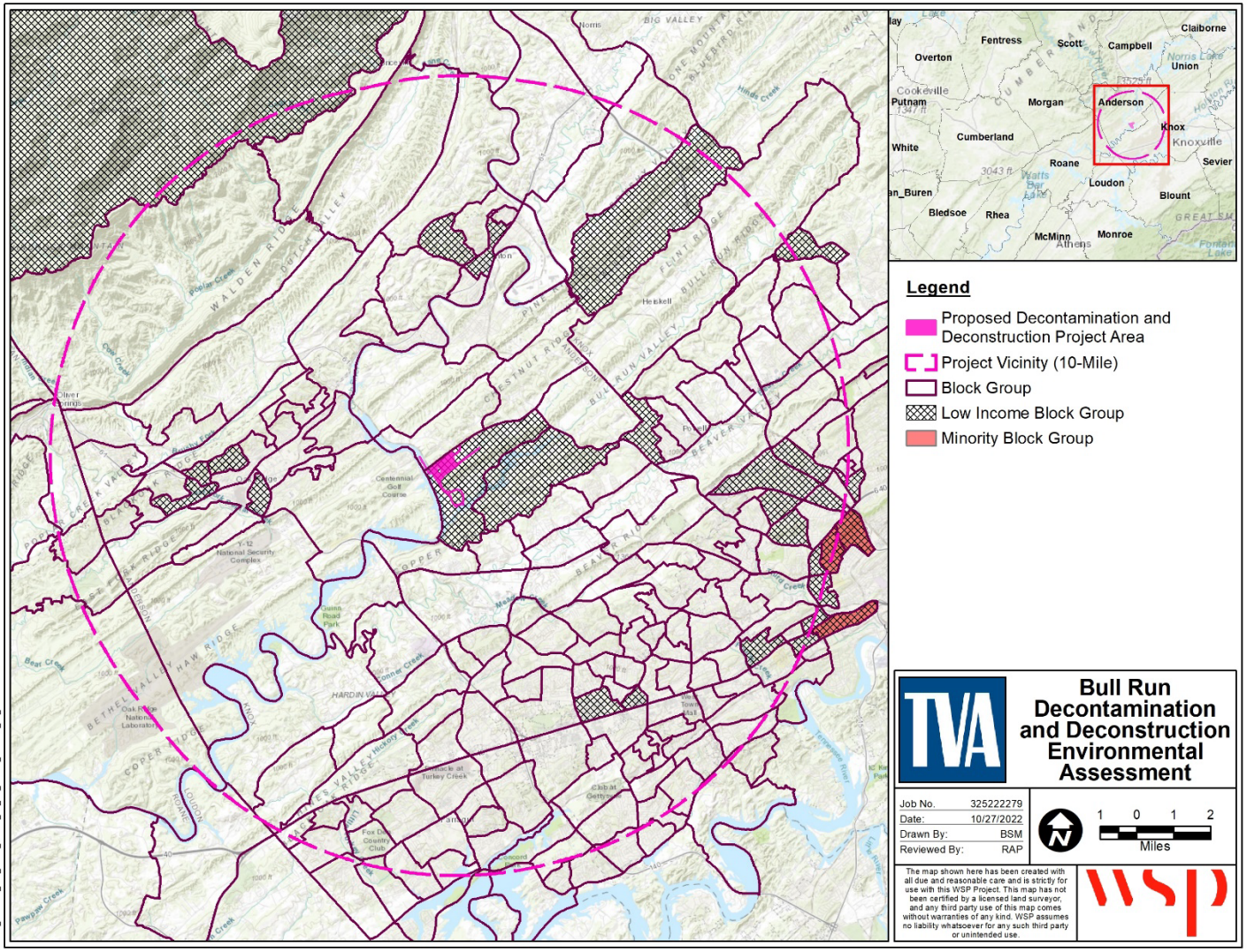

Figure 3-7. Environmental Justice Populations within a 10-mile Radius of the Project Area

3.19.1.3.1 Minority Populations

Table 3-18 presents the results of the minority population analysis for the study area. The minority population as a percentage of total population ranges from 9.5 percent in Morgan County to 22.0 percent in Knox County, with the State of Tennessee having a minority population of 29.1 percent of the total population. Three CBGs in the study area were identified as meeting the CEQ criteria for minority populations (Figure 3-7 and Table 3-18); these CBG minority populations are located in Knox County and represent an environmental justice population as it relates to minority populations.

Table 3-18. 2020 Minority Population Data

	Total Population	Minority Population	Percent Minority Population
Anderson County	77,123	11,079	14.4%
Knox County	478,971	105,181	22.0%
Block Group 2, Census Tract 26	1,679	893	53.2%
Block Group 3, Census Tract 28	2,078	1,558	75.0%
Block Group 4, Census Tract 28	1,237	671	54.2%
Loudon County	54,886	8,467	15.4%
Morgan County	21,035	2,006	9.5%
Roane County	53,404	5,310	9.9%
Tennessee	6,910,840	2,010,594	29.1%

Source: USCB 2022a

3.19.1.3.2 Low Income

Table 3-19 shows the percentage of individuals in the study area living below the poverty level. In 2020, the estimated proportion of the population with income below the poverty level ranged from 11.3 percent in Loudon County to 22.8 percent in Morgan County. The State of Tennessee had a 14.6 percent population with income below the poverty level. The portion of the population identified as low-income (those whose household income is less than two times the poverty level) ranged from 30.7 percent in Knox County to 47.8 percent in Morgan County. The State of Tennessee had 33.8 percent of the population below the low-income level. Within the 10-mile study area, there are 28 CBGs that meet the criteria for a low-income population (Figure 3-7 and Table 3-19). These CBGs are located within Anderson and Knox counties and represent an environmental justice population in terms of poverty level.

Table 3-19. 2020 Poverty Level and Low-Income Data

	Total Population[1]	Persons Below Poverty Level	Percent of Persons Below Poverty Level	Persons Below Low Income Level[2]	Percent of Persons Below Low Income Level[2]
Anderson County	74,792	11,349	15.2%	26,150	35.0%
Block Group 3, Census Tract 202.02	1,761	821	46.6%	1,121	63.7%
Block Group 2, Census Tract 204	2,521	1,164	46.2%	1,286	51.0%
Block Group 1, Census Tract 205	1,300	290	22.3%	688	52.9%
Block Group 2, Census Tract 205	579	60	10.4%	352	60.8%
Block Group 1, Census Tract 207	829	235	28.5%	449	54.4%
Block Group 4, Census Tract 209.02	1,336	196	14.3%	726	53.1%
Block Group 2, Census Tract 212.01	1,006	357	35.5%	579	57.6%
Block Group 3, Census Tract 212.12	1,945	780	40.1%	1,101	56.6%
Block Group 1, Census Tract 213.04	2,099	484	23.1%	1,257	59.9%
Block Group 2, Census Tract 213.04	1,545	340	22.0%	854	55.3%
Knox County	455,044	60,065	13.2%	139,572	30.7%
Block Group 2, Census Tract 26	1,815	732	40.3%	1,183	65.2%
Block Group 2, Census Tract 27	1,657	761	45.9%	1,201	72.5%
Block Group 1, Census Tract 28	735	28	3.8%	422	57.4%
Block Group 3, Census Tract 28	1,533	624	40.7%	1,325	86.4%
Block Group 4, Census Tract 28	1,375	328	23.9%	1,072	78.0%
Block Group 1, Census Tract 37	1,564	325	20.8%	915	58.5%
Block Group 2, Census Tract 38.01	1,745	574	32.9%	1,048	60.1%
Block Group 4, Census Tract 38.01	770	92	11.9%	439	57.0%
Block Group 2, Census Tract 39.01	1,553	333	21.4%	814	52.4%

	Total Population[1]	Persons Below Poverty Level	Percent of Persons Below Poverty Level	Persons Below Low Income Level[2]	Percent of Persons Below Low Income Level[2]
Block Group 1, Census Tract 39.02	971	205	21.1%	851	87.6%
Block Group 4, Census Tract 40	1,650	254	15.4%	892	54.1%
Block Group 1, Census Tract 46.10	2,983	712	23.9%	1,542	51.7%
Block Group 3, Census Tract 46.10	702	255	36.3%	387	55.1%
Block Group 1, Census Tract 48	2,730	1,062	38.9%	2,059	75.4%
Block Group 2, Census Tract 48	881	56	6.4%	502	57.0%
Block Group 2, Census Tract 49	1,802	738	41.0%	1,128	62.6%
Block Group 3, Census Tract 61.03	1,121	175	15.6%	605	54.0%
Block Group 2, Census Tract 62.05	413	120	29.1%	234	56.7%
Loudon County	51,857	5,845	11.3%	16,486	31.8%
Morgan County	18,539	4,232	22.8%	8,869	47.8%
Roane County	52,262	7,237	13.8%	17,411	33.3%
Tennessee	6,603,468	965,213	14.6%	2,231,052	33.8%

Source: USCB 2022b
[1] Population for whom poverty status is determined
[2] Low Income is defined as two times the poverty level

3.19.2 Environmental Consequences

3.19.2.1 Alternative A – Full Demolition of All Structures to Three Feet Below Final Grade

3.19.2.1.1 Socioeconomics

An anticipated influx of a temporary construction workforce would create a short-term change in the demographic characteristics of the study area. The workforce necessary for the demolition of BRF is expected to be a combination of TVA workforce and specialized demolition workforce, supplemented with local laborers. Specialized workforce laborers may be required to relocate temporarily to the affected or nearby areas while general laborers are anticipated to come from the local workforce. Primary responsibility for the workforce composition would be determined by the demolition contractor. TVA estimates that the workforce needed for decontamination would range from 50 to 150 personnel over a 12-month period. The workforce needed for deconstruction would range from 50 to 100 personnel over an 18- to 24-month period, which could overlap the decontamination phase.

Demolition and deconstruction activities and the associated influx in the workforce is also expected to result in short-term increased economic opportunity. Economic benefits may occur because of increased spending particularly at service industries such as local convenience stores, restaurants, and hotels. Payroll taxes would also increase with increased employment, and sales tax would increase as more materials and supplies are purchased during demolition activities. Future use of the BRF facility site is undetermined; restoration to grade is the extent of the plans for the site at present. Consequently, associated impacts, including beneficial and/or negative impacts related to such redevelopment are unknown as well. The deconstructed area may be redeveloped in the future for industrial or commercial use and may ultimately contribute to the region's economic health. Overall, the demographic and economic impacts of the demolition of the BRF facility are anticipated to be beneficial albeit short-term in duration and incrementally minor.

Upon completion of deconstruction and demolition activities, three workers would be required to perform the necessary minor, part-time maintenance activities at BRF. Personnel from other TVA facilities may be used, as necessary, to assist with performing operations and maintenance activities.

3.19.2.1.2 Environmental Justice

As described above, portions of the study area meet the criteria to be considered an environmental justice population under EO 12898 as it relates to minority and low-income populations. As shown in Figure 3-7, the project area is located within a low-income environmental justice population (Block Group 2, Census Tract 213.04). The closest residential area is located across Edgemoor Road to the north, approximately 140 feet from the northwest project boundary at its closest point, in a CBG that was not identified as an environmental justice population. However, some residents to the northeast of BRF and to the south, adjacent to the rail loop, are located in identified low-income communities. Demolition and deconstruction activities, including the release of air and noise emissions, would have the greatest impact on these residential areas located in close proximity to BRF, which are comprised of both environmental justice and non-environmental justice communities. In addition, increased traffic related to workforce vehicles, transport of borrow material, and hauling of debris to a landfill could result in increased traffic on local roads,

noise, and fugitive dust in the communities throughout the study area. While both environmental justice communities and non-environmental justice communities in proximity to the project site may experience minor impacts from air and noise emissions due to deconstruction and decommissioning, environmental justice populations may bear a disproportionate impact due to the location of the project area within and adjacent to block groups with low-income populations. However, these impacts would be short term and minor.

To engage the local communities and environmental justice populations, TVA has established a Bull Run Community Outreach Team, which will identify key regions and communities and key community leaders, organizations, and community infrastructure to engage in environmental justice outreach. TVA will also identify local farmers markets, festivals, grocery stores, community centers, school, and libraries in or near environmental justice communities. The Bull Run Community Outreach Team will meet with local leaders, develop a project website, and transmit postcards, fliers, media releases, newspaper advertisements, and/or social media content.

Transportation activities associated with this alternative include hauling demolition debris to an existing permitted landfill, hauling debris offsite to be recycled and obtaining borrow material from a previously permitted site for use in site restoration. TVA anticipates borrowing approximately 30,000 cubic yards of borrow material; however, no specific site has been identified at this time and site selection would be left up to the contractor. Likewise, the demolition contractor has responsibility to select which permitted landfill and/or recycling facility would be utilized. It is anticipated that the selected landfill has environmental control plans, and project designs to ensure compliance in regard to offsite sensitive receptors.

The transport of demolition debris offsite would lead to increased traffic, transportation related noise, exposure to fugitive dust, and exhaust emissions for those communities located along the transportation routes. Although the exact locations of the landfill and borrow site are not known, it is assumed that transport of these materials would use existing arterial or interstate roadways whenever possible. These activities would likely result in traffic patterns that were present when the plant was in operation and would be short-term and intermittent.

While haul routes for both borrow and demolition debris would use arterial routes and major interstates when possible, it may be necessary to use local roads. The transport of borrow and demolition debris is intermittent in nature and not expected to result in heavy volumes of traffic through residential areas for extended periods of time. Mitigation measures including implementing BMPs for controlling fugitive dust and proper maintenance of vehicles for controlling emissions would reduce potential impacts to communities along haul routes.

Overall, the proposed demolition and deconstruction activities would have minor, localized, temporary impacts on the surrounding community. Environmental justice populations in proximity to the project site may bear greater impacts from air and noise emissions due to the location of the project area within a low-income block group. However, these impacts would be temporary and limited to the deconstruction and decommissioning phase of the project. Overall, impacts associated with the proposed action would be minor for both environmental justice communities and non-environmental justice communities.

3.19.2.2 Alternative B – Selective Demolition of All Structures to Three Feet Below Final Grade, Retain Turbine Bay of Powerhouse and Intake Structure

Under Alternative B, the proposed action is the same as described above in Alternative A, except that the powerhouse and intake structures would remain in place. Impacts therefore would be very similar to those described for Alternative A but would be slightly less because the demolition and deconstruction phase would be shorter, and less material would be hauled offsite to a landfill.

3.19.2.3 Alternative C – No Action Alternative

Under the No Action Alternative, TVA would not perform any decontamination or deconstruction activities and the site would remain in its current condition. The No Action Alternative would not alter demographic or economic conditions in the study area, nor pose considerations for impacts to be disproportionately borne by environmental justice populations.

3.20 Cumulative Impacts

The CEQ regulations (40 CFR §§ 1500-1508) implementing the procedural provisions of the NEPA of 1969, as amended (42 USC § 321 et seq.) define cumulative impact as: "…the impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions (RFFAs) regardless of what agency (federal or nonfederal) or person undertakes such other actions." (40 CFR § 1508.7).

A cumulative impact analysis must consider the potential impact on the environment that may result from the incremental impact of a project when added to other past, present and RFFAs (40 CFR § 1508.7). Baseline conditions reflect the impacts of past and present actions. The impact analyses summarized in preceding sections are based on baseline conditions and, therefore, incorporate the cumulative impacts of past and present actions.

3.20.1 Scoping for Cumulative Impacts Analysis

TVA evaluated a full range of environmental resource issues associated with Alternatives A and B for inclusion in the cumulative impacts analysis. The proposed actions and their connected actions identified under these alternatives would occur mostly on land that was previously disturbed and is used for industrial purposes. The landscape surrounding the existing BRF facility is already subject to environmental stressors associated with industrial operations and previous disturbance of the site. Consequently, as has been described in prior subsections of this EA, the existing quality of environmental resources potentially directly or indirectly affected by project activities is generally low.

This analysis is limited to those resource issues potentially adversely affected by project activities. Accordingly, land use and prime farmland; geology; aquatic ecology; wildlife; vegetation; wetlands; floodplains; threatened and endangered species; visual resources; natural areas, parks, and recreation; utilities and service systems; safety; and socioeconomics are not included in this analysis as these resources are either not adversely affected, or the effects are considered to be negligible or beneficial. Primary resource categories specifically considered in this cumulative impacts assessment include groundwater, surface water, cultural resources, air quality and climate change, hazardous materials and solid and hazardous waste, transportation, noise, and environmental justice.

3.20.2 Geographic Area of Analysis

The appropriate geographic area over which past, present and future actions could reasonably contribute to cumulative effects is variable and dependent on the resource evaluated. The cumulative impact analysis is based on the resources of potential concern and the geographic area in which potential adverse impacts from site-specific activities have the potential to alter (degrade) the quality of the regional environmental resources. For air quality, the geographic area is the county.

Based upon the defined list of resources potentially affected by cumulative effects, the following general geographic areas were considered appropriate for consideration in this analysis:

- Lands in the vicinity of BRF. This geographic area provides an appropriate framework for the consideration of potential cumulative impacts to noise, transportation, and socioeconomics. This geographic area includes near off site areas and those within a 10-mile radius of BRF.
- Lands, waters, and wetlands within the vicinity of BRF. This geographic area contains water resources (surface water and groundwater) and aquatic resources potentially impacted by runoff from decontamination and deconstruction activities at BRF.
- Regional landfills. This geographic area encompasses regional landfills that may accept solid and/or hazardous waste associated with potential future actions. This geographic area extends for a distance of 20 miles (reasonable trucking distance) and includes established permitted landfills.
- Surrounding environmental justice communities. This geographic area encompasses identified low-income and minority populations within a 10-mile radius of BRF that may be subject to effects from multiple actions. Such actions may include transportation of demolition debris through environmental justice communities.

3.20.3 Identification of "Other Actions"

3.20.3.1 Summary of Other Actions

Past, present, and reasonably foreseeable future actions that were identified for consideration in this cumulative analysis are listed in Table 3-20. These actions were identified within the geographic area of analysis as having, in the aggregate, the potential to result in larger and potentially significant adverse impacts to the resources of concern.

Actions that have a timing that is "past" or "present" inherently have environmental impacts that are integrated into the base condition for each of the resources analyzed in this chapter. However, these actions are included in this discussion to provide for a more complete description of their characteristics. Actions that are not reasonably foreseeable are those that are based on mere speculation or conjecture, or those that have only been discussed on a conceptual basis.

Table 3-20. Summary of Other Reasonably Foreseeable Future Actions in the Vicinity of the Proposed Project

Action	Approximate Distance from BRF Project Area	Description	Timing and Reasonable Foreseeability
Bull Run Fossil Plant Retirement	At BRF (in project area)	In February 2019, the TVA Board of Directors approved the retirement of BRF by December 2023. At that time, TVA would cease most plant operations and reduce plant staff. Based on the impacts analysis performed in the associated EA (TVA 2019c), adverse impacts to all resources would be negligible to minor and long-term beneficial impacts are anticipated for air quality, surface water, groundwater, aquatic ecology, solid and hazardous waste, visual resources, transportation, and noise.	Reasonably Foreseeable Future
Bull Run Fossil Plant Switchyard Refurbishment	At BRF (adjacent to project area)	Due to the scheduled retirement of BRF in 2023, TVA needs to upgrade the transmission system to ensure power supply to the area remains reliable. Modifications to the 161-kilovolt and 500-kilovolt switchyards include repairs and replacements of some existing equipment and installation of new equipment including breakers, switches, and insulators. Additionally, line relays and communications equipment in the existing control room would be upgraded and relocated to the existing switch house along with associated upgrades at the remote terminals. Equipment upgrades at the Bull Run Substation Switchyard are anticipated to be completed by 2027.	Reasonably Foreseeable Future
Bull Run Fossil Plant CCR Impoundment Work	At BRF (adjacent to project area)	As part of TVA's goal to eliminate wet ash storage at its coal plants, TVA is considering closure of the ash impoundments at BRF. TVA could consider several options of closure of these facilities including Closure-by-Removal with CCR transported to an offsite landfill and Closure-in-Place. The viable closure options would be evaluated in accordance with the TDEC order and through consultation with TDEC. Although a decision regarding specific actions associated with these activities has not been finalized, the closure of existing surface impoundments and long-term management and storage of CCR generated at BRF are reasonably foreseeable activities. TVA would conduct a NEPA evaluation to address the potential environmental effects associated with long-term management of CCR stored at BRF. The NEPA document will identify the environmental impacts of activities associated with the proposed projects and would include a detailed cumulative effects assessment as part of the evaluation of alternatives. Proposed schedule for this action is unknown at this time.	Reasonably Foreseeable Future

Action	Approximate Distance from BRF Project Area	Description	Timing and Reasonable Foreseeability
City of Oak Ridge Water Treatment System Upgrades	4 miles southwest	The City of Oak Ridge will design and construct a new ultrafiltration membrane drinking water treatment plant to replace the existing 80-year-old conventional treatment plant at Y-12, which is currently at capacity and beyond its useful life. The new plant will be located at the existing raw water intake off Pump House Road. Construction is anticipated to begin in fall 2022, and the plant is expected to begin operation in spring 2025 (Pounds 2022).	Reasonably Foreseeable Future
Clinch River Nuclear (CRN) Site Advanced Nuclear Reactor Technology Park	15 miles southwest	TVA will construct and operate various facilities at an advanced nuclear reactor technology park containing one or more advanced nuclear reactors with a cumulative output not to exceed 800 megawatts electric at TVA's CRN Site in Oak Ridge, Roane County, Tennessee (TVA 2022a). This project it subject to ongoing due diligence evaluations and proposed schedule is unknown.	Reasonably Foreseeable Future
Horizon Center Industrial Park	12 miles southwest	Operational industrial park with sites containing approximately 320 acres remaining for development and approximately 500 acres set aside for environmental preservation.	Past, Present, and Reasonably Foreseeable Future
Kairos Nuclear Reactor Demonstration	14 miles southwest	Demonstration of Kairos' Hermes low-power test reactor at the East Tennessee Technology Park. Kairos Power, LLC is a U.S. based company developing a fluoride salt cooled high temperature reactor (KP-FHR) using Tri-structural Isotropic fuel in pebble form (NRC 2022). This project it subject to ongoing due diligence evaluations and proposed schedule is unknown.	Reasonably Foreseeable Future
Oak Ridge General Aviation Airport	13.5 miles southwest	Development of a general aviation airport with a 5,000-foot runway, would support general aviation in the Oak Ridge Corridor region, as current capacity is limited in this market and is not expected to support projected growth and future demand. The city plans to open the airport in 2025 (City of Oak Ridge 2022).	Reasonably Foreseeable Future

Action	Approximate Distance from BRF Project Area	Description	Timing and Reasonable Foreseeability
Synchronous Condensers	At BRF (in project area)	After BRF is decommissioned and deconstructed, there is an option for the site to utilize synchronous condensers, which would provide additional means for transmission system stability. Synchronous condensers help provide stability to the transmission systems' inertia and voltage support that are lost as the coal units are retired and replaced with much smaller generating sources with less mass. If synchronous condensers are installed and utilized, the existing generator would be connected to the transmission system directly via a breaker. Some new equipment would need to be installed to modify or size-match the generator auxiliaries. Cooling would be provided by installing a closed loop water and glycol loop with fans and a radiator to discharge heat to air, which would eliminate the need for pulling and discharging water from the river. More studies would need to be conducted to determine the viability of using these units. Timing of potential installation depends on additional studies; however, the synchronous condensers could be installed in 2024 and operating as soon as Spring of 2024. If this project is determined to be viable, a separate NEPA review would be conducted.	Reasonably Foreseeable Future
Tennessee Department of Transportation (TDOT) Edgemoor Road and Edgemoor Road Bridge Expansion	Adjacent to project area	Approximately 3.6 miles of Edgemoor Road from SR-62 to near Melton Lake Drive and another 3.6 miles from near Melton Lake Drive to SR-9, which includes the stretch of road on which BRF is located, would be widened from two lanes to four lanes with a median and/or center turn lane. This project would also include bicycle and pedestrian facilities and a new bridge. At this time, these projects are candidate projects for Fiscal years 2021 to 2023 with estimated completion to be in 2026 (TDOT 2019).	Reasonably Foreseeable Future
TRISO-X Fuel Fabrication Facility	12 miles southwest	Construction and operation of a fuel fabrication facility to produce nuclear fuel to support next generation reactors in the energy, aerospace, chemical, and defense sectors. A construction permit application has been submitted to the U.S. Nuclear Regulatory Commission for review. Preconstruction activities have begun, and initial operations are planned for 2025.	Present, Reasonably Foreseeable Future

3.20.4 Analysis of Cumulative Effects

To address cumulative impacts, the existing affected environment surrounding the project area was considered in conjunction with the environmental impacts presented in Chapter 3. These combined impacts are defined by the CEQ as “cumulative” in 40 CFR Section 1508.7 and may include individually minor, but collectively significant actions taking place over a period of time. The potential for cumulative effects to the identified environmental resources of concern are analyzed below for Alternative A and B.

3.20.4.1 Groundwater

As described in Section 3.2, groundwater quality within the vicinity of BRF is generally of good quality with selected areas of localized exceedances of one or more constituents. Activities associated with all of the RFFAs listed in Table 3-20 also have the potential to affect groundwater during their construction phases. However, for many of these potential actions, implementation of the proper BMPs would minimize the impacts to groundwater.

Construction activities associated with decontamination and deconstruction of BRF under either Alternatives A or B have the potential to release constituents that may impact groundwater. However, demolition and environmental abatement would be conducted in accordance with any applicable environmental and safety regulations, minimizing the potential for a release of contaminants. In the long term, all potential environmental contamination sources would be removed from the decontamination and deconstruction area, which would limit the potential for contamination of groundwater from these sources and would have a positive impact on groundwater quality relative to existing conditions. Therefore, there would be no cumulative impact on groundwater under either Alternatives A or B.

3.20.4.2 Surface Water

Surface water runoff associated with demolition and construction activities could occur under the proposed action. Similar impacts could be anticipated from construction activities associated with all of the RFFAs listed in Table 3-20. If proper BMPs are implemented and stormwater discharges comply with TDEC permit limits, cumulative impacts of the proposed action on surface water via runoff under either Alternatives A or B would be negligible.

3.20.4.3 Air Quality and Climate Change

The geographic reference area for air quality is Anderson County, Tennessee. It is expected that emissions would continue from local vehicles and other permitted industrial and commercial facilities in the county. The retirement of BRF in 2023 would result in significant reductions in air emissions that represents a benefit to regional air quality conditions. In addition to ongoing emissions from vehicles, local emissions and fugitive dust are expected to occur in conjunction with activities associated with the RFFAs listed in Table 3-20.

Air emissions associated with demolition activities under Alternatives A and B would also result in an increase in local emissions and fugitive dust. As described in Section 3.10, emissions from equipment and vehicle use are expected to be minor and short-term. In addition, fugitive dust emissions associated with demolition activities would be mitigated through the use of BMPs, such as water suppression for dust control and regular inspections and maintenance of construction vehicles. The cumulative impact of the demolition activity emissions, when combined with the ongoing emissions from local

vehicles and other facilities, would incrementally increase emissions local to BRF under the proposed action, but such increases would not be notable on a regional scale. Furthermore, the retirement of BRF would result in significant reduction in emissions prior to the beginning of demolition activities. If the RFFAs occur at the same time as the proposed project, there would be potential for minor and short-term impacts to air quality. However, exceedances of applicable ambient air quality standards are not expected. Therefore, the cumulative effects of the proposed action on air quality under either Alternatives A or B would not adversely affect regional air quality.

3.20.4.4 Hazardous Materials and Solid and Hazardous Waste

Under both Alternatives A and B, demolition debris and hazardous wastes would be hauled by truck to a landfill designed to receive such wastes. Due to the temporary nature of the operations and the use of permitted disposal facilities, along with trained and experienced contractors and personnel, environmental impacts from waste handling and disposal are not anticipated. Reasonably foreseeable future construction activities in the immediate vicinity identified in Table 3-20 would also have the potential to contribute waste to permitted disposal facilities in the region. Because there are permitted landfills in the vicinity of BRF that have sufficient capacity for large volumes of solid waste, and because large volumes of materials are expected to be recycled, the cumulative impact from the proposed project on local or regional landfill capacity is anticipated to be negligible.

3.20.4.5 Transportation

The RFFAs such as the proposed CCR impoundment closures would contribute to additional traffic volumes on the local transportation network. Volumes of traffic would be variable depending on the closure method selected. If CCR impoundment closures occur at the same time as the proposed project, the number of trucks associated with the transport of debris from BRF deconstruction, added to the number of trucks required to support CCR impoundment closure and restoration activities, could result in a very large number of trucks entering and exiting the facility on a daily basis. This could lead to cumulative impacts associated with congestion along adjacent arterial roadways. TVA would mitigate congestion in the vicinity of BRF with a traffic plan, as needed. Possibilities include staging of trucks, spacing logistics, or timing truck traffic to occur during lighter traffic hours (such as not in the morning or afternoon commute hours). With implementation of these mitigation measures, cumulative impacts of the proposed action to transportation would be minor to moderate depending on the closure method selected and extent of temporal overlap with CCR impoundment closure activities.

The proposed upgrades to Edgemoor Road may also contribute to cumulative transportation impacts during the construction phase of that project. Significant congestion could result if trucks transporting demolition debris to disposal areas need to travel west on Edgemoor Road. The congestion would be further worsened if both of these projects occur at the same time as the CCR impoundment closure. Should construction on Edgemoor Road lead to cumulative effects associated with congestion near BRF and adjacent roadways, TVA would mitigate congestion with a traffic mitigation plan, as needed.

3.20.4.6 Noise

Noise impacts from the proposed action under either Alternative A or B would be temporary and intermittent, and with the implementation of mitigation measures designed to minimize noise and vibration impacts, impacts would be minor. Implementation of the RFFAs has the potential to contribute to additional noise impacts associated with construction activities.

Due to the temporary nature of construction activities, noise from construction associated with these activities are expected to be localized and would not result in a cumulative impact to noise. Therefore, the cumulative effects of the proposed action under Alternatives A or B on noise emissions would not adversely affect sensitive noise receptors.

3.20.4.7 Cultural Resources

Either Alternative A or B would result in an adverse effect on NRHP-eligible BRF through the demolition of buildings and structures that contribute to the property's eligibility. Mitigation measures will be identified through consultation with the SHPO and listed in the MOA for this project. Any potential impacts to the NRHP-eligible BRF due to the Edgemoor Road expansion project would be mitigated through consultation with SHPO. Therefore, no cumulative effects to cultural resources are anticipated.

3.20.4.8 Environmental Justice

Several communities within the vicinity of BRF meet the criteria for environmental justice consideration. Due to location of environmental justice populations within the BRF project area and adjacent CBGs, there is potential that these communities would be indirectly impacted due to an increase in traffic, noise, exposure to fugitive dust, and exhaust emissions from the trucks used to transport the borrow material and demolition debris. It is also likely that some of these communities would be along the routes taken by trucks for the potential CCR impoundments closures at BRF, or other planned construction projects within the vicinity of BRF. Because these short-term actions are potentially coincident, potential cumulative effects may be expected to occur on a local basis. Therefore, the cumulative effects of the proposed action on noise and dust emissions within low-income and minority communities have the potential to represent a moderate increase in impact to environmental justice populations if these activities occur concurrently with other construction activities in the geographic area. Such physical impacts associated with the transport of borrow material or demolition debris (i.e., noise, dust) would be mitigated through BMPs identified in Section 2.3.2 or by the selection of borrow sites and haul routes that are not within identified environmental justice communities. These impacts would also be temporary, as they would occur only during the construction periods of these projects.

3.21 Unavoidable Adverse Impacts

Unavoidable adverse impacts are the effects of the proposed action on natural and human resources that would remain after mitigation measures or BMPs have been applied. Mitigation measures and BMPs are typically implemented to reduce a potential impact to a level that would be below the threshold of significance as defined by the CEQ and the courts. Impacts associated with the proposed activities have the potential to cause unavoidable adverse effects to natural and human environmental resources.

Unavoidable localized increases in air and noise emissions would occur during deconstruction activities. Activities associated with the use of construction equipment may result in varying amounts of dust, air emissions, and noise that may potentially impact onsite workers. Workers would use appropriate protection and adhere to safety standards designed to minimize worker-related injuries. Additional impacts include traffic noise, air emissions, and fugitive dust associated with the construction workforce traveling to and from the site, as well as the transport of demolition debris offsite and borrow material onsite. Emissions and fugitive dust from construction equipment and vehicles are minimized through implementation of mitigation measures, including proper maintenance of construction equipment and vehicles and dust suppression measures.

In addition, temporary impacts to water quality from runoff at the site could impact nearby receiving water bodies during construction activities. BMPs to minimize runoff would be implemented, and water discharged in the course of decontamination and deconstruction activities would meet established TDEC permit limits.

With the application of appropriate BMPs and adherence to permit requirements, these unavoidable adverse effects would be minor.

3.22 Relationship of Short-Term Uses to Long-Term Productivity

NEPA requires a discussion of the relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity. This EA focuses on the analyses of environmental impacts associated with the decontamination and deconstruction of the buildings and structures at BRF that are no longer used for their original purpose to support power generation. For the purposes of this section, these activities are considered short-term uses of the environment and the long-term is considered to be initiated upon the completion of deconstruction and site restoration.

Most environmental impacts during deconstruction activities would be relatively short-term and would be addressed by BMPs and mitigation measures. Deconstruction activities would have a limited, yet favorable, short-term impact to the local economy through the creation of construction jobs and associated revenue.

In the long term, the site could become productive if commercial or industrial facilities were to be established, thereby producing employment opportunities and tax revenue, and enhancing long-term productivity of the site.

3.23 Irreversible and Irretrievable Commitments of Resources

A resource commitment is considered irreversible when impacts from its use would limit future use options and the change cannot be reversed, reclaimed, or repaired. Irreversible commitments generally occur to nonrenewable resources such as minerals or cultural resources and to those resources that are renewable only over long timespans, such as soil productivity. A resource commitment is considered irretrievable when the use or consumption of the resource is neither renewable nor recoverable for use by future generations until reclamation is successfully applied. Irretrievable commitments generally apply to the loss of production, harvest, or other natural resources and are not necessarily irreversible.

Resources required by decontamination and deconstruction activities, including labor and fossil fuels, would be irretrievably lost. Nonrenewable fossil fuels would be irretrievably lost through the use of gasoline and diesel-powered equipment during demolition and deconstruction. However, it is unlikely that their limited use in these projects would adversely affect the overall future availability of these resources.

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Appendix A – Bat Strategy Project Review Form

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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: Bull Run Fossil Plant Decontamination and Deconstruction EA **Date:** Sep 29, 2022

Contact(s): Brittany Kunkle **CEC#:** **Project ID:** 40530

Project Location (City, County, State): Anderson County, Tennessee

Project Description:

Decontamination and deconstruction of the Bull Run Fossil Plant. No tree removal proposed at this time.

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:

- ☐ 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	Oct 18, 2022	

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):

No known roosts of MYGR, MYSE, MYSO within 3 miles. No trees to be removed.

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
5 Operate, Maintain, Retire, Expand, Construct Power Plants				

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
☑	15, 16, 17, 18, 22, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 45, 47, 48, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 90, 91, 92, 93, 94, 95, 96	**NV1** - Noise will be short-term, transient, and not significantly different from urban interface or natural events (i.e., thunderstorms) that bats are frequently exposed to when present on the landscape.
☐	16, 25, 26, 37, 47, 52, 62, 63, 64, 65, 70, 71, 73, 78, 80, 82, 83, 86, 91	**NV2** - Drilling, blasting, or any other activity that involves continuous noise (i.e., longer than 24 hours) disturbances greater than 75 decibels measured on the A scale (e.g., loud machinery) **within a 0.5 mile radius of documented winter and/or summer roosts** (caves, trees, unconventional roosts) will be conducted when bats are absent from roost sites.
☐	16, 26, 62	**NV3** - Drilling or blasting **within a 0.5 mile radius of documented cave** (or unconventional) roosts will be conducted in a manner that will not compromise the structural integrity or alter the karst hydrology of the roost site.
☐	16, 26, 62	**NV4** - Drilling or blasting **within 0.5 miles of a documented roost site** (cave, tree, unconventional roost) that needs to occur when bats are present will first involve development of project-specific avoidance or minimization measures in coordination with the USFWS.
☐	15, 26, 92	**HP1** - Site-specific cases in which potential impact of human presence is heightened (e.g., conducting environmental or cultural surveys within a roost) will be closely coordinated with staff bat biologists to avoid/ minimize impacts below any potential adverse effect. Any take from these activities would be covered by TVA's Section 10 permit.
☐	15, 26, 92	**HP2** - Entry into roosts known to be occupied by federally listed bats will be communicated to the USFWS when impacts to bats may occur if not otherwise communicated (i.e., via annual monitoring reports per TVA's Section 10 permit). Any take from these activities would be covered by TVA's section 10 permit.
☐	23	**SHF1** - Fire breaks will be used to define and limit burn scope.
☐	17, 23, 34	**SHF2** - Site-specific conditions (e.g., acres burned, transport wind speed, mixing heights) will be considered to ensure smoke is limited and adequately dispersed away from caves so that smoke does not enter cave or cave-like structures.
☐	23	**SHF3** - Acreage will be divided into smaller units to keep amount of smoke at any one time or location to a minimum and reduce risk for smoke to enter caves.
☐	17, 23, 34	**SHF4** - If burns need to be conducted during April and May, when there is some potential for bats to present on the landscape and more likely to enter torpor due to colder temperatures, burns will only be conducted if the air temperature is 55° or greater, and preferably 60° or greater.
☐	23	**SHF5** - Fire breaks will be plowed immediately prior to burning, will be plowed as shallow as possible, and will be kept to minimum to minimize sediment.
☐	23	**SHF6** - Tractor-constructed fire lines will be established **greater than 200 feet from cave entrances**. Existing logging roads and skid trails will be used where feasible to minimize ground disturbance and generation of loose sediment.
☐	17, 22, 23, 32, 33, 34, 35, 36	**SHF7** - Burning will only occur if site specific conditions (e.g. acres burned, transport wind speed, mixing heights) can be modified to ensure that smoke is adequately dispersed away from caves or cave-like structures. This applies to prescribed burns and burn piles of woody vegetation.

☐	17, 22, 23, 32, 33, 34, 35, 36	**SHF8** - Brush piles will be burned a **minimum of 0.25 mile from documented, known, or obvious caves or cave entrances** and otherwise in the center of newly established ROW when proximity to caves on private land is unknown.
☐	17, 23, 34	**SHF9** - A **0.25 mile buffer of undisturbed forest** will be maintained around documented or known gray bat maternity and hibernation colony sites, documented or known Virginia big-eared bat maternity, bachelor, or winter colony sites, Indiana bat hibernation sites, and northern long-eared bat hibernation sites. Prohibited activities within this buffer include cutting of overstory vegetation, construction of roads, trails or wildlife openings, and prescribed burning. Exceptions may be made for maintenance of existing roads and existing ROW, or where it is determined that the activity is compatible with species conservation and recovery (e.g., removal of invasive species).
☐	33, 34	**TR1*** - Removal of potentially suitable summer roosting habitat during time of potential occupancy has been quantified and minimized programmatically. TVA will track and document alignment of activities that include tree removal (i.e., hazard trees, mechanical vegetation removal) with the programmatic quantitative cumulative estimate of seasonal removal of potential summer roost trees for Indiana bat and northern long-eared bat. Project will therefore communicate completion of tree removal to appropriate TVA staff.
☐	33, 34	**TR2** - Removal of suitable summer roosting habitat **within 0.5 mile of Priority 1/Priority 2 Indiana bat hibernacula, or 0.25 mile of Priority 3/Priority 4 Indiana bat hibernacula or any northern long-eared bat hibernacula** will be prohibited, regardless of season, with very few exceptions (e.g., vegetation maintenance of TL ROW immediately adjacent to a known cave).
☐	33, 34	**TR3*** - Removal of suitable summer roosting habitat within documented bat habitat (i.e., within 10 miles of documented Indiana bat hibernacula, within 5 miles of documented northern long-eared bat hibernacula, within 2.5 miles of documented Indiana bat summer roost trees, within 5 miles of Indiana bat capture sites, within 1 mile of documented northern long-eared bat summer roost trees, within 3 miles of northern long-eared bat capture sites) will be tracked, documented, and included in annual reporting. Project will therefore communicate completion of tree removal to appropriate TVA staff.
☐	33, 34	**TR4*** - Removal of suitable summer roosting habitat within potential habitat for Indiana bat or northern long-eared bat will be tracked, documented, and included in annual reporting. Project will therefore communicate completion of tree removal to appropriate TVA staff.
☐	33, 34	**TR5** - Removal of any trees **within 150 feet of a documented Indiana bat or northern long-eared bat maternity summer roost tree** during non-winter season, range- wide pup season or swarming season (if site is within known swarming habitat), will first require a site-specific review and assessment. If pups are present in trees to be removed (determined either by mist netting and assessment of adult females, or by visual assessment of trees following evening emergence counts), TVA will coordinate with the USFWS to determine how to minimize impacts to pups to the extent possible. May include establishment of artificial roosts before removal of roost tree(s).
☐	33, 34	**TR6** - Removal of a documented Indiana bat or northern long-eared bat roost tree that is still suitable and that needs to occur during non-winter season, range-wide pup season, or swarming season (if site is within known swarming habitat) will first require a site-specific review and assessment. If pups are present in trees to be removed (determined either by mist netting and assessment of adult females, or by visual assessment of trees following evening emergence counts), TVA will coordinate with USFWS to determine how to minimize impacts to pups to the extent possible. This may include establishment of artificial roosts before removal of roost tree(s).
☐	33, 34	**TR7** (**Existing Transmission ROW only**) - **Tree removal within 100 feet of existing transmission ROWs will be limited to hazard trees**. On or adjacent to TLs, a hazard tree is a tree that is tall enough to fall within an unsafe distance of TLs under maximum sag and blowout conditions and/or are also dead, diseased, dying, and/or leaning. Hazard tree removal includes removal of trees that 1) currently are tall enough to threaten the integrity of operation and maintenance of a TL or 2) have the ability in the future to threaten the integrity of operation and maintenance of a TL.
☐	33, 34	**TR8** (**TVA Reservoir Land only**) - Requests for removal of hazard trees on or adjacent to TVA reservoir land will be inspected by staff knowledgeable in identifying hazard trees per International Society of Arboriculture and TVA's checklist for hazard trees. Approval will be limited to trees with a defined target.
☐	33, 34	**TR9** - If removal of suitable summer roosting habitat occurs when bats are present on the landscape, a funding contribution (based on amount of habitat removed) towards future conservation and recovery efforts for federally listed bats would be carried out. Project can consider seasonal bat presence/absence surveys (mist netting or emergence counts) that allow for positive detections without resulting in increased constraints in cost and project schedule. This will enable TVA to contribute to increased knowledge of bat presence on the landscape while carrying out TVA's broad mission and responsibilities.

■	69, 77, 89, 91	**AR1** - Projects that involve structural modification or demolition of buildings, bridges, and potentially suitable box culverts, will require assessment to determine if structure has characteristics that make it a potentially suitable unconventional bat roost. If so a survey to determine if bats may be present will be conducted. Structural assessment will include: o Visual check that includes an exhaustive internal/external inspection of building to look for evidence of bats (e.g., bat droppings, roost entrance/exit holes); this can be done at any time of year, preferably when bats are active. o Where accessible and health and safety considerations allow, a survey of roof space for evidence of bats (e.g., droppings, scratch marks, staining, sightings), noting relevant characteristics of internal features that provide potential access points and roosting opportunities. Suitable characteristic may include: gaps between tiles and roof lining, access points via eaves, gaps between timbers or around mortise joints, gaps around top and gable end walls, gaps within roof walling or around tops of chimney breasts, and clean ridge beams. o Features with high-medium likelihood of harboring bats but cannot be checked visually include soffits, cavity walls, space between roof covering and roof lining. o Applies to box culverts that are at least 5 feet (1.5 meters) tall and with one or more of the following characteristics. Suitable culverts for bat day roosts have the following characteristics: • Location in relatively warm areas • Between 5-10 feet (1.5-3 meters) tall and 300 ft (100 m) or more long • Openings protected from high winds • Not susceptible to flooding • Inner areas relatively dark with roughened walls or ceilings • Crevices, imperfections, or swallow nests o Bridge survey protocols will be adapted from the Programmatic Biological Opinion for the Federal Highway Administration (Appendix D of USFWS 2016c, which includes a Bridge Structure Assessment Guidance and a Bridge Structure Assessment Form). o Bat surveys usually are NOT needed in the following circumstances: • Domestic garages /sheds with no enclosed roof space (with no ceiling) • Modern flat-roofed buildings • Metal framed and roofed buildings • Buildings where roof space is regularly used (e.g., attic space converted to living space, living space open to rafters) or where all roof space is lit from skylights or windows. Large/tall roof spaces may be dark enough at apex to provide roost space
■	69, 77, 89, 91	**AR2** - Additional bat P/A surveys (e.g., emergence counts) conducted if warranted (i.e., when AR1 indicates that bats may be present).
☐	91	**AR3** - Bridge survey protocols will be implemented, either by permittee (e.g., state DOT biologists) or qualified personnel. If a bridge is determined to be in use as an unconventional roost, subsequent protocols will be implemented.
☐	69, 89	**AR4** - Removal of buildings with suitable roost characteristics within six miles of known or presumed occupied roosts for Virginia big-eared bat would occur between Nov 16 and Mar 31. Buildings may be removed other times of the year once a bat biologist evaluates a buildings' potential to serve as roosting habitat and determines that this species is not present and/or is not using structure(s).

■	16, 17, 18, 21, 22, 24, 25, 26, 27, 28, 29, 31, 32, 33, 34, 35, 36, 37, 38, 39, 48, 50, 51, 56, 61, 62, 63, 64, 65, 67, 69, 84, 89	**SSPC1** (**Transmission only**) - Transmission actions and activities will continue to Implement A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities. This focuses on control of sediment and pollutants, including herbicides. Following are key measures: o BMPs minimize erosion and prevent/control water pollution in accordance with state-specific construction storm water permits. BMPS are designed to keep soil in place and aid in reducing risk of other pollutants reaching surface waters, wetlands and ground water. BMPs will undertake the following principles: • Plan clearing, grading, and construction to minimize area and duration of soil exposure. • Maintain existing vegetation wherever and whenever possible. • Minimize disturbance of natural contours and drains. • As much as practicable, operate on dry soils when they are least susceptible to structural damage and erosion. • Limit vehicular and equipment traffic in disturbed areas. Keep equipment paths dispersed or designate single traffic flow paths with appropriate road BMPs to manage runoff. • Divert runoff away from disturbed areas. • Provide for dispersal of surface flow that carries sediment into undisturbed surface zones with high infiltration capacity and ground cover conditions. • Prepare drainage ways and outlets to handle concentrated/increased runoff. • Minimize length and steepness of slopes. Interrupt long slopes frequently. • Keep runoff velocities low and/or check flows. • Trap sediment on-site. • Inspect/maintain control measures regularly & after significant rain. • Re-vegetate and mulch disturbed areas as soon as practical. o Specific guidelines regarding sensitive resources and buffer zones: • Extra precaution (wider buffers) within SMZs is taken to protect stream banks and water quality for streams, springs, sinkholes, and surrounding habitat. • BMPs are implemented to protect and enhance wetlands. Select use of equipment and seasonal clearing is conducted when needed for rare plants; construction activities are restricted in areas with identified rare plants. • Standard requirements exist to avoid adverse impacts to caves, protected animals, unique/ important habitat (e.g., cave buffers, restricted herbicide use, seasonal clearing of suitable habitat).
■	16, 17, 18, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 48, 50, 51, 52, 53, 54, 55, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 70, 71, 73, 76, 77, 78, 80, 81, 82, 83, 86, 87, 88, 89, 90	**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.

■	16, 17, 18, 21, 22, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 48, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 61, 62, 63, 64, 65, 66, 67, 69, 70, 71, 73, 76, 77, 80, 81, 82, 83, 84, 86, 87, 88, 89, 90, 91	**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
□	17, 22, 32, 33, 34, 35, 36	**SSPC4** (**Transmission only**) - Woody vegetation burn piles associated with transmission construction will be placed in the center of newly established ROWs to minimize wash into any nearby undocumented caves that might be on adjacent private property and thus outside the scope of field survey for confirmation. Brush piles will be burned a **minimum of 0.25 miles from documented caves** and otherwise in the center of newly established ROW when proximity to caves on private land is unknown.

☐	17, 18, 21, 22, 24, 25, 26, 30, 31, 33, 34, 35, 36, 40, 46, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 66, 67, 68, 69, 70, 72, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 87, 88, 91, 93, 95, 96	**SSPC5** (**26a, Solar, Economic Development only**) - Section 26a permits and contracts associated with solar projects, economic development projects or land use projects include standards and conditions that include standard BMPs for sediment and contaminants as well as measures to avoid or minimize impacts to sensitive species or other resources consistent with applicable laws and Executive Orders.
☐	21, 54	**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.
☐	17, 21, 25, 26, 27, 28, 29, 31, 32, 33, 34, 35, 36, 37, 38, 54, 55	**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.
☑	16, 26, 36, 37, 38, 39, 48, 50, 52, 59, 60, 62, 66, 67, 69, 72, 75, 77, 78, 79, 86	**L1** - Direct temporary lighting away from suitable habitat during the active season.
☑	16, 26, 36, 37, 38, 39, 48, 50, 52, 59, 60, 62, 66, 67, 69, 72, 75, 77, 78, 79, 86	**L2** - Evaluate the use of outdoor lighting during the active season and seek to minimize light pollution when installing new or replacing existing permanent lights by angling lights downward or via other light minimization measures (e.g., dimming, directed lighting, motion-sensitive lighting).

[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).

Hide All Unchecked Conservation Measures

- ○ HIDE
- ◉ UNHIDE

Hide Table 4 Columns 1 and 2 to Facilitate Clean Copy and Paste

- ○ HIDE
- ◉ UNHIDE

NOTES (additional info from field review, explanation of no impact or removal of conservation measures).

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:

[ ] (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.

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☒ Terrestrial Zoologist acknowledges that Project Lead/Contact (name) Brittany Kunkle 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.

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Appendix B – Animal and Plant Species with the Potential to Occur in the Bull Run Fossil Plant Decontamination and Deconstruction Project Area

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Appendix B – Animal and Plant Species with the Potential to Occur in the Bull Run Fossil Plant Decontamination and Deconstruction Project Area

This appendix provides supporting information to the Bull Run Fossil Plant (BRF) decontamination and deconstruction environmental assessment (EA) regarding animal and plant species that may be affected by proposed activities within the project area and vicinity. Information is presented that provides a listing of relevant common terrestrial wildlife species, as well as listings of terrestrial and aquatic animals and plant species of concern within the potentially affected area, the potential availability of habitats within the project area that may be used by each species, and their potential occurrence on or near the BRF site.

B.1 Common Terrestrial Wildlife

Common species of birds that have been observed nesting or roosting in TVA fossil plant buildings and structures include American robin, barn swallow, barn owl, Carolina wren, mourning dove, northern mockingbird, osprey, and rock dove. Mammals and reptiles that may opportunistically utilize human structures and have been observed in TVA buildings include Norway rat, eastern woodrat, black rat snake, eastern gray squirrel, house mouse, northern raccoon, and Virginia possum.

The forested areas within the BRF decontamination and deconstruction project area include small forest stands in the northwestern portion of the reservation, the narrow forest fragment that bisects the powerhouse buildings and the coal yard, and other forested strips along the rail line and on either side of the coal yard. These areas are mature forest, but they are very dense with Chinese privet and Japanese honeysuckle in the understory. Birds typically found in forest edges and fragments in this region include American robin, barred owl, blue jay, brown thrasher, common yellowthroat, downy woodpecker, hairy woodpecker, eastern phoebe, eastern kingbird, eastern towhee, eastern wood-pewee, gray catbird, hooded warbler, indigo bunting, mourning dove, pileated woodpecker, prairie warbler, red-eyed vireo, red-tailed hawk, tufted titmouse, white-breasted nuthatch, white-eyed vireo, yellow-billed cuckoo, and yellow-rumped warbler (National Geographic 2002, Stokes 1996).

Where there are snags and pockets of less dense understory, there may be moderate quality foraging and roosting habitat for several species of bat. Some examples of common bat species likely found within this habitat include big brown, eastern red, and hoary bat. Eastern chipmunk, eastern woodrat, white-footed mouse, and woodland vole are other mammals that may be present within this habitat (Kays and Wilson 2002, Whittaker 1996). Eastern box turtle, eastern fence lizard, eastern garter snake, northern black racer, rat snake, and ring-necked snake are common reptiles of these forests in the project region (Gibbons and Dorcas 2005, Powell et al. 2016).

Fields within the project area are almost entirely comprised of mowed grass or otherwise heavily disturbed mowed herbaceous habitat. These areas do not offer suitable habitat for rare wildlife species, but they can be used by common species. Birds that utilize these disturbed herbaceous areas include black vulture, Canada goose, common grackle, field sparrow, grasshopper sparrow, red-tailed hawk, red-winged blackbird, and white-throated sparrow (National Geographic 2002). Mammals that can be found in these areas are common mole, coyote, ground hog, least shrew, white-footed mouse, and white-tailed deer (Whitaker 1996). Reptiles that may use these habitats in this region include black racer,

black rat snake, corn snake, eastern kingsnake, and eastern milksnake (Gibbons and Dorcas 2005, Powell et al. 2016).

Emergent and palustrine wetlands and saturated wet weather conveyances within field settings provide habitat for common amphibians and reptiles. Amphibians likely present include American bullfrog, American toad, eastern newt, southern leopard frog, spring peeper, and upland chorus frog (Powell et al. 2016). Reptiles with the potential to occur in the project area include common snapping turtle, kingsnake, five-lined skink, rat snake, and watersnake (Gibbons and Dorcas 2005, Powell et al. 2016).

B.2 Threatened and Endangered Species

The Endangered Species Act (ESA) (16 USC §§ 1531-1543) was passed to conserve the ecosystems upon which endangered and threatened species depend, and to conserve and recover those species. An endangered species is defined by the ESA as any species in danger of extinction throughout all or a significant portion of its range. A threatened species is likely to become endangered within the foreseeable future throughout all or a significant part of its range. Critical habitats, essential to the conservation of listed species, also can be designated under the ESA. The ESA establishes programs to conserve and recover endangered and threatened species and makes their conservation a priority for Federal agencies. Section 7 of the ESA requires federal agencies to consult with the U.S. Fish and Wildlife Service (USFWS) when their proposed actions may affect endangered or threatened species or their critical habitats.

The State of Tennessee provides protection for species considered threatened, endangered, or deemed in need of management within the state other than those federally listed under the ESA. The listings are handled by the Tennessee Department of Environment and Conservation (TDEC); additionally, the Tennessee Natural Heritage Program and the Tennessee Valley Authority (TVA) both maintain databases of species that are considered threatened, endangered, special concern, or tracked in Tennessee.

B.2.1 Terrestrial Animals

A review of the TVA Natural Heritage Project Database in May 2022 indicated that there are records of three Tennessee state-listed terrestrial animal species (hellbender [*Cryptobranchus alleganiensis*], osprey [*Pandion haliaetus*], and little brown bat [*Myotis lucifugus*]), one federally proposed endangered species (tricolored bat [*perimyotis subflavus*]) and one federally protected species (bald eagle [*Haliaeetus leucocephalus*]) within 3 miles of the project area (TVA 2022b). Three federally listed terrestrial animal species (gray bat [*Myotis grisescens*], Indiana bat [*Myotis sodalis*], and northern long-eared bat [*Myotis septentrionalis*]) have been reported from Anderson County, Tennessee. Review of the USFWS IPaC online database identified one additional candidate species (monarch butterfly [*Danaus plexippus*]) that has the potential to occur in the project area (USFWS 2022). Thus, impacts to this species have also been evaluated. No designated critical habitats have been documented within a 3-mile radius of BRF. A list of the terrestrial threatened and endangered species that are reported from Anderson County and other species of conservation concern documented within a 3-mile radius of BRF can be found in Table B-1.

A field survey by TVA terrestrial zoologists in May 2022 determined that of the several buildings within the project area, particularly warehouses and utility buildings, may provide potential roosting habitat for bats or migratory birds after buildings are left vacant.

Bald eagles are protected under the Bald and Golden Eagle Protection Act (USFWS 2013). This species is associated with larger mature trees capable of supporting its massive nests. These trees are usually found near larger waterways where the eagles forage (USFWS 2007). Records document the occurrence of two bald eagle nests in Anderson County, Tennessee. The closest of these is approximately 2.4 miles away. Bald eagles are routinely spotted foraging over the Clinch River/Melton Hill Reservoir adjacent to BRF. However, no bald eagle nests were observed during the field survey on the project area in May 2022.

Ospreys occupy riparian habitats alongside bodies of water such as rivers, lakes, and reservoirs. They build nests of sticks on a variety of man-made structures (e.g., transmission line structures, lighting towers) near water (NatureServe 2022). Four active osprey nests were documented within the project area during the May 2022 field survey. Three active nests were located on transmission structures to the west and south of the switchyard, and the remaining nest was on a lighting tower south of the coal yard. An inactive osprey nest was also observed on a transmission structure across the Clinch River/Melton Hill Reservoir at the shoreline within Haw Ridge Park. Foraging habitat for osprey is present in the Clinch River/Melton Hill Reservoir.

Table B-1. Federally Listed Terrestrial Species Reported from Anderson County, Tennessee and Other Species of Conservation Concern Documented Within 3 Miles of the Project Area

Common Name	Scientific Name	Status[1]		Suitable Habitat Present[3]
		Federal	State (Rank[2])	
Birds				
Bald eagle	*Haliaeetus leucocephalus*	DM	D (S3)	P (foraging only)
Osprey	*Pandion haliaetus*	--	-- (S3)	Y
Mammals				
Gray bat[4]	*Myotis grisescens*	E	E (S2)	P
Indiana bat[4]	*Myotis sodalis*	E	E (S1)	P
Little brown bat	*Myotis lucifugus*	--	T (S3)	P
Northern long-eared bat[4]	*Myotis septentrionalis*	T, PE	T (S1S2)	P
Tricolored bat	*Perimyotis subflavus*	PE	T (S2S3)	P
Amphibians				
Hellbender[5]	*Cryptobranchus alleganiensis*	PS	E (S3)	N
Insects				
Monarch butterfly	*Danaus plexippus*	C	-- (S4)	P

Source: TVA Regional Natural Heritage Database (TVA 2022b) and USFWS Information for Planning and Consultation (USFWS 2022) (https://ecos.fws.gov/ipac/), extracted May 5, 2022.

[1] Status Codes: DM = Delisted, recovered, and still being monitored; D = Deemed in Need of Management; E = Endangered; T = Threatened; PE = Proposed Endangered; PS = Partial Status.

[2] State Ranks: S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable; S4 = Apparently Secure.

[3] Habitat Codes:
Y = Yes, species has been documented in existing habitats within proposed decontamination and deconstruction project area boundary, laydown areas, and/or the light use area, and suitable habitat is present
N = No, no records of species within proposed project areas and no suitable habitat is present
P = Potentially suitable habitat is present, but no records of species in proposed project areas

[4] Federally listed species known from Anderson County, Tennessee, but not within three miles of the project footprint.

[5] A subpopulation of hellbender found in the Ozarks of Missouri and Arkansas is federally listed. Species of hellbender found in Anderson County, Tennessee are not federally listed.

Gray bats roost in caves year-round and migrate between summer and winter roosts during spring and fall (Brady et al. 1982, Tuttle 1976a). Bats disperse over bodies of water at dusk where they forage for insects emerging from the surface of the water (Tuttle 1976b). Although they prefer caves, gray bats have been documented roosting in large numbers inside buildings (Gunier and Elder 1971), and they have been observed in buildings and captured during mist net surveys at the Oak Ridge National Laboratory that is within Anderson County. The closest of these records is approximately 5.2 miles from the project area. In addition, there are two caves known within 3 miles of the project area, the closest of which is approximately 2.2 miles away. Suitable roosting habitat for this species may exist in buildings left open and abandoned during the decommissioning process, as it can take several years before demolition occurs. Foraging habitat for this species exists in the project area over wet low-lying areas south of the switchyard and over the Clinch River/Melton Hill Reservoir.

Indiana bats hibernate in caves during winter months and use areas around them for swarming (mating) in the fall and for staging in the spring, prior to migration back to summer habitat. During the summer, Indiana bats roost under the exfoliating bark of dead snags and living trees in mature forests with an open understory and a nearby source of water (Pruitt and TeWinkel 2007, Kurta et al. 2002). Although less common, Indiana bats have also been documented roosting in buildings (Butchkoski and Hassinger 2002). Indiana bats are known to change roost trees frequently throughout the season, while still maintaining site fidelity, returning to the same summer roosting areas in subsequent years (Pruitt and TeWinkel 2007). The closest known record of this species was captured during a 2013 mist net survey approximately 6.3 miles from the project area. As discussed above for the gray bat, there are two caves known within 3 miles of the project area. Foraging and moderate summer roosting habitat for this species exists in the project area in and around trees, the Clinch River/Melton Hill Reservoir, and in wet low-lying areas south of the switchyard. Similar to the gray bat, suitable habitat for this species also may exist in buildings left open and abandoned during the decommissioning process.

Little brown bats hibernate primarily in caves and mines. During summer, this species can be found in hot buildings where females form nursing colonies, as well as in trees with suitable cracks and crevices. Colonies are usually close to water bodies where these bats prefer to forage. Foraging also occurs among trees in open areas (Harvey et al. 2011). The nearest known little brown bat record and nearest known cave are both approximately 2.2 miles from the project area. One additional cave is known within three miles of the project. Similar to the Indiana bat discussed above, habitat for this species exists in the project area in and around trees, the Clinch River/Melton Hill Reservoir, wet low-lying areas, and in buildings left open and abandoned during the decommissioning process.

The northern long-eared bat predominantly overwinters in large hibernacula such as caves, abandoned mines, and cave-like structures. During the fall and spring, they utilize entrances of caves and the surrounding forested areas for swarming and staging. In the summer, northern long-eared bats roost individually or in colonies beneath exfoliating bark or in crevices of both live and dead trees (typically greater than 3 inches in diameter). Roost selection by northern long-eared bats is similar to that of Indiana bats; however, northern long-eared bats are thought to be more opportunistic in roost site selection. This species also roosts in abandoned buildings and under bridges. Northern long-eared bats emerge at dusk to forage below the canopy of mature forests on hillsides and roads, and occasionally over forest clearings and along riparian areas (USFWS 2014). The closest known record of this species was captured during a 2013 mist net survey approximately 6.3 miles from the project area. As discussed above, there are two caves known within 3 miles of the project area. In addition, habitat for this species exists in the project area in and around trees, the Clinch River/Melton Hill Reservoir, wet low-lying areas, and in buildings left open and abandoned during the decommissioning process.

Tricolored bats hibernate in caves, mines, and rock crevices. In summer they roost in dead or live vegetation in live trees. They are associated with forested landscapes where they forage near trees and along waterways, especially in riparian areas (Harvey 1992). In middle Tennessee, tricolored bats have been documented using clumps of dead foliage hanging from branches of live trees during summer. The dead foliage was typically comprised of hickory or oak leaves (Thames 2020). The nearest known tricolored bat record and cave are approximately 2.2 miles from the project. One additional cave is known within 3 miles of the project area. Foraging and moderate summer roosting habitat for this species exists in the project area in and around trees, the Clinch River/Melton Hill

Reservoir, and wet low-lying areas. As discussed in Subsection 3.8 of the environmental assessment, the culvert in which one bat was observed in 2016 (species unknown) may also provide temporary transitional roosting habitat for tricolored bats.

Hellbenders are state-listed as in need of management and are aquatic salamanders found in larger, fast-flowing streams and rivers with large shelter rocks. Eggs are laid in depressions created beneath large rocks or submerged logs (Petranka 1998). One record of this species has been reported within 3 miles of the project area. A specimen was caught in 1976 in Melton Hill Reservoir approximately 1.1 mile away. Suitable nesting habitat is no longer thought to occur in the reach of the Clinch River/Melton Hill Reservoir that is adjacent to BRF or in any of the mainstems of rivers with TVA impoundments. No suitable habitat for hellbenders occurs in the project area.

The monarch butterfly is a highly migratory species, with eastern U.S. populations overwintering in Mexico. Monarch populations typically return to the eastern U.S. in April (Davis and Howard 2005). Summer breeding habitat requires milkweed plant species, on which adults exclusively lay eggs for larvae to develop and feed on. Adults will drink nectar from other blooming wildflowers when milkweeds are not in bloom (NatureServe 2022). Herbaceous areas in the project area are routinely mowed grassy areas that do not provide host plant or foraging habitat for monarch butterfly. Occasional flowering plants may still occur in low areas alongside roads or railroad tracks, or around wet areas southwest of the switchyard. However, these areas do not comprise a substantial amount of available habitat. Though this species has not been historically tracked by state or federal heritage programs, the USFWS IPaC database website determined that this species has the potential to occur within the project area. This species was not observed on BRF during the May 2022 field survey.

B.2.2 Aquatic Animals

A review of the TVA Natural Heritage Database indicated records of 16 federally and/or state-listed aquatic species (six fish and 10 mollusks) within 10 miles of BRF (TVA 2022b). Review of the USFWS IPaC website identified seven additional federally listed aquatic species potentially in the vicinity of BRF (USFWS 2022). These species included six mollusk species and one aquatic snail. A list of the aquatic threatened and endangered species that are found or may potentially occur within a 10-mile radius of BRF can be found in Table B-2.

A total of ten listed mollusk species have been recorded with a 10-mile vicinity of BRF. None of the listed mollusk species were observed during the 2016 biological characterization survey (TVA 2017), and no individuals or populations of these species are considered present in the Clinch River/Melton Hill Reservoir near BRF (TVA 2022a). A 2010 mussel survey of the riverfront adjacent to BRF did not find evidence of presence of any state-listed or federally listed threatened or endangered mussel species (Third Rock Consultants 2010).

Four federally and/or state-listed fish species have been recorded within a 5-mile radius of BRF (TVA 2019). The spotfin chub (*Erimonax monachus*) has been verified within a 5-mile radius of BRF. Habitat for the spotfin chub typically includes large, clear creeks or medium-sized rivers with moderate to swift currents over gravel and bedrock (Lee et al. 1980; Burkhead and Jenkins 1991). The blue sucker (*Cycleptus elongatus*), a state threatened species, has been classified as possibly historical in the vicinity of BRF. Habitat for blue sucker is primarily channels and flowing pools with moderate current in large rivers and

lower tributaries; however, they may occur in some impoundments (NatureServe 2022). One species, the yellowfin madtom (*Noturus flavipinnis*) has been extirpated. This species is found primarily in slow pools and small backwaters of medium-sized to large creeks and small rivers that are unpolluted, warm to cool, and unsilted (Burkhead and Jenkins 1991).

Table B-2. Federally and State Listed Aquatic Species Within 10 Miles of BRF and/or with Potential to Occur Near BRF

Common Name	Scientific Name	Status[1]		Documented in 10-mi radius
		Federal	State (Rank[2])	
Mollusks				
Alabama Lampmussel	*Lampsilis virescens*	E	E (S1)	No
Birdwing Pearlymussel	*Lemiox rimosus*	E	E (S1)	Extirpated
Cracking Pearlymussel	*Hemistena lata*	E	E (S1)	Extirpated
Dromedary Pearlymussel	*Dromus dromas*	E	E (S1)	Extirpated
Fanshell	*Cyprogenia stegaria*	E	E (S1)	No
Finerayed Pigtoe	*Fusconaia cuneolus*	E	E (S1)	Historical[3]
Orange-foot Pimpleback	*Plethobasus cooperianus*	E	E (S1)	Historical
Pink Mucket	*Lampsilis abrupta*	E	E (S2)	Extirpated
Ring Pink	*Obovaria retusa*	E	E (S1)	No
Rough Pigtoe	*Pleurobema plenum*	E	E (S1)	No
Rough Rabbitsfoot	*Quadrula cylindrica strigillata*	E	E (S2)	No
Sheepnose Mussel	*Plethobasus cyphyus*	E	-- (S2)	No
Shiny Pigtoe Pearlymussel	*Fusconaia cor*	E	E (S1)	Historical
Slabside Pearlymussel	*Pleuronaia dolabelloides*	E	E (S2)	Historical
Spectaclecase	*Cumberlandia monodonta*	E	E (S2S3)	Historical
White Wartyback	*Plethobasus cicatricosus*	E	E (S1)	Historical
Fish				
Yellowfin Madtom	*Noturus flavipinnis*	T	T (S1)	Extirpated
Slender Chub	*Erimystx chani*	T	T (S1)	No
Spotfin Chub	*Erimonax monachus*	T	T (S2)	Yes
Highfin Carpsucker	*Carpiodes velifer*	--	D (S2S3)	Historical
Tennessee Dace	*Chrosomus tennesseensis*	--	D (S3)	Yes
Flame Chub	*Hemitremia flammea*	--	D (S3)	Yes
Blue Sucker	*Cycleptus elongatus*	--	T (S2)	Historical
Aquatic Snail				
Anthony's Riversnail	*Athearnia anthonyi*	E	E (S1)	No

Sources: TVA 2022b, USFWS 2022, NatureServe 2022, TDEC 2016

[1] Status Codes: E = Listed endangered; T = Listed threatened; -- = Not listed; D = Deemed in need of management

[2] Rank Codes: S1 = Extremely rare and critically endangered; S2 = Very rare and imperiled; S3 = Vulnerable

[3] Historical records are those observations that are greater than 25 years old.

Suitable habitat for the Tennessee dace (*Chrosomus tennesseensis*), a state-listed species in need of management, does not exist in the Clinch River/Melton Hill Reservoir in the vicinity of BRF (TVA 2022a). Habitat for this species consists of sluggish pool areas of fine gravel, sand, and silt within spring-fed headwaters and clear and cold small creeks that are well shaded by riparian vegetation (Starnes and Jenkins 1988; Page and Burr 2011).

Flame chub (*Hemitremia flammea*), a state listed species in need of management, primarily occupies spring-fed tributaries (NatureServe 2022), and, therefore, is unlikely to be found in the Clinch River/Melton Hill Reservoir in the vicinity of BRF, but it does have the potential to occupy the nearby Bullrun Creek.

B.2.3 Plants

A review of the TVA Regional Natural Heritage database indicated that no federally listed vascular plant species, or associated designated critical habitat, are known to occur on or within a 5-mile radius of BRF (TVA 2022b). A total of 16 species of plants listed by the TDEC as threatened, endangered, or species in need of management in Tennessee are known to occur within Anderson County (TDEC 2022). Of those, 11 species plus American ginseng (*Panax quinquefolius*) are known to occur within 5 miles of BRF (TVA 2022b).

Preferred habitat for each species and the possibility of habitat within the project area is addressed in Table B-3. Lands associated with the BRF project area have been extensively disturbed by current and/or previous land use. These areas are currently used for industrial purposes and do not contain intact, high-quality native plant communities (TVA 2016; Wood 2022). No sensitive species or associated habitat are expected to be present within the BRF project area.

Table B-3. Habitat Requirements for State-Listed Plant Species' Records within Anderson County

Common Name	Scientific Name	Habitat Requirements	Status*	Present in 5-mile Vicinity of Project Area[1]	Habitat within Project Area**
American ginseng	*Panax quinquefolius*	Slopes of shaded, rich woodlands[2]	S-CE	Y	N
Branching whitlow-wort	*Draba ramosissima*	Bluffs, rocky woods[4]	S	Possibly Historical	N
Butternut	*Juglans cinerea*	Rich mesic woods and streambanks[4]	T	Y	N
Copper iris	*Iris fulva*	Swamps, marshes, wet woods[4]	T	Y	N
Hairy willow-herb	*Epilobium ciliatum*	Moist to wet meadows, springs and bogs[4]	T	Historical	N
Heartleaf meehania	*Meehania cordata*	Wooded mountain slopes[2]	T	N	N
Large-leaved grass-of-parnassus	*Parnassia grandifolia*	Wet woods and fens[4]	S	N	N
Mountain witch-alder	*Fothergilla major*	Dry woods, thickets, riverscour cobble bars[4]	T	Y	N
Naked-stem sunflower	*Helianthus occidentalis*	Barrens, prairies[4]	S	Possibly Historical	N
Northern bush-honeysuckle	*Diervilla lonicera*	Dry woods and thickets, streambanks, rocky slopes[4]	T	Y	N
Nutall's Waterweed	*Elodea nuttallii*	Lakes, streams, small rivers[4]	S	Y	N
Prairie goldenrod	*Solidago ptarmicoides*	Cedar glades and barrens[4]	E	Possibly Historical	N
Spreading false-foxglove	*Aureolaria patula*	Calcareous ledges and bluffs[4]	S	Y	N
Sullivantia	*Sullivantia sullivantii*	Moist shaded cliffs[3]	E	N	N
Tall larkspur	*Delphinium exaltatum*	Open woodlands, rich woods, rocky slopes, glades, prairies[2]	E	Y	N
Torrey's mountain mint	*Pycnanthemum torreyi*	Barrens[3]	E	Y	N
Tubercled rein-orchid	*Platanthera flava var. herbiola*	Swamps and floodplains[3]	T	N	N

Source:
[1] TVA 2022
[2] NatureServe 2022
[3] TDEC 2022
[4] Chester 2015

*Status:
S = State Special Concern Species
S-CE = State Special Concern Species – Commercially exploited
E = State Endangered Species
T = State Threatened Species

**Habitat Codes:
Y = Yes, species has been documented in existing habitats in proposed project areas, and suitable habitat is present
N = No, no records of species within proposed project areas, and no suitable habitat is present

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Appendix C – Coordination

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TENNESSEE VALLEY AUTHORITY
400 West Summit Hill Drive, Knoxville, Tennessee 37902

September 1, 2022

Mr. E. Patrick McIntyre, Jr.
Executive Director
and State Historic Preservation Officer
Tennessee Historical Commission
State Historic Preservation Office
2941 Lebanon Pike
Nashville, Tennessee 37214

Dear Mr. McIntyre:

DECOMMISSION, DEACTIVATION, DECONTAMINATION, AND DEMOLITION (D4) OF TENNESSEE VALLEY AUTHORITY (TVA) BULL RUN FOSSIL PLANT (BRF), ANDERSON COUNTY, TENNESSEE (36.02023, -84.15616) (TVA TRACKING NUMBER – CID 82364)

TVA proposes to undertake D4 of TVA's BRF in Anderson County, Tennessee. BRF is a coal-fired generating facility located on a 750-acre reservation on the east side of Melton Hill Reservoir at Clinch River Mile 48 (Figure 1).

Decommissioning activities would begin upon unit shutdown in preparation for deactivation and demolition. Decommissioning includes removal of components that may be used in other TVA sites, draining of oil/fluids from equipment, removal of ash from the boilers, removal of information technology assets, removal of plant records, etc. Following decommissioning and deactivation, decontamination would be completed, followed by demolition. The site would be returned to a brownfield for possible future development. The 500 kilovolt (kV) and 161kV switchyards adjacent to the plant would remain in service. Buildings and structures proposed for demolition include all that are located within the boundary shown in Figure 1, except for the following: Claxton Community Park, Claxton Community Center, CCR Impoundments, Bull Run Entry Monument/Visitor's Overlook, the Intake, and Switchyards (Figure 2).

TVA proposes decontamination and demolition of the powerhouse and buildings and structures within the proposed demolition boundary to three feet below final grade. Demolition would be conducted via mechanical deconstruction and/or explosives. All buildings and structures with below grade features would be backfilled, using concrete and masonry from the demolished facilities in addition to fill from an existing, permitted, off-site borrow source. All buried utilities would be cut and capped within the project boundary and abandoned in place if they do not interfere with other ongoing projects that overlap the project footprint. All hollow pipe utilities would be decommissioned and sealed with a mechanical cap or plug. The site would be restored to grade to provide proper drainage. TVA is also considering a second alternative for demolition, in which TVA would retain the Turbine Bay of the Powerhouse and the Intake Structure; all other structures would be demolished.

TVA finds that the proposed project constitutes an undertaking (as defined at 36 CFR § 800.16 (y)) that has the potential to cause effects to historic properties. TVA recommends that the area of potential effects (APE) be considered as the area of proposed ground-disturbance, where physical effects could occur, as well as areas within BRF that could be affected by the demolition of above-ground resources (see Figure 1). As the project would not include any new construction, TVA does not consider the BRF D4 project to have potential for indirect effects on any above-ground historic structures that may be present in the viewshed.

Historic Architectural Resources

TVA constructed BRF between 1962 and 1967. The site architecturally expresses Modernism but is mostly utilitarian and industrial. During the late 1950s and early 1960s, TVA began to push the limits of design and engineering for its steam plants as the greater Knoxville area expressed crucial power needs as the city proper and others around continued to sprawl. BRF's steam generator, designed by General Electric, was the largest unit for supercritical pressure in the world in 1963 until a year later when that title was given to another steam plant in New York with a generator that was designed by the Consolidated Edison Company. BRF was TVA's first supercritical system yielding maximum energy efficiency at its time of construction.

Through previous consultation in 2018 with the Tennessee Department of Transportation (TDOT), BRF has been determined eligible for listing in the National Register of Historic Places (NRHP). However, a formal NRHP boundary has not been previously determined and no listing exists of contributing and non-contributing resources within the property. In 2019, without prior knowledge of TDOT's assessment, TVA contracted with Tennessee Valley Archaeological Research (TVAR) to complete a baseline NRHP inventory. At the time the survey was completed, TVA anticipated the possible future closure of BRF, but plans for the D4 project were not complete. Therefore, the assessment of BRF was completed pursuant to Section 110 of the National Historic Preservation Act. For the documentation and NRHP evaluation, TVA required an intensive-level architectural survey/documentation of the entire BRF property and NRHP evaluation of all resources located at BRF. The results of the survey are attached to this submittal in a report titled, *A Historic Architectural Resource Intensive Survey and National Register Assessment of the Bull Run Fossil Plant (BRF), Anderson County, Tennessee*.

The survey documented a total of 35 architectural resources within the BRF property boundary. Of those recorded, 19 are historic and 16 are non-historic. Two of the historic architectural resources—Claxton Community Center/Edgemoor Baptist Church (AN-IP-18) and Arnold-Hall Cemetery (AN-IP-19)—are not directly associated with the history of BRF, as they pre-date the construction of the plant. TVAR recommends that none of the historic architectural resources surveyed are individually eligible for listing in the NRHP.

TVAR also evaluated BRF to determine if all or a portion of the facility was eligible for NRHP listing as a historic district. TVAR recommends BRF is an NRHP-eligible historic district for its local significance under Criterion A in the areas of engineering and industry with a period of significance as 1962-1968. BRF was TVA's first supercritical system, which produced high yields of energy with maximum efficiency. The facility featured multiple new and innovative designs that contributed to the field of engineering within the energy industry, as the success of its new systems brought supercritical capabilities to an additional TVA coal-fired generating plant, Cumberland. Moreover, the power produced at BRF fed the regional economic hub of Knoxville, creating lasting economic impact to the area.

The proposed BRF historic district boundary contains 393 acres with a total of 29 resources (see Figure 2 and Figures 4.6-4.8 of the report). Of these, TVAR recommends 17 as contributing resources—including the Powerhouse, which anchors the historic district—and support buildings and structures that facilitate the various functions required for power production or share an aesthetic and historic relationship with BRF. The remaining 12 resources are recommended by TVAR as non-contributing to the proposed historic district, as the majority are not original to the complex and none are related to the history, aesthetic, or function of the facility. The proposed historic district retains sufficient levels of all seven aspects of integrity for listing in the NRHP, despite some alterations within the historic district.

TVA has read the attached report and agrees with TVAR's recommendations. Therefore, TVA finds that BRF is eligible for listing in the NRHP under Criterion A for its association with engineering and industry.

Archaeological Resources

TVA has previously completed archaeological surveys meeting TVA and Tennessee Division of Archaeology guidelines in all areas within the BRF reservation (including the current project footprint), excluding areas that are clearly disturbed by development (plant facilities, parking lots, coal ash storage areas, etc.). The most recent survey, in 2019, focused on areas not included in several prior surveys. This survey identified two archaeological sites, both of which our offices agreed are ineligible for inclusion in the NRHP. Our offices agreed in consultation that there are no NRHP-listed or -eligible archaeological sites in the BRF reservation (please see our letter of December 6, 2019 "*re: Inventory of Archaeological Sites Within the Bull Run Fossil Plant, Anderson County, Tennessee*", and your response dated December 12, 2019). Based on the prior surveys and consultation TVA finds that the proposed BRF D4 project would not affect any archaeological sites listed in or eligible for listing in the NRHP.

Assessment of Effects

Given that this proposed project would involve the demolition of the BRF historic district, TVA finds that this project would result in an adverse effect. Pursuant to 36 CFR Part 800.6(a) we are seeking your agreement with TVA's eligibility determinations and finding that the undertaking as currently planned will result in adverse effects on historic properties.

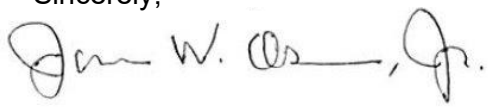
TVA is currently considering options for mitigation, including but not limited to state-level Historic American Engineering Record documentation of the 17 contributing resources of the BRF historic district and development of an interpretive kiosk at the BRF Visitor's Overlook/Entry Monument.

TVA is seeking your concurrence on the following:

- BRF is eligible for listing in the NRHP under Criterion A for its association with engineering and industry;
- the proposed undertaking would have an adverse effect to the BRF regardless of the demolition alternative chosen; and
- a combination of documentation and on-site interpretation would be appropriate mitigation measures for this adverse effect finding.

Please contact Hallie A. Hearnes by email, hahearnes@tva.gov with your comments.

Sincerely,



James W. Osborne, Jr.
Manager
Cultural Compliance

HAH:ERB
Enclosures
cc (Enclosures):
Ms. Jennifer Barnett
Tennessee Division of Archaeology
1216 Foster Avenue, Cole Bldg. #3
Nashville, Tennessee 37210

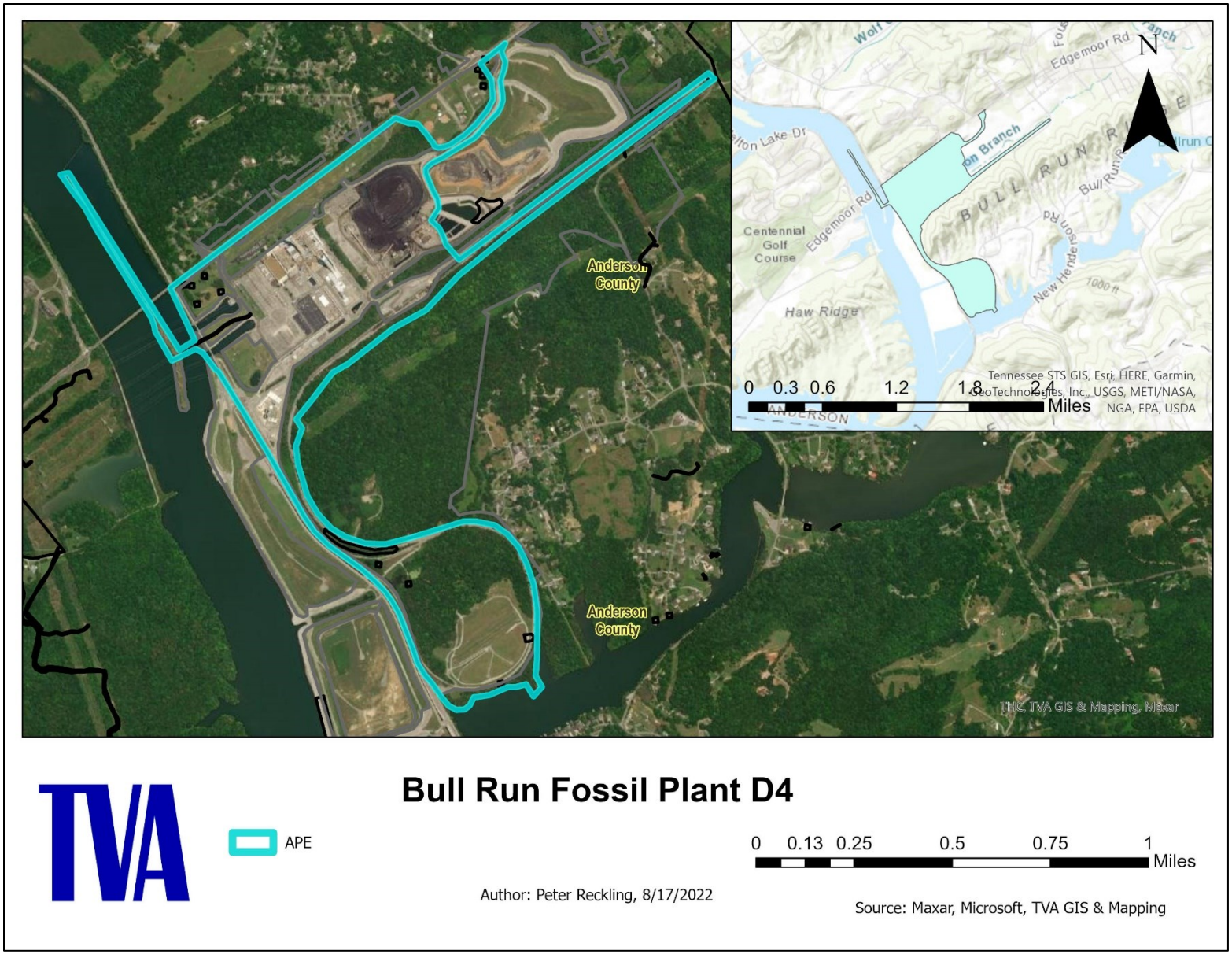


Figure 1. BRF D4 project area, with the APE depicted in teal.

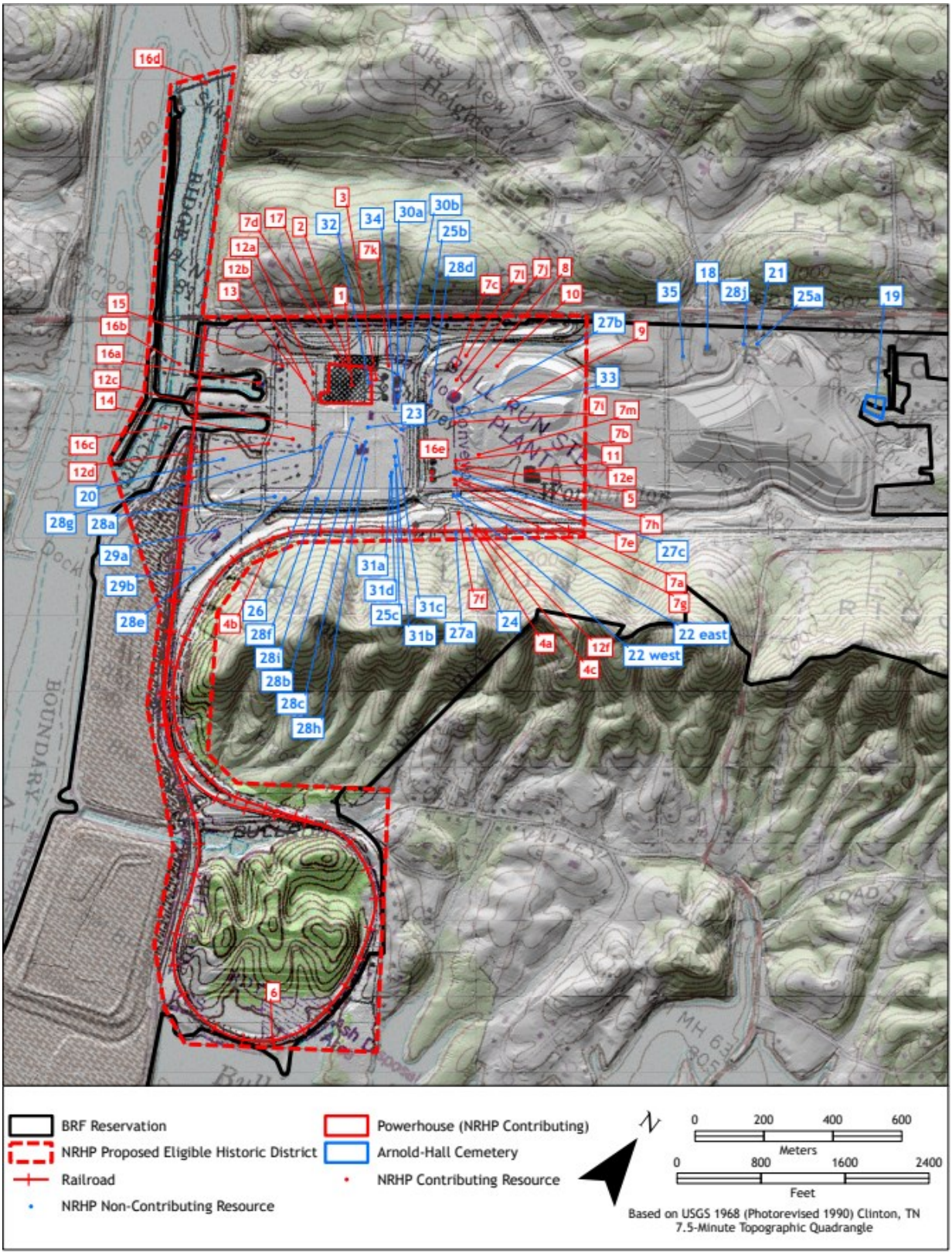


Figure 2. Overview of the proposed BRF historic district with identified resources (listed in Tables 4.1 and 4.2 and clearly depicted in Figures 4.3 and 4.6–4.8 of the report); red indicates contributing resources, blue indicates non-contributing resources.