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TRANSMISSION SYSTEM ROUTINE PERIODIC VEGETATION MANAGEMENT

FISCAL YEARS 2022 AND 2023

DRAFT ENVIRONMENTAL ASSESSMENT

Prepared by:

TENNESSEE VALLEY AUTHORITY
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COVER SHEET

Transmission System Routine Periodic Vegetation Management Fiscal Years 2022 and 2023 Draft Environmental Assessment

Proposed Action: The Tennessee Valley Authority (TVA) has prepared this Environmental Assessment (EA) to address potential environmental, social, and economic impacts associated with the proposed management of vegetation within its existing active transmission line rights-of-way (ROW).

Type of document: Draft Environmental Assessment

Lead agency: Tennessee Valley Authority

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Abstract:

TVA manages vegetation within its active transmission ROW to assure the safe and reliable operation of its transmission facilities. Routine assessment methods to establish a basis for vegetation control measures were evaluated in a programmatic Environmental Impact Statement (PEIS) released in 2019. This EA addresses the planned vegetation management for Fiscal Years 2022 and 2023 within individual transmission line segments, using routine methods established in the PEIS. This EA tiers from the PEIS providing a more site-specific review and analysis. TVA proposes to target previously cleared or maintained areas along some segments of transmission ROWs in TVA's twelve managed ROW sectors across TVA's power service area. Typically, vegetation management activities consist of herbicide application (90%), mechanical control (6% - i.e., brush hogs, equipment mounted saws) and manual methods (4% - i.e., chainsaw, handsaw).

The PEIS document was prepared at the programmatic level to encompass ROW vegetation management across TVA's entire transmission system. A Record of Decision was issued in October 2019 indicating TVA's preferred vegetation management program would be to manage the full extent of the ROW to a meadow-like end-state. This would entail removing incompatible vegetation and managing the ROW as a mix of herbaceous and low-growing shrub species and is expected over time to also minimize the intensity of maintaining the ROW.

The PEIS was issued after a ruling in *Sherwood v. TVA*, a case in the Federal 6th circuit, compelled TVA to take a hard look at the consequences of TVA's vegetation management practices. A resulting July 31, 2017 court injunction that limited certain tree clearing was lifted on November 25, 2020. The PEIS goal of meadow-like end-state would require the initial removal of trees and woody vegetation on 3% of the total transmission system ROW. TVA will not, however, fully implement the PEIS program under this EA. Further, tree removal in Buffer Zones on the ROW edges will not be included in the analysis of this EA. Instead, analysis is limited to trees that would present a risk to the reliability of the transmission system.

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Acronyms, Abbreviations, and Glossary of Terms Used

Acre	A unit measure of land area equal to 43,560 square feet.
Access Road	A dirt, gravel, or paved road that is either temporary or permanent, and is used to access the right-of-way and transmission line structures for construction, maintenance, or decommissioning activities.
ANSI	American National Standard Institute
BA	Biological Assessment
BMP	Best Management Practices
Border Zone	The border zone is the area located between the outside edge of the ROW and the wire zone. The width of this area varies based upon ROW width, voltage, structure type, and structure height.
Buffer Zone	A portion of the Border Zone on some transmission ROWs that has not been subjected to routine maintenance.
CFR	Code of Federal Regulations
Compatible Vegetation	Compatible vegetation is that which will never grow sufficiently close to a conductor so as to violate the minimum clearance distances.
Conductors	Cables that carry electrical current
CWA	Clean Water Act
Danger Tree	Tree located on or off the ROW that, under maximum sag and blowout conditions, could strike a transmission line structure or come within an unsafe distance of a transmission line if it were to fall toward the line. For most transmission lines, this distance is five feet, but for higher voltage lines, the distance is generally 10 feet.
EA	Environmental Assessment
Easement	A legal agreement giving TVA the right to use property for a purpose such as a right-of-way for constructing, maintaining, and operating a transmission line.
EIS	Environmental Impact Statement
Endangered Species	A species in danger of extinction throughout all or a significant part of its range.
EO	Executive Order
EPA	U.S. Environmental Protection Agency
Ephemeral Stream	Watercourses or ditches that only have water flowing after a rain event; also called a wet-weather conveyance.
ESA	Endangered Species Act
Feller-Buncher	A piece of heavy equipment that grasps a tree while cutting it, which can then lift the tree and place it in a suitable location for disposal; this equipment is used to prevent trees from falling into sensitive areas, such as a wetland
FERC	Federal Energy Regulatory Commission

Floor Work	Vegetation management activities typically consisting of mechanical control (e.g., brush hogging) and herbicide application which target previously cleared or maintained areas along the transmission rights-of-way to achieve an end-state vegetation community consisting of a mix of herbaceous and low-growing shrub species.
FY22	TVA's Fiscal Year 2022 runs from October 1, 2021 to September 30, 2022
FY23	TVA's Fiscal Year 2023 runs from October 1, 2022 to September 30, 2023
Groundwater	Water located beneath the ground surface in the soil pore spaces or in the pores and crevices of rock formations.
Hazard	Vegetation at risk to the reliability of the transmission system and/or safety of the public. An *immediate hazard* is any vegetation that upon inspection potentially presents a jeopardy or risk to the public safety or the transmission system reliability during the period from the date of inspection or evaluation until the next scheduled Preventative Maintenance tree maintenance activity.
Incompatible Vegetation	Incompatible vegetation is that which has the potential to grow sufficiently close to a conductor so as to violate the minimum clearance distances.
Inspections	Periodic review of the condition of transmission system rights-of-way by means of aerial inspections, ground inspections, and as-needed, field inspections to determine maintenance needs, and any need to adjust the cycle of scheduled work due to emergent conditions.
IPaC	Information for Planning and Consultation. An information, planning and assessment database that can be used to help determine the potential impacts of a project to species regulated by the USFWS.
IVM	Integrated Vegetation Management
kV	Symbol for kilovolt (1kV equals 1,000 volts)
LiDAR	Light Detection and Ranging
LPC	Local Power Company
NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Corporation
NHPA	National Historic Preservation Act
NPDES	National Pollutant Discharge Elimination
NPS	National Park Service
NRHP	National Register of Historic Places
NPV	Net Present Value
NWI	National Wetland Inventory
O-SAR	Office-Level Sensitive Area Review
Outage	An interruption of the electric power supply to a user
PA	Programmatic Agreement
PEIS	Programmatic Environmental Impact Statement

Riparian	Related to or located on the banks of a river or stream
ROW	Right-of-way, a corridor containing a transmission line
Runoff	That portion of total precipitation that eventually enters a stream or river
SHPO	State Historic Preservation Officer
SMZ	Streamside Management Zones
Structure	A pole or tower that supports a transmission line
Substation	A facility connected to a transmission line used to reduce voltage so that electric power may be delivered to a local power distributor or user.
TCP	Traditional Cultural Properties
Threatened Species	A species likely to become endangered within the foreseeable future
Tree Work	Vegetation maintenance activities consisting of manual control (e.g., chainsaw) and mechanical control (e.g., equipment mounted saws and other devices) which focus on tree removal or tree trimming.
TVA	Tennessee Valley Authority
TWRA	Tennessee Wildlife Resources Agency
USACE	U.S. Army Corps of Engineers
USC	United States Code
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
Wetland	A marsh, swamp, or other area of land where the soil near the surface is saturated or covered with water, especially one that forms a habitat for wildlife
Wire Zone	The wire zone includes the area directly under the lines

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CHAPTER 1 – PURPOSE AND NEED FOR ACTION

The Tennessee Valley Authority (TVA) develops long-range vegetation management plans for its transmission system according to industry-wide North American Electric Reliability Corporation (NERC) standards. TVA's long-range vegetation management planning process includes considerations regarding how and when TVA would control the vegetation growing within its transmission line rights-of-way (ROW). TVA has prepared this Environmental Assessment (EA) to address the Fiscal Year 2022 (FY22) and Fiscal Year 2023 (FY23) planning cycles for the proposed management of vegetation within transmission ROWs. This EA, which tiers from TVA's programmatic Transmission System Vegetation Management Environmental Impact Statement (PEIS) (TVA 2019), identifies individual transmission line ROWs. This EA, which tiers from TVA's programmatic Transmission System Vegetation Management Environmental Impact Statement (PEIS) (TVA 2019), identifies individual transmission line ROW segments for each fiscal year in which vegetation management activities are proposed.

1.1 Purpose and Need

The purpose of TVA's transmission system vegetation management program is to strategically manage TVA's existing transmission line ROW in a manner consistent with applicable laws, orders, standards, practices and guidance, while providing reliable electricity transmission to TVA's customers and protecting environmental resources to the extent possible. Failure to implement the transmission system vegetation management program could result in wildfires, major power outages, and injury to life or property. The need for the proposed action includes:

- Enhanced public safety through controlled vegetation management of TVA's transmission lines.
- Effectively manage vegetation that interferes with the safe, efficient and reliable operation of transmission lines so TVA can continue to provide the public safe and reliable electric power in a cost-effective and environmentally sound manner.
- Compliance with NERC standards to maintain transmission lines in a safe and reliable operating condition.

1.2 Introduction and Background

1.2.1 TVA's Transmission System

TVA's transmission system consists of a network of more than 16,000 miles of electric transmission lines all contained within approximately 238,000 acres of utility ROW. Most of TVA's transmission system is located on private lands. TVA typically acquires easements that include the right to manage vegetation in order to protect transmission lines and the transmission system.

1.2.2 The Need for Transmission System Reliability

Reliability of TVA's transmission system is extremely important because interruptions can cause widespread and extended outages. For example, one high-voltage transmission line can support a primary substation, but if an interruption occurs on this transmission line, all other substations that depend on the primary substation also will be interrupted. The other secondary substations distribute power to homes, businesses, hospitals, and safety devices, such as traffic lights. Therefore, the loss of one primary substation can affect thousands of people.

NERC began enforcing its Reliability Standard FAC-003 Transmission Vegetation Management Program on June 18, 2007. The industry-wide reliability standard states that transmission systems, like the TVA system, must maintain adequate transmission line clearances as required by the National Electric Safety Code in order to be able to survive single-failure events while continuing to serve customer needs with adequate voltage. Because failure to address the vegetation clearance, compliance and monitoring requirements of FAC-003 can result in wildfires, major power outages, and injury to life or property, NERC can apply regulatory penalties for non-compliance, including mitigation and fines.

As such, TVA's vegetation management cycle on ROWs associated with transmission lines is typically conducted on a three-year cycle. In addition, floor vegetation maintenance work incorporates a greater percentage of herbicide use to expedite adequate clearance.

Vegetation that is not managed properly contributes to unnecessary electrical transmission interruptions. On LPC distribution lines, safe working clearance distances can be more easily maintained due to the lower voltages and corresponding electrical arc potential. On higher voltage transmission lines, conductive objects, such as trees and vegetation, pose a greater threat to interrupting the power system because the higher energy levels enable the electricity to arc over greater distances to the object and then to the ground.

1.2.3 TVA's Vegetation Management Program

TVA's transmission system serves nearly ten million residents in a more than 82,000-square-mile area. For vegetation management purposes this area is divided into six regions consisting of a total of twelve sectors across TVA's power service area (Figure 1-1). TVA develops a yearly plan for each sector, using an Integrated Vegetation Management (IVM) approach, to identify roughly one-third of the transmission system which needs vegetation management. This area, shown on Figure 1-1, comprises the study area for this EA as this area is inclusive of all areas where TVA maintains ROW. Analysis of impacts to individual ROW segments that undergo vegetation management practices in the EA adopts a "Sector" area perspective.

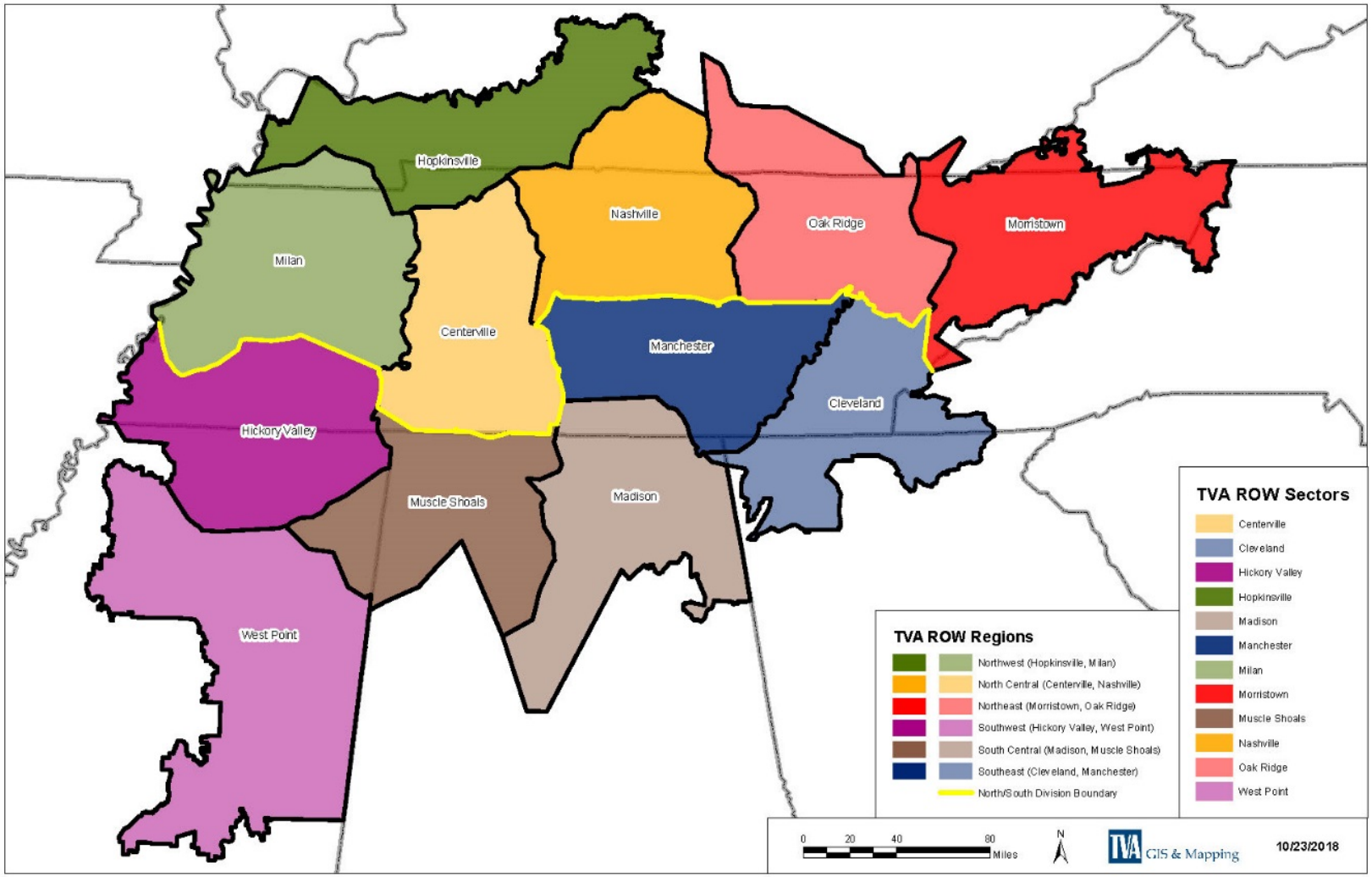


Figure 1-1. TVA's Fiscal Year 2022 and 2023 Environmental Assessment Study Area and the Right-of-Way Vegetation Management Sectors and Regions

TVA's vegetation management program along its transmission system ROW consists of the following basic components:

- *Floor work* – Vegetation maintenance activities which target previously cleared or maintained areas along the ROWs. Typically, floor activities consist of mechanical control (e.g., brush hogging, which is also known as bush hogging, and will be referred to as brush hogging in this document) and herbicide application.

- *Tree work* – Vegetation maintenance activities which focus on tree removal or tree trimming. Typically, tree activities consist of manual control (e.g., chainsaw) and mechanical control (e.g., equipment mounted saws and other devices).

- *Inspections* – Periodic review of ROW condition to determine maintenance needs, and any need to adjust the cycle of scheduled work due to emergent conditions.

- *Planning and Support* – The ROW manager develops plans to maintain his or her respective ROWs in a cost-effective, efficient, and environmentally responsible manner to minimize vegetation-related interruptions.

- *Communication* – Notification of, communication to and education for the property owner.

- *Reliability and Compliance* – Vegetation management activities maximize reliability of the transmission system. Vegetation maintenance activities also must be compliant where applicable with the NERC Reliability Standard FAC-003. TVA's ROW can be classified into three broad categories based on the need for routine vegetation maintenance: lands primarily maintained by others (51.5%); lands subject to limited maintenance (2%); and lands actively maintained by TVA (46.5%). TVA has vegetation management rights for the entirety of the 238,000 acres of active ROW. TVA, however, only actively maintains approximately 46.5 percent or 110,752 acres because about 51.5 percent of the ROW is used as cropland, golf courses, orchards or similar uses that integrate compatible vegetation, which is primarily maintained by the landowner. Compatible vegetation is that which will never grow sufficiently close to a conductor so as to violate the minimum clearance distances. While the floor of the ROW is often maintained by others in these areas, TVA conducts routine inspection and vegetation management of ditch banks, fence rows, towers, and other features. Trees that are tall enough to either fall within a ROW or grow to an unsafe distance of transmission lines are managed on all lands within and adjacent to the TVA ROW. A relatively small amount of the TVA transmission system ROW (4,720 acres) does not require routine vegetation management by anyone. These areas include ROW that spans open water or deep valleys where vegetation growing at lower elevations cannot threaten the transmission line.

What is "compatible" and "incompatible" vegetation?

Compatible Vegetation: Vegetation will never grow sufficiently close to a conductor so as to violate the minimum clearance distances. Example: low-growing shrubs and herbaceous plants.

Incompatible Vegetation: Vegetation that has the potential to violate minimum clearance distances. Example: young woody trees.

TVA typically also manages danger trees on lands along and adjacent to the TVA ROW. A danger tree is a tree, located on and off the ROW that would strike a transmission line structure or come within an unsafe distance of a transmission line if it were to fall toward the line. For most transmission lines, this distance is five feet, but for higher voltage lines the distance is generally 10 feet. Danger trees that are or have the potential to be a risk to the safety and reliability of TVA's transmission line system must be removed (American National Standards Institute [ANSI] A300 Part 7 2012). Any reference to danger tree removal includes all trees that fit this definition.

What are "Danger" Trees?

Danger trees are trees located on and off the ROW that are tall enough to fall within an unsafe distance of transmission lines. For most transmission lines, this distance is five feet, but for higher voltage lines, the distance is generally 10 feet.

On July 31, 2017, the U.S. District Court for the Eastern District of Tennessee issued an injunction to TVA, pursuant to *Sherwood v. TVA*, No. 3-12-cv-156. TVA was enjoined from "maintain[ing] Buffer Zones on the edges of its ROW in a manner as described in its 1997 and 2008 Line Maintenance Manuals" until after completing an Environmental Impact Statement pursuant to the National Environmental Policy Act (NEPA) that analyzed TVA's ROW vegetation management program. TVA stopped removing woody vegetation, except for trees that were an immediate hazard to the reliability of the transmission system and/or safety of the public, as prescribed by the referenced Line Maintenance Manuals.

On August 30, 2019, TVA issued a PEIS to programmatically address vegetation management within the TVA power system's transmission line ROW, as required by the court, and released a Record of Decision on October 18, 2019 (84 FR 55995) identifying its preferred vegetation management alternative to manage the full extent of the ROW to a meadow-like end-state consisting of a mix of herbaceous and low-growing shrub species (TVA 2019). On November 25, 2020, the District Court dissolved the *Sherwood* injunction.

The PEIS and this EA share the goal of assessing the potential environmental effects entailed with removing incompatible vegetation in TVA ROWs, resulting in a meadow-like end-state. This end state is expected over time to minimize the intensity of maintaining the ROW. In addition to ROW that has had routine vegetation management, meeting this goal would require the initial removal of trees and woody vegetation on three percent of the total transmission system ROW (8,094 of the total 238,196 acres of ROW) that either remained or have regrown within the Buffer Zones of the ROW since construction. TVA will not, however, fully pursue the meadow-like end-state program under this EA; the initial tree removal in Buffer Zones as described in the PEIS will not be included in the analysis of this EA. Instead, this EA is limited to trees within the ROW that present a risk to the reliability of the transmission system as defined by ANSI A300 Part 7, B-3.1 (2012).

1.2.4 Vegetation Management Practices

The study area supports a variety of vegetation including trees, brush and herbaceous plants. As described in TVA's PEIS (2019), ROW vegetation management on the transmission system is necessary to ensure that safe and reliable electric power service is not interrupted by trees or other vegetation growing under or near the transmission lines. To protect public safety and improve power reliability, TVA maintains different areas within a ROW (Figure 1-2):

- *Wire Zone* – Generally, the wire zone includes the area directly under the lines.

- *Border Zone* – The border zones are located between the wire zone and the outside edge of the ROW. The width of this area varies based upon ROW width, voltage, structure type, and structure height.

- *Buffer Zone* - A portion of the border zone on some transmission ROWs that has not been subjected to routine maintenance.

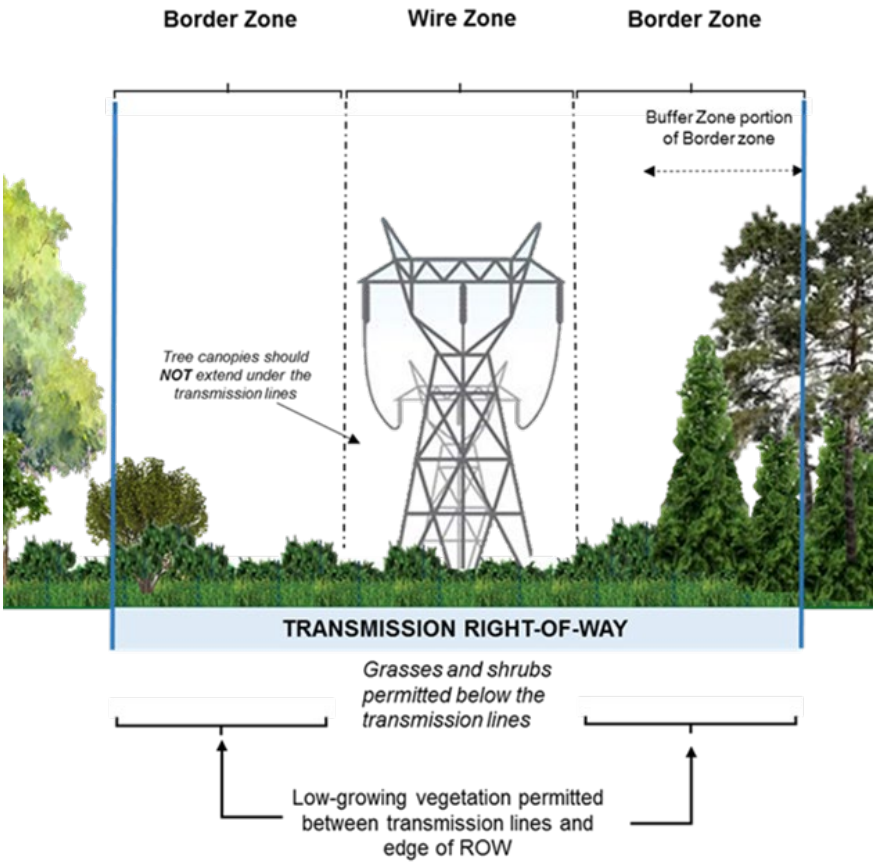


Figure 1-2. Transmission Line Rights-of-Way Zones

Within the Border Zone of TVA's ROW easements, there is an area that has in the past been considered by TVA as a Buffer Zone. The Buffer Zone in some locations has not been subjected to routine vegetation management. To reduce the risk of trees or branches falling onto lines, or lines sagging or swaying into trees, incompatible vegetation in the Wire and Border Zones should be removed. As indicated in the PEIS (2019) and described above, TVA additionally plans to address the trees within the Buffer Zones that are a risk to the reliability of the transmission system. However, the initial tree removal as described in the PEIS is not included in this environmental review. Instead, analysis is limited to trees that present a risk to the reliability of the transmission system as defined by ANSI A300 Part 7, B-3.1 (2012). Additionally, TVA plans to remove any other incompatible vegetation in ROW Buffer Zones during TVA's routine vegetation management cycles. TVA shall conduct additional environmental review to address the potential effects of tree removal in the Buffer Zone.

1.2.5 Emphasis on Integrated Vegetation Management

The Federal Energy Regulatory Commission (FERC) and NERC both recognize the ANSI Tree, Shrub and Other Woody Plant Maintenance-Standard Practices for electric utility ROW as a best management practice (BMP) (ANSI 2012).

The concept of IVM is the basis of this standard and is defined as:

> A system of managing plant communities in which compatible and incompatible vegetation is identified, action thresholds are considered, control methods are evaluated, and selected control(s) are implemented to achieve a specific objective. Choice of control methods is based on effectiveness, environmental impact, site characteristics, safety, security, and economics.

TVA's IVM process consists of six elements (Figure 1-3).

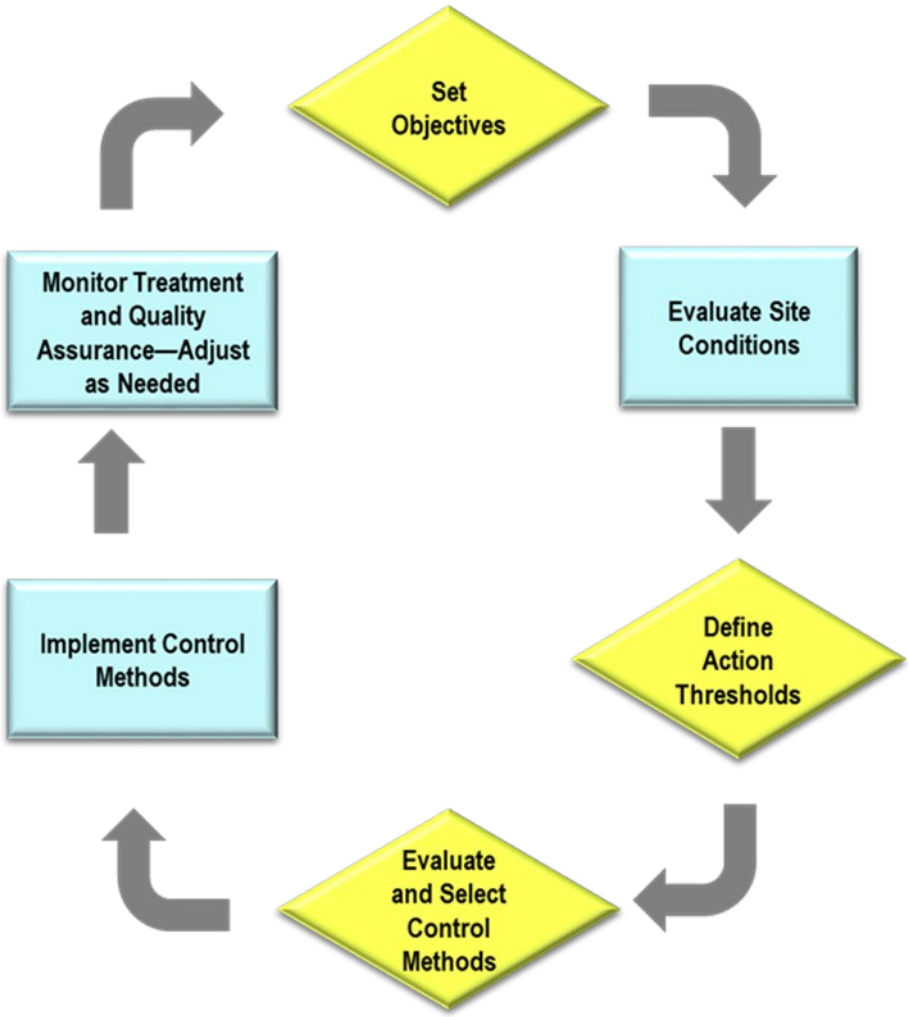


Figure 1-3. TVA Integrated Vegetation Management Process

The goal of IVM is to provide an integrated and balanced approach of vegetation management that considers the overall long-term effect on public health and safety, reliability of electric transmission, environmental stewardship, and cost. As vegetation growth is dynamic, the IVM planning and implementation process is iterative and continuous; this allows flexibility to adjust plans as needed.

Setting objectives, defining action thresholds and selecting site-specific application of tools to control vegetation are all considered in the IVM process. TVA believes that the IVM process provides the appropriate flexibility for making sound decisions regarding ROW vegetation management; thus, the alternatives considered in this EA are based on the IVM concept. Vegetation control methods are selected based upon a thorough consideration of the end-state and form of the plant communities that are subject to control, as well as an integrated application of TVA's office-level sensitive area review (O-SAR) process. The O-SAR process, described below in Section 2.2.2, prescribes the need for site-specific field surveys and particular tool use based on the documented or potential presence of sensitive environmental resources.

1.2.6 Selection of Vegetation Control Methods

The process for selecting from various vegetation management methods is determined based on location, the existing plant communities, prior site history, and the integration results of TVA's O-SAR process. The vegetation control methods or tools and their appropriate uses for various ROW conditions are identified and discussed in TVA's PEIS (2019).

Of the vegetation control methods available for ROW vegetation maintenance (e.g., manual, mechanical, and herbicide/growth regulators), the most suitable approach would be the one that best achieves the management objectives at each site within the ROW (see Table 1-1). The site-specific selection of control methods (individually or in combination) are based on a range of factors including an understanding of environmental resources and their sensitivities, knowledge of specific site characteristics, safety, economics, and current land use issues.

Table 1-1. Methods Appropriate for Use on TVA Transmission Line ROWs

	Vegetation Control Method		
	Manual	**Mechanical**	**Herbicide**
Agricultural Areas	Usually not many trees requiring control.	Usually not many trees requiring control.	Appropriate for target vegetation control. Agricultural landowner often uses herbicide methods for localized treatments of weeds.
Forested Areas	Manual methods appropriate for tree removal.	Appropriate for dense stands of vegetation and for removal of buffers.	Appropriate for target vegetation control (including invasive weeds), and stump treatments of deciduous trees.

	Vegetation Control Method		
	Manual	**Mechanical**	**Herbicide**
Grassland and Shrub	Usually not many trees requiring control. Would address invasive weeds in very limited cases. Root systems would not be controlled; seeds have the potential to spread.	Appropriate for clearing brush on access roads, or around towers.	Appropriate for general application and for invasive weed control.
Residential Areas	Would address invasive weeds in very limited cases. Weed roots would not be controlled; seeds have the potential to spread.	Would address invasive weeds in very limited cases. Weed roots would not be controlled; seeds have the potential to spread.	Appropriate for controlling invasive weeds, selected application.
Danger Trees Outside the ROW	Manual methods are appropriate for selective removal of danger trees.	Appropriate; however, mechanical methods tend to be non-selective and used for smaller tree heights.	Growth regulator may be appropriate to stunt growth of potential danger trees.

Effective vegetation control along the ROW typically requires the use of a combination of methods depending on the target vegetation type. TVA uses herbicides predominantly during routine floor vegetation management and a mix of manual and mechanical methods to remove trees. Noxious or invasive plant species are controlled predominantly by a mix of methods dominated by mechanical techniques and herbicides. By comparison, tall-growing, incompatible trees and shrubs are typically controlled using a more balanced application of all techniques (manual, mechanical, and herbicide).TVA recognizes that each tool has inherent advantages and disadvantages (TVA 2019).

Setting objectives, defining action thresholds and selecting site-specific application of tools to control vegetation all require consideration as part of the IVM process. Use of all the methods identified (manual, mechanical, and herbicide/growth regulators) is appropriate and necessary to ensure flexibility of application, increased environmental sensitivity, and cost effectiveness for each site-specific application.

1.3 Decision to be Made

The primary decision before TVA is whether to ensure safe and reliable electric power to TVA's power service area by strategically managing vegetation along its transmission line ROWs consistent with applicable laws, regulations, standards, practices and guidance, while protecting environmental resources to the extent possible. If the proposed vegetation management is to occur along transmission line ROWs, other secondary decisions are involved. These include the type and timing of vegetation control methods. TVA's decision will consider factors such as environmental impacts, economic issues, and the availability of resources.

1.4 Related Environmental Reviews

In 2019, TVA released the PEIS, which is incorporated by reference (TVA 2019). This review more broadly represented a comprehensive analysis of management activities and potential environmental impacts associated with TVA's vegetation management program across all sectors within the TVA power service area. Various vegetation management methods and tools were considered as part of the analysis. TVA issued a Record of Decision on October 18, 2019 identifying its preferred vegetation management program alternative as a condition-based control strategy with a goal of maintaining the rights-of-way in a meadow-like end-state (84 FR 55995).

On November 9, 2020, TVA issued a final EA and finding of no significant impact for its Fiscal Year 2021 proposal to perform routine vegetation management on about one-third of the transmission system ROWs (TVA 2020). The management of vegetation within the ROW is needed to ensure the transmission system can continue to provide reliable power and to prevent outages related to incompatible vegetation. Site-specific effects of vegetation management was considered within twelve managed sectors in areas that had been previously and continuously maintained on a recurring cycle. The EA tiered from the PEIS which evaluated and analyzed TVA's vegetation management program (TVA 2019).

1.5 Public Involvement

As part of TVA's public communication plan for this project, TVA has developed a Web site as the primary platform for public outreach. The project Web site is intended to serve as the primary hub for distributing information to the public. Visitors to the page can navigate from the project Web site to other web sites for additional information pertaining to TVA's transmission system and current vegetation management. The Web site directs the public to submit comments via email, mail, or an online comment form accessed from the project Web site. TVA has also used local news outlets and notices placed in local newspapers to notify members of the public of the proposed FY22 and FY23 vegetation management plans.

1.6 Prior Agency and Tribal Involvement

During the review of TVA's vegetation management program (TVA 2019), TVA contacted federal and state agencies, as well as federally recognized Native American tribes represented in the TVA power service area (see Appendix A).

Pursuant to Section 7 of the Endangered Species Act (ESA), and in consultation with the (U.S. Fish and Wildlife Service) USFWS, TVA prepared a programmatic Biological Assessment (BA) that evaluated impacts of a suite of TVA routine actions on federally listed bats present in the TVA power service area. This consultation was completed in April 2018 (Appendix B). TVA also has consulted with the USFWS on routine vegetation management activities carried out on TVA transmission line ROWs for all other threatened and endangered species. This consultation was completed in May 2019 (Appendix C).

Pursuant to Section 106 of the National Historic Preservation Act (NHPA), and in consultation with the Advisory Council on Historic Preservation; the state historic preservation officers (SHPOs) of Alabama, Georgia, Kentucky, Mississippi, North Carolina, Tennessee and Virginia; and all federally recognized Indian tribes with an interest in the region, TVA prepared a Programmatic Agreement (PA) for existing TVA operation and maintenance activities, including vegetation management. This consultation was completed in February 2020 (Appendix D).

Further, TVA coordinated with other federal land management agencies in conjunction with the PEIS. During the PEIS, the National Park Service (NPS) and the U.S. Forest Service (USFS) served as cooperating agencies contributing on vegetation management practices on TVA transmission line ROWs crossing federal lands under their respective jurisdiction. Regardless, these agencies would be notified, and consulted with, as appropriate, concerning any transmission line ROW segments proposed for vegetation management. Additionally, TVA entered into a General Agreement with the NPS which addresses vegetation management for ROW easements and permits on NPS lands (Appendix E).

Following the release of the Final PEIS, copies or notices of its availability with instructions on access was provided to agencies, federally recognized Indian tribes represented in the TVA power service area, and individuals that had expressed interest in the project.

1.7 Scope of the Environmental Assessment and Issues to be Addressed

TVA prepared this EA in compliance with the NEPA statute, regulations promulgated by the Council on Environmental Quality, and TVA's NEPA regulations at 18 CFR 1318. This EA, which tiers from the PEIS (TVA 2019), identifies individual transmission line segments in each of the twelve managed ROW sectors in which vegetation management activities are proposed for either FY22 or FY23 (Appendix F), and provides more site-specific review and analysis, as appropriate. For the purpose of this EA, all areas proposed for vegetation management within ROW segments have been previously cleared and continuously maintained. Prior to removal of incompatible forested areas within Buffer Zones, TVA will identify and conduct an environmental review specific to these locations. As such, TVA proposes within Buffer Zones to remove trees that present a risk to the reliability of the transmission system.

To facilitate "tiering" the PEIS established the process TVA considers when making decisions regarding vegetation management, identified potential environmental impacts associated with vegetation management tools, and established mitigation measures that would minimize environmental impacts (TVA 2019). This EA integrates the findings and conclusions of this analysis.

In the PEIS, TVA determined that the resources listed below could potentially be impacted by the alternatives considered (TVA 2019). These resources were identified based on internal scoping as well as comments received during previous public scoping periods for transmission line projects.

- Surface Water
- Aquatic Ecology
- Vegetation
- Wildlife
- Threatened and Endangered Species
- Wetlands
- Managed and Natural Areas, Parks and Recreation
- Archaeological and Historic Resources

Further, the PEIS concluded that the potential effects of floor-work and hazard/danger tree vegetation management on transmission line ROWs would be minor, short-term, temporary,

negligible, and/or none related to air quality and global climate change, geology, groundwater, hydrogeology, floodplains, socioeconomics and environmental justice, transportation, visual resources, land use and prime farmland, solid and hazardous waste, and public health and safety. Thus, any further analysis for effects to these resources was not deemed necessary.

TVA's action would satisfy the requirements of Executive Order (EO) 11988 (Floodplain Management), EO 11990 (Protection of Wetlands), EO 12372 (Intergovernmental Review), EO 12898 (Environmental Justice), EO 13112 as amended by 13751(Invasive Species), EO 13653 (Preparing the U. S. for the Impacts of Climate Change), and applicable laws including the Farmland Protection Policy Act, the NHPA of 1966, ESA of 1973, as amended, Clean Water Act (CWA), and Clean Air Act.

1.8 Necessary Permits or Licenses

TVA maintains agency-wide state NPDES General Permits for Discharges from the Application of Pesticides. A Pesticide Discharge Management Plan is maintained annually that prescribes how the ROW herbicide applications comply with these permits. TVA would acquire any necessary permits prior to performing any vegetation management (e.g., for ROWs located within the Great Smoky Mountains NPS, TVA has been granted an IVM Special Use Permit that will allow for herbicide application).

CHAPTER 2 - ALTERNATIVES

2.1 Alternatives Including the Proposed Action

As described in Chapter 1, the scope of the potential alternatives is informed by the purpose and need of the proposed action, namely, the need to manage and/or eliminate vegetation that interferes with the safe and reliable operation of the transmission system. A description of the proposed action is provided below in Section 2.1.2. Additional background information about its existing vegetation management practices, as well as the need to address future management along the transmission system ROW is also provided.

This chapter has five major sections:

1. A description of alternatives;
2. A explanation of the process of vegetation management;
3. A comparison of anticipated environmental effects by alternative;
4. Identification of mitigation measures; and
5. Identification of the preferred alternative.

2.1.1 Alternative A – No Action Alternative – Do Not Perform Routine Vegetation Management

Under the No Action Alternative, there would be no initial change to the current state of vegetation within TVA transmission line ROWs. Individual ROW segments that TVA has identified in which floor work vegetation management activities are needed would not take place.

As a result, the existing ROW would contain vegetation incompatible with TVA's transmission system. The volume of non-compatible woody vegetation within the previously-cleared ROWs increased due to the *Sherwood v. TVA* court injunction order and would continue to pose an increasing risk to the transmission system.

The No Action Alternative does not adequately address the potential for service outages from trees growing into the line, falling into the line, or creating a fire hazard to the transmission lines and structures, and thereby creates an increased risk to reliability. The No Action Alternative also does not adequately address the risk to public safety that can stem from wildfires caused by power lines. In addition, the No Action Alternative would lead to a marked increase in worker safety concerns, due to the increased risk of serious injuries and fatalities associated with the increased need to undertake manual removal of large danger trees.

The net present value (NPV) of the cost to maintain the transmission system ROW for the next 20 years under the No Action Alternative is estimated to be approximately $205 million (TVA 2019). However, tree work costs are higher for this alternative and would increase over time due to the inefficiencies inherent in removal of only trees at a current risk to the transmission system, as opposed to removal of all incompatible trees during routine vegetation management. This increase would be a direct result of continued vegetation growth until the vegetation grows sufficiently to meet the definition of risk, which would necessitate addressing that imminent risk in the next maintenance cycle. In addition, the

increased costs include management of new trees that sprout and grow as a result of the less aggressive vegetation management.

Consequently, this alternative would not satisfy the project purpose and need and, therefore, is not considered a viable or reasonable alternative. It does, however, provide a benchmark for comparing the environmental impacts of implementation of the Action Alternative.

2.1.2 Alternative B – Action Alternative – Perform Routine Vegetation Management

Under the Action Alternative, TVA proposes as part of TVA's FY22 and FY23 planning cycles to implement its yearly process of routine vegetation management within approximately one-third of its transmission system ROWs each fiscal year within each of the twelve managed sectors in the TVA power service area (Figure 1-1; Appendix F; Appendix G). TVA would use an IVM approach to promote the establishment of a plant community "end-state" dominated by low-growing herbaceous and shrub-scrub species that do not interfere with the safe and reliable operation of the transmission system. The goal of this vegetation management alternative would be to allow compatible vegetation to establish and propagate to reduce the presence of woody species. TVA would continue to use all assessment techniques, including Light Detection and Ranging (LiDAR) data.

TVA's policy and direction for managing vegetation along its transmission line ROW integrates an IVM strategy allowing TVA to apply a range of methods depending on the target vegetation type. The proposed Action Alternatives incorporates this IVM approach based on a carefully planned, multidimensional strategy developed in consultation with forestry and habitat experts. IVM aims to create conditions on the ROW that improve safety and prevent power outages by creating inherently more compatible and self-sustaining ecosystems while ensuring compliance with regulatory standards (Appendix H).

The proposed Action Alternative to manage vegetation is "context sensitive" within an overarching IVM approach in its selection of methods and in its incorporation of TVA's O-SAR process to avoid and minimize impacts (Figure 2-1). The scope of the potential alternative is constrained by the need for TVA to eliminate vegetation that interferes with the safe and reliable operation of the transmission system including both the conductor and structures. The establishment of a stable, low-growing plant community would reduce the intensity of vegetation control once the desired end-state in each location has been achieved.

Routine vegetation management includes the identification and removal of vegetation within the ROW incompatible with TVA's desired end-state condition. Within ROWs primarily maintained by TVA, vegetation for most of the transmission system has routinely undergone floor work (i.e., that which is focused on the maintained herbaceous community) which is planned on an established cycle and would be controlled using a mixture of methods. In general, vegetation within the ROW would be controlled using a mix of approximately 90 percent herbicide, 6 percent mechanical and 4 percent manual methods. However, the net effect of TVA's O-SAR process is to consider the site-specific sensitivity at a given location on the ROW in the development of a context sensitive approach to tools for vegetation management that not only have an effect on method selection for floor work, but also for tree work (Figure 2-1).

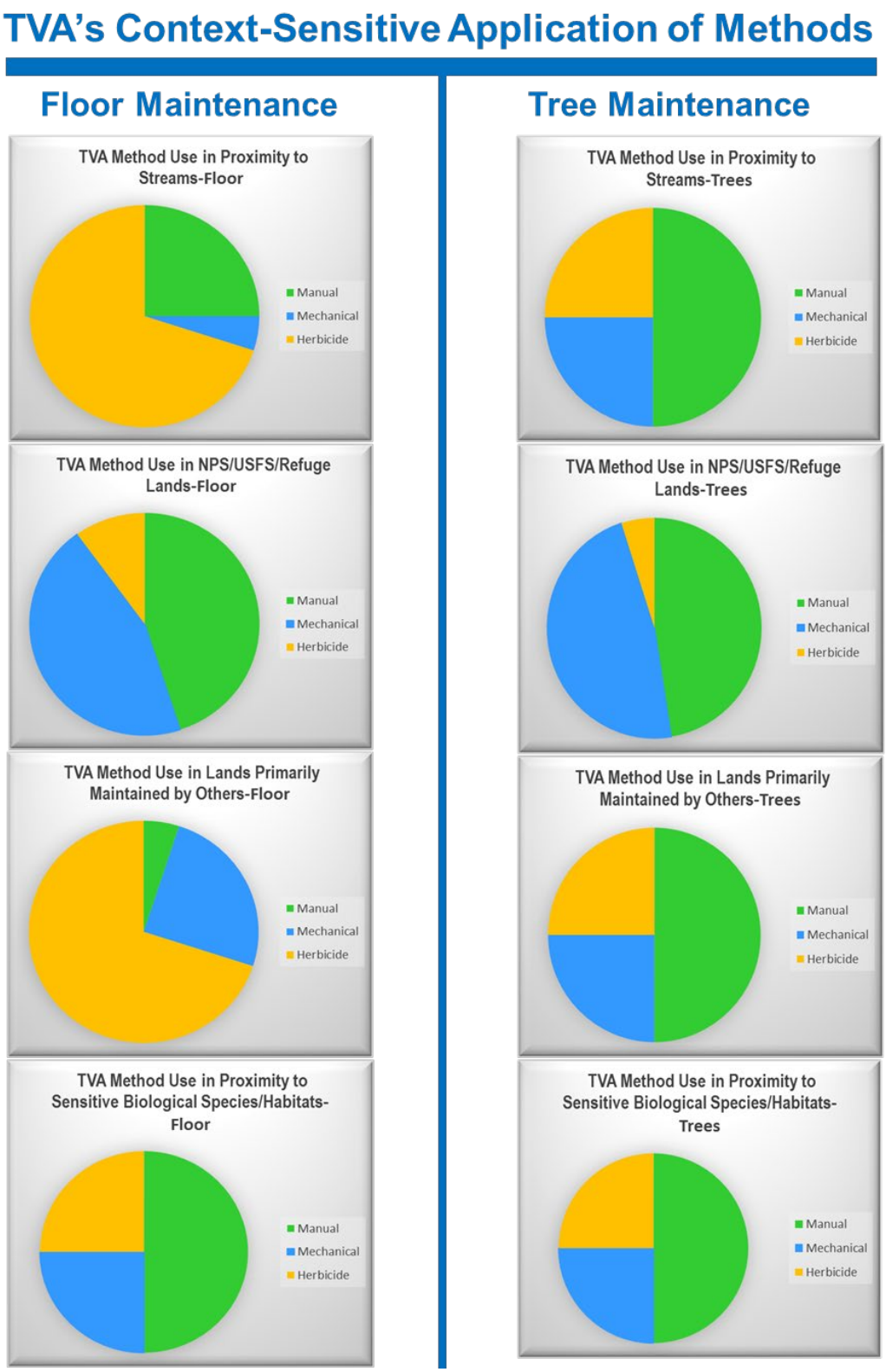


Figure 2-1. TVA's Context Sensitive Application of Vegetation Control Methods

All danger trees would be removed using a combination of mechanical or manual methods depending on the specific site conditions. However, under this alternative, TVA would continue to use a context sensitive approach for selection of different tools by area (floor vs. trees) and for respective environmental settings or vegetation maintenance as summarized in Figure 2-1.

These ecosystems foster beneficial, attractive and low-maintenance habitat where incompatible vegetation is discouraged and other, more benign forms of vegetation can thrive. By combining selective use of herbicides with physical vegetation removal, IVM can more thoroughly eradicate incompatible vegetation and allow more “compatible” species to fill in, making it harder for tall-growing vegetation to reestablish.

As illustrated in Figure 2-2, TVA predominantly uses herbicides during routine floor vegetation maintenance and a mix of manual and mechanical methods to remove trees. Noxious or invasive plant species are predominantly controlled by a mix of methods dominated by mechanical techniques and herbicide application. By comparison, tall-growing incompatible trees and shrubs typically are controlled using a more balanced application of all techniques (manual, mechanical, and herbicide).

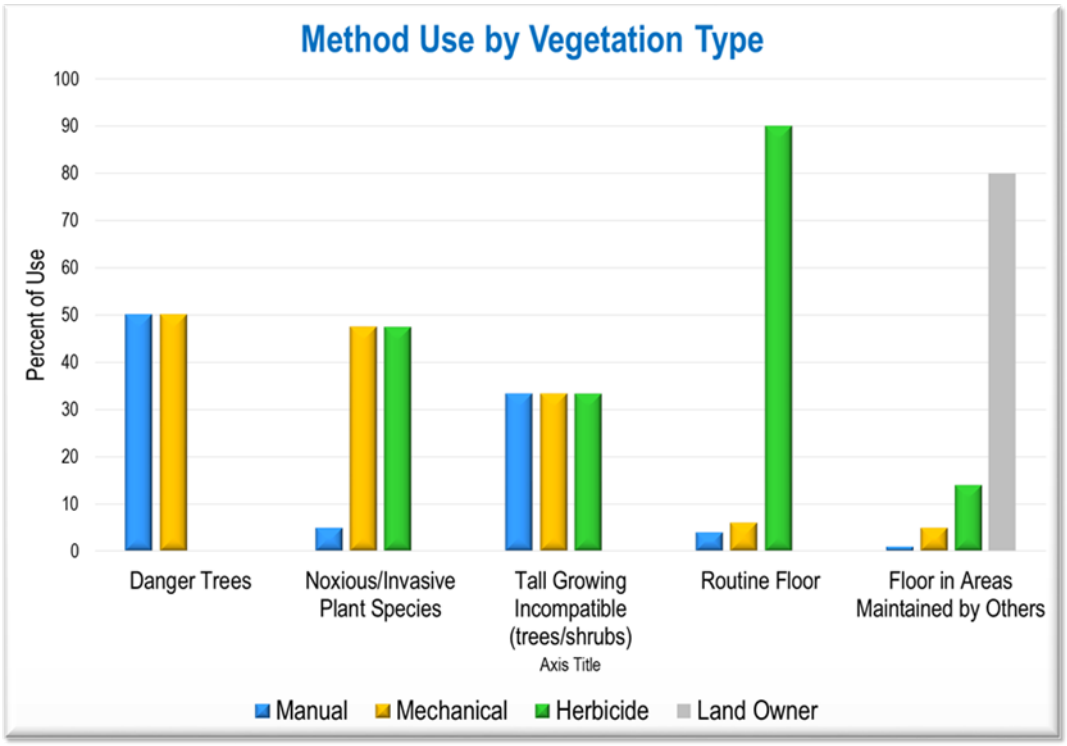


Figure 2-2. Relative Frequency of Method Use by Target Vegetation Type

Under the Action Alternative, compatible trees and shrubs would be allowed in areas maintained actively by others (such as residential lands, orchards, forest plantations, agricultural lands or other similar areas). Where terrain conditions provide for higher clearances (i.e., ravines, steep slopes etc.), vegetation may not conflict with the safe and reliable operation of the transmission lines, and thus would not need to be removed.

The proposed alternative includes routine assessment methods to establish a basis for vegetation control measures. The assessment process is accomplished by a variety of methods including aerial inspections, ground inspections, as-needed field inspections, and information from TVA personnel, property owners, and the general public.

Another powerful assessment technique available to TVA is aerial three-dimensional imagery to map areas of the ROW. This imagery is procured using aerial photography, remote sensing methods, photogrammetry, and LiDAR data. Using these techniques, the height of vegetation growing within the ROW (wire and border) can be measured and assessed to determine its potential to be a current or near-term (i.e., 5 to 10 years depending on growth rate of individual species) threat to transmission lines or structures and thus, to reliability. TVA can use information obtained by these techniques to determine planning needs to conduct both routine and recurring vegetation maintenance and for identifying incompatible vegetation for removal.

The NPV of the cost to maintain the ROW for the next 20 years under this alternative is estimated to be approximately $180 million. In the long-term, however, it would be less expensive to maintain the ROW under this alternative.

2.2 Process of Managing Vegetation within Transmission Line ROWs

2.2.1 Vegetation Management Framework

Each year TVA assesses vegetation conditions on and along its ROW to identify vegetation that potentially could interfere with the safe, efficient and reliable operation of the existing transmission system, and public safety. TVA also must comply with the NERC Reliability Standard (FAC-003) where applicable. Maintaining adequate clearance between transmission line conductors and tall-growing vegetation is essential to reliability, safety, and compliance with applicable regulatory standards. As noted in Chapter 1, TVA's transmission system vegetation management responsibilities encompass approximately 238,000 acres of ROW.

The framework for TVA's vegetation management program within its transmission system consists of the following basic components:

a. Inspections
b. Planning and Support
c. Floor work
d. Tree work
e. Communication
f. Reliability and Compliance

Floor work on TVA's transmission system is routine and focused on periodic, repeated application of vegetation control measures. Floor work is used to maintain plant communities in an herbaceous or low-growing condition to prevent future incompatibility with transmission facilities, thereby promoting reliability and regulatory compliance. Vegetation management of lands primarily maintained by others includes cropland, golf courses, orchards, lawns, and other developed landscapes. Within these areas of the ROW, floor work primarily is performed by landowners maintaining landscapes in residential and developed lands and by routine agricultural practices (e.g., cultivated fields, hay fields,

pastures, orchards, etc.). Even on property maintained by others, TVA retains rights for vegetation management within its transmission line easements. Landowners cannot engage in activities that violate the easement terms or create an unreasonable interference to TVA operations. TVA typically manages vegetation along fence rows, tower structures, ditch banks and other features, as resources allow. Floor work is conducted using a range of tools and methods as described in Chapter 1 and in TVA's review of its vegetation management program (TVA 2019). Floor activities typically consist of herbicide application with lesser amounts of mechanical and manual control methods.

Tree work throughout TVA's transmission system (including lands primarily managed by others) focuses on removal of incompatible trees to maintain the safety and integrity of the transmission system. Tree work includes removal of trees that may become a risk to the reliability of the transmission system within the ROW easement and removal of danger trees outside of the ROW easement. Typically, trees are controlled through manual methods (e.g., chainsaw) and mechanical controls (e.g., equipment-mounted saws, mowers). Tree work throughout TVA's transmission system is directed by inspections and assessments that identify incompatible woody vegetation and guide control measures.

As part of the process, each year TVA develops a vegetation removal plan specific to each transmission line project area based on local terrain conditions, species composition, growth form, and vegetative density. TVA has developed a stepwise process incorporated under all of the proposed vegetation management alternatives to ensure that vegetation management proactively protects environmental resources, considers land use and land ownership, and enhances health and safety. This process applies to planned vegetation maintenance activities and is not applicable to addressing emergency needs.

Under this approach TVA ensures the following steps are implemented:

1. **Identify the area of vegetation maintenance and type of required activity to ensure safety and reliability.**
    a. Floor work – Identify the types of vegetation that require control (invasive weeds, tall-growing vegetation).
    b. Tree Work – Tree removal of incompatible vegetation that would represent a current or future risk to the transmission system.
2. **Identify surrounding land use (i.e., urban, forested, agriculture, pasture, etc.) and landowners.**
    a. Address ROW vegetation maintenance within special use lands associated with NPS, USFS, tribal lands, or other special use/conservation lands in accordance with any existing agreements or regulations.
    b. Follow current TVA process for notifying property owners.
    c. Evaluate surrounding land uses to determine constraints on vegetation control. Incorporate appropriate BMPs as described in *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities Revision 3-2017* (TVA 2017a). The manual can be accessed *here*.

3. **Identify sensitive or natural resources within an area of activity and implement any special requirements associated with performing work in those areas.**

    a. Review and interpret O-SAR data (see Section 2.2.2 below).

    b. Identify appropriate mitigation measures as outlined in TVA's guide for environmental and best management practices (TVA 2017a) for the following resources:

    - Streamside Management Zones (SMZ).
    - Wetlands.
    - Other sensitive resources which can include, but are not limited to, caves, federal and state-listed threatened, endangered or special status species (plants and animals), public water supplies, groundwater, critical or unique wildlife or habitat (e.g., trout streams, designated critical habitat, wading-bird nesting areas, heronries, sinkholes), and cultural resource features.

Environmental Constraint: Streamside Management Zones

BMP Employed: When removing vegetation within an SMZ, TVA uses buffers of a minimum 50 feet on each side of the bank. Buffer width is predetermined based on waterway, primary use, topography, physical barriers, and resource sensitivity. Removal of vegetation within an SMZ is limited to only tall-growing, incompatible species, preserving the low-growing vegetation to minimize disturbance. Stumps must be left in place and all debris from vegetation removal must be removed from within the SMZ.

    c. Evaluate work area for safety factors in relation to TVA personnel and the general public.

    d. Identify areas with steep or unstable slopes (usually greater than 30 percent). Certain types of mechanical equipment may not be feasible in these areas.

    e. Ensure TVA personnel and contractors are properly trained for specific techniques required for special requirements.

4. **Determine vegetation control methods.**

    a. Consider Steps 1 through 3.

    b. Consider safety.

    c. Consider cost.

    d. Incorporate appropriate BMPs and guidance as described in TVA's guide for environmental and BMPs (TVA 2017a or most current revision) and current TVA Vegetation Management Guidelines as described in Appendix H.

5. **Prepare appropriate environmental documentation. Determine if the work is within the parameters of the PEIS (2019).**

    a. If yes, determine if work is covered under an existing Categorical Exclusion or EA.

    b. If not, conduct further environmental review if anticipated impacts are substantially different from those evaluated in the PEIS.

    c. Monitor to determine whether follow-up treatments or mitigation measures are necessary.

6. **Determine appropriate debris management method and re-vegetation method if required.**
    a. Determine whether reseeding is necessary or appropriate under the circumstances.
    b. Determine appropriate debris management method considering Steps 1 through 3 above.
7. **Determine re-inspection requirements.**
    a. Determine steps needed to evaluate whether vegetation treatments and/or mitigation measures are working properly and to ensure that other resources are not being adversely affected.
    b. Monitor to determine whether follow-up treatments or mitigation measures are necessary.

2.2.2 TVA's Integrated Sensitive Area Review Process

The types of sensitive resources occurring in or near the ROW vary widely and include threatened and endangered plant and animal species, caves, heron/osprey rookeries, natural areas, and wetlands. To protect sensitive resources on transmission line ROWs, TVA developed the O-SAR process as an integral component of all of its vegetation management practices. The OSAR process is used to address routine vegetation maintenance activities and is discussed in greater detail in TVA's PEIS (2019).

As part of the O-SAR process, qualified biologists perform reviews of the entire transmission system every 3 years. These desktop reviews use computer-based mapping programs and a wide array of digital data, in lieu of field surveys, to ascertain where sensitive resources may occur on TVA ROWs. Field verified data is added to the O-SAR data, if and when it becomes available. Sensitive resources identified as part of the review process are grouped into five general categories (Table 2-1). The more common widely available data sets used in office-level reviews include aerial photography, U.S. Geological Survey topographic maps, National Wetland Inventory (NWI) data, U.S. Environmental Protection Agency (EPA) Level 4 ecoregion maps, and Natural Resource Conservation Service soils maps. TVA's approach is unique in that it uses specific data as part of the O-SAR review that includes both transmission line/structure locations coupled with TVA's extensive Regional Natural Heritage database. This is a "living[1]" database that contains over 30,000 occurrence records for protected plants, animals, caves, heronries, eagle nests, and natural areas for the entire TVA study area.

[1] TVA adds records based on field survey findings, and TVA's Regional Natural Heritage database is periodically synced with both the USFWS federal listing of threatened and endangered species and state Natural Heritage programs.

Table 2-1. Elements of TVA's Office-Level Sensitive Area Review Database

Sensitive Resource Categories	Data Descriptions
Plants	Locations (documented or potential) of federally or state-listed plant species or unique plant communities.
Aquatic Animals	Locations (documented or potential) of federally or state-listed aquatic animal species.
Terrestrial Animals	Locations (documented or potential) of federally or state-listed terrestrial animal species, bald eagle nests, caves, heron rookeries, osprey nests, Indiana/northern long-eared bat habitat, and other unique resources.
Natural Areas	Locations of federal, state, local, or non-profit lands managed for ecological and/or recreational purposes. A few examples include National Parks, Federally Designated Critical Habitat, Tennessee Designated Natural Areas, state Wildlife Management Areas, and land trust properties.
Wetlands	Includes NWI wetlands; potential wetlands identified by TVA using topographic features, water bodies, soils boundaries, and proximity to NWI; and field verified wetlands delineated during TVA field surveys of transmission line ROW.

Sensitive resources identified within the O-SAR database are defined as polygons and assigned a "Class" level with specific guidance governing ROW vegetation management planning efforts. Sensitive area class definitions for vegetation management activities are provided in Appendix H. The guidance that arises from the O-SAR database Class assignment may be informational or prescriptive, and may result in limitations of particular vegetation control tools, requirements for notification to TVA biologists, and/or the need for site-specific field surveys to be performed by TVA biologists prior to work activities. This Class assignment guidance constitutes an important aspect of the implementation of BMPs to minimize environmental impact. The guidance is particularly important to clearly define what vegetation maintenance activities are permissible within sensitive areas, taking into account the specific sensitive resources that occur or might occur on a given section of ROW. It also seeks to give certainty and flexibility to TVA ROW personnel, who develop vegetation control activities over large areas under schedule and budget constraints. On lands managed by NPS and USFS, additional reviews by appropriate agency staff is required prior to the implementation of vegetation management practices. Among other things, the need for additional review will be determined by TVA's respective property rights and/or any effective agreements. For instance, some NPS parcels on ROW may not have any chance of threatened or endangered plants or animals, but herbicide use is still not allowed because of specific guidance per the land manager. For ROWs located within the Great Smoky Mountains NPS, TVA has been granted an IVM Special Use Permit that will allow for herbicide application.

2.2.3 Programmatic Agreements and Consultations

TVA's formulation of vegetation management alternatives also integrates the content of PAs and consultations developed and executed in coordination with other federal and state agencies. TVA uses these program-level, regulatory-based determinations to avoid or minimize adverse effects of TVA actions.

As described in Section 1.6, and in accordance with Section 7 of the ESA, TVA consulted with the USFWS to assess, on a programmatic basis, the impact of 10 overarching TVA routine actions on four federally listed bat species (gray bat, Indiana bat, northern long-eared bat, Virginia big-eared bat) and their habitats. As part of this effort, TVA prepared a programmatic BA, which was submitted to USFWS on June 18, 2017. Within the BA, TVA analyzed the effects of 96 routine activities associated with the 10 routine actions. One of the routine actions was maintenance of existing electric transmission assets, which included vegetation management activities along transmission line ROWs.

TVA determined that 21 of the 96 activities will have no effect on Indiana bat or northern long-eared bat; 72 activities may affect, but are not likely to adversely affect these two species; and three activities are likely to adversely affect these two species. Potential adverse effects to Indiana bat and northern long-eared bat could result from tree removal (two of three activities) or prescribed fire (one of three activities). Of these, tree removal is identified as an activity that can occur during vegetation maintenance activities. The use of prescribed fire is limited to portions of TVA Reservoir Lands and would not be used during vegetation maintenance activities. TVA also determined that 21 activities covered under the programmatic BA will have no effect on gray bat or Virginia big-eared bat, and 75 activities may affect, but are not likely to adversely affect these two species.

As a component of the BA, TVA committed to implementing conservation measures to avoid and minimize impacts associated with routine actions, as well as to continue conducting conservation measures that may benefit or promote the recovery of the Indiana bat, northern long-eared bat, gray bat, and Virginia big-eared bat.

In response to TVA's programmatic BA on bats and routine actions, the USFWS prepared a programmatic Biological Opinion, concurring with TVA's "effects determinations" and proposed conservation measures. This programmatic consultation was completed in April 2018, and it will be carried out over a 20-year term. Documentation of this consultation including the USFWS Biological Opinion is included Appendix B.

TVA also consulted with the USFWS to assess the impacts of routine activities associated with TVA's transmission system ROW vegetation management program on all species listed under the ESA (other than the four federally listed bat species addressed in the programmatic consultation) with potential to occur in the study area. This consultation was completed and the USFWS issued a Biological Opinion in May 2019 concurring with TVA's effects determinations. The Biological Opinion is included in Appendix C. BMPs and conservation measures developed in conjunction with this consultation to avoid and minimize effects to sensitive species will be integrated into TVA's ROW vegetation management procedures.

TVA also consulted with the Advisory Council on Historic Preservation, the SHPOs of Alabama, Georgia, Kentucky, Mississippi, North Carolina, Tennessee and Virginia (respectively), and all federally recognized Indian tribes with an interest in the region for existing TVA operation and maintenance activities, including vegetation management. Pursuant to Section 106 of the NHPA this consultation was completed in February 2020 (see Appendix D).

2.3 Comparison of Alternatives

The environmental impacts of each alternative under consideration are summarized in Table 2-2. These summaries are derived from the information and analyses vegetation maintenance methods provided in the Affected Environment and Environmental Consequences sections for each resource in Chapter 3 and/or in TVA's PEIS for resource issues that were determined to be minor, short-term, temporary, negligible, and/or none (TVA 2019).

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

No Action Alternative Do Not Perform Vegetation Management	Action Alternative Perform Routine Periodic Vegetation Management
Reliability	
Increased risk of non-compliance with reliability standards.	Enhances compliance with reliability standards.
Vegetation	
No immediate change in baseline condition. However, continued growth of vegetation would change species composition from an herbaceous community to a more shrub/scrub community, and possibly over time changing to one with more wooded/forested species.	Impact to vegetation would be short-term as the areas have undergone routine, vegetation management to be maintained as a low-growing herbaceous community.
Wildlife	
No immediate change in baseline condition. However, continued growth of vegetation would change species composition over time.	Potential impacts would be negligible as the vegetation has already been routinely managed supporting an herbaceous community.
Aquatic Biology	
No change in baseline condition.	Potential short-term and long-term impacts associated with sedimentation during ROW vegetation management. Impact to aquatic biota avoided or minimized through the use of TVA's O-SAR process and adherence to avoidance and minimization measures and BMPs.
Threatened and Endangered Species	
No change in baseline condition. Impact to threatened and endangered species would be minimized through the use of TVA's O-SAR process and adherence to avoidance and minimization measures in the TVA's ESA consultations and applicable BMPs.	Potential short-term and long-term impacts to threatened and endangered species/habitats as a result of vegetation management. Impacts would be minimized through the use of TVA's O-SAR process and adherence to avoidance and minimization measures in TVA's ESA consultations and applicable BMPs.
Surface Water[1]	
No change in baseline condition.	Potential impacts associated with runoff and sedimentation during vegetation management. Impacts avoided or minimized through the use of TVA's O-SAR process and adherence to avoidance and minimization measures and BMPs.
Wetlands	
No change in baseline condition.	Potential indirect, minor impacts associated with sedimentation during floor vegetation management. Impact minimized through the use of TVA's O-SAR process and adherence to mitigation measures and BMPs.

No Action Alternative Do Not Perform Vegetation Management	Action Alternative Perform Routine Periodic Vegetation Management
Natural and Managed Areas	
No change in baseline condition.	No change in baseline condition. Impact minimized through the use of TVA's O-SAR process and adherence to mitigation measures and BMPs.
Parks[1]	
No change in baseline condition.	No change in baseline condition.
Cultural Resources	
No change in baseline condition.	Provides flexibility in the improvement and management of visual quality of historic properties. In limited cases where impacts exist during ROW vegetation management, those impacts would be minimized through adherence to BMPs and Section 106 or program alternative, such as the PA, where applicable.
Floodplains[1]	
No change in baseline condition.	Potential for floodplain impacts would be minimized by BMPs such that the impact of debris management on floodplains and flow alteration would be minor.
Geology, Groundwater and Soils[1]	
No change in baseline condition.	Increased, albeit limited, potential for soil disturbance and erosion in the long-term as a result of ROW vegetation management. Impacts would be avoided/minimized through adherence to avoidance and minimization measures and BMPs.
Land Use and Prime Farmland[1]	
No impact.	No impact to prime farmland. Minor potential impact to land use during vegetation management would be avoided or minimized through adherence to BMPs.
Visual Resources[1]	
No change in baseline condition.	Temporary, short-term impact during ROW vegetation management as the ROW would be managed to a meadow-like state.
Health and Safety[1]	
Short- and long-term safety diminished for those who are working due to risks associated with manual processes required for individual tree removals.	Enhanced worker safety in the long-term by controlled vegetation management but safety enhancement is slightly less because some compatible trees would remain.
Public Health and Safety would be at increasing risk due to the increased numbers of violations of vegetation clearances in the transmission system and the decrease in system reliability.	Enhanced property owner safety and public health and safety due to TVA controlled vegetation management and reliability of the transmission system.
Solid and Hazardous Waste[1]	
No change in baseline condition in the short-term as initially there would be less need for tree removal. But in the long-term there would be an ever-increasing volume of trees that would be identified as risks.	Temporary, short-term impact during ROW vegetation management as the ROW would be managed to a meadow-like state.

No Action Alternative Do Not Perform Vegetation Management	Action Alternative Perform Routine Periodic Vegetation Management
Transportation[1]	
No change in baseline condition.	Impacts to transportation during ROW vegetation management would be negligible.
Air Quality and Climate Change[1]	
No change in baseline condition.	Temporary, short-term increased impacts during ROW vegetation management.
Noise[1]	
No change in baseline condition.	Temporary, short-term increased impacts during ROW vegetation management.
Socioeconomics & Environmental Justice[1]	
No impact.	No impact.
Cumulative Effects	
No change in baseline condition.	Incremental benefits to habitat are negligible given the context of the study area.

[1] TVA previously determined potential effects to this resource would be minor, short-term, temporary, negligible, and/or none as a result of routine vegetation management activities (TVA 2019).

2.4 Summary of Mitigation Measures

Mitigation measures identified in Chapter 3 to avoid, minimize, or reduce adverse impacts to the environment are summarized below. Any additional project-specific mitigation measures, such as avoiding areas identified from desktop reviews as having a high probability of any sensitive resources, have been identified on a site-specific basis and are provided in Section 3.9.

No change in baseline condition in the short-term as initially there would be less need for tree removal. But in the long-term there would be an ever-increasing volume of trees that would be identified as risks.

TVA has prepared comprehensive standard BMPs that represent mitigation measures that are effective in avoiding, minimizing, rectifying and compensating for effects of vegetation management activities. These BMPs are detailed in TVA's guide for environmental and best management practices (TVA 2017a). Topics addressed in this manual include the following:

- BMPs for Construction and Maintenance Activities including Vegetation Management.
- Sensitive Resources and Buffer Zones.
- Structural Controls, Standards and Specifications.
- Seeding/Stabilization Techniques.
- Practices and procedures are provided that directly relate to the vegetation management activities including initial woody vegetation removal, good housekeeping, waste disposal, herbicide use, and storm water discharge management.
- Integration of TVA's O-SAR process as described in Section 2.2.2.

2.5 TVA's Preferred Alternative

TVA's preferred alternative is Alternative B, the Action Alternative – Perform Routine Vegetation Management which would include removal of trees that are deemed a risk to the transmission system. This alternative is considered to provide the best balance in enhancing system reliability and safety, minimization of environmental impacts, and striving for cost effectiveness.

Vegetation management under this alternative would be accomplished with an IVM approach to promote the establishment of low-growing herbaceous plant communities compatible with the safe and reliable operation of the transmission system. TVA would also use an approach that is condition based for identification and removal of incompatible vegetation and danger trees that would use LiDAR and other assessment techniques.

Routine vegetation maintenance would include identification and removal of vegetation within the ROW that is incompatible with TVA's desired end-state condition. Within lands primarily managed by TVA, floor work would occur on previously cleared and routinely maintained ROW resulting in an end-state consisting of a mix of herbaceous and low-growing shrub species. This vegetation community is more compatible with a transmission system and over time is expected to minimize intensity of maintaining the floor.

Under Alternative B there would be greater coordination and interaction with local landowners to identify compatible vegetation than with the No Action Alternative. Although TVA would need to remove trees identified as a risk to the transmission system, TVA would work with local property owners, when requested, to evaluate the compatibility of vegetation within or near the ROW. Vegetation compatible with the safe and reliable operation of the transmission system may be allowed to remain within the ROW. Relative to the No Action Alternative, this alternative would enhance compliance with reliability standards.

Impacts associated with this alternative primarily include temporary short-term impacts during vegetation maintenance activities to most natural resources. Because vegetation removal activities would be conducted within previously established ROW, the overall effect on vegetation is considered to be moderate as the routine maintenance of vegetation would not destabilize the general plant communities within the study area. Long-term impacts of this management alternative are related to the repeated cyclic disturbance within the ROW.

The effects of Alternative B include both short-term and long-term impacts; however, sound planning and the incorporation of TVA's O-SAR process and other BMP measures would avoid and minimize long-term impacts. Alternative B provides benefits in terms of habitat quality and management intensity based on the desired end-state.

Impacts on factors related to the human environment (land use, socioeconomics, air, noise, cultural resources, solid/hazardous waste, public and worker safety, etc.) are generally considered to be localized and temporary. This alternative keeps incompatible vegetation away from transmission lines, reducing the likelihood of devastating, and possibly fatal, wildfires. Consequently, this alternative reduces the risk to homeowners' safety.

CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter provides a description of the potentially affected environmental resources in the study area and the general impacts of vegetation control. The descriptions below of the potentially affected environment are based on published and unpublished reports, the use of TVA's O-SAR process and on personal communications with resource experts. This information establishes the baseline conditions against which TVA decision makers and the public can compare the potential effects of implementing the alternatives under consideration.

The analysis of potential effects to endangered and threatened species and their habitats included records of occurrence within a three-mile radius for terrestrial animals, a five-mile radius for plants, and within 10-digit hydrologic unit code[2] (HUC) watershed for aquatic animals. The analysis of potential effects to aquatic resources included the local watershed, but was focused on watercourses within or immediately adjacent to the proposed ROW and associated temporary access roads. The analysis of potential wetland presence was conducted at the ecoregion level (Level III, Omnerick 1987). Because wetland habitat and extent can vary across ecoregions, wetlands are discussed relative to typical wetland resources by ecoregion. The area of potential effect (APE) for architectural resources included all areas within a 0.5-mile radius from the proposed TL route, as well as any areas where the project would alter existing topography or vegetation in view of a historic resource. The APE with respect to archaeological resources included the entire ROW width for the transmission line segments and the associated temporary access roads.

3.1 Vegetation

3.1.1 Affected Environment

The twelve sectors TVA uses to organize ROW vegetation management activities intersect nine distinct Level III ecoregions (Omernik 1987). The ecoregions support a diverse array of plant communities including deciduous, mixed evergreen-deciduous, and evergreen forest, as well as herbaceous vegetation (see Figure 3-1). Many types of specific plant communities occur throughout the TVA power service area including bottomland hardwood, mixed mesophytic, upland oak-hickory, and swamp forests along with an array of herbaceous communities (TVA 2019).

Specific plant communities located on and adjacent to TVA transmission line ROW vary greatly across the TVA power service area. Plant communities can range from highly disturbed, early successional habitats dominated by invasive species, to rich, diverse herbaceous communities that possess landscape level conservation importance. The relative quality of plant habitats found in any given ROW depends on a multitude of factors, including many that are unrelated to vegetation management decisions implemented by TVA. Factors outside of TVA control that influence plant communities include land use (previous and current), geology, landscape position, soil texture, depth to bedrock, aspect, and rainfall.

[2] The United States is divided and subdivided to into hydrologic units by the U. S. Geological Survey. There are six levels of classification. A 10-digit HUC is the fifth (watershed) level of classification.

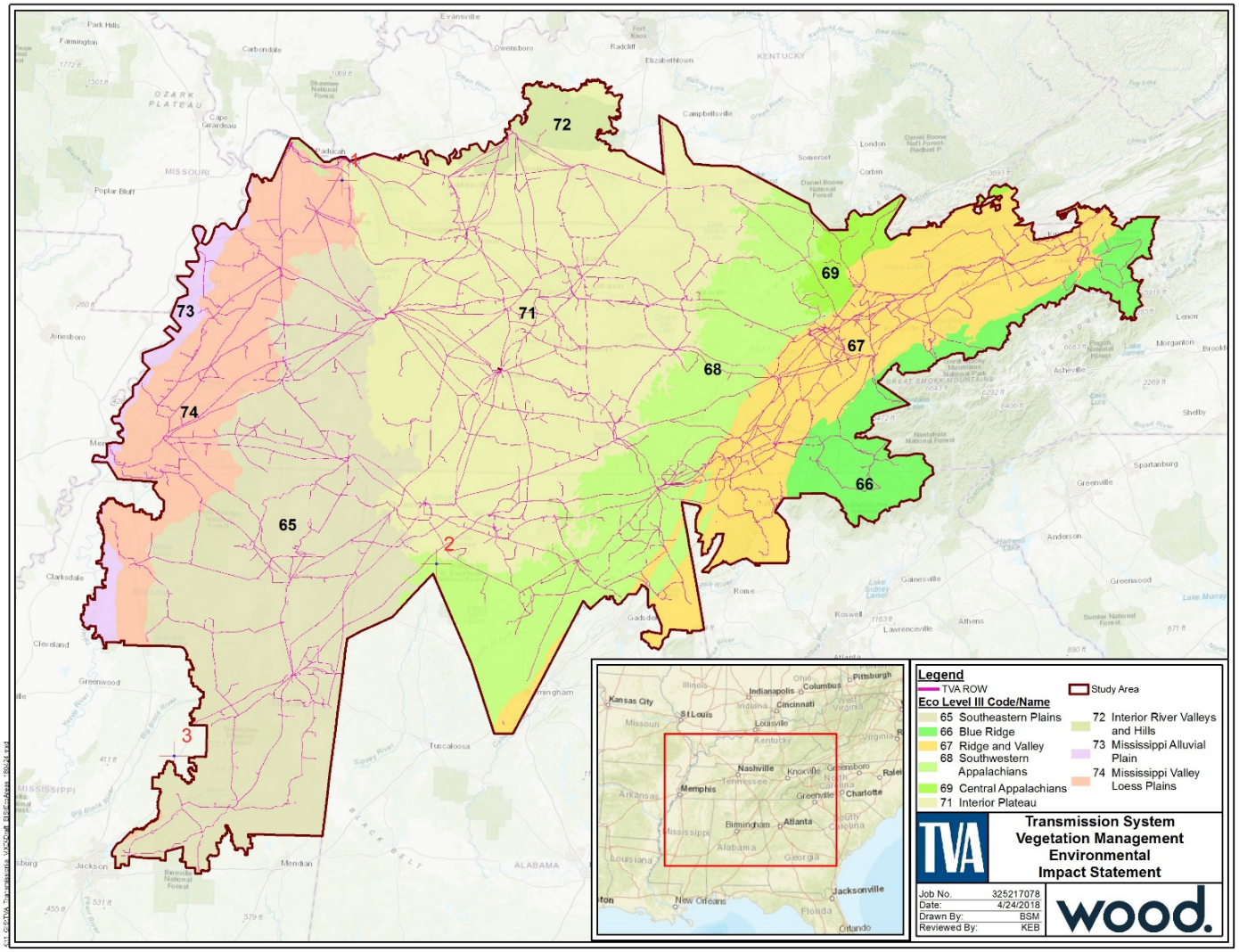


Figure 3-1. Level III Ecoregions within the TVA Study Area

Many plant communities within and adjacent to TVA ROW are heavily disturbed and dominated by weedy species found most often in pastures, lawns, and developed areas. However, there are also habitats that intersect the TVA transmission system that have regional conservation significance. Many of these communities are rare, restricted to very small geographic areas and/or are threatened by human activities. Examples include glades, prairies, barrens, marshes, bogs, fens, and seeps. A few generations ago, native grassland habitats were relatively abundant in portions of the southeastern U.S.; today they are rare (Noss 2013). Reasons for this decline in intact grasslands are many, but growth in agriculture, residential and commercial development, fire suppression, and colonization by invasive species are primary factors. As a result, a subset of maintained transmission line ROWs represent some of the only relatively intact grasslands remaining on the landscape. Approximately 20 globally rare herbaceous communities, as defined by NatureServe, have the potential to occur within TVA transmission line ROWs (TVA 2019). Within the TVA ROW sectors where vegetation management would occur in FY22 and FY23, important grassland habitat is most likely to occur in the Inner Nashville Basin of central Tennessee, the Eastern Highland Rim of Tennessee and northern Alabama, the Cumberland Plateau and Plateau Escarpment in Alabama, Kentucky and Tennessee, Blackland Prairie in Mississippi, Southern Table Plateau on Lookout and Sand Mountain in Alabama and Georgia, the Crawford-Mammoth Cave Uplands and adjacent Western Pennyroyal Karst Plain in Kentucky, and small portions of the Ridge and Valley in Tennessee and Alabama.

Invasive plants are well-established and wide-spread throughout the TVA power service area. While not well-established in most of the high-quality grassland habitat, these species are abundant across many TVA ROWs, including those slated for vegetation management activities in FY22 and FY23. EO 13112 Invasive Species (February 3, 1999) directed TVA and other federal agencies to prevent the introduction of invasive species (both plants and animals), control their populations, restore invaded ecosystems and take other related actions. EO 13751 issued on December 8, 2016, amends EO 13112 and directs actions by federal agencies to continue coordinated federal prevention and control efforts related to invasive species.

The relative proportion of invasive species on any given ROW is often determined by factors outside of TVA control. For example, the prior and current ROW land use can have a material effect on the potential for invasive species to gain a competitive advantage over native species. Land uses, including high intensity grazing, agriculture, and residential or commercial development, severely degrade natural communities. TVA vegetation management activities along ROW, as well as the ROW in general, serve as both vectors for invasive species and refugia for rare grassland communities and species.

3.1.2 Environmental Consequences for Vegetation

Localized herbicide application and mowing are the vegetation management tools that would be used most frequently in FY22 and FY23 to clear vegetation on the floor of the open ROW. Other Manual, Mechanical, and Herbicide Application Methods, along with Debris Management and Restoration activities, occur very infrequently or do not have the potential to affect vegetation on a meaningful scale (TVA 2019). Tree clearing along the ROW margins would result in a negligible overall change to plant habitats present on the landscape.

Localized applications of herbicide would result in some level of off-target impact. In situations where the woody stem count is high on a given ROW, even localized application of herbicides could produce substantial impacts to non-target species. However, these areas of high woody stem count would be unlikely to support high-quality herbaceous habitats, usually because of site-specific conditions unrelated to TVA vegetation management (i.e., owner land use, soil type, landscape position, etc.). In drier transmission line ROW areas with rocky or sandy soils, where woody stem count is inherently lower, localized herbicide application could foster herbaceous plant communities that are rare on the landscape. These important plant habitats may be globally rare or just relatively diverse herbaceous communities, with limited distribution remaining in the southeastern U.S.

Mowing would remove nearly all woody stems; however, the amount of re-growth can be rapid depending on conditions on the ground. For example, in drier areas with sandy or rocky soils, the rate of tree establishment and growth is relatively slow. In this case mowing can help to maintain high quality native plant communities. However, in all but the driest habitats in the eastern U.S., tree invasion is rapid, and woody plants quickly replace herbaceous species. In addition, repeated mowing of transmission line ROW encourages stump resprouting (sucker growth) and promotes dense stands of woody species. This is particularly problematic in wetlands or on sites with rich soils. Using mowing alone, or as the primary mechanism for vegetation removal on ROWs, would reduce species diversity and encourage the dominance of woody plants able to proliferate through root resprouting.

TVA uses the O-SAR process (see Section 2.2.2) to avoid impacts to important plant habitats within ROWs by limiting the use of the most damaging methods in areas likely to contain grasslands dominated by native plant species. Broadcast and aerial herbicide is restricted on about 17 percent (about 41,000 acres) of TVA transmission line ROW that are likely to contain important habitat. Manual, mechanical, and localized herbicide methods can be used in these areas. These methods likely serve to perpetuate important herbaceous habitats found in the ROW by eliminating trees that rapidly encroach into open areas without appropriate disturbance. Slightly less than 1 percent (about 2,000 acres) of TVA ROW is known to contain rare plant habitats. These areas are denoted in the O-SAR database, and when vegetation maintenance is scheduled to occur in such locations, TVA biologists and operations staff would work together to ensure the habitats are protected. Sometimes the proposed work would not affect the plant communities found within the ROW. Other times operations staff augments the timing or method of proposed work to protect sensitive resources. For proposed work planned during FY22 and FY23, the TVA botanist would coordinate individually with every ROW for all sites in each sector that contain documented rare plant habitat. This would ensure that the most potentially damaging tools, like broadcast herbicide, would not be used in ROW supporting important grassland habitats and that the proposed FY22 and FY23 vegetation management activities would not have significant impacts on terrestrial plant ecology of the region.

3.2 Wildlife

3.2.1 Affected Environment

The proposed study area includes segments of ROW within each of the twelve managed ROW sectors across the TVA Region. The Affected Environment for this EA has previously been described in the Transmission System Vegetation Management PEIS (TVA 2019). Wildlife habitat within and around the segments proposed for maintenance in FY22 and FY23 ranges in quality. Low-quality habitat includes maintained lawns near residential and industrial areas as well as disturbed forest fragments around power-generating facilities.

Moderate-quality habitat consists of early successional and herbaceous communities within and along transmission line ROWs bordered by forest edges (edge habitats). Higher-quality habitat include contiguous blocks of forest along reservoir shorelines. Important habitats found within and along transmission line ROWs include riparian corridors, bluffs, swamps, grasslands, rivers and associated stream tributaries, reservoirs, islands, larger un-fragmented forested landscapes, and karst (cave) habitats.

Transmission line ROW corridors are typically dominated by open herbaceous habitats. Undeveloped open lands are comprised of cultivated fields, hayland/pasture, shrub/scrub, and other non-forested cover types. Secondary growth or young trees that have grown up since that last maintenance cycle that are scattered in otherwise open herbaceous habitats within the ROW may occur in sections of ROW that are needing maintenance. Mature forested habitat may be present in ROWs under lines that span valleys or steep mountain sides. Riparian and wetland habitats within and near TVA transmission line ROW corridors are associated with stream valleys, depressional areas, reservoir systems and areas with localized groundwater discharge. Coupled with unique features such as vernal pools, oxbows, bluffs and islands, these areas provide a diverse array of nesting and foraging habitats for wildlife (TVA 2011a). Birds, mammals, reptiles, amphibians, and pollinators that are commonly found in these areas have been described in the PEIS (TVA 2019).

Review of the TVA Regional Natural Heritage database in April 2021 indicated that 12 bald eagle nests, 14 caves, 14 heronries, and 416 osprey nests are known to occur within 50 feet of the ROWs proposed for maintenance in FY22 and FY23. There are a total of 84 caves within 200 feet of these ROWs and 29 bald eagle nests, 750 osprey nests, and 21 heronries within 660 feet of these ROWs (See Table 3-1).

Table 3-1. Total Number of Terrestrial Animal Resources from (A) Within 50 feet of TVA ROW or (B) Where O-SAR Restrictions Overlap TVA ROW Vegetation Management Proposed in Fiscal Years 2022 and 20231

TVA Right-of-Way Vegetation Management Sectors	Terrestrial Animal Federally and State-listed Species							
	Caves		Osprey		Heronries		Bald Eagle	
	A	B	A	B	A	B	A	B
Cleveland	2	4	22	45	4	3	0	0
Centerville	1	4	32	62	0	0	0	0
Hopkinsville	1	3	40	61	0	0	2	4
Hickory Valley	0	0	69	84	0	0	0	0
Manchester	3	13	13	32	2	2	0	2
Madison	5	15	92	163	0	4	6	11
Milan	0	0	43	62	0	1	0	0
Muscle Shoals	0	5	6	19	1	1	3	3
Morristown	0	20	18	24	1	1	1	6
Nashville	0	10	44	127	2	2	0	0
Oak Ridge	2	10	32	68	3	5	0	3
West Point	0	0	2	3	1	2	0	0

[1] Source: TVA Regional Natural Heritage Database, queried April 2021.

A few bald eagle nests occur on transmission line structures themselves. These large nests are typically built on the highest crossbeam of the tower. However, the majority of nests known from within 660 feet of TVA transmission lines are in trees adjacent to the transmission line ROW. Eagle nest records in the TVA Regional Natural Heritage database include those recently used as well as those that haven't been used in a decade or more. This is because eagle nests themselves receive protections whether or not occupied.

The majority of the osprey nests documented in Table 3-1 are located on transmission towers and are thus directly in the middle of the ROWs. While osprey can and do build nests anywhere on the tower with a suitable platform, the majority of them are built on the highest crossbeam of the towers putting the nests approximately 70 to 100 feet off the ground where vegetation management actions would occur.

Herons located on tower structures tend to build nests in the lower sections of the towers where beams intersect. Therefore, they are typically closer to the ground where vegetation management could occur. The remainder of heronries are in trees within 660 feet of the ROW proposed for maintenance.

Review of the Information for Planning and Consultation (IPaC) database on USFWS's website in April 2021 resulted in the identification of 37 migratory bird species of conservation concern that have the potential to occur in the Study Area. Of these species, only 13 have the potential to occur in the action area during migration (American golden plover, bobolink, dunlin, lesser yellowlegs, marbled godwit, Nelson's sparrow, red-throated loon, ruddy turnstone, semipalmated sandpiper, short-billed dowitcher, swallow-tailed kite, willet, yellow rail). Six others are only found in the action areas during winter or migration (LeConte's sparrow, long-eared owl, northern saw-whet owl, rusty blackbird, Smith's longspur, yellow-bellied sapsucker). Eighteen species could be in the action area during the breeding season: American kestrel, Bachman's sparrow (uncommon breeders in the area), bald eagle, black-billed cuckoo (uncommon breeders in the area), blue-winged warbler, Canada warbler, cerulean warbler (uncommon breeders in the area), eastern whip-poor-will, golden eagle, golden-winged warbler (uncommon breeders in the area), Henslow's sparrow (uncommon breeders in the area), Kentucky warbler, king rail, least tern, prairie warbler, prothonotary warbler, red-headed woodpecker, and wood thrush (Table 3-2).

Table 3-2. Migratory Birds of Conservation Concern with Potential to Occur within 50 feet of ROW Proposed for Vegetation Management in Fiscal Years 2022 and/or 2023[1]

Species	CL[2]	CV	HK	HV	MC	MD	ML	MS	MT	NA	OR	WP
American Golden Plover							X					X
American Kestrel		X	X	X			X	X				X
Bachman's Sparrow		X	X									X
Bald Eagle	X	X	X	X	X	X	X	X	X	X	X	X
Black-billed Cuckoo					X	X		X	X		X	
Black-capped Chickadee									X			
Blue-winged Warbler	X	X	X	X	X	X	X	X		X	X	
Bobolink					X	X		X	X		X	
Canada Warbler					X	X		X	X		X	
Cerulean Warbler	X	X	X	X	X	X	X	X	X	X	X	X
Dunlin		X	X	X			X	X				X
Eastern Whip-poor-will	X	X	X	X	X	X	X	X	X	X	X	X
Golden Eagle	X	X	X		X	X	X	X	X		X	

Species	CL[2]	CV	HK	HV	MC	MD	ML	MS	MT	NA	OR	WP
Golden-winged Warbler					X	X		X	X		X	
Henslow's Sparrow	X	X	X	X	X				X	X	X	
Kentucky Warbler	X	X	X	X	X	X	X	X	X	X	X	X
King Rail						X		X				X
LeConte's Sparrow	X	X	X		X	X	X	X				X
Long-eared Owl									X			
Least Tern		X	X	X			X	X				
Lesser Yellowlegs	X	X	X	X	X	X	X	X		X	X	X
Marbled Godwit							X	X				X
Nelson's Sparrow		X	X									
Northern Saw-whet Owl									X			
Prairie Warbler	X	X	X	X	X	X	X	X	X	X	X	X
Prothonotary Warbler		X	X	X			X	X				X
Red-headed Woodpecker	X	X	X	X	X	X	X	X	X	X	X	X
Red-throated Loon			X	X			X	X				X
Ruddy Turnstone			X									
Rusty Blackbird	X	X	X	X	X	X	X	X	X	X	X	X
Semipalmated Sandpiper	X	X	X	X	X	X	X	X		X	X	X
Short-billed Dowitcher		X	X				X	X				X
Smith's longspur			X			X	X					
Swallow-tailed Kite			X				X					X
Willet		X	X	X			X	X				
Wood Thrush	X	X	X	X	X	X	X	X	X	X	X	X
Yellow-belled Sapsucker					X	X		X	X		X	
Yellow Rail			X	X								X

[1] Source: TVA Natural Heritage Database, queried April 2021
[2] ROW Sector Abbreviations: CL = Cleveland, CV = Centerville, HK = Hopkinsville, HV = Hickory Valley, MC = Manchester, MD = Madison, ML = Milan, MS = Muscle Shoals, MT = Morristown, NA = Nashville, OR = Oak Ridge, WP = West Point

3.2.2 Environmental Consequences for Wildlife

Each method of vegetation control that may be used during FY22 and FY23 vegetation management activities has the potential to impact wildlife species and their habitats directly and indirectly. A more thorough impact analysis of each vegetative control method on wildlife can be found in TVA's Transmission System Vegetation Management PEIS (TVA 2019). A summary is provided in Appendix J. Manual control methods typically have a greater potential for disturbance than herbicide applications. Mowing, chainsaws, soil/ground disturbance due to machinery and heavy equipment could directly impact species in the path of the machinery by loss of life should they be unable to flee from the vegetation or borrows in the ground being impacted. Increased levels of noise could also stress nearby individuals. Ground disturbance resulting in sedimentation or contamination could impact sensitive cave systems deep underground.

Herbicide application is less damaging to soils when applied in small quantities from backpack mounted sprayers. ROW maintenance activities focus herbicide application to woody species therefore leaving ground cover available for wildlife. This minimizes erosion, sedimentation, and potential damage to nesting and tunneling wildlife. However there is concern over the potential toxicity of the herbicide on non-target organisms (wildlife) and subterranean cave systems. TVA does not typically apply herbicides at the maximum recommended concentration, and low-volume backpack spraying should never reach maximum application rates. All herbicides currently used by TVA have been determined to

be practically non-toxic to slightly toxic to mammals, birds and terrestrial invertebrates (bees) with the exception of Tebuthiuron which was determined to be moderately toxic to mammals. When working near aquatic features, TVA uses EPA-registered herbicides determined to be safe for use near aquatic environments. Again, see TVA's PEIS for more detailed impact analyses (TVA 2019).

TVA has several practices in place that minimize impacts to sensitive wildlife/terrestrial resources. BMPs are used near all regulated aquatic features and include use of mats on wetlands and the use of aquatic approved herbicides (TVA 2017a). TVA also uses the O-SAR process to avoid impacts to important terrestrial animals and their habitats by limiting the use of certain practices all together or during sensitive times of year. Each ROW proposed for FY22 and FY23 vegetation management has several O-SAR buffers zones that touch the ROW. These buffers modify TVA ROW vegetation management actions such that impacts to sensitive resources are minimized.

The following O-SAR buffers would be applied near sensitive wildlife resources associated with the FY22 and FY23 vegetation management actions:

- Cave - 200 feet - No herbicide use within 200 feet of cave due to potentially sensitive subterranean aquatic resources. Hand clearing or small machinery clearing only (i.e.: chainsaws, brush hog, mowers). Vehicles and equipment confined to existing access roads. Avoid entering cave.
- Osprey nest - 660 feet - Either 1) Assume presence. No broadcast spraying. Only use brush hogs or mowers for vegetation removal or selective herbicide spraying between March 1 and July 31 within 660 feet of nest site; OR 2) Request seasonal field survey to determine if nest is active.
- Heronry - 660 feet - Either 1) Assume presence. No broadcast spraying. Only use brush hogs or mowers for vegetation removal or selective herbicide spraying between February 1 and July 15 within 660 feet of nest site; OR 2) Request seasonal field survey to determine if nests are active.
- Bald Eagle nest - 660 feet - Either 1) Assume presence. No disturbance, spraying, or vegetation clearing would occur between December 1 and July 1 within 660 feet of nest site; OR 2) Request seasonal field survey to determine if nest is active.
- In rare instances in which restricted actions need to take place while osprey or heron nests are active, TVA would coordinate with U.S. Department of Agriculture Wildlife Services (USDA-WS) to ensure any actions comply with the conditions specified under USDA's "Take" permit.

Migratory bird species (other than osprey, herons, and bald eagles addressed above) also have the potential to be impacted by the proposed actions. While the USFWS IPaC database identified 37 species as having the potential to occur in the action area (USFWS 2021), 13 of those species are only likely to be found in the action area during migration (Cornell 2021). Migration stopovers are typically used on a short-term basis (one to several days) only in spring and fall. Due to the speed at which ROW vegetation management occurs, there is a low likelihood that these migratory species would be in the action area at the time of maintenance. Many of these migratory species are shorebirds and would be found on mudflats along the edges of lakes and rivers where little vegetative maintenance would be needed and where TVA BMPs would be applied to minimize impacts to the aquatic resources.

Six other species (LeConte's sparrow, long-eared owl, northern saw-whet owl, rusty blackbird, Smith's longspur, yellow-bellied sapsucker) have the potential to occur in the action area during migration and during winter (non-breeding) months. Individuals of these species would be able to flush if disturbed due to their presence in the action area during non-nesting months. The potential to impact owls and sapsuckers roosting in tree cavities would be limited to scattered mature trees along the edges of the ROW and forested habitat. Additional habitat would occur further in interior forested parcels.

Eighteen species could be in the action area during the breeding season when they are more sensitive to disturbance: American kestrel, Bachman's sparrow, bald eagle, black-billed cuckoo, blue-winged warbler, Canada warbler, cerulean warbler, eastern whip-poor-will, golden eagle, golden-winged warbler, Henslow's sparrow, Kentucky warbler, king rail, least tern, prairie warbler, prothonotary warbler, red-headed woodpecker, and wood thrush.

Special precautions are taken around bald eagle nests using the O-SAR process mentioned above and described in Section 2.2.2 and in previous documents (TVA 2019). No nesting golden eagles are known to occur in the action area or immediately surrounding. Therefore, this species likely only has the potential to be affected should it be foraging in ROWs at the time of the proposed actions. Golden eagles are expected to flush when disturbed by noise indicating oncoming vegetation management actions. Least terns nest on sandbars and open areas with little to no vegetation. There is almost no potential for ROW vegetative maintenance to occur in nesting habitat for least tern. As mentioned above Bachman's sparrow, black-billed cuckoo, cerulean warbler, golden-winged warbler, and Henslow's sparrow are uncommon breeders in the proposed action area. Therefore, the potential to impact individuals of these species while they are immobile (i.e. eggs, nestlings) is lower than some of the other species. Several more of these breeding species nest in the interior of forests American kestrel, Canada warbler, cerulean warbler, eastern whip-poor-will, red-headed woodpecker, and wood thrush. Therefore, the potential to impact nests of these species would be confined to the removal of trees at risk to the transmission system in specific locations along the ROW edges should actions occur during nesting months. Those species that nest expanses of herbaceous growth in the ROWs such as Henslow's sparrow and Kentucky warbler would be at greater risk although herbaceous growth is not be the target of proposed actions. Direct impacts to these species could result from movement of machinery through an area. Those species that nest around bodies of water such as king rail and prothonotary warbler could be avoided due to TVAs BMPs around aquatic features. Species that nest on forest edges in shrubs or young trees scattered in fields such as black-billed cuckoo, blue-winged warbler, golden-winged warbler, and prairie warbler have the greatest potential to be impacted by the proposed actions. Woody plant species, on which these species nest, would be the target of the maintenance actions. Should the proposed actions occur during the nesting season, immobile individuals (i.e. eggs, nestlings) could be sprayed with herbicide or have the vegetation removed mechanically. Based on EPA guidelines, no adverse impacts should occur to birds directly sprayed with herbicide while nesting. In addition, proposed vegetative maintenance occurs throughout the year, therefore impacts described above would only occur if these actions occurred during the few months of the year when nesting is occurring. In addition, these types of maintenance actions do not occur every year but rather are on a three-year cycle. Proposed actions are not expected to significantly impact populations of migratory birds. As required under EO 13186 – Responsibilities of Federal Agencies to Protect Migratory Birds, TVA is currently developing a Memorandum of Understanding in coordination with the USFWS, as well as an Avian Protection Plan. In the interim, consistent with EO 13186, TVA implements measures for the conservation of migratory bird populations.

The outcome of these vegetative control methods is a ROW that is dominated by herbaceous species. These types of wildlife habitats would otherwise disappear due to forest regeneration should they be left unmaintained. This type of herbaceous habitat often unavailable anywhere else across the landscape (See Section 3.1.1) and provides habitat for wildlife that is becoming imperiled such as pollinator species and some species of migratory birds. Similarly, areas of ROW with some young woody regrowth provide needed habitats for other species of migratory birds. These habitats are normally ephemeral due to forest regeneration, but ROW vegetation management actions provide the repeated disturbance and sun exposure needed for some of these fast growing woody species to regenerate. Therefore, while impacts could occur to those species using these ROW habitats should they be present during the actions, it is the maintenance actions themselves that allow for the habitat for these species of wildlife to persist in the long-term.

3.3 Aquatic Ecology

3.3.1 Affected Environment

The twelve managed ROW sectors encompass portions of several major watersheds that support high aquatic biotic diversity. Several of these sectors are within the ROWs proposed for maintenance in FY22 and FY23. Tennessee is reported to support approximately 319 fish species, including native and introduced species (Etnier and Starnes 1993) and 132 freshwater mussels (Parmalee and Bogan 1998). The Tennessee and Cumberland rivers have the highest number of endemic fish, mussel, and crayfish species in North America (Schilling and Williams 2002). The other major drainages within the TVA region share a diversity of aquatic life equal to or greater than the Tennessee River drainage (TVA 2015). There are approximately 42,000 miles of perennial streams and 46 TVA managed reservoirs in the study area (TVA 2011b and 2017). Most beneficial uses (as designated by the states) are supported in most water bodies in the study area including for fish and aquatic life support.

Fish species within the twelve sectors are represented by approximately 30 families with the largest being the perch family (more than 90 species), followed by minnows (more than 80 species), catfish (more than 20 species), suckers (21 species), and sunfishes (more than 20 species). The most diverse watershed within the twelve sectors is the Tennessee River watershed with an estimated 205 native species (Etnier and Starnes 1993).

As described in the PEIS, TVA has been monitoring the health of the major reservoirs within the Tennessee River system since 1990 to evaluate the ecological conditions. A multi-metric approach known as the Reservoir Fish Assemblage Index is used to evaluate ecological conditions for fish communities because of their importance in the aquatic food web and because fish life cycles are long enough to integrate conditions over time. Though altered from human activity, main stream reservoirs support healthy fish communities and generally rate good or fair based on attained Reservoir Fish Assemblage Index scores (McDonough and Hickman 1999). The number of species ranged from around 50 to 90 species per reservoir (TVA 2004).

Stream habitats in the study area include very large rivers (e.g., Mississippi and lower Tennessee), large rivers (e.g., lower Cumberland and upper Tennessee), medium rivers (e.g., lower Duck and Clinch), small rivers (e.g., Little, Buffalo), and numerous perennial, intermittent, and ephemeral streams (Meyer et al. 2007). Each of these stream habitat types have a characteristic fish composition with diversity generally increasing downstream along a gradient of increasing stream size, habitat heterogeneity, and habitat availability (Schlosser 1987). Therefore, larger streams and rivers are the most diverse systems in the study area. However, smaller streams (e.g., headwater streams and tributaries) are the most likely to be encountered during TVA vegetation maintenance activities due to their abundance throughout the study area. Smaller streams are characterized by small-bodied species such as small minnows, madtom catfishes, darters, and sculpins (Schlosser 1987). Darter species contribute heavily to the overall fish diversity in headwater streams in the study area with 73 species found in smaller reaches (Meyer et al. 2007). Some fish species found in the study area only use headwater streams for spawning and nursery areas. For example, the federally threatened slackwater darter lives in pools of perennial streams, but it migrates upstream to spawn in “slack water” formed by shallow springs, seeps, or flooded fields that slowly run off into adjacent headwater streams (Etnier and Starnes 1993).

Benthic (bottom dwelling) macroinvertebrate populations typically found in TVA’s reservoir system and non-reservoir aquatic environments are described in the PEIS (TVA 2019). Because benthic macroinvertebrates are relatively immobile, negative impacts to aquatic ecosystems can be detected earlier in benthic macroinvertebrate communities than in fish communities. Benthic invertebrates are a vital part of the food chain of aquatic ecosystems. Benthic invertebrate reservoir communities are strongly affected by seasonal thermal stratification, varying dissolved oxygen concentrations and large water level fluctuations in reservoirs. Poor benthic community ratings are typical of tributary reservoirs. Macroinvertebrate communities of reservoirs are generally low in diversity and comprised of tolerant taxa.

In contrast, benthic macroinvertebrate populations in non-reservoir aquatic environments are often comprised of assemblages that are representative of lotic habitats. Composition and quality of such communities are often correlated with such factors as stream size and placement within the watershed, surrounding land uses and proximity to point source and non-point source discharges. Within rural portions of TVA’s transmission line ROW, smaller streams may be expected to be composed of benthic invertebrates that are less tolerant of low dissolved oxygen levels and representative of a wide range of sub-habitats. For example, higher gradient riffle environments may be expected to support greater abundances of organisms that are clingers or swimmers. Smaller headwater streams within ROW may be dominated by only a few species, though all classes of invertebrates may be found.

Freshwater mussels are excellent indicators of water quality and habitat stability. Mussels provide many other important ecosystem services including filtering large quantities of water. The overall native mussel community has decreased from 42 species to 21 species (four of which invaded post-dam construction) due to loss of flow-sensitive species (Sickel et al. 2007).

Main stream tailwaters, like those off Kentucky Lake, are areas of highest mussel diversity in the regulated TVA system. Remaining riverine mussel species reach greater abundance and diversity in flowing main stream reaches, but their status remains only fair due to overall low diversity, low abundances, and low reproductive success for some species (TVA 2004). Dennis (1984) provided a detailed account of the distribution of mussels by stream size throughout the Tennessee River watershed (see Table I-19 in Dennis 1984). The greatest number of mussels (about 70 percent of species) are found in medium to large streams. Only six species were common to all stream sizes and found throughout the study area including: threeridge, purple wartyback, deertoe, mucket, pocketbook, and kidneyshell.

3.3.2 Environmental Consequences for Aquatic Ecology

Transmission line vegetation management activities have little potential to directly and indirectly affect the aquatic ecology of waterways within the study area, regardless of the methods applied. Potential effects include: ground disturbing activities such as the removal of vegetation that could result in minor and temporary erosion, sedimentation, and increased water temperatures; overspray or spills of non-aquatic rated herbicides into aquatic environments; and leaks of oil or fuel that could alter water quality. However, these impacts are expected to be rare and effects minimal because TVA employs a host of BMPs that are designed to minimize environmental impacts like soil disturbance/erosion, stream bank destabilization, instream deposition of woody debris, damage to instream habitats (vehicle/equipment traffic), and inadvertent discharge of herbicides or other petrochemical to aquatic environments.

Herbicide application has the potential to impact water quality via inadvertent application to stream channels, excess surface runoff, spray drift, and leaching through the soil profile (Annett et al. 2014; Tatum et al. 2017), however, TVA employs standard operating procedures (e.g., label-directed use) and BMPs specifically designed to eliminate these risks. For example, overspray has the highest potential to acutely affect aquatic organisms (Rolando et al. 2017). Algae, microorganisms, macroinvertebrates, amphibians, and fish are affected by exposure to consistently elevated levels of herbicide (Warren et al. 2003; Warrington et al. 2017), but, in the environment, organism exposure would fluctuate due to varying physical and climatic conditions. Field measures for concentration and durations of exposure to herbicides are typically well below standard toxicity endpoints (Scarbrough et al. 2015; Rolando et al. 2017). For example, glyphosate-based herbicides have a low-runoff risk and rapidly dissipate when introduced to aquatic environments (Rolando et al. 2017). Acute and chronic toxicity of herbicides to aquatic organisms is dependent on herbicide type, concentration, exposure time, and varies by species; but, overall risks of aquatic ecosystem exposure to herbicides are low when used within legal label recommendations and applied by trained applicators.

Spot application is intended to use the least amount of herbicide possible to treat individual plants. Similarly, localized herbicide application consists of treating individual or small groupings of plants via basal, low-volume foliar, granular, and bare-ground treatments to minimize any overspray or excess runoff. Heavy rains could carry herbicides (e.g., granular pellets) offsite and into adjacent streams; however, rain would also serve to dilute any excess herbicide and limit any acute or chronic effects (Scarbrough et al. 2015).

Additionally, broadcast application methods using mechanized equipment also have the potential for ground-disturbing impacts (as described above). Inadvertent application to aquatic environments via overspray and drift are most likely with broadcast and aerial application methods. Drift is the airborne movement of herbicides through wind or evaporation to non-target areas. As described in the PEIS (TVA 2019), TVA uses BMPs (i.e., SMZs), prior planning, proper herbicide mixtures, and advanced technologies to reduce or eliminate drift during application. Therefore, herbicide toxicity to aquatic ecosystems is unlikely under TVA's standard procedures.

The O-SAR review process avoids impacts to sensitive aquatic resources within ROWs by limiting the use of methods used within SMZs or unique/ important aquatic habitats. These areas are denoted in the O-SAR database, and when vegetation management is scheduled to occur within these areas, TVA biologists and operations staff work together to ensure the species and/or habitats are protected. For proposed work planned during FY22 and FY23, the TVA biologist would coordinate individually with every ROW for all sites in each sector for every ROW that contains O-SAR aquatic zones. This would ensure that the most potentially damaging tools, like broadcast herbicide, would not be used in these areas and the FY22 and FY23 floor work would not have significant impacts to aquatic ecology.

3.4 Threatened and Endangered Species

The TVA study area provides habitat for numerous species of plants and animals that have declining populations or are otherwise rare and considered to be endangered, threatened, or of special concern at the national and/or state level.

3.4.1 Regulatory Framework for Threatened and Endangered Species

The ESA (16 United States Code [USC] §§ 1531-1543) was passed to conserve the ecosystems upon which threatened and endangered 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 defined as one likely to become endangered within the foreseeable future throughout all or a significant part of its range. Areas known as critical habitats, essential to the conservation of federally listed species, can also be designated under the ESA. The ESA establishes programs to conserve and recover federally listed species and makes their conservation a priority for federal agencies. Under Section 7 of the ESA, federal agencies are required to consider the potential effects of their proposed actions on federally listed species and critical habitats. If the proposed action has the potential to affect these resources, the federal agency is required to consult with the USFWS.

There are laws protecting listed species in all seven states in the study area. In a few states, protection is limited to species listed under the ESA, but in other states, legal protections are extended to additional species designated by the state as endangered, threatened, or other classifications such as "in need of management."

Conservation measures and avoidance and minimization measures identified in the following sections, as well as routine use of BMPs and project planning and environmental review processes, in some cases apply to state-listed species and habitats as well as to federally listed species and habitats. TVA has consulted with USFWS per Section 7(a) (2) of the ESA concerning the potential impacts of routine vegetation maintenance activities to affect federally threatened and endangered species within the study area. This consultation was completed and the USFWS issued a Biological Opinion in May 2019 concurring with TVA's effects determinations (Appendix C). TVA had previously consulted with USFWS on a suite of TVA routine actions on federally listed bats present in the TVA power service area. This consultation was completed in April 2018 (Appendix B).

3.4.2 Threatened and Endangered Species in the TVA Study Area

According to the USFWS IPaC database (USFWS 2017a) and the TVA Regional Natural Heritage database, 168 species listed under the ESA as endangered, threatened, proposed for listing, or candidates for listing have been reported from within the TVA study area. In addition, about 1,350 individual plant and animal species have been formally listed as protected species by one or more of the states, or otherwise identified as a species of conservation concern (TVA 2017b). Additionally, critical habitats for 43 federally listed species are located within the study area (USFWS 2017a; TVA 2019).

Of the nine ecoregions within the TVA power service area, the highest concentrations of terrestrial and aquatic species federally listed under the ESA occur in the Blue Ridge ecoregion (see Figure 3-1). Relatively few listed species occur in the Mississippi Alluvial Plain ecoregion. The taxonomic groups within the power service area with the highest proportion of species listed under the ESA are fish and mollusks. Factors contributing to the high proportions of vulnerable species in these groups include the high number of endemic species within the study area and the alteration of their habitats that increased the risk to these species. River systems with the highest numbers of listed aquatic species include the Tennessee, Cumberland and Coosa rivers (TVA 2015).

Population status trends for federally listed species in the TVA study area are variable (i.e., increasing, stable, or decreasing). For example, populations of a few listed species have increased, primarily because of conservation efforts, to the point where they are no longer listed under the ESA (e.g., bald eagle, peregrine falcon, and Tennessee coneflower). Other species have had their listing status downgraded from endangered to threatened (e.g., snail darter, large-flowered skullcap, and small whorled pogonia) due to increased population estimates and habitat protections. Among the federally listed species with populations that continue to decline are the American hart's tongue fern, Indiana bat, and northern long-eared bat. The formerly common northern long-eared bat recently was federally listed as threatened under the ESA due to dramatic population declines caused by white-nose syndrome. This pathogen was first reported in the TVA study area in 2009, and signs of mortality were first observed in 2011 (Samoray 2011). Population trends of many of the other listed species in the TVA study area are poorly understood.

Many species listed under the ESA occur in the immediate vicinity of the TVA transmission system ROW and could potentially be affected by its vegetation management. A summary of federally and state-listed species occurrences within 50 feet of TVA ROW where FY22 and FY23 planned vegetation management is proposed is provided in Table 3-3. Appendix K includes a report of these federally and state-listed species occurrences identified from the TVA Regional Natural Heritage database.

Table 3-3. Total Number of Federally Listed and State-Protected Species Occurrences Previously Reported from Within 50 feet of TVA ROW Where Vegetation Management is Proposed in Fiscal Years 2022 and 2023[1]

TVA Right-of-Way Vegetation Management Sectors	Federally and State-listed Species				
	Plants	Terrestrial Animals			Aquatic Animals
		Bat	Eagle	Other	
Cleveland	4	2	0	1	11
Centerville	7	0	0	1	1
Hopkinsville	20	8	2	6	0
Hickory Valley	11	0	0	2	6
Manchester	82	2	0	3	3
Madison	60	0	6	2	5
Milan	3	0	0	3	0
Muscle Shoals	20	0	3	0	1
Morristown	4	0	1	0	2
Nashville	33	0	0	5	5
Oak Ridge	20	8	0	4	1
West Point	29	0	0	0	1

[1] Source: TVA Regional Natural Heritage Database, queried April 2021. Tally includes all federally listed and species tracked by individual states.

The major habitats supporting federally listed species in the TVA study area include free-flowing rivers and streams, caves, limestone cedar glades, high elevation areas, shorelines, and bluff/rock outcrops. TVA has taken multiple actions to minimize the adverse effects of vegetation management on federally listed species (e.g., seasonal restrictions on select activities to avoid impacts to federally listed roosting bats and nesting turtles) (TVA 2011a) and has taken steps to conserve listed species occurring in other habitats (TVA 2015).

3.4.3 Affected Environment of Threatened and Endangered Species

3.4.3.1 Plants

An April 2021 review of the TVA Regional Natural Heritage database indicated that 16 occurrences of 7 federally listed plants and 277 occurrence of 133 state-listed plants are known to occur within 50 feet of the TVA transmission line ROWs proposed for vegetation management during FY22 and FY23 (Table 3-3). A complete list of species known to be present within and immediately adjacent to TVA transmission line ROWs is found in Appendix K. TVA records known locations of these species so vegetation management activities can be planned in a manner to avoid and/or minimize impacts in those areas. There are about 2,500 documented or potential sites for federally or state-listed plant species recorded in the O-SAR database within TVA ROW across the entire TVA power service area. As described in Section 2.2.2, TVA uses this information to assign class rankings to sensitive areas that are used to guide management decisions regarding vegetation maintenance activities in the vicinity of recorded features. The location of all federally and state-listed plant species is recorded in the O-SAR database.

Within the TVA ROW sectors where vegetation management would occur in FY22 and FY23, federally and state-listed plant species are most likely to occur where ROW plots intersect regions that support intact grassland habitat. These areas of high-quality habitat occur most often in the Inner Nashville Basin of central Tennessee, the Eastern Highland Rim of Tennessee and northern Alabama, the Cumberland Plateau and Plateau Escarpment in Alabama, Kentucky and Tennessee, Blackland Prairie in Mississippi, Southern Table Plateau on Lookout and Sand Mountain in Alabama and Georgia, the Crawford-Mammoth Cave Uplands and adjacent Western Pennyroyal Karst Plain in Kentucky, and small portions of the Ridge and Valley in Tennessee and Alabama.

3.4.3.2 Terrestrial Animals

Review of the TVA Regional Natural Heritage database in April 2021 indicated there are records of three federally listed (gray bat, northern long-eared bat, Indiana bat) and 18 state-listed terrestrial animal species (acuminate snaketail, a cave obligate spider, Duck River cave beetle, streamside salamander, green salamander, black mountain salamander, hellbender, northern crawfish frog, southeastern five-lined skink, Bachman's sparrow, fish crow, cerulean warbler, golden-winged warbler, blue-winged warbler, meadow jumping mouse, eastern small-footed bat, little brown bat, and tricolored bat) within 50 feet of the ROWs proposed for vegetation management in FY22 or FY23. This includes 20 records of various bat species and 27 records of various other species (see Appendix J). Four additional federally listed species have O-SAR polygons and associated restrictions that apply to ROWs within at least one proposed sector in FY22 or FY23 (Black Warrior waterdog, flattened musk turtle, ringed map turtle; and Mitchell's satyr; See Table 3-4). Review of the USFWS IPaC database system indicated seven additional federally listed species have the potential to be impacted by the proposed actions (bog turtle, noonday snail, painted snake coiled forest snail, Carolina northern flying squirrel, Virginia big-eared bat, red-cockaded woodpecker, and wood stork) (USFWS 2021).

Table 3-4. Summary and Comparison of Alternatives by Resource Area

Common Name	Scientific Name	Federal Status[2]	O-SAR Polygons	Sector[3]
TERRESTRIAL ANIMALS				
Black Warrior Waterdog	*Necturus alabamnesis*	LE	1	MD
Flattened Musk Turtle	*Sternotherus depressus*	LT	1	MS
Northern Long-eared Bat	*Myotis septentrionalis*	LT	75	CL, CV, HK, HV, MC. MD, MS, MT, NA, OR
Indiana Bat	*Myotis sodalis*	LE	85	CL,CV, HK,HV, MC, MD, ML, MS, MT, NA, OR
Mitchell's Satyr Butterfly	*Neonympha mitchellii mitchellii*	LE	7	HV, WP
Ringed Map turtle	*Graptemys oculifera*	LT	1	WP

[1] Source: TVA Regional Natural Heritage Database, queried April 2021.
[2] Status Codes: LE = Listed Endangered; LT = Listed Threatened;
[3] ROW Sector Abbreviations: CL = Cleveland, CV = Centerville, HK = Hopkinsville, HV = Hickory Valley, MC = Manchester, MD = Madison, ML = Milan, MS = Muscle Shoals, MT = Morristown, NA = Nashville, OR = Oak Ridge, WP = West Point

Species specific information comes from Cornell (2021), Natureserve (2021), Tennessee Wildlife Resources Agency (2021) and Scott and Redmond (2021).

Mitchell's satyr butterflies require wetlands with a strong sedge component and a tree canopy nearby. Suitable habitat for this species exists in areas of forested wetland scattered across the ROW. Seven O-SAR polygons for Mitchell's satyr are located in areas proposed for vegetation management in FY23 within the Hickory Valley and West Point sectors.

Two snails were identified through an IPaC search. The noonday globe is a federally threatened land snail known from an area of only about two miles of high cliffs within the Nantahala Gorge in Western North Carolina (Morristown Sector). This species is found on wet cliffs with many exposed calcium rich rocks within mature forest. Painted snake coiled forest snail can be found within crevices or under ledges of limestone in areas with karst topography in the Madison and Manchester sectors. This federally threatened species prefers areas with dense, mature forest and moist conditions, but tend to avoid areas with heavy moss growth.

Acuminate snaketail is a species of dragonfly that inhabits clear streams, often with exposed bedrock. This species requires high water quality. Their range is probably naturally limited to the western Highland Rim physiographic region and major drivers of decline include logging, agriculture, and stream gravel removal which cause stream substrates to become unstable, open, and silted.

Duck River Cave beetle is a cave obligate in the genus *Pseudanophthalmus* which typically occur in twilight zone or deeper in or on moist soil, often near streams or drip areas. They (especially larvae) probably do burrow some. They are often found under rocks or debris. *P. tullahoma* is critically imperiled and thought to inhabit 3 or fewer sites. *Nesticus barri*, a cave obligate spider, is known from about 60 caves in the southern Cumberland Plateau.

The streamside salamander is a state-listed as endangered amphibian known from four records within 50 feet of TVA ROW proposed for vegetation management in the Nashville Sector in FY22. Streamside salamanders inhabit upland deciduous forests in regions of rolling topography, mostly in areas with limestone bedrock. This species breeds most frequently in first- and second-order streams, less frequently in ponds. This species breeds from December through early April, hatches in April, undergoes metamorphose in May and June, and migrates from late October through March.

Green salamanders, primarily considered a rock-crevice dwelling species, typically inhabit shaded rock outcrops in mixed mesophytic forests between 500 and 1,300 meters in elevation. Breeding females require cool, clean and moist horizontal crevices or narrow chambers to suspend their eggs from an overhead substrate. One record of this state-listed species has been recorded within the Manchester Sector proposed for vegetation management in FY22.

Black Mountain salamander are a state-listed as in-need-of-management amphibian species which reside in mountain brooks, spring runs, and roadside puddles in the mountainous terrain of temperate forests. This species has been observed within 50 feet of FY23 proposed activities in the Oak Ridge Sector.

Eastern hellbenders favor larger, fast-flowing, streams and rivers with large shelter rocks. Eggs are laid in depressions created beneath large rocks or submerged logs. One historical record of hellbender is known from within 50 feet of the proposed action areas at Pickwick Dam in the Hickory Valley Sector. Sedimentation is one of the larger threats to suitable habitat for this species as it fills in space under rocks preventing them from being used as shelter or nesting habitat.

Black Warrior waterdog is a federally listed as threatened species present in the Madison and Muscle Shoals sectors. It is only found in streams within the Black Warrior River Basin in Alabama and prefers substrates dominated by clay or bedrock with little sand, also containing abundant rock crevices and rock slabs for retreats (shelter) and areas for egg laying. No records are known within 50 feet of TVA ROW, but one O-SAR buffer is present on a ROW scheduled to be maintained in FY23 in the Madison Sector.

Northern crawfish frogs are associated with moist meadows, pasturelands, river floodplains, pine scrub, and golf courses. They use crayfish and rodent burrows for shelter, and can be found under logs and in sewers. They breed from late February to early May in seasonal and permanent ponds primarily located in agricultural landscapes. Three records are known within 50 feet of a ROW proposed for FY22 vegetation management actions in the Hopkinsville Sector. These records were from a creek, a small pond, and a flooded pasture.

Southeastern five-lined skinks are found in a variety of wooded habitats, but generally prefer drier sites than similar species. They are often seen on fallen trees, limbs, stumps, logs, fences, and rock piles; and will occasionally climb trees when threatened. Females lay 3 to 8 eggs under rotten logs, stumps, rocks, or leaf litter during the spring or early summer. Females remain with the eggs during the 2 to 8 week incubation period. This species has been observed in the Hopkinsville Sector ROW proposed for vegetation management in FY22.

Flattened musk turtles are a federally listed as threatened species endemic to the upper Black Warrior River system in the Madison and Muscle Shoals sectors. Its optimum habitat appears to be free-flowing large creeks or small rivers with vegetated shallows about 2 to 5 feet deep with a detectable current and an abundance of crevices, rocks, or boulders. This species may nest within 100 feet of river banks in full to partial sun areas and may be vulnerable to stream sedimentation and injury when nesting. One O-SAR buffer is present in the Muscle Shoals Sector proposed for vegetation management in FY22.

Ringed map turtles are a federally listed as threatened species found in the Pearl River system and its tributaries. They are most abundant in streams with a moderate to fast current that contain numerous basking logs in close proximity to sand and gravel bars. Sedimentation and pollution are the major threats to this species. One O-SAR buffer for this species intersects the proposed FY23 vegetation management in the West Point Sector.

Bog turtle populations within the southern populations and occurring within the TVA power service area are considered federally threatened due to similarity of appearance to populations in the northern populations. This species inhabits slow, shallow rivulets of bogs, marshy meadows, spring seeps, wet cow pastures, and shrub swamps. Management for meadow-like vegetation on ROWs may benefit this species. Although no records are known within the proposed action area, this species was flagged by an IPaC search. Mechanical equipment could crush turtles or nests and would be prohibited in wetlands near known records should they be reported in the future.

Bachman's sparrow inhabits dry, open woods, especially pines. This species used to thrive in longleaf pine forests found all over the southeastern U.S. Much of the habitat for this species is disappeared due to conversion of forest for timber harvest and development, as well as fire from fire suppression. Remaining habitats are fragmented and populations of this species have been in decline since the 1960s. With the loss of longleaf pine forests, the species has also adapted to use brushy, open fields. These types of habitat can be found within maintained ROWs that would otherwise be lost due to forest regeneration. Two records are known from ROW proposed for vegetation management in FY23 in the Hickory Valley and Oak Ridge sectors.

Fish crow inhabit beaches, bays, lagoons, inlets, swamps, near marshes, and, less frequently, deciduous or coniferous woodland. In inland situations, they primarily use bald cypress swamps and along major watercourses; also garbage dumps and towns. This species nests in trees and has been observed within 50 feet of the ROW in the Hopkinsville Sector proposed for vegetation management in FY23.

Cerulean warblers utilize closed canopy habitat within forested stands containing numerous well-spaced, large trees. These areas are typically within old-growth, deciduous stands, particularly in floodplains or other moist areas. This species nests in mature trees and has been observed within 50 feet of ROW proposed for vegetation management in the Oak Ridge Sector in FY22 and the Manchester Sector in FY23.

Golden-winged warblers breed in second growth areas with patches of shrubs, scattered trees, and grassy ground cover such as abandoned pastures and shrubby fields, old shrubby strip-mine benches, and rarely clear cuts. This species nests on or near the ground. This species was observed within 50 feet of the ROW in the Oak Ridge Sector in habitat proposed for vegetation management in FY22.

Blue-winged warblers nest on brushy hillsides, second growth, partly open situations with saplings, bogs, woodland edge and clearings, stream edges, overgrown pastures, swamps. They nest close to or on the ground, in bushes, weeds, or grasses, or under bushes, or between exposed roots of stumps. Blue winged warbler were observed in the ROW proposed for vegetation management in FY23 in the Cleveland Sector.

Red-cockaded woodpeckers are listed as federally endangered and although no records are known within 50 feet of ROW proposed for vegetation management, the IPaC system identified this species for review based on presence in the West Point Sector. This species typically inhabits open, mature pine forests with a dense groundcover consisting of a variety of grass, forb, and shrub species. These woodpeckers were extirpated from most of their habitat by clearing of mature pines. ROW vegetation management promotes their preferred groundcover, but is incompatible with large trees. Clearing of trees near known populations of this species could be detrimental and requires prior field survey for woodpeckers and nest cavities.

Wood storks, a federally listed as threatened species, are highly colonial and require wetland habitat for foraging. They form large rookeries south of TVA's power service area, but some vagrant individuals have been recorded in northern Mississippi. Wood storks roost over water or on islands and feed on small fish in shallow fresh waterbodies and wetlands. Tree clearing and impacts to wetlands and waterbodies could affect individuals of this species. No records of this species are known within 50 feet of TVA ROW, but IPaC identifies potential habitat in the Hickory Valley, West Point, and Muscle Shoals sectors.

Carolina northern flying squirrels are a federally listed as endangered species that lives at high elevations in the Appalachian Mountains and were identified by IPaC in the Cleveland and Morristown sectors. It feeds on lichens that grow on trees (live, dead, standing, or fallen). The lichens are very slow growing and require specific moisture levels and substrate in order to grow. Even select spraying could kill unintended pockets of lichen.

Meadow Jumping Mice prefer open-grassy fields, but also use hay fields, shrubby fields, fence rows, and edges of woods. They are frequently found in moist areas or near water. One record is known in the Nashville Sector proposed for vegetation management in FY22 and another is known from a TVA ROW in the Madison Sector proposed in FY23.

Eastern small-footed bats inhabit caves during winter. Summer roosts and nursery sites include caves, buildings, and cavities in the ground or beneath rocks. This species forages over ponds and streams as well as in riparian forests, upland forests, clearings and ridgetops. One record of this species has been recorded in Norris Dam in the Oak Ridge Sector within 50 feet of ROW proposed for vegetation management in FY22 and FY23.

Little brown bats primarily hibernate in caves and mines. During summer, females form nursing colonies in cliff crevices, hollow trees, under loose tree bark, or in undisturbed parts of buildings such as attics. Colonies are usually close to water bodies where these bats prefer to forage. Foraging also occurs among trees in open areas. This species has suffered extreme declines due to white-nose syndrome. The nearest known little brown bat records occur in two caves within 50 feet of the ROW, one in the Hopkinsville Sector and one in the Oak Ridge Sector both proposed for vegetation management in FY23.

Tricolored bats are found hanging in trees among clumps of live and dead leaves, in tree cavities, caves, mines, buildings, bridges, and rock crevices in summer. In winter, they roost in caves, mines, or other cave-like structures including box culverts and dams. They forage in forested areas and over water. Four records are known within 50 feet of the ROW in the Hopkinsville Sector proposed for vegetation management in FY22. For proposed FY23 vegetation management, one record each are present in the Manchester and Oak Ridge sectors, both within caves. Known throughout the TVA region, this species has seen dramatic population declines in recent years due to white-nose syndrome.

Virginia big-eared bat are federally listed as endangered inhabiting caves year-round. Cave disturbances could affect them. Protective 200-foot buffers have been placed around each known cave to prevent access, disturbance or contamination by chemicals and sediment. This species was identified by IPaC as potentially occurring in the project area.

Gray bat are a federally listed as endangered species associated year-round with caves, roosting in different caves throughout the year. Bats disperse from colonies at dusk to forage along waterways. Gray bat records exist within three miles of the proposed actions. This species was documented within 50 feet of the ROW in the Hopkinsville, Manchester, and Oak Ridge sectors.

Indiana bats inhabit caves during winter and migrate during summer to roost under exfoliating bark and within cavities of trees (typically greater than or equal to 5 inches in diameter). Foraging occurs along riparian areas and along the tops of trees such as along a forested edge or tree line. Indiana bats have been recorded once in Hopkinsville Sector plots proposed for vegetation management in FY22 and once on Oak Ridge Sector plots proposed for vegetation management in FY23. Some habitat requirements overlap between

Indiana bat and northern long-eared bat, which roosts in caves or cave-like structures in winter, and utilizes cave-like structures as well as live and dead trees with exfoliating bark and crevices in the summer. Northern long-eared bat have been recorded two times on Cleveland Sector plots proposed for vegetation management in FY22 and two times on Oak Ridge Sector plots proposed for vegetation management in FY23.

3.4.3.3 Aquatic Animals

TVA's Regional Natural Heritage database indicated 13 and 12 federally and state-listed aquatic species, respectively, are known to occur within 50 feet of the TVA ROW proposed for vegetation management in FY22 and FY23 (Table 3-5 and Table 3-6). The watersheds of the Tennessee, Cumberland, and Coosa rivers support an unusually diverse group of aquatic animals, but human activities have resulted in adverse impacts to the streams and aquatic organisms therein (Etnier and Starnes 1993). Previous evidence suggests pristine stream habitats in the Tennessee River system had been inhabited by 91 freshwater mussel species (Parmalee and Bogan 1998). Mussels were beginning to be affected by human activities by the mid-1800s, and many freshwater mussels were already extirpated before the Tennessee River impoundments (dams) were constructed (TVA 2011a). The lack of early fish collections does not allow a similar comment about the impact of these activities to Tennessee River fish assemblages, but there likely were species of Tennessee River fish that became extinct before they were known to science (TVA 2011a). Diversity was higher in the study area in the past. However, exceptional species diversity is still observed in fish; mollusks, crayfish, aquatic insects, and various other invertebrate groups.

Table 3-5. Federally and State-Listed Aquatic Animal Species Known to Occur Within 50 feet of Proposed Vegetation Management in Fiscal Year 2022[1]

Common Name	Scientific Name	Federal Status[2]	State Status[2]	State Rank[3]
FISH				
Blackside Dace	*Phoxinus cumberlandensis*	T	T	S2
Blue Sucker	*Cycleptus elongatus*		T	S2
Egg-mimic Darter	*Etheostoma pseudovulatum*		E	S1
Pink Heelsplitter	*Potamilus alatus*			S2
Snail Darter	*Percina tanasi*	T	T	S2S3
Tangerine Darter	*Percina aurantiaca*		D	S3
Tuscumbia Darter	*Etheostoma tuscumbia*		SP	S2
MUSSELS				
Cumberland Elktoe	*Alasmidonta atropurpurea*	E	E	S1S2
Fanshell	*Cyprogenia stegaria*	E, XN	E	S1
SNAILS				
Anthony's River Snail	*Athearnia anthonyi*	E, XN	SP	S1
Ornate Rocksnail	*Lithasia geniculata*			S2
Rugose Rocksnail	*Lithasia jayana*			SX
Skirted Hornsnail	*Pleurocera pyrenella*			S2

[1] Source: TVA Regional Natural Heritage Database, queried on 04/06/2021

[2] Status Codes: E = Listed Endangered; T = Listed Threatened; XN = Experimental Non-Essential Population; D = Deemed in Need of Management; SP = State Protected

[3] State Ranks: S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable; SX = Considered Extirpated; S#S# = Range Rank.

Table 3-6. Federally and State-Listed Aquatic Animal Species Known to Occur Within 50 feet of Proposed Vegetation Management in Fiscal Year 2023[1]

Common Name	Scientific Name	Federal Status[2]	State Status[2]	State Rank[3]
CRUSTACEANS				
Hiwassee Crayfish	*Cambarus hiwasseensis*		WL	S3S4
Nashville Crayfish	*Orconectes shoupi*	E, PDL	E	S1S2
FISHES				
Arrow Darter	*Etheostoma sagitta*		S	S3
Highfin Carpsucker	*Carpiodes velifer*		D	S2S3
Northern Madtom	*Noturus stigmosus*		D	S3
Tennessee Dace	*Chrosomus tennesseensis*		D	S3
MUSSELS				
Alabama Creekmussel	*Strophitus connasaugaensis*		E	S1
Fine-lined Pocketbook	*Lampsilis altilis*	T	T	S2
Georgia Pigtoe	*Pleurobema hanleyianum*	E	E	S1
Smooth Rabbitsfoot	*Quadrula cylindrica cylindrica*	T	SP	S1
Southern Pigtoe	*Pleurobema georgianum*	E	E	S1
Triangular Kidneyshell	*Ptychobranchus greenii*	E	E	S1

[1] Source: TVA Regional Natural Heritage Database, queried on 04/06/2021
[2] Status Codes: E = Listed Endangered; T = Listed Threatened; D = Deemed in Need of Management; PDL = Proposed Delisting; SP = State Protected; WL = Watch List.
[3] State Ranks: S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable; S4 = Apparently Secure.

3.4.4 Environmental Consequences for Threatened and Endangered Species

3.4.4.1 Plants

Localized herbicide application and mowing are the vegetation management tools that would be used most frequently in FY22 and FY23 to clear vegetation on the floor of the open ROW. Other Manual, Mechanical, and Herbicide Application Methods, along with Debris Management and Restoration activities, occur very infrequently or do not have the potential to affect vegetation on a meaningful scale (TVA 2019).

Localized applications of herbicide do result in some level of off-target damage. In situations where the woody stem count is high on a given ROW, even localized application of herbicides can produce substantial damage to non-target species. However, these areas of high woody stem count are unlikely to support rare plants, usually because of site conditions unrelated to TVA vegetation management (i.e. owner land use, soil type, landscape position, etc.). In drier ROW areas with rocky or sandy soils, where woody stem count is inherently lower, localized herbicide application can foster quality herbaceous plant communities as well as federally and state-listed plant species. From an ecological perspective, the disturbance associated with localized application of herbicide on ROW with rare plant species has taken the place of fire and large animal grazing, which would have been the primary mechanisms maintaining grasslands before European settlement of the region. Nearly all these open areas would rapidly transition to forest and the majority of rare plants and communities occurring there would disappear from the landscape without tree removal and localized herbicide use in the ROW.

Mowing removes nearly all woody stems when utilized, but the amount of re-growth can be rapid depending on conditions on the ground, resulting in a proliferation of woody species that form a rapidly growing, low canopy that suppresses rare herbaceous species. Using mowing alone, or as the primary mechanism for vegetation removal on ROW, often reduces species diversity and encourages the dominance of woody plants able to proliferate through root sprouting. Mowing in drier ROW, because of the slower overall tree growth rate can be more effective. Mowing is sometimes used in sensitive areas containing federally or state-listed species if herbicide cannot be applied without harming the population.

Slightly less than 1 percent (about 2,000 acres) of TVA ROW is known to contain populations of rare plant species (TVA 2019). These areas are denoted as Class 2 sites in the O-SAR database. When vegetation management is scheduled to occur in these locations, TVA biologists and Transmission ROW operations staff work together to ensure the species are protected. Sometimes the proposed work would not affect the listed plants found in the ROW. Other times operations staff augments the timing or method of proposed work to protect sensitive resources. TVA (2019) outlined several examples of how O-SAR is used to avoid negative impacts to rare plants. Methods likely to be used in FY22 and FY23 vegetation management include:

- Timing – Shifting the time frame of vegetation management, including mowing and herbicide application, to avoid impacting a threatened or endangered plant species.

- Flagging – TVA botanists perform field surveys to delineate specific areas where the federally and state-listed species occur on ROW. Sites would be marked in the field with flagging tape and maps are provided to the herbicide contractor, along with instructions on how work should be conducted in these spans. Typically, foliar herbicide would not be applied within flagged areas and any woody vegetation within the relatively small areas would be removed with machetes or spot application of herbicide.

- Conservation Spray – This technique differs from standard foliar application of herbicide because of extensive communication between TVA staff and herbicide applicators on the sensitive nature of the site. In addition, there is direct TVA oversight during the application, which leads to extra caution and large reductions in damage to non-target vegetation. While this technique has not been assessed in all situations encountered on ROW, thorough documentation indicates these very targeted, low-volume foliar application of herbicide to woody plants do not appear to negatively impact the federally threatened white fringeless orchid populations on TVA ROW (USFWS 2015).

- Natural Area Cooperation – TVA works with local land managers to coordinate vegetation management within sensitive areas on TVA ROW within natural areas (i.e. National Parks). With this model, professional land management agencies can perform ROW vegetation management within TVA ROW while preventing impacts to the sensitive resources, often federally and state-listed plant species. Agreements with land management agencies are made on a case-by-case basis.

The federally listed species known to occur in or adjacent to ROW plots proposed for FY22 and FY23 work include Price’s potato-bean, leafy prairie-clover, whorled sunflower, fleshy-fruit gladecress, Spring Creek bladderpod, white fringeless orchid, and large-flowered skullcap. During preparation of the Transmission System Vegetation Management PEIS

(TVA 2019), TVA consulted with the USFWS on the TVA ROW Vegetation Management program on the potential effects of the program on all federally listed plants and animals, including those listed above. TVA concluded, and the USFWS concurred, that the ROW Vegetation Management program is likely to adversely affect these seven plant species. However, while the program may affect individual plants from time to time, TVA does not anticipate that vegetation management activities would extirpate any populations from the transmission line. In fact, conditions found in ROW where these five species occur are demonstrably favorable for the majority of the seven federally listed plants known from plots where work would occur. For example, no suitable off ROW habitat occurs adjacent to leafy prairie-clover, whorled sunflower, fleshy-fruit gladecress, Spring Creek bladderpod and white fringeless orchid populations that would intersect planned FY22 and FY23 vegetation management work. The open ROW is necessary for the survival of the species at these sites. TVA ROW vegetation management proposed for FY22 and FY23, would result in insignificant short-term impacts to individual federally and state-listed plants as well as long-term beneficial impacts to populations of those same species.

3.4.4.2 Terrestrial Animals

The proposed actions could impact all federally and state-listed terrestrial animal species recorded within 50 feet of the Action Alternative study area; however the severity of those impacts range greatly. Other federally listed species with potential to be impacted have been identified by IPaC based on species range and/or by TVA's O-SAR system for potentially suitable habitat and will also be addressed.

TVA consulted with the USFWS to assess the impacts of routine activities associated with TVA's transmission system ROW vegetation management program on all species listed under the ESA (other than the four federally listed bat species addressed in the programmatic consultation) with potential to occur in the study area. This consultation was completed and the USFWS issued a Biological Opinion in May 2019 concurring with TVA's effects determinations (USFWS 2019). In addition to implementing BMPs, TVA routinely uses the O-SAR process to identify sensitive areas for federally listed species and to modify proposed vegetation management actions to minimize the potential for impacts (seasonal restrictions, restricted activities) to federally listed species. These practices resulted in a may affect, but not likely to adversely affect determination by the USFWS for all federally listed terrestrial animal species (excluding bats and bog turtle) (See Appendix C).

Mitchell's satyr is protected by TVA BMPs including the use of mats and other techniques used to minimize disturbance to soils and groundwater hydrology within delineated wetlands and buffers. The use of BMPs within and around wetlands in the proposed path of the ROW would allow for maintenance of habitat for Mitchell's satyr in the project area. Consultation with the USFWS determined that the proposed actions may affect but were not likely to adversely affect Mitchell's satyr butterfly (USFWS 2019).

The federally listed as threatened noonday globe snail was identified in IPaC due to TVA ROW within Swain County, NC. This species is not known to exist outside of the Nantahala Gorge (approximately 7 miles away) and would not be impacted by the proposed actions.

The federally listed as threatened painted snake coiled forest snail was also identified in IPaC. No records are known within 50 feet of TVA ROW. Because this species prefers dense, mature forests, it is unlikely to be impacted by management of early successional ROW vegetation.

Vegetation management would not have significant impacts on populations of acuminate snaketail. In addition to standard BMPs, habitat for this species is protected with the following restrictions: clearing must be performed with hand tools only; chemical usage and activities that can increase siltation in streams or destabilize banks must be avoided.

Duck River cave beetle and *Nesticus barri* cave obligate spider would be protected from impacts to known caves within 200 feet of TVA ROW. Within this buffer, hand clearing or brush hogging would be used, whereas herbicide use, vehicle operation, and cave entrance is prohibited. Given these precautions, neither of these species would be significantly impacted by ROW vegetation management activities.

Streamside salamander habitat is protected by nine O-SAR buffers within the Nashville and Manchester sectors ROW that are proposed for vegetation management in FY22. With the following commitments, impacts to individuals may occur, but impacts to populations are unlikely: herbicides - conservation spray only within 90-foot-wide SMZ; mowing would be avoided within the 90-foot-wide SMZ from November to July, or until streams are dry.

Green salamanders, because of their preference for shaded rock outcrops (as opposed to open ROW) and their habitat in rock crevices are unlikely to be impacted by vegetation management activities.

Black Mountain salamander, eastern hellbender and Black Warrior waterdog are exclusively or primarily aquatic species that could be impacted by the proposed actions. However, as described in Section 3.3.2, BMPs would be used along all bodies of water. Any impacts to water quality, including sedimentation, would be minimized with the use of the BMPs. Additionally, only herbicides approved for use near water would be used near these features. As a result, impacts to these species are likely to be negligible. Consultation with the USFWS determined that the proposed actions may affect but were not likely to adversely affect the federally endangered Black Warrior waterdog (USFWS 2019).

Northern crawfish frog habitat (often agricultural cropland) would not be targeted for vegetation management due to the lack of woody species. Therefore the potential for impacts would be limited to the movement of machinery within the ROW to access other areas in need of vegetation management. Northern crawfish frog are not expected to be significantly impacted by the proposed actions.

Southeastern five-lined skink use habitat within the ROW and individuals or nests may be impacted by mowing or crushed by equipment. Loss of these individuals is not expected to cause significant impacts to populations.

Consultation with the USFWS determined that the proposed actions may affect but were not likely to adversely affect flattened musk turtle and ringed map turtle (USFWS 2019). Each of these species has an O-SAR buffer that intersects the proposed vegetation management (flattened musk turtle in FY22; ringed map turtle in FY23). BMPs must be observed in SMZs to minimize sedimentation and herbicide inputs to streams. Additionally, vehicular traffic and laydown areas are seasonally prohibited in potential flattened musk turtle nesting areas from May through September.

Bachman's sparrow could be impacted by proposed vegetation management particularly during nesting season. This species nests on the ground at the base of a small shrub, clump of grass or seedling. While young shrubs and short seedlings would not be the target of vegetation management, larger shrubs and taller seedlings certainly could be. Machinery used in these areas could directly impact nests. However, without vegetation management in these areas the forest would regenerate and become unsuitable for this species. So while direct negative impacts could occur to this species should maintenance occur during nesting season (when eggs and nestlings are unable to flee), it is precisely the vegetation management proposed that keeps the areas open and available for the species. In addition, such maintenance activities could occur year-round and is only likely to occur every three years. Therefore, actions are not expected to impact populations of Bachman's sparrow.

Fish crows and cerulean warblers nest in trees and would not be impacted unless an active nest was present in a tree deemed a risk to the transmission system. In this rare case, failure of isolated nests is not expected to impact the populations of either species.

Golden-winged warbler and blue-winged warbler use similar habitat and may nest on or near the ground in the ROW. Both of these species are vulnerable to mowing and equipment operation in the ROW. Nests and immobile young may be lost if vegetation is mowed during nesting season. Without periodic vegetation management, ROWs would become unsuitable for these species due to forest succession. It is unknown whether the benefit of habitat management outweighs the risk of potential impacts to nesting success.

Red-cockaded woodpecker populations are well documented and colonies are marked by buffers in the O-SAR system. Vegetation management activities in FY22 and FY23 will not intersect occupied areas (Table 3-1) and this project would have no impact on this species.

Wood stork potentially could use wetlands within TVA ROWs and adjacent forested wetlands for roosting. Nesting does not occur in the TVA region and BMPs would be used to minimize impacts to water quality and hydrology. Consultation with the USFWS determined that the proposed actions may affect, but were not likely to adversely affect wood stork (USFWS 2019).

Carolina northern flying squirrel habitat is delineated in the O-SAR database. Proposed vegetation management activities in FY22 and FY23 do not intersect occupied areas (Table 3-1) and thus, this project would have no impact on this species.

Meadow jumping mouse individuals are likely to be impacted if they are present in a span of ROW that requires mowing. Without periodic maintenance, ROWs would become unsuitable for these species due to forest succession. Small mammals are frequently prey for other species and loss of individuals would not significantly impact the overall population.

Eastern small-footed bat summer roosts and nursery sites would be sheltered from the impacts of vegetation management. BMPs would be used to prevent impacts to aquatic foraging habitats. Proposed actions are unlikely to impact eastern small-footed bats.

Little brown bat foraging habitat would be protected by BMPs to preserve water quality. This species may be impacted by clearing of trees along the ROW edges if they are roosting in them at the time. Loss of a maternity colony could impact the population of this rare bat.

Tricolored bats use a variety of habitats. Depending on the timing of the proposed actions, this species would either be in a cave or cave-like habitats or in trees or other features out on the landscape. The O-SAR process identifies caves and puts restrictions on activities within 200 feet of caves (see Section 3.2) such that proposed actions would not impact tricolored bats should they be roosting in caves at the time of proposed actions. However, impacts could occur to tricolored bats should they be roosting in a tree at the time of proposed vegetation management. Adult tricolored bats roosting in clumps of leaves are expected to flush if disturbed by the noise of the machinery. However, should the tree be used as a maternity roost or if bats are roosting deep in tree cavities, adverse impacts could occur, particularly if they take place during the month it takes pups (young) to become volant. Due to the scattered placement of trees along miles of ROW and the variety of habitats this species is known to roost in, it is not expected that proposed actions would significantly impact populations of this species.

Pursuant to Section 7(a) (2) of the ESA, TVA entered into consultation with the USFWS in 2014 to programmatically assess the impact of 96 routine TVA actions on the four federally listed bat species known to occur in the TVA study area: Indiana bat, northern long-eared bat, gray bat and Virginia big-eared bat. This consultation included activities associated with transmission line ROW vegetation management. TVA determined that none of the activities associated with vegetation management have the potential to adversely affect gray bat or Virginia big-eared bat. Vegetation management activities (primarily tree removal), were determined to be likely adversely affect Indiana bat and northern long-eared bat. The USFWS issued a Biological Opinion in April 2018, concurring with TVA's effects determinations and issued an Incidental Take Statement that authorizes TVA's ROW vegetation management practices over a 20-year term.

The southern bog turtle is listed as threatened in the northern part of its range, but is listed due to similarity of appearance in the southern part of the range, which includes Georgia, North Carolina, South Carolina, Tennessee, and Virginia. It is this southern part of the range that intersects the TVA study area. Species listed due to similarity of appearance are not subject to Section 7 consultation. Southern bog turtle would not be significantly impacted by the proposed actions.

3.4.4.3 Aquatic Animals

TVA reviews ROWs prior to vegetation management and identifies appropriate vegetation control methods, appropriate conservation activities, BMPs, and avoidance and minimization measures to guide activities based on the known or likely occurrence of sensitive species or special habitats within TVA ROWs. While some methods of vegetation control could have significant impacts on individuals or populations of federally or state-listed threatened or endangered species (e.g., aerial herbicide application on a known population of federally endangered mussels or spawning habitat of fish), TVA's O-SAR screening process identifies potential impacts and identifies the appropriate vegetation control methods and restrictions (hand clearing, mechanical clearing or spot application of herbicide, seasonal avoidance) in this instance. Species- and/or group-specific (e.g. SMZs) restrictions and guidance have been developed for all federally listed and most state-listed resources in the study area. Therefore, no impacts are anticipated to aquatic animal species from the proposed FY22 and FY23 vegetation management activities.

3.5 Surface Water

3.5.1 Affected Environment

The quality of the region's water is critical to protection of human health and aquatic life. Water resources provide habitat for aquatic life, recreation, domestic and industrial water supplies and other benefits. Major watersheds in the TVA study area (Figure 3-2) include most of the Tennessee River, the Cumberland River basins, portions of the lower Mississippi, Green, Pearl, Tombigbee, and Alabama/Coosa River basins, and a small portion of the lower Ohio River basin.

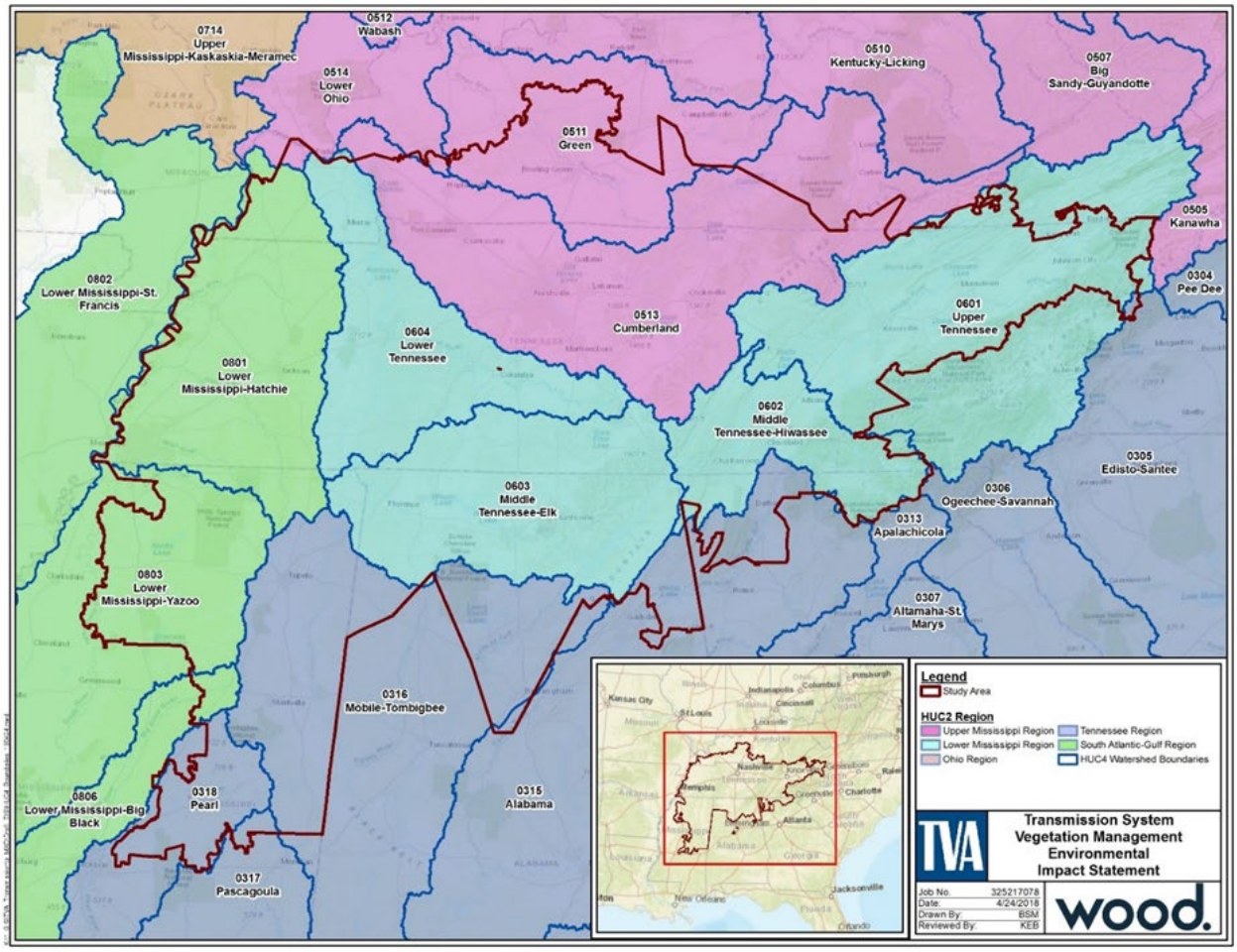


Figure 3-2. Major Watersheds of the TVA Study Area

As indicated in Section 3.3, stream habitats in the study area include very large rivers (e.g., Mississippi and lower Tennessee), large rivers (e.g., lower Cumberland and upper Tennessee), medium rivers (e.g., lower Duck and Clinch), small rivers (e.g., Little, Buffalo), and numerous perennial, intermittent, and ephemeral streams. As such, the typical stream makeup of riffles, runs, and pools would be expected to be encountered with width and depth dependent on the size of the water body crossed by the ROW. The Tennessee River basin makes up a large centralized portion of the TVA study area (see Figure 3-2). The Tennessee River begins where the Holston and French Broad Rivers join in Knoxville, Tennessee, 652 river miles from where it empties into the Ohio River near Paducah, Kentucky. The Cumberland River is formed by the junction of the Poor and Clover Forks in

Harlan County, Kentucky, about 693 miles above its confluence with the Ohio River near Smithland, Kentucky. The drainage area of the Cumberland is 17,598 square miles. The lower Mississippi River in the reach that borders west Tennessee is one of the largest rivers in the world. Its drainage basin is 1,247,000 square miles and includes nearly all of the United States between the Rocky Mountains and the Appalachian Mountains. The Green River Basin is located in south central Kentucky and north central Tennessee. The drainage area is 9,273 square miles, of which 377 are in Tennessee.

Fresh water abounds in much of the TVA study area and generally supports most beneficial uses, including fish and aquatic life, public and industrial water supply, waste assimilation, agriculture, and water-contact recreation, such as swimming. Water quality in the TVA region is generally good.

The federal Water Pollution Control Act, commonly known as the CWA, is the primary law that affects water quality. It establishes standards for the quality of surface waters and prohibits the discharge of pollutants from point sources unless a NPDES permit is obtained. Section 404 of the CWA further prohibits the discharge of dredge and fill material to waters of the United States, which include most wetlands, unless authorized by a permit issued by the U.S. Army Corps of Engineers (USACE).

Several other environmental laws contain provisions aimed at protecting surface water, including the Resource Conservation and Recovery Act, the Comprehensive Environmental Response, Compensation and Liability Act and the Federal Insecticide, Fungicide, and Rodenticide Act, among others.

The seven states in the TVA power service area have enacted laws regulating water quality and implementing the CWA. As part of this, the states classify water bodies according to their uses or designations and establish water quality criteria specific to these uses. Each state has issued an anti-degradation statement containing specific conditions for regulated actions and designed to maintain and protect current uses and water quality conditions.

3.5.2 Environmental Consequences for Surface Water

The potential for impacts to surface water resources centers on the evaluation of alterations to surface water quality. The clearing of vegetative cover within the study area has the potential to cause minor and temporary effects on surface water quality, regardless of the methods used for clearing (TVA 2019). These alterations could be caused by small increases in sediment laden storm water runoff, small increases in stream temperatures and decreases of dissolved oxygen from the loss of tree cover; the alteration of nutrient levels; small increases of pollutants, such as solid wastes from litter and chemical pollutants from leaking vehicles and heavy equipment; and the minor increase of concentrated storm water flows from reduced vegetation cover. The evaluation of the surface water resources including designated uses and whether they are high quality or impaired (listed on the State 303(d) list) is considered to determine the appropriate control measures. Compliance with all applicable federal, state and local environmental laws and regulations would be followed including State Regulatory Storm Water Construction Permits, USACE 404/401 permitting, and Water Quality Certifications. A State-specific Storm Water BMP Plan, if required, would be drafted and would identify specific BMPs to address vegetation maintenance-related activities that would be adopted to minimize storm water impacts per state guidelines. Appropriate BMPs (TVA 2017a) would be followed, and all proposed project activities would be conducted in a manner to ensure that waste materials are contained, and the introduction of pollutants to the receiving waters would be minimized.

In addition to the removal of vegetative cover, the use of herbicides for the control of vegetation has the potential to affect the water quality of streams. Therefore, any pesticide/herbicide use as part of vegetation maintenance activities would have to comply with the NPDES General Permit for Application of Pesticides, which also requires a pesticide discharge management plan if certain thresholds are met. In areas requiring chemical treatment, only EPA-registered and TVA approved herbicides would be used in accordance with label directions designed in part to restrict applications near receiving waters and to prevent unacceptable aquatic and water quality impacts. Proper implementation and application of these products would be expected to have no significant impacts to surface waters. No cumulative impacts are anticipated.

3.6 Wetlands

3.6.1 Affected Environment

Wetlands are those areas inundated or saturated by surface or groundwater such that vegetation adapted to saturated soil conditions is generally prevalent. Due to their landscape position, vegetation structure, and influence on downstream hydrology, wetlands provide a suite of benefits valued by society. These include toxin absorption and sediment retention for improved water quality, storm water impediment and attenuation for flood control, shoreline buffering for erosion protection, and provision of fish and wildlife habitat for commercial, recreational, and conservation purposes. Examples of wetland habitats include bottomland forests, swamps, wet meadows, isolated depressions, and shoreline fringe along watercourses or impoundments.

The TVA power service area crosses nine ecoregions (Level III, EPA 2017a) where wetland habitats comprise palustrine systems (non-tidal or freshwater complexes, dominated by trees, shrubs, or persistent emergent vegetation) (Cowardin et al. 1979). Palustrine wetlands across the TVA region can include bottomland hardwood forests (forested wetlands), scrub-shrub wetlands, beaver ponds (aquatic-bed or emergent wetlands), wet meadows and marshes (emergent wetlands), and highland bogs (forested, scrub-shrub, or emergent wetlands that have organic soil). NWI maps over two million acres of wetland across the TVA region, with 6,751 acres occurring on TVA ROWs (TVA 2019).

On TVA transmission line ROWs where conductor clearance is necessary, vegetation management aims to maintain low-stature wetland vegetation. Therefore, wetland communities on TVA ROWs consist predominantly of emergent (erect, rooted, or floating) wetland plants. These typically include water lilies, cattails, grasses, rushes, bulrushes, sedges, smartweeds, reeds, and other hydrophytic (wet site) species. Emergent wetlands often occur along streams in poorly drained depressions and along the edges of water bodies, and experience varying water depths (EPA 2017b). Perennial plants typically dominate and remain present for most of the growing season, which can lead to a similar appearance of these wetlands year after year in areas with relatively stable climatic conditions (Federal Geographic Data Committee 2013).

Scrub-shrub wetlands contain woody plants less than 20 feet tall. These wetland communities may comprise woody vegetation with a limited growth potential, such as buttonbush or tag alder. Wetlands containing these or similar shrub species represent a relatively stable community and can be typical of shallow embayments or frequently inundated riparian areas. However, scrub-shrub wetlands can represent successional communities comprised of tree saplings (EPA 2017a). These communities develop when saplings invade emergent wetland habitat. However, TVA’s ROW vegetation management

program aims to deter threatening woody vegetation growth. Therefore, the presence of successional scrub-shrub wetland communities would be lacking on TVA ROWs.

Forested wetlands may persist on TVA ROWs in spanned valleys (deep ravines) or where the maintenance footprint does not extend to the full extent of the ROW. These forested wetland communities are commonly an extenuation of the adjacent maintained emergent wetland habitat within the ROW. They are typically characterized by an overstory of trees with species including red maple, oaks, willows, and cypress; an understory of younger wetland trees or shrubs; and an herbaceous layer comprised of shade tolerant species.

The proposed vegetation management cycles for FY22 and FY23 comprise a total 240,585 acres of ROW, divided into twelve sectors. To evaluate wetland presence within these ROW sectors, TVA utilized NWI (USFWS 1977-2017) coupled with O-SAR using higher resolution and more current aerial imagery, hydrology data, and soils information to map additional potential wetlands. In addition, the O-SAR dataset references all ground-truthed wetland delineations that have taken place within a ROW. Accordingly, a total of 13,825 acres of potential wetland area have been identified within the ROW sectors proposed for vegetation management activities in FY22 and FY23 that mirror past routine management actions within the ROW. This wetland area represents six percent of the total ROW footprint proposed for vegetation management (Table 3-7).

Table 3-7. Mapped Wetland Acreage by Right-of-way Sector

ROW Sector	Ecoregion Location*	Total ROW Sector Acres	NWI Acres	O-SAR Acres	Ground Truthed Acres	Total Mapped Wetland Acres	Percent of ROW Sector Mapped Wetland
Centerville	IP	20,140	118	478	22	618	0.03
Cleveland	BR, R&V, SW App	16,745	60	438	56	554	0.03
Hickory Valley	MSV LP, SE Plains	18,918	690	770	242	1,702	0.09
Hopkinsville	IP, IRV&H, MSV LP	21,117	267	766	88	1,121	0.05
Madison	IP, R&V, SW App	20,994	315	1,020	72	1,407	0.07
Manchester	IP, R&V, SW App	24,075	156	743	101	1,000	0.04
Milan	IP,MS AP, MSV LP, SE Plains	20,935	1,055	817	330	2,202	0.11
Morristown	BR,R&V	19,935	43	384	24	451	0.02
Muscle Shoals	IP, SE Plains, SW App	16,819	929	493	198	1,620	0.10
Nashville	IP	25,165	101	567	19	689	0.03
Oak Ridge	IP, R&V, SW App	19,114	56	620	50	726	0.04
West Point	SE Plains	16,628	1,010	725	260	1,735	0.10
TOTAL		**240,585**	**4,800**	**7,821**	**1,462**	**13,825**	**0.06**

*Ecoregion Level III (EPA 2017a): BR=Blue Ridge; IP=Interior Plateau; IRV&H=Interior River Valley and Hills; R&V=Ridge and Valley; MS AP=Mississippi Alluvial Plan; MSV LP=Mississippi Valley Loess Plains; SE Plains= Southeast Plains; SW App=Southwestern Appalachians.

The Cleveland and Morristown sectors are located predominantly in east Tennessee, with portions in northeast Georgia, and some ROW area extending into western North Carolina. These sectors total 554 acres and 451 acres of mapped wetland area, which represents 3 percent and 2 percent of these ROW sectors, respectively. East Tennessee, northeast Georgia, and western North Carolina comprise portions of the Southwestern Appalachians, Blue Ridge, and Ridge and Valley ecoregions. The steep topography of the Blue Ridge Mountains is not conducive to wetland development due to the high rate of runoff; therefore, wetlands are relatively smaller in size and generally form along drainages or wherever runoff can otherwise pool for sufficient development of wetland habitat (Weakley and Schafale 1994). The Ridge and Valley region is characterized by gentler topography, with wetland habitat most common in floodplains of stream and river systems in the valley flats; although seepage fens containing rare species are known from this ecoregion as well. Wetlands in the Southwestern Appalachians are located in valley floors where undulating low mountain terrain allows for water retention. Due to the topography of the area crossed by these ROW sectors, wetlands in narrow valley bottoms can be spanned by conductors with structures located on upland rises between drainages. Wetlands in wider valley flats may contain structures to accommodate a longer ROW crossing.

The Oak Ridge, Madison, and Manchester sectors extend from east Tennessee into central Tennessee, south central Kentucky, and north central Alabama. These sectors total 726 acres, 1,000 acres, and 1,407 acres of mapped wetland area on the ROW, which represents 4 percent, 7 percent and 4 percent of these ROW sectors, respectively. Central Tennessee, south central Kentucky, and north central Alabama comprise portions of the Southwestern Appalachians, as described above, and the Interior Plateau. The Interior Plateau ecoregion contains the entirely of the Centerville and Nashville ecoregions, as well. These sectors contains 618 acres and 689 acres of mapped wetland, comprising 3 percent of each of these ROW sectors. The Interior Plateau is characterized by karst geology underlying lower elevation hills and plains. ROW sectors crossing this ecoregion would encounter wetland habitat formed in sinkhole depressions, limestone seeps, and along river valleys. A portion of the Hopkinsville Sector is located across southwest Kentucky and north central Tennessee in the Interior Plateau ecoregion, where similar wetland habitat and occurrence regime would be anticipated. This sector extends into the Mississippi Valley Loess Plains, described below. Hopkinsville Sector contains 1,121 mapped potential wetland acres, comprising 5 percent of the ROW area.

The Muscle Shoals Sector is located between northwest Alabama and northeast Mississippi, crossing the Interior Plateau and Southern Appalachians ecoregions, as described above, and extending across the Southeastern Plains. This sector contains 1,620 mapped wetlands acres, comprising 10 percent of the sector's total ROW area. All of the West Point Sector and portions of the Milan and Hickory Valley sectors are located in the Southeastern Plains across Mississippi, west Tennessee, and western Kentucky. Both Milan and Hickory Valley sectors extend into the Mississippi Valley Loess Plains, and Hickory Valley extends further west into the Mississippi Alluvial Plain ecoregion. West Point's Sector is comprised of 10 percent mapped potential wetland features, totaling 1,735 acres; 9 percent of Hickory Valley's Sector is comprised of mapped potential wetland features, totaling 1,702 acres; and 11 percent of Milan's Sector is mapped as potential wetland, totaling 2,002 acres. The higher percentage of wetland across these sectors is anticipated due to the flatter lands and lower gradient drainage basins typical of these ecoregions. Wetlands encountered in these ROW sectors would be extensive across the wide floodplain wetland complexes typical of these regions.

The mapped wetland location data generated for ROW vegetation management purposes is a guide to use for planning vegetation management activities in wetlands. The data sets capture identifiable potential for wetland occurrence within the ROW sectors proposed for maintenance. However, not all areas identified as wetland may be in need of maintenance. Wetlands on ROWs may be maintained at low stature through existing land use (farming, pasture) or may be inundated sufficiently to deter sapling establishment. Therefore, the true extent of affected wetlands would be determined on a case-by-case basis by ROW foresters who are informed by these datasets on the locations for potential wetland presence.

3.6.2 Environmental Consequences for Wetlands

Activities in wetlands are regulated by state and federal agencies to ensure no more than minimal impacts to the aquatic environment and no net loss of wetland resources. Under CWA §404, activities resulting in the discharge of dredge or fill material in jurisdictional wetlands, and any secondary wetland impacts, such as forested wetland clearing, must be authorized by the USACE through a Nationwide, Regional, or Individual Permit. CWA §401 mandates state water quality certification for projects requiring USACE approval and permitting. Lastly, EO 11990 requires federal agencies such as TVA to minimize wetland destruction, loss, or degradation, and preserve and enhance natural and beneficial wetland values, while carrying out agency responsibilities. Compliance with USACE permitting is required for regulated activities within jurisdictional waters of the U.S., which could include mitigation based on their review of TVA's proposed impacts.

As described in Section 3.6.1, wetland identification for the purpose of TVA's transmission system ROW vegetation management program is conducted utilizing NWI data and supplemented with an O-SAR review that incorporates higher quality imagery and overlays indicative of wetland presence. The use of office-level materials for wetland identification runs the inherent risk of inaccuracies (Tiner 1997); therefore, limitations of this data must be considered. For example, there may be wetlands present for which no mapped evidence or other data currently exists and are, therefore, undetectable via office-level review. The presence or absence of these wetland resources could only be verified through field surveys to accurately determine the extent and condition. Wetland delineations are not performed for the purpose of planning ROW vegetation maintenance activities; however, some ground surveyed wetland boundaries may be referenced in the O-SAR dataset. Because most of the wetland areas have only been identified through desktop resources, potential impacts due to ROW vegetation management activities may occur at wetlands not previously identified. Therefore, to ensure compliance with wetland regulations, wetland O-SAR data is only applicable to vegetation management activities occurring within the routinely cleared (three-year cycle) ROW corridor and associated access road work resulting in less than 0.1 acre of permanent disturbance.

Impacts over 0.1 acre commonly require agency notification and potential mitigation to ensure no more than minimal impacts to the aquatic environment, in accordance with state and federal wetland regulations. Thus, an environmental review separate from O-SAR is conducted for vegetation management outside of the routinely cleared (three-year cycle) ROW corridor and associated access road work where greater than 0.1 acre of permanent impact is proposed. In addition, as a general practice, vegetation maintenance crews remain alert to wetland "indicators" such as standing water, soil saturation, etc., and work accordingly to protect and identify previously unmapped wetland resources.

Most often, however, vegetation management activities may be conducted with minimal wetland disturbance and without regulated wetland impacts. The proposed methods for vegetation management on the affected ROW sectors include: mechanical mowing, hand clearing, herbicide application, and tree removal. The NWI and O-SAR dataset provide a means of implementing avoidance strategies or BMPs when conducting these activities to ensure temporary or nominal impacts in areas identified as potential wetland.

Mechanical mowing using brush hogs or large mowers may accommodate floor work to maintain a meadow-like habitat. However, access to wetlands with inundated or saturated soils with mechanical equipment is limited due to the unstable substrate. Therefore, mowing in wetlands may only be conducted under dry conditions, such as the dry-season during which time soil saturation would be reduced. Under these conditions, mowers and brush hogs may be used to clear briars and/or small saplings within wetlands with minimal impacts. Additionally, it is anticipated that the existing wetland function would not change.

Hand clearing using hand held shears, clippers, brush saws, axes, and chainsaws to sever above ground vegetation of shrubs or saplings would maintain existing wetland function by promoting long-term emergent meadow-like wetland habitat. Manual clearing with hand tools can be used where inundated and saturated wetland soils constrain access precluding the use of other vegetation management strategies. Resprouting of manually cut or pulled woody wetland plants can ultimately lead to increased stem density, especially for invasive species that tend to resprout more aggressively. Seasonal timing of manual clearing and herbicide application to cut stems can help to reduce resprouting (Kays and Canham 1991; Wegner 1953). Therefore, the manual removal method is most effective when conducted during the appropriate season and/or in combination with herbicide.

Herbicide application in wetlands within the ROW sectors would be applied to target woody wetland vegetation of smaller stature in order to prevent tree growth on the open ROW floor. Therefore, there would not be a reduction or change in the wetland function or value. In combination with mechanical clearing, manual clearing, and reseeding practices, herbicide application can extend the necessary routine vegetation maintenance cycles due to its effectiveness for woody vegetation control. There is potential for this method to affect wetlands not identified during the O-SAR process or apparent to ROW management crews. Spot spray herbicide, localized herbicide, and broadcast herbicide, aerial herbicide application methods may be selected depending on the management needs. Consideration of site specific characteristics ensures potential herbicide runoff, leaching, or drift is contained when applied in or near a wetland (TVA 2019).

Tree removal in wetlands may be conducted with hand held cutters, as described above, or accomplished with a feller-buncher. A feller-buncher is a machine that grasps the tree trunk while shearing it near the ground surface, then removing it to a suitable location outside the wetland. Both methods leave the root ball intact and result in minimal soil if access is conducted using wetland BMPs (TVA 2017a). Because tree removal would only occur along ROW edges, and typically result in the removal of one or few trees in one location, no significant wetland impacts would be anticipated

The following BMPs (TVA 2017a) would be implemented within locations where mapped NWI and O-SAR wetlands are present and vegetation management activities are necessary:

- Adhere to dry season schedule (September to mid-November) when practicable.
- Soils ruts would not exceed 12 inches; if necessary, use low ground pressure equipment, such as rubberized tracks, wide tires, or lightweight equipment (ATVs) in mapped wetlands to adequately minimize soil rutting/compaction/disturbance.
- Woody wetland vegetation should be cut less than 12 inches from ground level.
- Woody debris would be removed outside identified wetland area.
- Stumps would not be removed or grubbed.
- Only aquatic approved herbicide within mapped wetlands would be permissible.
- Water flow into or out of mapped wetlands would not be restricted during work activities.
- Erosion control techniques would be implemented within 50 feet of wetland boundary where soil disturbance is proposed.
- Existing contours within wetlands would be restored to preconstruction specifications.
- Disturbed and exposed wetland soils would be seeded upon completion of work (or within 14 days, whichever comes first).

The wetland review process provides locations for potential and known wetland locations across the entire ROW sectors proposed for management. This represents a total of 13,825 acres, or 6 percent of the ROW footprint proposed for management in FY22 and FY23. ROW crews will consult the wetland dataset and ensure wetland BMPs are followed at mapped wetland locations. The use of the wetland data, however, is restricted to specific actions or thresholds. If the proposed vegetation management activity exceeds the impact acreage threshold or involves otherwise regulated activities, a wetland delineation would be conducted to ensure appropriate wetland compliance is achieved. Therefore, with the wetland datasets used as a tool in vegetation management planning, use of those dataset subscribed to, and wetland delineations conducted for compliance purposes otherwise, the proposed ROW sector vegetation management activities are anticipated to have no significant wetland impacts.

3.7 Managed and Natural Areas, Parks and Recreation

3.7.1 Affected Environment

Numerous areas across the TVA region are recognized and, in many cases, managed for their recreational, biological, historic and scenic resources. These areas are owned by 1) federal and state agencies 2) local governments 3) non-governmental organizations such as the Nature Conservancy 4) regional land trusts and private corporations and 5) private individuals.

Parks, managed areas and ecologically significant sites are typically managed for one or more of the following objectives:

- Recreation - managed for outdoor recreation or open space. Examples include national, state and local parks and recreation areas, reservoirs (TVA and other), picnic and camping areas; trails and greenways, and TVA small wild areas.

- Species/Habitat Protection - places with endangered or threatened plants or animals, unique natural habitats, or habitats for valued fish or wildlife populations. Examples include national and state wildlife refuges, mussel sanctuaries, TVA habitat protection areas and nature preserves.

- Resource Production/Harvest - lands managed for production of forest products, hunting and fishing. Examples include national and state forests, state game lands and wildlife management areas and national and state fish hatcheries.

- Scientific/Educational Resources - lands protected for scientific research and education. Examples include biosphere reserves, research natural areas, environmental education areas, TVA ecological study areas and federal research parks.

- Historic Resources - lands with significant historic resources. Examples include national battlefields and military parks, state historic sites and state archeological areas.

- Scenic Resources - areas with exceptional scenic qualities or views. Examples include national and state scenic trails, scenic areas, wild and scenic rivers, Nationwide Rivers Inventory streams and wilderness areas.

- Agricultural Resources - lands with significant local agricultural production and open space value, often in areas where suburban development is increasing. Examples include working family farms protected by conservation easements

An April 2021 analysis of the TVA Regional Natural Heritage database indicated the twelve ROW vegetation management sectors include numerous parks, managed areas and ecologically significant sites. In general, natural areas are more concentrated in the eastern portion of the TVA region. A total of 591 natural areas are either crossed by TVA transmission line ROWs or located within 50 feet of the ROWs for the FY22 vegetation management activities, and 604 natural areas are either crossed by TVA TL ROWs or located within 50 feet of the ROWs for the FY23 vegetation management activities (Table 3-8).

Table 3-8. The Number of Natural Areas Located within each Sector Planned for Vegetation Management Activities in Fiscal Years 2022 and 2023

Sector	Number of Natural Areas	
	FY22	FY23
Cleveland	82	33
Centerville	58	52
Hickory Valley	21	24
Hopkinsville	39	39
Manchester	81	102
Madison	37	39
Milan	30	16
Muscle Shoals	36	29
Morristown	61	47
Nashville	53	58
Oak Ridge	85	82
West Point	8	83
TOTAL	**591**	**604**

Appendix L includes a complete list of natural areas by sector for FY22. Appendix M includes a complete list of natural areas by sector for FY23. Areas crossed by TVA transmission line ROW include NPS units, USFS areas, National Wildlife Refuges, and numerous state wildlife management areas, state parks, state forests, local parks, and conservation easements.

3.7.2 Environmental Consequences for Natural Areas

TVA maintains natural areas data in the TVA Regional Natural Heritage database. This data includes the type, location, management entity, and contact information for each site, and may include pertinent rare species and habitat information. TVA's O-SAR process uses this information, in conjunction with the transmission line ROW clearing spatial data, to develop site-specific guidance for each natural area that is to be used during scheduled ROW maintenance each year.

Mitigation measures to minimize impacts to managed and natural areas, parks, and recreation include:

- Follow procedures outlined in TVA's *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities Revision 3-2017* (TVA 2017a).

- Contact the appropriate land manager before implementing vegetation maintenance activities to coordinate timing of the ROW maintenance such to minimize impacts to visitors, park operations, scheduled hunting, etc.

- Seek opportunities to partner with natural area managers to plan and conduct vegetation management that would meet multiple natural resource management objectives.

- Where available, utilize existing site-specific vegetation management plans for ROWs that cross managed lands.

Prior to implementing the planned FY22 and FY23 ROW vegetation management activities, ROW crews review the natural areas O-SAR dataset and ensure standard BMPs are followed within all natural areas. Where indicated, the crew would consult with natural areas land managers, and coordinate activities as warranted. Utilizing the mitigation measures listed above no significant impacts to natural areas are associated with the FY22 and FY23 vegetation management activities.

3.8 Archaeological and Historic Resources

3.8.1 Affected Environment

3.8.1.1 Regulatory Framework

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. 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 925 USC 3001-3013).

TVA executed a PA with the Advisory Council on Historic Preservation, seven SHPOs and all federally recognized Indian tribes with an interest in the region. The PA establishes a program alternative for compliance with Section 106 of the NHPA that would allow compliance to be achieved more efficiently through consultation at the programmatic level. The PA set forth procedures and criteria for an alternative process for all existing TVA operation and maintenance activities that are similar and repetitive in nature. The majority of the activities associated with ROW vegetation management are covered within this PA.

3.8.1.2 Archaeological Resources

3.8.1.2.1 Background

The history of human activity throughout the study area spans thousands of years. The earliest groups to leave a definitive material record of their presence were early Paleoindians who entered the region during the Late Pleistocene glacial epoch at least 12,000 years ago. Their descendants and the descendants of other Native American groups who migrated to the area occupied the region for the next 11 millennia. This long prehistoric era lasted until the arrival of Europeans explorers in the sixteenth and seventeenth centuries. Cultural change is a slow and continual process. Archaeological researchers divide the prehistoric human history of the study area into six distinct cultural periods; Paleoindian (10,000-8000 B.C.), Archaic (8000-1000 B.C.), Gulf Formational/Early Woodland (1000-100 B.C.), Middle-Late Woodland (100 B.C.-A.D. 900), Mississippian (A.D. 900-1540), and Contact/Protohistoric period (A.D. 1540-1672) (Anderson and Sullivan 2013; Hudson 2002). The modern historic era includes activities taking place from the eighteenth, nineteenth, and early twentieth centuries.

The Paleoindian period is characterized by small nomadic groups who exploited a variety of resources across the landscape including the hunting of now extinct mega-fauna. Artifacts attributed to this period often include large fluted stone projectiles of the Clovis tradition. The Archaic period spans approximately seven millennia in which many cultural changes occurred. The early part of the Archaic period was much like that of the Paleoindian; mobile groups exploiting an increasing number of new environmental niches as the climate began to warm at the end of the ice age. Then the archaeological record became more diverse. Lithic projectile point forms recovered include those of the Eva, Morrow Mountain, White

Springs, and Benton clusters (Justice 1987). Groundstone tools became more complex with the development of grooved axes, bannerstones and netsinkers during the Middle Archaic period. The first evidence of the spear thrower also appeared in the form of atlatl weights (Sassaman 1996). Deep storage pits, post molds (structures), and burials as well as evidence of the collection of arboreal nut crops and other cultigens, such as hickory nuts and wild plant remains such as goosefoot, maygrass, and knotweed are present at later Archaic sites (Gremillion 1996).

A main attribute that separates the Gulf Formational/Early Woodland period from the Archaic is the introduction of ceramics or pottery. The first pottery appeared in the western portion of the Middle Tennessee Valley between 1,000 and 800 B.C. largely in the form of undecorated fiber- and sand-tempered wares. Smaller lanceolate shaped, notched, and stemmed projectile of the Adena Stemmed, Gary Contracting Stemmed, Motley, and Wade types have been recovered from Early and Middle Woodland period sites (Justice 1987). Later Woodland period sites include undecorated and decorated chert-, quartz-, and more prominently grog- and limestone-tempered pottery (Faulkner 2002). More complex varieties of structural and storage features indicating increased emphasis on horticulture of native plants and sedentary lifeways also are evident at later Woodland sites. Small triangular Hamilton and small notched projectile types occur and mark the introduction of bow and arrow technology, a key cultural marker throughout the Tennessee Valley.

The Mississippian period throughout the TVA study area was dominated by chiefdom level societies, which influenced the surrounding tribal groups, arguably the most radical shift in social organization in the prehistoric era (Harle et al. 2013). Elaborate mortuary practices involving burial pits, mounds, and more extravagant grave goods evolved during this time. Large planned villages are often fortified. The villages contain extensive midden deposits and a high density of features. Rectangular, wall trenched dwellings with raised clay fire basins are also evident. In addition, many inhabitants were dispersed into farming hamlets throughout the landscape.

The beginning of the Contact/Protohistoric period in the Southeast is commonly marked by the de Soto expeditions deep into interior portions of the Southeast (A.D.1544-1543). From the period of initial European contact to the Historic period, the archaeological and ethnohistoric record indicates a steady decline of the Native American population and extensive movement of many tribes. Introduced disease, especially smallpox, may have been a major catalyst for this decline (Smith 2002). The Mississippian pattern of large towns surrounded by smaller hamlets continued to operate in some areas even during the latter part of the Protohistoric when there were influxes of Native Americans from outside groups who were displaced by Euroamerican encroachment (Davis 1990). Eventually, these villages declined in number, population, and overall size and were ultimately abandoned.

European influx only increased throughout the eighteenth century, and following the Revolutionary War, settlement further west beyond the Appalachian Mountains began in earnest. This resulted in the forced cessation of Native American lands throughout the Tennessee River Valley, including those belonging to the Chickasaw, Choctaw, Muscogee-Creek, Seminole, and Cherokee to name a few. In 1830, Congress passed the Indian Removal Act resulting in the forced removal of tens of thousands of Native Americans westward, known as the ‘Trail of Tears’ or Indian Removal. Today 21 federally recognized Indian tribes traces their descendants back to the Tennessee Valley. These tribes include: Absentee Shawnee Tribe of Indians of Oklahoma, Alabama-Coushatta Tribe of Texas,

Alabama-Quassarte Tribal Town, Cherokee Nation, The Chickasaw Nation, The Choctaw Nation of Oklahoma, Coushatta Tribe of Louisiana, Delaware Nation, Eastern Band of Cherokee Indians, Eastern Shawnee Tribe of Oklahoma, Jena Band of Choctaw Indians, Kialegee Tribal Town, Mississippi Band of Choctaw Indians, The Muscogee (Creek) Nation, Osage Nation, Poarch Band of Creek Indians, The Quapaw Tribe of Indians, The Seminole Nation of Oklahoma, Shawnee Tribe, Thlopthlocco Tribal Town, and United Keetoowah Band of Cherokee Indians in Oklahoma.

The American Industrial Revolution occurred within subsequent decades, resulting in marked growth of urban centers, large plantations, and smaller subsistence farming homesteads throughout the study area. The construction of railroads furthered the growth of industry in the Valley. The Civil War played a significant role in the development of the region. The Reconstruction Era of the late nineteenth century and the influx of European immigrants during the turn of the nineteenth and early twentieth century also had a major impact to settlement and the economy of the Valley.

Archaeological investigations in the study area began in the early 19th century with the explorations of Cyrus Thomas, C.B. Moore, and the Smithsonian Institute. These early investigations focused on larger sites such as mound complexes. The earliest TVA related archaeological surveys occurred in the 1930s and 1940s, prior to inundation of Norris, Wheeler, Guntersville, Chickamauga, Douglas, Pickwick, and Kentucky Reservoirs among others (Webb 1939; Lewis and Kneberg 1995). These surveys, staffed by New Deal public works programs, were opportunistic in nature focusing on the excavation of large village sites. Following the passage of the NHPA in 1966 TVA has implemented numerous archaeological investigations throughout the study area as they consider effects to cultural resources by their undertakings in compliance with Sections 106 and 110.

Only portions of the ROWs subject to this EA have undergone systematic Phase I archaeological surveys since the mid-1990s in association with compliance with Section 106. As a result, numerous archaeological sites within the ROWs have been identified and evaluated with respect to their eligibility status for listing on the National Register of Historic Places (NRHP). Much of the survey work is conducted at the planning stages and prior to new construction of transmission lines.

3.8.1.2.2 Archaeological Sites

Prehistoric Archaeological sites located within the TVA study area can take many forms. These can range from low-density lithic artifact scatter to extensive and complex village sites. Prehistoric sites are most often discovered within sub-surface deposits or below ground. Near surface deposits have often been previously disturbed by historic plowing activities, but intact cultural deposits can occur below what is termed the ‘plowzone.’ Earlier prehistoric sites, namely Paleoindian and earlier Archaic sites, are less common and are characterized by low density lithic artifact scatters across a variety of topographical settings; both upland and along lower elevated landforms along river drainages. In general, Middle and Late Archaic sites are more numerous across the study area landscape. Later Woodland and Mississippian period as well as Protohistoric sites are common along terrace sequences of major rivers, including the Tennessee River. These sites can represent long-term villages and contain rich archaeological deposits. Lithic resource procurement sites are also prehistoric archaeological sites types that can occur within the study area.

Historic era archaeological sites throughout the study area are predominately associated with industrial, military, and domestic activities dating to the late eighteenth, nineteenth, and early twentieth centuries. Historic sites often contain both above- and below-ground cultural remains. Above-ground remains can be represented by structural remnants, wells and cisterns, and chimney remains mainly for industrial and domestic sites and various earthwork forms associated with Civil War military sites. Below-ground deposits can be represented by structure floors and layouts, storage cellars, and privies. Examples of industrial sites within the study area can include anything business related including mill complexes, iron furnaces, plantation operations, blacksmith shops, and taverns to name a few. Worker camp complexes can also occur within the study area. These can be associated with mill operations as well as early twentieth century TVA dam construction. Civil War military historic sites involve different types of sites, including battlefields, training camps, bivouacs (encampments), earthen fortifications, masonry fortifications, and other strictly military features on the landscape. Domestic sites are the most prevalent historic site within the study area. These sites are dotted across the landscape and can occur as small communities or individual farmstead complexes. Associated out buildings can also occur. In addition, historic cemeteries have been located within transmission line corridors and can represent themselves by single or multiple grave markers that may or may not be fenced off and maintained. In many cases, only a few grave markers remain, but depressions representing unmarked graves may be present.

The study area represents a diverse cultural landscape that held special meaning to its past inhabitants and to their descendants. Some of these places can be considered Traditional Cultural Properties (TCP). A TCP is defined as a property that is eligible for inclusion on the NRHP because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community (Parker and King 1998). Similarly, a cultural landscape is defined as "a geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values" (Birnbaum 1996). It should be noted that TVA does not disclose to the public any sensitive information regarding the location or other information such as sacred sites or TCPs identified by consulting tribes. Some examples of TCPs within the study area include segments of the Trail of Tears. The Congressionally designated Trail of Tears National Historic Trail is a prominent cultural resource within the study area. The Trail of Tears consisted of many routes and sub-routes that involved the removal of Native Americans from their ancestral homelands. Analysis indicated there are approximately 101 incidences where the Trail of Tears crosses TVA’s transmission lines within the ROWs planned for vegetation management. The majority of these crossings are where Trail of Tear/Removal Routes existing improved roads, which follows the historic alignment.

3.8.2 Environmental Consequences for Archaeological and Historic Resources

As described above a range of cultural resources have the potential to be present within the transmission line ROWs proposed for maintenance in FY22 and FY23, including prehistoric Native American archaeological sites, historic era archaeological sites, and TCPs including Trail of Tears segments. The majority of vegetation management activities within the ROW have little to no potential to affect cultural resources. Activities that have the potential to cause soil disturbance can disturb sub-surface cultural deposits related to both prehistoric and historic era archaeological sites. However, this potential effect would be low as activities are focused on maintaining vegetation within an established transmission line ROW. The use of spot or localized herbicides as a method to control vegetation within the

study area, would not adversely affect cultural resources. However, broadcast and aerial spray, which is rarely used, have the potential to affect culturally significant and traditionally used native plants should they be present. Methods involving manual vegetation activities include the use of hand tools for either pulling or cutting vegetation and have a low potential for disturbance of subsurface cultural resources given that vegetation would be cut and not actually removed from the soil. The use of machinery within the transmission line ROW has the potential to disturb sensitive above-ground historic resources, if present.

TVA executed a PA in consultation with the Advisory Council on Historic Preservation, seven SHPOs, and all federally recognized Indian tribes with an interest in the region. The purpose of the PA is to establish a program alternative for compliance with Section 106 of the NHPA that would allow compliance to be achieved more efficiently through consultation at the programmatic level. The PA set forth procedures and criteria for an alternative process for all existing TVA operation and maintenance activities that are similar and repetitive in nature. The majority of the activities associated with ROW vegetation management are covered within the PA.

TVA executed a PA with the seven state SHPOs and all federally recognized Indian tribes with an interest in the region. TVA released the PA for public comment in December 2018. The PA covers the majority of TVA vegetation management activities that are subject to the PEIS (TVA 2019), categorizing them in the PA into Appendix A and B activities. Appendix A activities are those activities that have been determined through the PA consultation process as being unlikely to affect historic properties and are therefore excluded from further Section 106 review. Appendix A activities include the "*use of herbicides (except for aerial applications), brush hog, mulcher, mower, and other light-duty equipment to control vegetation and establish or maintain ROW width that involve no new ground disturbance, with the exception of activities occurring within cemeteries or other previously flagged sensitive archaeological sites*." Archaeologically sensitive areas (including known Trail of Tear/Removal routes with the potential for intact deposits) and cemeteries would be restricted to hand clearing only and no mechanized equipment would be allowed within the boundaries. If such activities are proposed that fall outside of those described in the PA's Appendix A then TVA would follow the Section 106 process as set forth by the PA for those portions of the transmission line ROW.

3.9 Summary of Method Impacts and Mitigation Measures

As described in each of the preceding sections, and in TVA's PEIS (TVA 2019) which is incorporated by reference, each aspect of TVA's vegetation management program (vegetation control, debris management, restoration) vary with respect to their impact to environmental resources. A summary of impacts associated with each of the vegetation methods is provided in Appendix J.

TVA employs standard practices when constructing, operating, and maintaining transmission lines, structures, and the associated ROW and access roads. These can be found on TVA's transmission website (TVA 2021). Some of the more specific routine measures applied to reduce the potential for adverse environmental effects during the proposed vegetation management of ROW are as follows:

- O-SAR Process
- To minimize the introduction and spread of invasive species in the ROW, access roads and adjacent areas, TVA would follow standard operating procedures consistent with EO 13112 (Invasive Species) for revegetating with noninvasive plant species (TVA 2017a).
- Only EPA-registered and TVA approved herbicides determined to be safe for use near aquatic environments would be used in accordance with label directions.

The following O-SAR buffers would be applied near sensitive wildlife resources associated with the FY22 and FY23 vegetation management actions:

- Cave - 200 feet - No herbicide use within 200 feet of cave due to potentially sensitive subterranean aquatic resource. Hand clearing or small machinery clearing only (i.e.: chainsaws, brush hog, mowers). Vehicles and equipment confined to existing access roads. Avoid entering cave.
- Osprey nest - 660 feet - Either 1) Assume presence. No broadcast spraying. Only use brush hogs or mowers for vegetation removal or selective herbicide spraying between March 1 and July 31 within 660 feet of nest site; OR 2) Request seasonal field survey to determine if nest is active.
- Heronry - 660 feet - Either 1) Assume presence. No broadcast spraying. Only use brush hogs or mowers for vegetation removal or selective herbicide spraying between February 1 and July 15 within 660 feet of nest site; OR 2) Request seasonal field survey to determine if nests are active.
- Bald Eagle nest - 660 feet - Either 1) Assume presence. No disturbance, spraying, or vegetation clearing would occur between December 1 and July 1 within 660 feet of nest site; OR 2) Request seasonal field survey to determine if nest is active.
- In rare instances in which restricted actions need to take place while osprey or heron nests are active, TVA would coordinate with USDA-WS to ensure any actions comply with the conditions specified under USDA's "Take" permit.

Wetland BMPs (TVA 2017a) would be implemented within locations where mapped NWI and O-SAR wetlands are present and vegetation management activities are necessary:

- Work in wetland areas would occur on a dry season schedule (September to mid-November) when practicable.
- Soils ruts would not exceed 12 inches; if necessary, low ground pressure equipment would be used, such as rubberized tracks, wide tires, or lightweight ATVs in mapped wetlands to adequately minimize soil rutting/compaction/disturbance.
- Woody wetland vegetation should be cut less than 12 inches from ground level.
- Woody debris would be removed outside identified wetland area.

- Stumps would be left intact, no grubbing.
- Only aquatic approved herbicide would be permissible.
- Water flow into or out of mapped wetlands would not be restricted during work activities.
- Erosion control techniques would be implemented within 50 feet of identified wetland areas where soil disturbance is proposed.
- Existing contours within wetlands would be restored to preconstruction specifications.
- Disturbed and exposed wetland soils would be seeded upon completion of work (or within 14 days, whichever comes first).

Natural Areas mitigation measures to minimize impacts to include:

- The appropriate land manager would be contacted before implementing vegetation maintenance activities to coordinate timing of the ROW maintenance such to minimize impacts to visitors, park operations, scheduled hunting, etc.
- Opportunities would be sought to partner with natural area managers to plan and conduct vegetation management that would meet multiple natural resource management objectives.
- Where available, existing site-specific vegetation management plans would be utilized for ROWs that cross managed lands.

Archaeologically sensitive areas (including known trail of tear routes with the potential for intact deposits) and cemeteries would be restricted to hand clearing only and no mechanized equipment would be allowed within the boundaries. If such activities are proposed that fall outside of those described in the PA's Appendix A, then TVA would follow the Section 106 process as set forth by the PA for those portions of the transmission line ROW.

3.10 Environmental Consequences Summary of the Proposed Vegetation Management Alternative

ROWs with an IVM approach to promote the establishment of a low-growing herbaceous plant community (end-state) that is compatible with the safe and reliable operation of the transmission system. Routine vegetation maintenance would include identification and removal of vegetation within the ROW that is incompatible with TVA's desired end-state condition (herbaceous). Floor work planned for FY22 and FY23 within the twelve sectors in the TVA power service area would result in plant communities of variable composition that are managed in a low height existing condition. Due to the 2017 *Sherwood v. TVA* litigation, TVA stopped removing woody vegetation in the Buffer Zone of ROWs (except for trees identified as an immediate hazard). As a result, Buffer Zones within the existing ROW continued to contain vegetation incompatible with TVA's transmission system. The volume of non-compatible woody vegetation also increased within the previously-cleared ROWs due to the court injunction order. TVA would use LiDAR and other assessment techniques in a condition-based approach for identification and removal of incompatible vegetation and trees deemed as a risk to the reliability of the transmission system as defined by ANSI A300 Part 7, B-3.1 (2012).

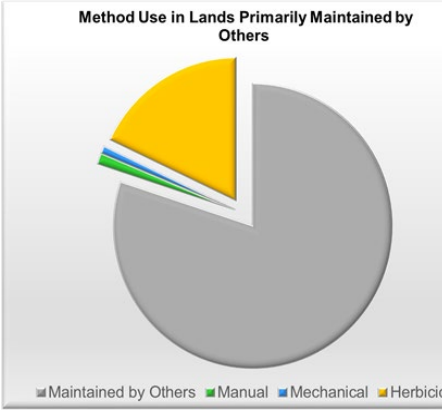
As part of this alternative, TVA would remove or trim any trees in the maintained area of the ROW, or in the non-maintained areas of the ROW, or any danger tree outside the ROW, in accordance with its contract rights, that it deems to present a risk to its transmission lines or structures. Within the Buffer Zone of the ROW, most trees that either remained or have redeveloped since the initial construction period would not be removed until NEPA has been completed on that Action. Thus, TVA would leave existing trees in the Buffer Zones of unmaintained ROW so long as they do not pose a risk to the transmission system.

As a result of the regular cycle of floor work, vegetation would be controlled using a range of techniques. Plant communities within the ROW would be maintained in the existing low-growing vegetative condition and the larger expanses of lands that may be subject to tree removal would remain forested with the exception of trees identified as a risk to the reliability of the transmission system. Woody vegetation would establish within the existing maintained ROW by either sprouting from existing root stocks or by germination and growth of propagules that are dispersed to the corridor from seed sources. Because TVA utilizes an IVM approach to manage vegetation on a site-specific basis, some localized impacts may be expected to result from the selection and application of methods of each tool as described for each of the resources described in the preceding sections. However, impacts of this alternative within a broader context (sector or study area) can be evaluated in consideration of:

- The frequency and context of tool application.
- TVA's O-SAR methodology (see Section 2.2.2 and Appendix I) for identification of sensitive resources that represent a BMP-approach to guiding vegetation management methods and minimizing environmental impacts.
- PAs and related agreements with other agencies including USFWS, USFS, NPS, SHPOs and tribes.
- Long-term cost effectiveness.
- Effect on system reliability and safety.
- Assessment approach.

Within lands actively managed and maintained by TVA, herbicide methods would be the primary tools used to maintain the floor in its existing condition. In general, vegetation within the ROW would be controlled using a mix of approximately 90 percent herbicide, 6 percent mechanical and 4 percent manual methods. The resulting end-state consisting of a mix of herbaceous and low-growing shrub species is more compatible and expected to provide improved habitat value that over time is expected to minimize intensity of floor work. For large public lands (NPS, USFS, etc.) methods would be subject to the terms of any special agreements and authorizations with each agency. Tree removal would be the focus of vegetation management within the ROW where such trees present a risk to the transmission system. Mechanical and manual methods would be used as the primary tools for controlling or removing such incompatible woody vegetation including trees in the maintained area or in the non-maintained areas of the ROW, or any danger tree that is outside the ROW.

Within lands primarily maintained by others but managed by TVA, it is expected that the approximately 80 percent of floor and buffer areas would be maintained by others using mechanical or manual methods. TVA would perform limited treatments of fence rows, towers, and other areas using primarily herbicide techniques. Additionally, TVA would use mechanical and manual methods as the primary tools for controlling or removing incompatible woody vegetation including trees in the maintained area or in the non-maintained areas of the ROW, or any danger tree outside the ROW.



Method Use in Lands Primarily Maintained by Others

As such, direct impacts to herbaceous plant communities' vegetation with this alternative would continue to exert a recurring impact on plants within the ROW. Such effects would include crushing, damaging, accidental treatment or removal of both target and non-target vegetation. However, because this is part of an existing program it would not result in widespread alteration of the overall plant community. Thus, overall impacts to vegetation are considered to be moderate as the routine maintenance of vegetation would periodically impact plant communities across the broader transmission system, but they would not destabilize the general plant communities of the study area.

As described in the PEIS (TVA 2019), other potential natural resource impacts of this disturbance within the ROW include the following:

- Limited disturbance and erosion of soils resulting from vegetation removal, traffic of maintenance equipment, and localized manual clearing activities.
- Potential for small, localized and short-term alteration of water quality from runoff including residual herbicides and sedimentation through erosion from disturbed surfaces are mitigated by use of O-SAR process and adherence to BMPs.
- Potential for small, localized and short-term effects on aquatic biota are minimized by use of the O-SAR process and adherence to BMPs.
- Potential removal of bat roost trees.
- Potential inadvertent spraying or damage to listed or sensitive plant species and communities.
- Potential for recruitment of sensitive herbaceous plant species within suitable areas of the ROW
- Potential for increased habitat and support for pollinator species.
- Disturbance and displacement of wildlife (disturbance or removal of habitats).
- Relatively increased long-term habitat quality associated with ROW floor end-state.
- Potential for generation of woody debris that may impede or alter flood flows.
- Potential for reduced frequency of vegetative controls in localized areas of the ROW that are established by inherently more compatible herbaceous and shrub communities.

However, sound planning and the incorporation of TVA's O-SAR process as a BMP measure and the incorporation of other established TVA ROW vegetation management BMPs (TVA 2017a) and established transmission-related environmental protection practices (Appendix H) would minimize the effects to sensitive resources (Appendix K) from this alternative. Each of the above effects would be localized and short-term disturbances that are not expected to result in notable or destabilizing effects on any of the above resources. As such, impacts from this alternative on the natural environment are minor.

Impacts on factors related to the human environment (land use, socioeconomics, air, noise, cultural resources, solid/hazardous waste, public and worker safety, etc.) and landowners/managers (residential, recreational, agricultural, commercial, industrial, NPS, USFS, city, county, and state) specific to this vegetation management approach would occur as a result of the repetitive and intensive maintenance disturbance on the ROW. Periodic recurring vegetation control of the floor would be conducted in conjunction with other vegetation management actions within Buffer Zones and along the edges of the ROW where danger trees may represent a risk to reliability and safety. The potential impacts of this repeated disturbance within the ROW to elements of the human environment include the following:

- Periodic presence of work crews on private and public lands within project areas.
- Transient movement of equipment and work crews on the associated roadway network.
- Localized air, greenhouse gas and noise emissions from operated equipment.
- Visual intrusion of workers and equipment.
- Disturbance of cultural resource sites.
- Periodic intrusions into the immediate viewshed of sacred sites.
- Management of debris.
- Need for access and local coordination efforts with affected landowners.
- Exposure of the public and workers to herbicides and other safety hazards.

Each of the above effects would be localized and short-term and are not expected to result in notable or destabilizing effects on any of the above resources. Additionally, impacts to cultural, historic and TCPs would be minimized by sound planning and the incorporation of mitigation measures such as TVA ROW vegetation management BMPs (TVA 2017a) and the executed Section 106 PA (Appendix D). They also may be minimized by adhering to any conditions or program alternative established in the Section 106 process. As such, impacts from this alternative on the elements of the human environment are minor.

Under this alternative, vegetation management activities within ROWs would continue within the safety-conscious culture in accordance with applicable standards or specific TVA guidance. TVA would continue to address and manage reduction or elimination of public and worker safety hazards through implementation of safety practices, training and control measures. Debris and wastes generated in conjunction with vegetation management would be managed in accordance with federal, state, and local requirements. Worker and public health and safety during vegetation management operations including material transportation would be maintained, and impacts to public health and safety would, in general, be minor.

3.11 Cumulative Impacts

The CEQ regulations (40 CFR 1500-1508) implementing the procedural provisions of the NEPA of 1969, as amended (42 USC 4321 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 regardless of what agency (federal or non-federal) or person undertakes such other actions (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 either explicitly or implicitly considers cumulative impacts.

3.11.1 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. Actions related to vegetation management within the existing transmission corridors vary with respect to location and timing. However, they are unified under this cumulative effects analysis as “similar” actions. Therefore, for this EA cumulative effects analysis TVA’s study area is considered to be the appropriate context for analysis of cumulative effects of TVA vegetation management for most resource areas. The TVA study area is a more than 82,000 square mile area that is inclusive of all areas where TVA maintains transmission system ROWs.

3.11.2 Identification of “Other Actions”

TVA recognizes that many types of state, private and non-federal activities within the TVA power service area have potential to occur in the foreseeable future, and that these would have varying levels of impact on environmental resources. Such actions may include state highway maintenance and improvement projects, airport operations and expansions, rail development projects, and industrial and mining operations.

Other actions may include routine maintenance and/or improvement of public lands by state and local agencies or an influx of new companies that leads to new infrastructure.

There also could be cumulative effects that result from implementation of a TVA activity or activities that is as yet unforeseen, such as the transfer of land from TVA to another landowner. Under this situation, TVA may or may not know what is planned for the land following the transfer as such potential future development is not reasonably foreseeable. Therefore, the potential impacts cannot be incorporated into this cumulative effects assessment. Future routine operations and including vegetation maintenance activities conducted by TVA have the potential to trigger state, private and non-federal actions. Those actions cannot be identified sufficiently to take them into account in TVA’s analyses other than in the broadest sense. Therefore, for this analysis TVA considered its broader program activities within the study area, coupled with other past and ongoing vegetation maintenance activities (across all land uses) as representing the baseline conditions within the study area. As such this baseline is the predominant and appropriate context for analysis against the proposed vegetation maintenance activities.

3.11.3 Analysis of Cumulative Effects

To address cumulative impacts, the existing affected environment surrounding the proposed action was considered in conjunction with the anticipated environmental impacts as described. Effects to natural and human resources under the Action Alternative would be localized and short-term and are not expected to result in notable or destabilizing effects. TVA would still develop new transmission line ROW, resulting in the clearing of additional vegetation, including forests. Future transmission line development would result in additional conversion of forest or tree dominated communities to herbaceous communities. However, because TVA's transmission line ROWs are linear in nature and spread out over a large geographical area, the construction of future transmission corridors in combination with the proposed vegetation management method would contribute relatively minor impacts when viewed in the context of the study area. In addition, when considered together with other actions in the region, including farming, logging, or industrial/commercial development, vegetation maintenance activities by TVA are not considered to have significant cumulative impacts on natural resources.

3.12 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 avoid, minimize or compensate for potential environmental impacts. Managing vegetation requires controlling the growth of plants within the ROW, which is an adverse effect. However, this adverse effect is needed to promote the safe, efficient and reliable operation of the existing transmission system. Sound planning, the incorporation of TVA's O-SAR process as a BMP measure, and the incorporation of other established TVA ROW vegetation management BMPs identified in this EA would reduce adverse effects associated with vegetation management practices.

The presence of humans and noise from vegetation maintenance activities has the potential to temporarily disturb wildlife located within the ROW. However, it is anticipated that wildlife would avoid areas when work is underway and TVA employs mitigation measures as described in Section 3.2.2 for specific animals and habitats. These adverse effects would be temporary, short-term and localized.

Additional unavoidable adverse impacts would be dependent on the specific vegetation control method selected. Although each vegetation control method creates unavoidable adverse impacts, TVA considers the environmental setting as well as cost effectiveness in its selection of control method.

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

3.13 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. For the purposes of this EA, vegetation maintenance activities including controlling vegetation within TVA transmission line ROWs are considered a short-term use of the environment. Long-term productivity relates to converting the natural productivity of the land to some developed use including transmission lines.

Under the Action Alternative, TVA would manage vegetation height within the ROW. The long-term productivity of lands within TVA's transmission system ROWs has already been affected by construction of the existing facilities. The use of transmission line ROWs for transmitting power precludes the use of the land for some activities (e.g., mining, timber production) and the implementation of a vegetation management program would not affect long-term productivity.

3.14 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 time spans, 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 natural resources and are not necessarily irreversible.

Resources required by vegetation maintenance activities, including labor and fossil fuels for vehicles and equipment, would be irreversibly lost regardless of the alternative selected. However, it is unlikely that their limited use in TVA's vegetation management program would adversely affect the overall future availability of these resources.

Land and natural resources within TVA's ROWs were previously committed to uses compatible with safe and reliable electric transmission at the time the transmission lines were constructed. While this commitment is considered to be long-term, it is not irretrievable as transmission lines may be decommissioned and lands re-committed to other uses. Additionally, uses of lands primarily maintained by others would be unaltered with any alternative as the productivity of croplands, orchards and other related lands would not be modified. No new transmission lines would be constructed as part of the No Action or the proposed action alternative. Vegetation management would not impact potential future uses of the land should the transmission lines be removed. Therefore, no additional areas of land or natural resources would be irretrievably committed under any alternative.

CHAPTER 4 – LIST OF PREPARERS

4.1 NEPA Project Management

Anita E. Masters

Education:	M.S., Biology/Fisheries; B.S., Wildlife Management
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Experience:	8 years in Biological Data Collection, 6 months in Environmental Reviews

CHAPTER 5 – LITERATURE CITED

American National Standards Institute (ANSI). 2012. American National Standard for Tree Care Operations – Tree, Shrub, and Other Woody Plant Management Standard Practices (IVM 1. Utility Rights-of-way). ANSI A300 (Part 7)-2012.

Anderson, D. G. and L. P. Sullivan. 2013. Tennessee Archaeology: A Synthesis. Retrieved from https://anthropology.utk.edu/tennessee_archaeology-a_synthesis/ (accessed December 2017).

Annett, R., H.R. Habibi, and A. Hontela. 2014. Impact of Glyphosate and Glyphosate-Based Herbicides on the Freshwater Environment. Journal of Applied Toxicology, 34(5): 458-479.

Birnbaum, C. A. 1996. Protecting Cultural Landscapes: Planning, Treatments and Management of Historic Landscapes.

Cornell Lab of Ornithology. 2021. All About Birds. Cornell Lab of Ornithology, Ithaca, New York. https://www.allaboutbirds.org Accessed on April 2021.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deep Water Habitats of the United States. U.S. Fish and Wildlife Service.

Davis, R.P. Stephen, Jr. 1990. Aboriginal Settlement Patterns in the Little Tennessee River Valley. Publications in Anthropology No. 54. Tennessee Valley Authority, Knoxville.

Dennis, S.D. 1984. Distributional Analysis of the Freshwater Mussel Fauna of the Tennessee River System, with Special Reference to Possible Limiting Effects of Siltation. Dissertation. Virginia Polytechnic Institute and State University, Blacksburg, Virginia.

EPA (U.S. Environmental Protection Agency). 2017a. Ecoregions of North America. Retrieved from https://www.epa.gov/eco-research/ecoregions-north-america (accessed June 2020).

_____. 2017b. Wetlands Classification and Types. Retrieved from https://www.epa.gov/wetlands/wetlands-classification-and-types#marshes (accessed June 2020).

Etnier, D.A. and W.C. Starnes. 1993. The Fishes of Tennessee. University of Tennessee Press. Knoxville, Tennessee.

Faulkner, C. H. 2002. Woodland Cultures of the Elk and Duck River Valleys, Tennessee: Continuity and Change. In: *The Woodland Southeast, edited by D. G. Anderson and R.C. Mainfort, Jr., pp. 185-203*. The University of Alabama Press, Tuscaloosa.

Federal Geographic Data Committee. 2013. Classification of Wetlands and Deepwater Habitats of the United States. FGDC-STD-004-2013. Second Edition. Wetlands Subcommittee, Federal Geographic Data Committee and U.S. Fish and Wildlife Service, Washington, DC.

Gremillion, K. J. 1996. Early Agricultural Diet in Eastern North America: Evidence from Two Kentucky Rockshelters. American Antiquity 61:520-536.

Harle, M. S., S. D. Koerner, and B. R. Braly. 2013. The Late Mississippian Period (A.D. 1350-1500) – Draft. In *Tennessee Archaeology: A Synthesis, edited by D. G. Anderson and L. P. Sullivan. Electronic document*, Retrieved from http://web.utk.edu/~anthrop/research/TennesseeArchaeology/.

Hudson, C. 2002. Introduction. The Transformation of the Southeastern Indians 1540-1760, edited by Robbie Ethridge and Charles Hudson, pp. 3-20. The University Press of Mississippi, Jackson.

Justice, N. D. 1987. Stone Age Spear and Arrow Points of the Midcontinental and Eastern United States. Indiana University Press, Bloomington.

Kays, J.S., and C.D. Canham. 1991. Effects of Time and Frequency of Cutting on Hardwood Root Reserve and Sprout Growth. Forest Science 37(2): 524-539.

Lewis, T.M. and M. Kneberg. 1995. Prehistory of the Chickamauga Basin in Tennessee. Edited by Lynne P. Sullivan. Tennessee Anthropological Papers 1. Department of Anthropology, University of Tennessee, Knoxville.

NatureServe. 2021. NatureServe Explorer: An Online Encyclopedia of Life. Arlington, VA. U.S.A. Retrieved from http://explorer.natureserve.org (accessed April 2021).

Noss, R. F. 2013. Forgotten Grasslands of the South: Natural History and Conservation. Island Press.

Omernik, J. M. 1987. Ecoregions of the Conterminous United States. Annals of the Association of American Geographers.

Parker, P. and T. King. 1998. (revised) Guidelines for Evaluation and Documenting Traditional Cultural Properties. National Register Bulletin N. 38.

Parmalee, P.W. and A.E. Bogan. 1998. The Freshwater Mussels of Tennessee. University of Tennessee Press, Knoxville.

Rolando, C.A., B.R. Baillie, D.G. Thompson, and K.M. Little. 2017. The Risks Associated with Glyphosate-Based Herbicide Use in Planted Forests. Forests 8(6): 208.

Samoray, S. 2011. 2011 White-nose Syndrome Monitoring and Bat Population Survey of Hibernacula in Tennessee. Prepared by: Steve Samoray for The Tennessee Chapter of The Nature Conservancy.

Sassaman, K. E. 1996. Technological Innovations in Economic and Social Contexts. In Archaeology of the Mid-Holocene Southeast, edited by K.E. Sassaman and D.G. Anderson, pp. 57-74. University of Florida Press, Gainesville.

Scarbrough, S.L., C.R. Jackson, S. Marchman, G. Allen, J. Louch, and M. Miwa. 2015. Herbicide Concentrations in First-Order Streams after Routine Application for Competition Control in Establishing Pine Plantations. Forest Science 61(3): 604-612.

Schilling, E. M. and J. D. Williams. 2002. Freshwater Mussels (Bivalvia: Margaritiferidae and Unionidae) of the Lower Duck River in Middle Tennessee: A Historic and Recent Review. Southeastern Naturalists 1(4):403-414.

Schlosser, I.J. 1987. A Conceptual Framework for Fish Communities in Small Warmwater Streams. In: *Community and Evolutionary Ecology of North American Stream Fishes, W.J. Matthews, and D.C. Heins (Eds.)*. University of Oklahoma Press, Norman, Oklahoma, pp. 17-32.

Scott, A. F. and W. H. Redmond. 2021. Atlas of Reptiles in Tennessee. The Center for Field Biology. Austin Peay State University. Clarksville, Tennessee. Available at https://www.apsubiology.org/tnreptileatlas/ (accessed April 2021).

Sickel, J.B., M.D. Burnett, C.C. Chandler, C.E. Lewis, H.N. Blalock-Herod, and J.J. Herod. 2007. Changes in the Freshwater Mussel Community in the Kentucky Portion of Kentucky Lake, Tennessee River, since Impoundment by Kentucky Dam. Journal of Kentucky Academy of Science 68(1): 68-80.

Smith, M. T. 2002. Aboriginal Population Movements in the Postcontact Southeast. In The Transformation of the Southeastern Indians 1540 to 1760, edited by Robbie Etheridge and Charles Hudson, pp. 3-20. University Press of Mississippi, Jackson.

Tatum, V.L., C.R. Jackson, M.W. McBroom, B.R. Baillie, E.B. Schilling, and T.B. Wigley. 2017. Effectiveness of Forestry Best Management Practices (BMPs) for Reducing the Risk of Forest Herbicide Use to Aquatic Organisms in Streams. Forest Ecology and Management 404: 258-268.

Tennessee Valley Authority (TVA). 2004. Final Programmatic Environmental Impact Statement for the Reservoir Operations Study. Knoxville, Tennessee.

_____. 2011a. Final Environmental Impact Statement. Natural Resource Plan, Alabama, Georgia, Kentucky, Mississippi, North Carolina, Tennessee, and Virginia. July 2011.

_____. 2011b. Natural Resource Plan. Knoxville, Tennessee. Retrieved from https://www.tva.gov/file_source/TVA/Site%20Content/Environment/Environmental%20Stewardship/Environmental%20Reviews/NRP/nrp_complete.pdf (accessed December 2017).

_____. 2017a. A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities, Revision 3. Edited by G. Behel, S. Benefield, R. Brannon, C. Buttram, G. Dalton, C. Ellis, C. Henley, T. Korth, T. Giles, A. Masters, J. Melton, R. Smith, J. Turk, T. White, and R. Wilson. Chattanooga, TN. Retrieved from https://tva-azr-eastus-cdn-ep-tvawcm-prd.azureedge.net/cdn-tvawcma/docs/default-source/energy/transmission/a-guide-for-environmental-protection-and-best-management-practices-for-tva-construction-and-maintenance-activities.pdf?sfvrsn=60c6b80d_2 (accessed April 2021).

_____. 2019. Transmission System Vegetation Management: Final Programmatic Environmental Impact Statement. Chattanooga, TN. Retrieved from https://www.tva.com/environment/environmental-stewardship/environmental-reviews/nepa-detail/Transmission-System-Vegetation-Management-Program (accessed April 2021).

_____. 2021. Transmission: Current TVA Transmission System Projects – Related Guidelines and Specifications. https://www.tva.com/energy/transmission (accessed May 2021).

Tiner, R.W. 1997. NWI Maps: What They Tell Us. National Wetlands Newsletter 19(2): 7-12.

Tennessee Wildlife Resources Agency. 2021. Tennessee's Watchable Wildlife. Retrieved from http://www.tnwatchablewildlife.org/index.cfm (Accessed April 2021).

United South and Eastern Tribes. 2007. Sacred Ceremonial Stone Landscapes found in the Ancestral Territories of USET member Tribes. 2007:037. https://www.usetinc.org/resources/resolutions/culture-heritage/ (accessed June 2019).

U.S. Fish and Wildlife Service (USFWS). 1977-2017. National Wetlands Inventory website. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. http://www.fws.gov/wetlands/.

_____. 2015. Threatened Species Status for *Platanthera integrilabia* (White Fringeless Orchid): Proposed rule. 80 FR 55304 55321.

_____. 2021. Information for Planning and Consultation (IPaC). U.S. Department of the Interior. Retrieved from https://ecos.fws.gov/ipac/ (accessed April 2021).

Warren, N., I.J. Allan, J.E. Carter, W.A. House, and A. Parker. 2003. Pesticides and Other Micro-organic Contaminants in Freshwater Sedimentary Environments—a Review. Applied Geochemistry 18(2): 59-194.

Warrington, B.M., W.M. Aust, S.M. Barrett, W.M. Ford, C.A. Dolloff, E.B. Schilling, T.B. Wigley, and M.C. Bolding. 2017. Forestry Best Management Practices Relationships with Aquatic and Riparian Fauna: A Review. Forests, 8(9): 331.

Weakley, A.S. and M. P. Schafale. 1994. Non-alluvial wetlands of the southern Blue Ridge: Diversity in a threatened ecosystem. Water, Air, and Soil Pollution 77:359-383.

Webb, W. S. 1939. An Archaeological Survey of the Wheeler Basin on the Tennessee River in Northern Alabama. Smithsonian Institution Bureau of American Ethnology, Bulletin 122. United States Government Printing Office, Washington, D.C.

Wegner, K.F. 1953. The Sprouting of Sweetgum in Relation to Season of Cutting and Carbohydrate Content. Plant Physiology 28(1): 35-49.

Appendix A – Federal and State Agencies, and Federally Recognized Native American Tribes Represented in the TVA Power Service Area that were Recipients of the Programmatic Transmission System Vegetation Management Environmental Impact Statement

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Agencies and Tribal Recipients of the Programmatic Transmission System Vegetation Management Environmental Impact Statement

Following is a list of the federal and state agencies, and federally recognized Native American tribes represented in the TVA power service area who received copies of the Transmission System Vegetation Management EIS (PEIS) or notices of its availability with instructions on how to access the PEIS on the project web page.

Federal Agencies

USDA Forest Service, Region 8, Atlanta, GA
U.S. Environmental Protection Agency, Washington, DC
U.S. Environmental Protection Agency, Region 4, Atlanta, GA
Department of Interior, Atlanta, GA
U.S. Fish and Wildlife Service, Southeast Region Office, Atlanta, GA
U.S. Fish and Wildlife Service, Frankfort, KY
U.S. Fish and Wildlife Service, Asheville, NC
U.S. Fish and Wildlife Service, Abingdon, VA
U.S. Fish and Wildlife Service, Cookeville, TN
U.S. Fish and Wildlife Service, Gloucester, VA
U.S. Fish and Wildlife Service, Daphne, AL
U.S. Fish and Wildlife Service, Athens, GA
U.S. Army Corps of Engineers, Savannah District
U.S. Army Corps of Engineers, Nashville District
U.S. Army Corps of Engineers, Memphis District
U.S. Army Corps of Engineers, Wilmington District
U.S. Army Corps of Engineers, Vicksburg District
U.S. Army Corps of Engineers, Mobile District
Economic Development Administration, Atlanta, GA
Advisory Council on Historic Preservation

Federally Recognized Tribes

Cherokee Nation
Eastern Band of Cherokee Indians
United Keetoowah Band of Cherokee Indians in Oklahoma
The Chickasaw Nation
Muscogee (Creek) Nation of Oklahoma
Poarch Band of Creek Indians
Alabama-Coushatta Tribe of Texas
Alabama-Quassarte Tribal Town
Kialegee Tribal Town
Thlopthlocco Tribal Town
Choctaw Nation of Oklahoma
Jena Band of Choctaw
Mississippi Band of Choctaw
Seminole Tribe of Florida
Seminole Nation of Oklahoma
Absentee Shawnee Tribe of Oklahoma
Eastern Shawnee Tribe of Oklahoma
Shawnee Tribe

State Agencies

Alabama
- Department of Agriculture and Industries
- Department of Conservation and Natural Resources
- Department of Economic and Community Affairs
- Department of Environmental Management
- Department of Transportation
- Alabama Historic Commission
- Top of Alabama Regional Council of Governments
- North-Central Alabama Regional Council of Governments
- Northwest Alabama Council of Local Governments

Georgia
- Georgia State Clearinghouse
- Historic Preservation Division

Kentucky
- Department for Local Government
- Department for Environmental Protection
- Energy and Environment Cabinet
- Department for Energy Development and Independence
- Department for Natural Resources
- Kentucky Heritage Council

Mississippi
- Northeast Mississippi Planning and Development District
- Department of Finance and Administration
- Department of Environmental Quality
- Department of Wildlife, Fisheries, and Parks
- Historic Preservation Division

North Carolina
- North Carolina State Clearinghouse
- Office of Archives and History

Tennessee
- Department of Environment and Conservation
- Office of Policy and Planning
- Tennessee Historical Commission
- Tennessee Wildlife Resources Agency
- First Tennessee Development District
- East Tennessee Development District
- Southeast Tennessee Development District
- Upper Cumberland Development District
- South Central Tennessee Development District
- Greater Nashville Regional Council
- Southwest Tennessee Development District
- Memphis Area Association of Governments
- Northwest Tennessee Development District

Virginia
- Office of Environmental Review
- Department of Historic Resources

Appendix B – Agency Correspondence and Consultation on Federally Listed Bat Species on Routine TVA Actions

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Appendix C – Agency Correspondence and Consultation on Federally Listed Threatened and Endangered Species (Except Bats) on the Impacts of Routine Vegetation Management Activities

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Appendix D – National Historic Preservation Act Programmatic Agreement on TVA Operation and Management Activities

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Appendix E –General Agreement Addressing TVA Right-of-Way Easements and Permits on National Park Service Lands

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United States Department of the Interior

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

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

APR 10 2019

Tricia Roelofs
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, Tennessee 37901

Dear Ms. Roelofs:

Enclosed is a signed General Agreement between the Tennessee Valley Authority and the National Park Service (NPS) which addresses vegetation management for electric transmission and distribution line right-of-way easements and permits on NPS lands. If you have any questions, please contact Anita Barnett at Anita_Barnett@nps.gov or 404-507-5706.

Sincerely,

Robert A. Vogel
Regional Director

Enclosure

GENERAL AGREEMENT
ON VEGETATION MANAGEMENT FOR POWERLINE RIGHTS-OF-WAY

Between

TENNESSEE VALLEY AUTHORITY

and

U.S. DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

I. Purpose

This General Agreement (GA) is entered into by the Tennessee Valley Authority (TVA) and the National Park Service (NPS) and addresses vegetation management for electric transmission and distribution line right-of-way (ROW) easements and permits (referred to throughout this GA as powerline ROWs) on NPS lands. The GA will help facilitate cooperation and coordination among TVA and the NPS regarding vegetation management within and immediately adjacent to existing and future powerline ROWs and associated facilities. Specifically, the GA will expedite implementation of cost-effective and environmentally sound vegetation management plans, procedures, and practices for powerline ROWs that will identify and, if possible, reduce any potential adverse environmental and cultural impacts while enhancing the ability of utilities to provide uninterrupted electrical service to customers and address public safety, including the public safety risks that may arise from wildfires caused by inadequate vegetation management.

This GA does not substitute for park-specific agreements, which should be established, or updated where existing, between TVA and individual NPS parks to address issues specific to that park unit, including consideration and/or protection of cultural resources, protection of state and federally listed species and habitats, and other similar relevant issues.

II. Authorities

TVA is a federal agency and instrumentality of the United States, created by and existing pursuant to the TVA Act (1933) to foster the social and economic welfare of the people in the Tennessee River Valley, promote stewardship of the region's natural resources, provide low cost energy, and improve flood control and navigation of the Tennessee River and its tributaries. In furtherance of that mission, TVA operates and maintains the nation's largest public power system, including hydropower, coal, gas, nuclear, solar and wind generation facilities, auxiliary structures and electrical distribution lines and facilities. Also in furtherance of that mission, TVA maintains approximately 237,000 acres of transmission line ROW powerline easements, collectively over 16,200 circuit miles.

The NPS is directed to manage all national park lands to protect and preserve natural and cultural resources, pursuant to the National Park Service Organic Act, 54 U.S.C. 100101. The NPS is

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responsible for managing nearly 84 million acres with over 400 units of the National Park System. The mission of the NPS is to preserve unimpaired the natural and cultural resources and values of the National Park System for the enjoyment, education, and inspiration of current and future generations. The NPS also has management responsibilities over other areas, including parts of the National Wild and Scenic Rivers System, National Trails System, National Heritage Areas, and NPS Affiliated Areas, which are closely linked in importance and purpose to those areas directly managed by the NPS. Each park unit has its own enabling legislation that defines the purpose of the park and other specifics related to resource protections. Management, including the issuance of permits, for each NPS unit is directed by each unit's superintendent.

III. Coordination and Cooperation

A number of TVA's powerline easements pass through NPS land. Therefore, coordination and cooperation between TVA and the NPS is important to enhance electric transmission reliability, increase maintenance efficiencies, reduce management costs, prevent the spread of invasive plants, reduce fuel loads, reduce the risk of wildfires, and minimize other potential environmental and cultural resource impacts and human safety risks. This coordination and cooperation should include each party's best efforts toward the following goals:

A. Completion of natural resource surveys to identify sensitive habitats and threatened and endangered flora within TVA ROWs on NPS land where appropriate.
B. Sharing data on state and federal listed species and protected habitats within and adjacent to ROWs to ensure that ROW access and management within ROWs protects sensitive species and habitats to the full extent possible.
C. Development of vegetation management plans that identify vegetation control prescriptions within a given year for each powerline ROW on NPS land. Such vegetation management plans must comply with applicable federal mandates and policies, be consistent with operations and maintenance plans for each powerline, and consider requirements for Federal reliability standards.
D. Develop protocols for maintenance, access, and safety. This includes protocols for wildfire management and response.

IV. Roles and Responsibilities

A. Both TVA and the NPS will:
    a. Facilitate coordination with each other at the local level to develop vegetation management plans, and cooperate to complete any necessary vegetation surveys for plan development. In addition, the Parties will work together on any necessary land use authorizations for powerline ROWs on NPS lands.
    b. Promote safety during vegetation management activities associated with powerline ROWs on NPS lands. The parties to this GA acknowledge that:
        i. In general, the safety of electric utility workers and the public at transmission and distribution facilities is the responsibility of TVA. Moreover, TVA will conduct their operations in accordance with applicable National Electrical Safety Code (NESC) and Occupational Safety and Health Administration (OSHA) standards, and the terms and

conditions in the ROW authorizations, and other worker protection standards where applicable.

ii. The NPS will coordinate with TVA to develop appropriate measures to ensure personal and public safety and protection of NPS lands and resources during vegetation management activities.

c. Address the management of trees that have the potential to interfere with the reliable operation of TVA's transmission system in all vegetation management plans and authorizations.
d. Prevent and control the spread of invasive species through a proactive and integrated management approach along powerline ROWs on NPS lands.
e. Work together to identify resource protection needs or cooperative resource management opportunities within TVA ROWs on NPS lands, such as pollinator enhancement projects and/or establishment of early successional habitat through the use of selective herbicide application or other methods.
f. Coordinate their efforts to comply with Section 106 of the National Historic Preservation Act. NPS and TVA will work together to address any cultural or tribal resources potentially affected by vegetation management and seek ways to balance and integrate cultural and natural resource management, including working together to identify opportunities for selective herbicide use to avoid potential impacts to cultural resources
g. Coordinate measures to protect sensitive species or habitats.
h. Consider the impacts of various vegetation management strategies on other resources, such as potential impacts to water quality from herbicide use or soil erosion.
i. Consider wetland impacts, both permanent and temporary, from vegetation management actions, such as use of heavy equipment, changes to the plant community and potential hydrology alterations.
j. Work together to establish site-specific wildfire prevention and response plans.

B. TVA will:

a. Provide the NPS with the necessary information for development of the proposed or revised vegetation management plan for ROWs on NPS lands. The information will include vegetation surveys, proposed treatment procedures and herbicide or pesticide use, maps, best management practices, and mitigation measures.
b. Develop site-specific vegetation management plans collaboratively with the NPS.
c. Collaborate and coordinate with the NPS on vegetation management activities associated with the powerline ROW with individual parks.
d. Ensure that TVA employees and contractors are informed on the terms and conditions of applicable ROW permits and approved vegetation management plans to best ensure compliance and avoid unauthorized boundary encroachment and resource damage.
e. Ensure this GA is disseminated to appropriate TVA staff and contractors within three months of the effective date.

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C. NPS will:

a. To the extent practicable and consistent with other NPS obligations and priorities, strive to review requests for any required, non-emergency vegetation management for powerline ROWs on NPS lands within 60 calendar days of receipt from TVA.
b. Review and provide park-level input on draft vegetation management plans, including wildlife protection requirements and mitigation measures.
c. When necessary, the NPS will use information provided by TVA to develop permit terms and conditions.
d. Ensure this GA is disseminated to all appropriate units of the National Park System within three months of the effective date.
e. Identify cultural resources on NPS lands that may need to be addressed in ROW vegetation plans and any related resource protection requirements; information regarding certain cultural resources, including their exact location, may be legally protected under Federal law and require safeguarding.

V. Principal Contacts

The principal contacts for this GA are:

Tricia Roelofs
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, TN 37902
(202) 436-6043
tlroelofs@tva.gov

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Niki Stephanie Nicholas
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mary_risser@nps.gov

Kim Kirk (Acting)
Superintendent, Russell Cave National Monument
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Bridgeport, AL 35740
(256) 495-2672
kim_kirk@nps.gov

VI. Implementation, Amendments, and Termination

This GA will become effective on the date it is fully executed and will remain in effect for five years, unless it is terminated in writing by TVA or NPS prior to its expiration. This GA may be amended with the written consent of TVA and NPS.

VII. Non-Fund-Obligating Document

Each party will fund its own participation under this GA and will carry out its separate activities in a coordinated and mutually beneficial manner. Nothing in this Agreement obligates the NPS

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to expend in any one fiscal year any sum in excess of appropriations made by Congress, or to involve the NPS in any contract or other obligation for the further expenditure of money in excess of such appropriations or allocations.

Although TVA is committed to cooperating with the NPS to the full extent possible, nothing in this Agreement shall obligate TVA to spend funds in excess of its annual ROW vegetation management budget.

VIII. Limitations

This GA is not intended to and does not create any right, benefit, or trust responsibility, substantive or procedural, enforceable at law or equity, by a party against the United States, its agencies, its officers, or any person. This GA has no legal effect on existing or future land use authorizations for powerline ROWs on NPS lands.

Nothing in this Agreement obligates TVA or the NPS to expand their respective legal obligations under the National Environmental Policy Act, the Endangered Species Act, National Historic Preservation Act, or any other law or regulation applicable to their respective activities on TVA ROW powerline easements.

IX. Authorized Representatives

In Witness Hereof, the Parties hereto have signed their names and executed this General Agreement.

Tricia L. Roelofs
Senior Manager
Tennessee Valley Authority

5.2.19
Date

Robert A. Vogel
Southeast Regional Director
National Park Service

4-10-19
Date

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Appendix F – Fiscal Year 2022 Planning Cycle - Transmission Line Segments by Sector Proposed for Vegetation Management

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Appendix Table F-1. TVA Transmission System Line Segments Proposed for Vegetation Management in Fiscal Year 2022

SECTOR NAME	SECTOR ABBREVIATION	PRIMARY LINE NAME
Centerville	CV	DAVIDSON-MONTGOMERY
Centerville	CV	BROWNS FERRY-MAURY
Centerville	CV	MT PLEASANT-ELK RIDGE
Centerville	CV	JOHNSONVILLE-MONSANTO1
Centerville	CV	LAWRENCEBURG-PULASKI
Centerville	CV	JOHNSONVILLE-CENTERVILLE
Centerville	CV	JOHNSONVILLE-MT PLEASANT1
Centerville	CV	JOHNSONVILLE-CUMBERLAND
Centerville	CV	CENTERVILLE-WAYNESBORO
Centerville	CV	JOHNSONVILLE-MCEWEN
Centerville	CV	COLUMBIA-MT PLEASANT
Cleveland	CL	ALPHA - COLVARD
Cleveland	CL	APALACHIA - BASIN
Cleveland	CL	APALACHIA-E CLEVELAND 1
Cleveland	CL	APALACHIA -E CLEVELAND 2
Cleveland	CL	BASIN -TOCCOA
Cleveland	CL	BULL RUN- WATTS BAR NP 500 KV
Cleveland	CL	CONCORD - W RINGGOLD
Cleveland	CL	E CLEVELAND - CATOOSA
Cleveland	CL	E CLEVELAND-MCDONALD
Cleveland	CL	FT LOUDOUN - ATHENS
Cleveland	CL	FULLER - MOSS LAKE
Cleveland	CL	HIWASSEE - MURPHY
Cleveland	CL	SEQUOYAH NP - CHARLESTON 1
Cleveland	CL	SEQUOYAH-CHICKAMAUGA 1
Cleveland	CL	SEQUOYAH-WATTS BAR HP
Cleveland	CL	W RINGGOLD - ALPHA
Cleveland	CL	WATTS BAR-ROANE
Hickory Valley	HV	BOLIVAR-WHITESVILLE
Hickory Valley	HV	BURNSVILLE-TRI STATE
Hickory Valley	HV	COLBERT-SELMER
Hickory Valley	HV	CORDOVA-FREEPORT
Hickory Valley	HV	CORDOVA-HICKORY VALLEY 2
Hickory Valley	HV	CORDOVA-S JACKSON
Hickory Valley	HV	CORINTH-BIGGERSVILLE
Hickory Valley	HV	HICKORY VALLEY-WHITESVILLE
Hickory Valley	HV	MARTINTOWN-ENTERPRISE

SECTOR NAME	SECTOR ABBREVIATION	PRIMARY LINE NAME
Hickory Valley	HV	NEW ALBANY-BELDEN
Hickory Valley	HV	NEW ALBANY-CORINTH
Hickory Valley	HV	NEW ALBANY-HOLLY SPRINGS
Hickory Valley	HV	PICKWICK-CORINTH
Hickory Valley	HV	PICKWICK-TRI STATE
Hickory Valley	HV	SHELBY-DELL
Hickory Valley	HV	UNION-NEW ALBANY
Hickory Valley	HV	BOLIVAR-WHITESVILLE
Hopkinsville	HK	BARKLEY-HOPKINSVILLE
Hopkinsville	HK	BARKLEY-OAKWOOD SW ST
Hopkinsville	HK	KENTUCKY DAM-EARLINGTON
Hopkinsville	HK	KENTUCKY DAM-ROCKCASTLE
Hopkinsville	HK	MARSHALL-C33(DOE)
Hopkinsville	HK	PARADISE-HOPKINSVILLE 1
Hopkinsville	HK	PARADISE-HOPKINSVILLE 2
Hopkinsville	HK	SHAWNEE-C-33(DOE)
Hopkinsville	HK	SHAWNEE-C-37(DOE)
Hopkinsville	HK	SHAWNEE-CLINTON
Madison	MD	ALBERTVILLE-ALBERTVILLE DST
Madison	MD	BELLEFONT-SCOTTSBORO
Madison	MD	BROWNS FERRY-MADISON 1
Madison	MD	BROWNS FERRY-MAURY
Madison	MD	FT PAYNE-GROVE OAK
Madison	MD	GOOSE POND-FT PAYNE
Madison	MD	GUNTERSVILLE-FARLEY
Madison	MD	HUNTSVILLE-DECATUR
Madison	MD	MADISON-FARLEY1
Madison	MD	SCOTTSBORO-HENAGAR
Madison	MD	WIDOWS CR-GOOSE POND
Madison	MD	WIDOWS CR-MADISON
Manchester	MC	BELFAST-CORNERSVILLE
Manchester	MC	CHICKAMAUGA -MOCCASIN 1
Manchester	MC	FRANKLIN-AEDC
Manchester	MC	FRANKLIN-BELFAST
Manchester	MC	FRANKLIN-WINCHESTER
Manchester	MC	GREAT FALLS - SPRING CITY
Manchester	MC	GREAT FALLS-MCMINNVILLE
Manchester	MC	GREAT FALLS-W COOKEVILLE

SECTOR NAME	SECTOR ABBREVIATION	PRIMARY LINE NAME
Manchester	MC	MAURY-RUTHERFORD
Manchester	MC	RACCOON MTN PS-RACCOON MTN1
Manchester	MC	RUTHERFORD-MURFREESBORO
Manchester	MC	WARTRACE-MANCHESTER
Manchester	MC	WATTS BAR HP - ROCKWOOD
Manchester	MC	WATTS BAR HP - SPRING CITY
Manchester	MC	WIDOWS CREEK - NICKAJACK
Manchester	MC	WIDOWS CREEK-OGLETHORPE 1
Manchester	MC	WIDOWS CREEK-OGLETHORPE 2
Manchester	MC	WIDOWS CREEK-RACCOON MTN
Manchester	MC	WIDOWS CREEK-RACCOON MTN 1
Manchester	MC	WIDOWS CR-GOOSE POND
Manchester	MC	WIDOWS CR-MADISON
Manchester	MC	WINCHESTER-HILLSBORO
Manchester	MC	WINCHESTER-WATTS BAR FP
Milan	ML	CLINTON-GREAT LAKES
Milan	ML	CLINTON-MARTIN
Milan	ML	DYERSBURG-HWAY 412
Milan	ML	DYERSBURG-RICHWOOD
Milan	ML	GLEASON-WEAKLEY
Milan	ML	HWAY 412-NEW TIPTONVILLE
Milan	ML	JOHNSONVILLE-GLEASON
Milan	ML	JOHNSONVILLE-MARTIN
Milan	ML	JOHNSONVILLE-PARIS
Milan	ML	JOHNSONVILLE-PARIS
Milan	ML	LAGOON CR-WEAKLEY
Milan	ML	MURRAY-MAYFIELD
Milan	ML	SHELBY-LAGOON
Milan	ML	UNION CITY-GREAT LAKES
Milan	ML	UNION CITY-N UNION CITY
Milan	ML	WEAKLEY-DYERSBURG1
Milan	ML	WEAKLEY-HWAY 412
Milan	ML	WEAKLEY-MILAN
Milan	ML	WEAKLEY-UNION CITY1
Morristown	MT	ALCOA - NIXON ROAD
Morristown	MT	ALCOA SW STA - NIXON ROAD 2
Morristown	MT	CHEROKEE-DOUGLAS
Morristown	MT	DOUGLAS-PIGEON FORGE 1
Morristown	MT	DOUGLAS-WALTERS

SECTOR NAME	SECTOR ABBREVIATION	PRIMARY LINE NAME
Morristown	MT	FONTANA - ALCOA SW STA 2
Morristown	MT	JOHN SEVIER-JONESBOROUGH SW STA
Morristown	MT	JOHN SEVIER-VOLUNTEER
Morristown	MT	JOHN SEVIER-WHITE PINE 1
Morristown	MT	PHIPPS BEND-POCKET
Morristown	MT	PHIPPS BEND-SULLIVAN
Morristown	MT	VOLUNTEER-PHIPPS BEND
Morristown	MT	WATUGA-S HOLSTON
Muscle Shoals	MS	COLBERT-LOWNDES
Muscle Shoals	MS	COLBERT-REYNOLDS 1
Muscle Shoals	MS	COLBERT-SELMER
Muscle Shoals	MS	COLBERT-TUPELO
Muscle Shoals	MS	TRINITY-CULLMAN
Muscle Shoals	MS	TRINITY-DECATUR 2
Muscle Shoals	MS	TRINITY-DECATUR E.C.
Muscle Shoals	MS	WILSON HP-FLORENCE
Muscle Shoals	MS	WILSON HP-FLORENCE
Muscle Shoals	MS	WILSON HP-SHOALS
Muscle Shoals	MS	WILSON-WHEELER
Muscle Shoals	MS	COLBERT-LOWNDES
Muscle Shoals	MS	COLBERT-REYNOLDS 1
Nashville	NA	CENTER HILL-GORDONSVILLE
Nashville	NA	CENTER HILL-LEBANON
Nashville	NA	DALE HOLLOW-BYRDS TOWN
Nashville	NA	DAVIDSON-W NASHVILLE1
Nashville	NA	GALATIN-W NASHVILLE
Nashville	NA	GALLATIN FP-W COOKEVILLE
Nashville	NA	GREAT FALLS-CENTER HILL
Nashville	NA	MAURY-E FRANKLIN1
Nashville	NA	MONTGOMERY-WILSON
Nashville	NA	RADNOR-E FRANKLIN1
Nashville	NA	RUTHERFORD-SMYRNA
Nashville	NA	S NASHVILLE-W NASHVILLE
Nashville	NA	W COOKEVILLE-LIVINGSTON
Nashville	NA	WILSON-LEBANON
Oak Ridge	OR	BRAYTOWN-WARTBURG
Oak Ridge	OR	BULL RUN - N KNOXVILLE 2
Oak Ridge	OR	BULL RUN FP - NORRIS

SECTOR NAME	SECTOR ABBREVIATION	PRIMARY LINE NAME
Oak Ridge	OR	BULL RUN-VOLUNTEER
Oak Ridge	OR	FT. LOUDOUN-ALCOA 1
Oak Ridge	OR	FT. LOUDOUN-ALCOA 2
Oak Ridge	OR	MELTON HILL -LENOIR CITY
Oak Ridge	OR	N KNOXVILLE - EAGLE BEND
Oak Ridge	OR	NORRIS - CLINTON
Oak Ridge	OR	NORRIS -COAL CREEK 2
Oak Ridge	OR	NORRIS -MCCREARY CO
Oak Ridge	OR	VOLUNTEER - N KNOXVILLE 2
Oak Ridge	OR	WATTS BAR-ROANE
West Point	WP	BATESVILLE-COFFEEVILLE
West Point	WP	BATESVILLE-OXFORD
West Point	WP	BATESVILLE-W BATESVILLE
West Point	WP	MCGREGORS CHAPEL-OXFORD
West Point	WP	PHILADELPHIA-MIDWAY
West Point	WP	STURGIS-CALHOUN CITY
West Point	WP	UNION-MCGREGORS CHAPEL
West Point	WP	WEST POINT-MIDWAY

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Appendix G – Fiscal Year 2023 Planning Cycle - Transmission Line Segments by Sector Proposed for Vegetation Management

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Appendix Table G-2. TVA Transmission System Line Segments Proposed for Vegetation Management in Fiscal Year 2023

SECTOR NAME	SECTOR ABBREVIATION	PRIMARY LINE NAME
Centerville	CV	COLUMBIA-W COLUMBIA
Centerville	CV	MONSANTO-NAT CARBON
Centerville	CV	WAYNESBORO-WAYNESBORO DST2
Centerville	CV	WAYNESBORO DST-CLIFTON CITY
Centerville	CV	CENTERVILLE-MONSANTO
Centerville	CV	WHEELER-Mt PLEASANT 1
Centerville	CV	MAURY-MT PLEASANT
Centerville	CV	CLARKSVILLE-W NASHVILLE
Centerville	CV	DICKSON-DAVIDSON
Centerville	CV	JOHNSONVILLE-MT PLEASANT2
Centerville	CV	COLBERT-LAWRENCEBURG
Centerville	CV	MT PLEASANT-LAWRENCEBURG
Centerville	CV	PULASKI-FAYETTEVILLE
Centerville	CV	CUMBERLAND-MONTGOMERY
Cleveland	CL	MURPHY-MARBLE
Cleveland	CL	MURPHY-HAYESVILLE
Cleveland	CL	ROPER - MEAG
Cleveland	CL	WIDOWS CREEK-OGLETHORPE 2
Cleveland	CL	WATTS BAR HP - ATHENS
Cleveland	CL	OGLETHORPE-CONCORD
Cleveland	CL	OGLETHORPE - ROCK SPRING
Cleveland	CL	E CLEVELAND - CHARLESTON
Cleveland	CL	CHARLESTON - ATHENS
Cleveland	CL	MURPHY - TOCCOA RIVER
Cleveland	CL	ATHENS-ETOWAH SW STA
Cleveland	CL	WATTS BAR-VOLUNTEER
Cleveland	CL	ROCK SPRING - CENTER POINT
Cleveland	CL	CENTER POINT - MOSS LAKE
Cleveland	CL	LOOPERS FARM - ALPHA
Hickory Valley	HV	BOONEVILLE-BOONEVILLE DST
Hickory Valley	HV	HOLLY SPRINGS-OXFORD
Hickory Valley	HV	ALLEN-HORN LAKE
Hickory Valley	HV	PICKWICK-STR 190(S JACKSON)
Hickory Valley	HV	COUNCE-HICKORY VALLEY
Hickory Valley	HV	HENDERSON-JACKSON
Hickory Valley	HV	HENDERSON-JACKS CR
Hickory Valley	HV	BURNSVILLE-CORINTH

SECTOR NAME	SECTOR ABBREVIATION	PRIMARY LINE NAME
Hickory Valley	HV	PICKWICK-SAVANNAH
Hickory Valley	HV	BOLIVAR-TOONE
Hickory Valley	HV	PICKWICK-COUNCE
Hickory Valley	HV	HAYWOOD-CORDOVA
Hickory Valley	HV	BENTON-CORDOVA
Hopkinsville	HK	OHIO CO-STEPHENSBURG
Hopkinsville	HK	HOPKINSVILLE DST-EDGOTEN
Hopkinsville	HK	MAYFIELD-HICKORY GROVE
Hopkinsville	HK	PARADISE-E BOWLING GREEN
Hopkinsville	HK	MONTGOMERY-OAKWOOD
Hopkinsville	HK	HOPKINSVILLE-CLARKSVILLE
Hopkinsville	HK	PARADISE-GOODLETTSVILLE
Hopkinsville	HK	PARADISE-N NASHVILLE
Hopkinsville	HK	PARADISE-MONTGOMERY
Hopkinsville	HK	CUMBERLAND-MARSHALL
Madison	MD	FAYETTEVILLE-SALEM
Madison	MD	ARAB-FAIRVIEW
Madison	MD	TIMS FORD-WINCHESTER
Madison	MD	COLLINSVILLE-GERALDINE
Madison	MD	BESSEMER(APCO)-S BESSEMER
Madison	MD	GOOSE POND-SCOTTSBORO
Madison	MD	MADISON-FARLEY2
Madison	MD	MADISON-GOOSE POND
Madison	MD	EAST POINT-GUNTERSVILLE
Madison	MD	GUNTERSVILLE-ALBERTVILLE
Madison	MD	GUNTERSVILLE-ALBERTVILLE
Madison	MD	GUNTERSVILLE-ALBERTVILLE
Madison	MD	GUNTERSVILLE-GOOSE POND
Madison	MD	WIDOWS CR-FT PAYNE
Madison	MD	ALBERTVILLE-FT PAYNE
Madison	MD	WIDOWS CR-MILLER
Manchester	MC	WATTS BAR HP-GREAT FALLS
Manchester	MC	WIDOWS CREEK- MOCCASIN
Manchester	MC	WIDOWS CR-WINCHESTER
Manchester	MC	WIDOWS CREEK-RACCOON MTN
Manchester	MC	MURFREESBORO-WARTRACE
Manchester	MC	NICKAJACK-RACCOON MOUNTAIN
Manchester	MC	NICKAJACK - OGLETHORPE

SECTOR NAME	SECTOR ABBREVIATION	PRIMARY LINE NAME
Manchester	MC	FRANKLIN-WARTRACE 1
Manchester	MC	WIDOWS CREEK-SEQUOYAH
Manchester	MC	WIDOWS CR-MILLER
Manchester	MC	SEQUOYAH-FRANKLIN
Manchester	MC	WIDOWS CREEK-ROCK SPRINGS
Milan	ML	MILAN-MIDDALE
Milan	ML	DYERSBURG-BONICORD
Milan	ML	MAYFIELD-PILOT OAK
Milan	ML	CLINTON-FULTON
Milan	ML	FULTON-PILOT OAK
Milan	ML	COVINGTON-DYERSBURG
Milan	ML	JOHNSONVILLE-S JACKSON
Milan	ML	JOHNSONVILLE-BUD CROCKETT
Milan	ML	PARIS-MAYFIELD
Milan	ML	BUD CROCKETT--W LEXINGTON
Milan	ML	COVINGTON-ALAMO
Milan	ML	JACKSON-AMERISTEEL
Milan	ML	MILAN-ALAMO
Milan	ML	MADISON WEST-McKELLAR
Morristown	MT	NE JOHNSON CITY-ELIZABETHTON
Morristown	MT	NE JOHNSON CITY-ERWIN
Morristown	MT	WATUGA-WILBUR
Morristown	MT	BOONE-FT PATRICK HENRY
Morristown	MT	JOHN SEVIER-FT PATRICK HENRY
Morristown	MT	TUSCULUM-WASHINGTON COLLEGE
Morristown	MT	SULLIVAN-NE JOHNSON CITY 1
Morristown	MT	SULLIVAN-BLUFF CITY 1
Morristown	MT	SULLIVAN-BLUFF CITY 2
Morristown	MT	ELIZABETHTON-NE JOHNSON CITY
Morristown	MT	SULLIVAN-ELIZABETHTON
Morristown	MT	VOLUNTEER-MORRISTOWN
Morristown	MT	NORRIS-PINEVILLE
Morristown	MT	FONTANA - SANTEETLAH
Morristown	MT	JOHN SEVIER-CHEROKEE 1
Morristown	MT	ELIZABETHTON-SHOUNDS
Morristown	MT	BOONE-SULLIVAN
Morristown	MT	PHIPPS BEND-PHIPPS BEND IND PK
Morristown	MT	JOHN SEVIER-BOONE
Morristown	MT	JONESBOROUGH-ERWIN

SECTOR NAME	SECTOR ABBREVIATION	PRIMARY LINE NAME
Morristown	MT	SULLIVAN-BROADFORD
Morristown	MT	SULLIVAN-NAGEL
Muscle Shoals	MS	MARGERUM-BURNSVILLE
Muscle Shoals	MS	GUNTOWN-KIRKVILLE
Muscle Shoals	MS	ARDMORE-ELKTON
Muscle Shoals	MS	ARDMORE-PEACH ORCHARD
Muscle Shoals	MS	ATHENS-BROWNS FERRY
Muscle Shoals	MS	WILSON-TRINITY
Muscle Shoals	MS	MEC-TRINITY 1
Muscle Shoals	MS	COLBERT-LAWRENCEBURG
Muscle Shoals	MS	COLBERT-BURNSVILLE
Muscle Shoals	MS	WHEELER-TRINITY
Muscle Shoals	MS	TRINITY-DECATUR 1
Muscle Shoals	MS	WILSON-COLBERT
Muscle Shoals	MS	COLBERT-PICKWICK
Muscle Shoals	MS	ARDMORE-ATHENS
Muscle Shoals	MS	LIMESTONE-ATHENS
Muscle Shoals	MS	BROWNS FERRY-WEST POINT
Muscle Shoals	MS	BROWNS FERRY-MADISON 1
Nashville	NA	CORDELL HULL-S CARTHAGE
Nashville	NA	E BOWLING GREEN-PORTLAND
Nashville	NA	DAVIDSON RD-DAVIDSON
Nashville	NA	CLARKSVILLE-W NASHVILLE
Nashville	NA	MURFREESBORO-SMYRNA 1
Nashville	NA	S NASHVILLE-CRAIGHEAD
Nashville	NA	RADNOR-CRAIGHEAD
Nashville	NA	SMYRNA-PIN HOOK
Nashville	NA	W NASHVILLE-DAVIDSON RD
Nashville	NA	SUMMER SHADE- E BOWLING GREEN
Nashville	NA	PIN HOOK-MURFREESBORO RD
Nashville	NA	MURFREESBORO RD-AIRPORT
Nashville	NA	RUTHERFORD-E FRANKLIN
Nashville	NA	GALLATIN-MURFREESBORO
Nashville	NA	S NASHVILLE-AIRPORT
Nashville	NA	MAURY-SATURN1
Nashville	NA	RADNOR-CAIN RIDGE
Nashville	NA	GREAT FALLS-W COOKEVILLE
Nashville	NA	PIN HOOK-CAIN RIDGE
Nashville	NA	BOWLING GREEN-GALLATIN FP

SECTOR NAME	SECTOR ABBREVIATION	PRIMARY LINE NAME
Nashville	NA	PIN HOOK-SMYRNA 2
Nashville	NA	PARADISE-GOODLETTSVILLE
Nashville	NA	PARADISE-N NASHVILLE
Nashville	NA	MAURY-DAVIDSON
Nashville	NA	DAVIDSON-PINHOOK
Nashville	NA	PINHOOK-WILSON
Oak Ridge	OR	OAK RIDGE-FLAT FORK
Oak Ridge	OR	FT LOUDOUN -JENA
Oak Ridge	OR	NORRIS -COAL CREEK 1
Oak Ridge	OR	FARRAGUT - MELTON HILL
Oak Ridge	OR	BRAYTOWN-PETROS
Oak Ridge	OR	BULL RUN - LONSDALE 2
Oak Ridge	OR	VOLUNTEER - N KNOXVILLE 1
Oak Ridge	OR	KINGSTON-BULL RUN
Oak Ridge	OR	NORRIS-PINEVILLE
Oak Ridge	OR	SUMMERSHADE-BULLITT CO
Oak Ridge	OR	W COOKEVILLE - PEAVINE SW STA
Oak Ridge	OR	ROCKWOOD - PEAVINE SW STA
Oak Ridge	OR	CLINTON - EAGLE BEND
Oak Ridge	OR	LONSDALE - N KNOXVILLE
Oak Ridge	OR	BULL RUN-ELZA
Oak Ridge	OR	BULL RUN-LONSDALE1
Oak Ridge	OR	LONSDALE - W HILLS
Oak Ridge	OR	ROCKWOOD - ROANE1
Oak Ridge	OR	KINGSTON FP - FT LOUDOUN
Oak Ridge	OR	FT LOUDOUN-LOUDON
Oak Ridge	OR	KINGSTON FP-LOUDON 1
Oak Ridge	OR	ELZA - HUNTSVILLE
Oak Ridge	OR	WATTS BAR-VOLUNTEER
Oak Ridge	OR	OAK RIDGE-FLAT FORK
Oak Ridge	OR	FT LOUDOUN -JENA
Oak Ridge	OR	NORRIS -COAL CREEK 1
Oak Ridge	OR	FARRAGUT - MELTON HILL
West Point	WP	W POINT - W COLUMBUS SW STA
West Point	WP	WEST POINT-LOWNDES 1
West Point	WP	BATESVILLE-BLUE GOOSE
West Point	WP	STARKVILLE-STURGIS
West Point	WP	LEAKE-SINGLETON

SECTOR NAME	SECTOR ABBREVIATION	PRIMARY LINE NAME
West Point	WP	W COLUMBUS SW STA - SEVERCORR SW STA
West Point	WP	COLUMBUS-COLLEGE STREET
West Point	WP	UNION-TUPELO1
West Point	WP	COFFEEVILLE-NEWS PRINT
West Point	WP	STURGIS-PHILADELPHIA
West Point	WP	RED HILLS-STURGIS
West Point	WP	PHILADELPHIA-DEKALB
West Point	WP	COLUMBUS-DEKALB
West Point	WP	BROWNS FERRY-WEST POINT
West Point	WP	WEST POINT-W VERNON

Appendix H – TVA Vegetation Management Guidelines

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Transmission Environmental Protection Procedures
Right-Of-Way Vegetation Management Guidelines

1.1 Overview

A. The Tennessee Valley Authority (TVA) must manage the vegetation on its rights-of-way and easements to ensure emergency maintenance access and routine access to structures, switches, conductors, and communications equipment. In addition, TVA must maintain adequate clearance, as specified by the National Electrical Safety Code, between conductors and tall growing vegetation and other objects. This requirement applies to vegetation within the right-of-way (ROW) as well as to trees located off the right-of-way.

B. Each year TVA assesses the conditions of the vegetation on and along its rights-of-way. This is accomplished by aerial inspections, ground inspections, periodic field inspections, aerial photography, LiDAR / Phodar data and information from TVA personnel, property owners and the general public. TVA utilizes this data to evaluate vegetation clearances and identifies vegetation on and off ROW that does, or could potentially pose a risk to reliability.

C. TVA transmission foresters develop a vegetation re-clearing plan that is specific to each line segment and is based on terrain conditions, species mix, growth, and density.

2.1 Right-of-Way Management Methods

A. TVA takes an Integrated Vegetation Management (IVM) approach that is based on a carefully planned, multidimensional strategy developed in consultation with forestry and habitat experts. Integrated vegetation management aims to improve safety and prevent power outages by creating healthy and self-sustaining ecosystems in ROWs while ensuring compliance with regulatory standards (NERC 2006). These ecosystems foster beneficial, attractive and low-maintenance habitat where tall trees won't grow and other, more benign forms of vegetation can thrive. Integrated vegetation management encourages early successional native habitats that pose less threat to power reliability yet offer safe havens for desirable plants and animals. By combining selective use of herbicides with physical removal, integrated vegetation management can more thoroughly eradicate problem vegetation and allow more compatible species to fill in, making it harder for tall-growing trees to reestablish.

TVA executes its transmission vegetation maintenance on a 2-, 3-, or 4-year cycle based on data that is acquired by various inspection methods. Photogrammetry, LiDAR, ground inspection and aerial inspection data are utilized to evaluate the next year's scheduled work to determine the annual vegetation maintenance work scope. LiDAR and Photogrammetry technologies provide a detailed vegetation threat analysis that can be used to assess risk as well as prioritize vegetation management work plans. This detailed analysis supports TVA's efforts to target incompatible species as well as promote the growth of compatible vegetation. This precision management approach is effective in reducing overall environmental impact by limiting work to specific areas of incompatibility.

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B. TVA uses a variety of herbicides specific to the species present with a variety of possible application techniques. Herbicides are selectively applied from the ground with backpack sprayers or vehicle-mounted sprayers. Any herbicides used are applied in accordance with applicable state and federal laws and regulations. Only herbicides registered with the United States Environmental Protection Agency (USEPA) are used.

C. In very steep terrain, in sensitive environmental areas, in extensive wetlands, at stream banks, and in sensitive property owner land use areas, hand clearing may be utilized. Hand clearing is recognized as one of the most hazardous occupations documented by the Occupational Health and Safety Administration. For that reason, TVA utilizes low volume herbicide applications in these areas when feasible.

D. TVA does not encourage tree re-clearing by individual property owners because of the high hazard potential of hand clearing, possible interruptions of the line, and electrical safety considerations for untrained personnel that might do the work.

E. Mechanical mowers not only cut the tall saplings and seedlings on the right-of-way, they also shatter the stump and the supporting near surface root crown. The tendency of resistant species is to re-sprout from the root crown and shattered stumps can produce a multi-stem dense stand in the immediate area. Repeated use of mowers on short cycle re-clearing with many original stumps re-growing in the above manner can create a single species thicket or monoculture. With the original large root system and multiple stems, the resistant species can produce re-growth at the rate of 5-10 feet in a year. In years with high rainfall, the growth can reach 12-15 feet in a single year. These dense, monoculture stands can become nearly impenetrable for even large tractors. Such stands have low diversity, little wildlife food or nesting potential, and become a property owner concern. Selective herbicide application may be used to control monoculture stands.

3.1 Herbicide Program

A. TVA has worked with universities (such as Mississippi State University, University of Tennessee, Purdue University and others), chemical manufacturers, other utilities, U.S. Department of Transportation, U.S. Fish and Wildlife Service (USFWS), and U.S. Forest Service (USFS) personnel to explore options for vegetation control. The results have been strong recommendations to use species-specific, low volume herbicide applications in more situations. Research, demonstrations, and other right-of-way programs show a definite improvement of rights-of-way treated with selective low-volume applications of new herbicides using a variety of application techniques and timing. Table 1 below identifies herbicides currently used on TVA rights-of-way. Table 2 identifies pre-emergent herbicides currently being used on bare ground areas on TVA rights-of-way and in substations. Table 3 identifies TGRs that may be used on tall trees that have special circumstances that require trimming on a regular cycle, e.g., restrictions on complete removal. The rates of application utilized are those listed on the U.S. Environmental Protection Agency (USEPA) approved label and consistent with utility standard practice throughout the Southeast.

Table 1 - Herbicides Currently Used on TVA Rights-of-Way

Trade Name	Active Ingredient	Label Signal Word
Accord/Accord XRT II	Glyphosate/Liquid	Caution
Arsenal	Imazapyr/Liquid/Granule	Caution
Chopper	Imazapyr/RTU	Caution
Clearstand	Imazapyr/Metsulfuron Methyl/Liquid	Caution
Escort	Metsulfuron Methyl/Dry Flowable	Caution
Garlon	Triclopyr/Liquid	Caution
Garlon 3A	Triclopyr/Liquid	Danger
Habitat	Imazapyr/Liquid	Caution
Krenite S	Fosamine Ammoinium	Caution
Milestone VM	Aminopyralid/Liquid	Caution
Pathfinder II	Triclopyr/RTU	Caution
Rodeo	Glyphosate/Liquid	Caution
Roundup	Glyphosate/Liquid	Caution
Roundup Pro	Glyphosate	Caution
Streamline	Aminocyclopyrachlor/ Metsulfuron Methyl/Liquid	Caution
Transline	Clopyralid/Liquid	Caution
Viewpoint	Imazapyr/Aminocyclopyrachlor/ Metsulfuron Methyl/Liquid	Caution

Table 2 - Pre-Emergent Herbicides Currently Used for Bare Ground Areas On TVA Rights-of-Way

Trade Name	Active Ingredients	Label Signal Word
Arsenal 5G	Imazapyr/Granule	Caution
Sahara	Diuron/Imazapyr	Caution
SpraKil SK-26	Tebuthiuron/Diuron/Granules	Caution
SpraKil S-5	Tebuthiuron/Granules	Caution
Topsite	Diuron/Imazapyr	Caution

Table 3 - Tree Growth Regulators (TGRs) Currently Used On TVA Rights-of-Way

Trade Name	Active Ingredients	Label Signal Word
Profile 2SC	TGR-paclobutrazol	Caution
TGR	Flurprimidol	Caution

B. The herbicides listed in Table 1 and 2 and TGRs listed in Table 3 have been evaluated in extensive studies in support of registration applications and label requirements. Many have been reviewed in the USFS vegetation management environmental impact statements (EISs), and those

evaluations are incorporated here by reference (USFS 1989a, 1989b, 2002a, and 2002b). Electronic copies can be accessed at https://cdxnodengn.epa.gov/cdx-enepa- public/action/eis/search. The result of these reviews has been a consistent finding of limited environmental impact beyond that of control of the target vegetation. All the listed herbicides have been found to be of low environmental toxicity when applied by trained applicators following the label and registration procedures, including prescribed measures, such as buffer zones, to protect threatened and endangered species.

C. Low volume herbicide applications are recommended since research demonstrates much wider plant diversity after such applications. There is better ground erosion protection and more wildlife food plants and cover plants develop. In most situations there is increased development of wild flowering plants and shrubs. In conjunction with herbicides, the diversity and density of low-growing plants provide control of tall-growing species through competition.

D. Herbicides are used in place of rotary mowing in order to avoid damage to nesting and tunneling wildlife. This method retains ground cover year around with a better mix of food species and associated high-protein insect populations for birds in the right seasons. Most also report less damage to soils (even when compared with rubber-tired equipment).

E. Best Management Practices (BMPs) governing application of herbicides are contained within *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities* (Muncy 2016) which is incorporated by reference. Herbicides can be liquid, granular, or powder and can be applied aerially or by ground equipment and may be selectively applied or broadcast, depending on the site requirements, species present, and condition of the vegetation. Water quality considerations include measures taken to keep herbicides from reaching streams whether by direct application or through runoff of or flooding by surface water. "Applicators" must be trained, licensed, and follow manufacturers' label instructions, USEPA guidelines, and respective state regulations and laws.

F. When herbicides are used, their potential adverse impacts are considered in selecting the compound, formulation, and application method. Herbicides that are designated "Restricted Use" by USEPA require application by or under the supervision of applicators certified by the respective state control board. Applications are done either by TVA or by contractors in accordance with the following guidelines identified in the TVA BMP manual (Muncy 2016):

1. The sites to be treated are selected and application directed by the appropriate TVA official.
2. A preflight walking or flying inspection is made within 72 hours prior to applying herbicides aerially. This inspection ensures that no land use changes have occurred, that sensitive areas are clearly identified to the pilot, and that buffer zones are maintained.
3. Aerial application of liquid herbicides will normally not be made when surface wind speeds exceed 5 miles per hour, in areas of fog, or during periods of temperature inversion.
4. Pellet application will normally not be made when the surface wind speeds exceed 10 miles per hour, or on frozen or water saturated soils.
5. Liquid application is not performed when the temperature reaches 95 degrees Fahrenheit or above.

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6. Application during unstable, unpredictable, or changing weather patterns is avoided. Equipment and techniques are used that are designed to ensure maximum control of the spray swath with minimum drift.
7. Herbicides are not applied to surface water or wetlands unless specifically labeled for aquatic use. Filter and buffer strips will conform at least to federal and state regulations and any label requirements. The use of aerial or broadcast application of herbicides is not allowed within a streamside management zone (SMZ) adjacent to perennial streams, ponds, and other water sources. Hand application of certain herbicides labeled for use within SMZs is used only selectively.
8. For aerial inspections, buffers and filter strips (200 feet minimum width) are maintained next to agricultural crops, gardens, farm animals, orchards, apiaries, horticultural crops, and other valuable vegetation.
9. Herbicides are not applied in the following areas or times: (a) in city, state, and national parks or forests or other special areas without written permission and/or required permits (b) off the right-of-way and (c) during rainy periods or during the 48- hour interval prior to rainfall predicted with a 20 percent or greater probability by local forecasters, when soil active herbicides are used.

G. TVA currently uses primarily low volume applications of foliar and basal applications, e.g., Accord (Glyphosate), Arsenal (Imazapyr), Clearstand (Imazapyr / Metsulfuron Methyl), Milestone VM (Aminopyralid) and Streamline (Aminocyclopyrachlor / Metsulfuron Methyl).

4.1 Benefits

A. Proper maintenance—including vegetation management—of ROW and its supporting facilities is crucial to ensuring the reliable transmission of affordable electrical power. Unmanaged and poorly maintained vegetation can cause electricity outages, wildfires, soil erosion, and water quality issues. Utility companies that adopt long-term IVM approaches often benefit from significant vegetation management cost savings, which can be reflected in customer rates.

B. ROW also provide important wildlife habitats. As wildlife habitats in the United States are lost to development, these ROW become increasingly important. The IVM approach can create natural, diverse, and sustaining ecosystems, such as a meadow transition habitat. A variety of wildlife species (including threatened and endangered species) consider these habitats home, such as butterflies, songbirds, small mammals, and deer. These habitats also encourage the growth of native plant species and can increase plant diversity.

C. Invasive and exotic species are often a problem on ROW, and, consequently, the surrounding land. IVM techniques (such as selective herbicide application) can minimize this problem, while ensuring native and endangered species are not affected.

5.0 References

Integrated Vegetation Management (IVM) on Rights-of-Way Fact Sheet. (2012, May) Retrieved from http://www.epa.gov/pestwise/htmlpublications/row_fact_sheet.html

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Muncy, J. A. 2016. A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities (revised edition). Edited by Abigail Bowen, Jodie Branum, Corey Chandler, Adam Dattilo, Britta Dimick, Shea Gaither, Casey Henley, Todd Liskey, Joe Melton, Cherie Minghini, Paul Pearman, Kenton Smithson, Joe Turk, Emily Willard, Robby Wilson. Norris: TVA Technical Note TVA/LR/NRM 92/1. Retrieved from <http://www.tva.com/power/projects/bmp_manual_2012.pdf> (n.d.).

U.S. Forest Service. 1989a. Vegetation Management in the Coastal Plain/Piedmont Final Environmental Impact Statement, Volumes I and II. Southern Region Management Bulletin R8-MB-23, January 1989. Atlanta, Ga.: USDA Forest Service.

———. 1989b. Vegetation Management in the Appalachian Mountains Final Environmental Impact Statement, Volumes I and II. Southern Region Management Bulletin R8-MB-38, July 1989. Atlanta, Ga.: USDA Forest Service.

———. 2002a. Vegetation Management in the Appalachian Mountains Final Environmental Impact Statement Supplement. Southern Region Management Bulletin R8-MB-97A, October 2002. Atlanta, Ga.: USDA Forest Service.

———. 2002b. Vegetation Management in the Coastal Plain/Piedmont Final Environmental Impact Statement Supplement. Southern Region Management Bulletin R8-MB-98A, October 2002. Atlanta, Ga.: USDA Forest Service.

Appendix I – Sensitive Areas Class Definitions for Re-clearing

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TVA Sensitive Areas Class Definitions for Right-of-Way Re-clearing

Plants

Class 1: No broadcast herbicide application. Alternatives are: 1) Select spray woody plants, 2) Mechanical or hand-clearing, 3) Request field surveys by TVA botanist to determine if species exists in the subject area.

Class 2: Contact TVA botanist at least three weeks before conducting maintenance activities in subject areas to determine if the proposed activities require restrictions.

Natural Areas

Class 1: No broadcast herbicide application. Alternatives are: 1) Select spray woody plants, 2) Mechanical or hand-clearing, 3) Request field surveys by TVA Biological Compliance staff to determine if species exists in the subject area.

Class 2: Must contact area land manager prior to entering or conducting maintenance in subject area. No broadcast herbicide application. Alternatives are: 1) Select spray woody plants, 2) Mechanical or hand-clearing, 3) Request field surveys by TVA Biological Compliance staff to determine if species exists in the subject area.

Class 3: Contact TVA Natural Areas biologist at least three weeks before conducting maintenance activities to determine if the proposed activities require restrictions.

Wetland Areas

Class 1: Wetland/potential wetland- Refer to "Wetlands ROW Re-clearing and Pole Replacement Guidelines" for restrictions.

Terrestrial Animal Areas

Class BALDEAGLE: Bald Eagle nest- Either 1) Assume presence. No disturbance, spraying or vegetation clearing between Dec. 1 - July 1 within 660 feet of nest site; OR 2) Request seasonal field survey to determine if nest is active.

Class CAVE: Cave - No herbicide use within 200 ft of cave due to potentially sensitive subterranean aquatic resource. Hand or small machinery clearing only (ie: chainsaws, bush hog, mowers). Vehicles and equipment confined to existing access roads. Avoid entering cave.

Class HERONOSPREY: Heronry and Osprey - Either 1) Assume presence. No broadcast spraying. Only use bushogs or mowers for vegetation removal or selective herbicide spraying between February 1 and July 15 within 660 feet of nest site; OR 2) Request seasonal field survey to determine if nests are active.

Class HERONRY: Heronry - Either 1) Assume presence. No broadcast spraying. Only use bushogs or mowers for vegetation removal or selective herbicide spraying between February 1 and July 15 within 660 feet of nest site; OR 2) Request seasonal field survey to determine if nests are active.

Class IBAT: Potential Indiana Bat Summer Roosting Habitat - Cut trees with exfoliating bark Nov 15 - Mar 31. If cutting necessary outside of time restriction a bat and/or habitat survey is required.

Class IBATNLEBAT: Potential Indiana Bat and Northern Long-Eared Bat Summer Roosting Habitat-Cut trees with exfoliating bark during the following seasons differentiated by state: VA, KY, TN and NC = Nov 15-Mar 31; AL, MS and GA = Dec 1 - Mar 15. If cutting necessary outside of time restriction a bat and/or habitat survey is required.

Class NLEBAT: Potential Northern Long-Eared Bat Summer Roosting Habitat - Cut trees with exfoliating bark during the following seasons differentiated by state: VA and KY = Nov 15 - Mar 31; TN and NC = Oct 15 - Mar 31; AL, MS, and GA = Dec 1 - Mar 15. If cutting necessary outside of time restriction a bat and/or habitat survey is required.

Class OSPREY: Osprey nest - Either 1) Assume presence. No broadcast spraying. Only use bushogs or mowers for vegetation removal or selective herbicide spraying between March 1 and July 15 within 660 feet of nest site; OR 2) Request seasonal field survey to determine if nests are active.

Class SPECIAL: Special Circumstance - Contact TVA Terrestrial Zoologist at least three weeks before conducting maintenance activities in buffered area to determine if the proposed activities require restrictions.

Aquatic Animal Areas

Class 1: No broadcast herbicide application. Alternatives are: 1) Select spray woody plants, 2) Mechanical or hand-clearing, 3) Request field surveys by TVA aquatic biologist to determine if species exists in the subject area.

Class 2: Contact TVA aquatic biologist at least three weeks before conducting maintenance activities in subject areas to determine if the proposed activities require restrictions.

ROW ACCESS

O-SAR data is appropriate and applicable to projects where all vehicular access to or within the ROW is existing and no access road improvements are required. The data provided in O-SAR does not apply to work involving road building, upgrading, improvement, or repair, such as but not limited to additional fill greater than 0.10 -acre, new or upgraded stream crossings, and vegetation removal outside the originally cleared ROW footprint. In such cases, a separate environmental review is necessary.

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Appendix J – Summary of Vegetation Management Method Impacts

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Appendix Table J-1. Summary of Impacts Associated with Vegetation Management Methods

Resource	Manual	Mechanical	Herbicides	Debris Management	Restoration
Vegetation	Potential impact on non-target vegetation; may result in benefits to some herbaceous species due to improved light penetration. Tree removal may result in conversion of forest or tree dominated communities to herbaceous communities.	May result in substantial impacts to non-target vegetation, potential and increase the spread of invasive species due to soil disturbance. Some methods may reduce adverse effects by minimizing soil disturbance. Repeated mowing may promote dense regrowth of woody stems that suppress herbaceous species.	Direct effects to targeted vegetation. Spot or localized spraying result in reduced impacts to non-target vegetation and may result in some positive effects on species composition. Broadcast and aerial application methods may have high potential for negative impacts to vegetation, including non-target vegetation.	Some methods may hinder or impede plant growth and restoration of treated areas.	Little potential to negatively affect transmission ROW vegetation because standard BMPs would dictate revegetation efforts to avoid the use of invasive weed species.
Wildlife	Lower potential for toxic inputs; less disturbing to soils; short-term noise and odor disturbance; disruptive to wildlife due to more frequent treatments; potential for localized direct injury to wildlife.	Promotes early successional habitat favorable to wildlife; less disruptive to wildlife due to less frequent treatments; short-term disturbance of wildlife; habitat alteration, impact to less mobile biota; short-term soil disturbance.	Use can create low-growing habitat beneficial to some wildlife; less disruptive to wildlife due to less frequent treatments; potential for herbicide toxicity to non-target wildlife, soil, and water.	Leaving debris can be beneficial by creating cover, nutrient recycling, and erosion control; leaving debris increases wildfire fuel load and can harbor tree diseases and pests; debris piles alter habitat; offsite debris removal involves mechanical equipment that increases wildlife disturbance and erosion.	Minor temporary impacts associated with increased erosion and potential for fuel oil leaks or spills. Impacts minimized with standard BMPs. Overall long-term benefit to habitat.

Appendix Table J-1. Summary of Impacts Associated with Vegetation Management Methods

Resource	Manual	Mechanical	Herbicides	Debris Management	Restoration
Aquatic Ecology	Minor potential for sedimentation; minor chance of chainsaw oil/fuel leaks/spills; likely no impacts to aquatic biota.	Minor potential for sedimentation and stream bank destabilization from soil-disturbing mechanical equipment; minor amounts of cut debris reaching streams; minor chance of oil/fuel leaks/spills; minor potential for altered water quality and impacts to aquatic biota. Minimized through the use of BMPs.	Minor potential for sedimentation from equipment; minimized through the use of BMPs. Potential for herbicides to reach waterways (rarely at toxic concentrations); potential acute and chronic impacts minimized through BMPs, prior planning, proper herbicide mixtures, and advanced technology to reduce or eliminate drift during application.	Minor impacts to aquatic biota as TVA manages placement of debris to avoid placement proximate to streams or other aquatic environments. Minor positive impact as large woody debris can provide fish habitat; wood chips and mulch can reduce erosion.	Minor potential for sedimentation from soil-disturbing equipment; minor amounts of cut debris reaching streams. Overall long-term benefit to the aquatic environment due to reduced erosion and sedimentation.
Threatened and Endangered Species[1]	TVA uses the Office-Level Sensitive Area Review (O-SAR) process to avoid and minimize impacts to federally and state-listed species that are known to occur on transmission ROWs and select methods that are least likely to negatively impact those resources.	TVA uses the O-SAR process to avoid impacts to federally and state-listed species that are known to occur on transmission ROWs and select methods that are least likely to negatively impact those resources.	Similar to Vegetation, Wildlife, and Aquatic Ecology impacts. TVA uses the O-SAR process to avoid impacts to federally and state-listed species that are known to occur on transmission ROWs and select methods that are least likely to negatively impact those resources.	TVA uses the O-SAR process to avoid impacts to federally and state-listed species that are known to occur on transmission ROWs and select methods that are least likely to negatively impact those resources.	Minor temporary impacts associated with increased erosion and potential for fuel oil leaks or spills. Impacts minimized with standard BMPs and SMZs. Overall long-term benefit to habitat.

Appendix Table J-1. Summary of Impacts Associated with Vegetation Management Methods

Resource	Manual	Mechanical	Herbicides	Debris Management	Restoration
Surface Water	Temporary, minor impacts from potential sedimentation; less impact relative to mechanical control.	Temporary, minor impacts from potential fuel/lubricant leaks and spills and sedimentation from soil-disturbing heavy equipment. Minimized through use of BMPs.	Minor potential for herbicides to reach surface waters through leaching, drift, or runoff and potential for sedimentation from heavy equipment. No significant impact expected due to BMPS, prior planning, proper implementation, and proper application of herbicides.	Excess vegetation debris in surface water may alter flows; potential fuel/lubricant leaks and spills; sedimentation from soil-disturbing heavy equipment. Impacts expected to be temporary and minor through use of BMPs.	Minor, temporary impacts from the use of soil disturbing equipment. Overall long-term benefit to water quality due to reduced erosion and sedimentation.
Wetlands	Little/no impact on non-target wetland areas. Tree removal may result in conversion of wetland type and reduction in wetland function; forested wetland conversion may be considered a jurisdictional activity by wetland regulatory agencies.	Minor potential for vehicular rutting and disturbance of wetland soils. Impact minimized with the use of BMPs such as matting, low ground pressure equipment, and dry season work. Tree removal may result in conversion of wetland type and reduction in wetland function; forested wetland conversion may be considered a jurisdictional activity by wetland regulatory agencies.	Impacts to non-target wetland areas due to runoff, leach, or drift of herbicides. Conversion of forest to emergent wetland may result in reduction of wetland function.	Debris left in wetlands may be considered a regulated fill by wetland regulatory agencies due to potential for obstructing flow, altering existing contours, changing water storage, and/or conversion to upland.	Positive benefit to wetlands as restoration would prevent the spread of invasive weeds within the wetlands, promote the establishment of low-growing vegetation, and promote wildlife habitat.

Appendix Table J-1. Summary of Impacts Associated with Vegetation Management Methods

Resource	Manual	Mechanical	Herbicides	Debris Management	Restoration
Floodplains	No impact.	No significant impact; greater impact relative to manual or selective herbicide. Impacts mitigated through the use of BMPs and measures taken to comply with EO 11988 and the National Flood Insurance Program.	No significant impact Impacts mitigated through the use of BMPs and measures taken to comply with EO 11988 and the National Flood Insurance Program.	Debris left in floodplains can impede the flow of water and create obstructions in the floodplain and floodway. Impacts mitigated through the use of BMPs and measures taken to comply with EO 11988 and the National Flood Insurance Program.	No impact.
Geology/Soils	No impact.	No impact to geology. Potential for localized soil disturbance and erosion.	No impact to geology or soils.	No impact on geology. Potential beneficial impact in erosion control.	No impact on geology. Potential beneficial impact in erosion control.
Groundwater	No impact.	Potential impact associated with contaminant release in proximity to groundwater recharge zones. Impact would be mitigated by BMPs and are anticipated to be minor.	Potential impact associated with contaminant release in proximity to groundwater recharge zones. Impact would be mitigated by BMPs and are anticipated to be minor.	Potential impact associated with contaminant release in proximity to groundwater recharge zones. Impact would be mitigated by BMPs and are anticipated to be minor.	Potential impact associated with contaminant release in proximity to groundwater recharge zones. Impact would be mitigated by BMPs and are anticipated to be minor.

Appendix Table J-1. Summary of Impacts Associated with Vegetation Management Methods

Resource	Manual	Mechanical	Herbicides	Debris Management	Restoration
Land Use and Land Ownership/ Management	No impact to land use, potential short-term disruption of character of lands. Vegetation management on state and federal lands must adhere to existing Land and Resource Management Plans, Special Use Permits, as well as programmatic or related agreements.	No impact to land use, potential short-term disruption of character of lands. Vegetation management on state and federal lands must adhere to existing Land and Resource Management Plans, Special Use Permits, as well as programmatic or related agreements.	No impact to land use, potential short-term disruption of character of lands. Vegetation management on state and federal lands must adhere to existing Land and Resource Management Plans, Special Use Permits, as well as programmatic or related agreements.	No impact to land use, potential short-term disruption of character of lands. Vegetation management on state and federal lands must adhere to existing Land and Resource Management Plans, Special Use Permits, as well as programmatic or related agreements.	No impact to land use. Vegetation management on state and federal lands must adhere to existing Land and Resource Management Plans, Special Use Permits, as well as programmatic or related agreements.
Prime Farmland	No impact	Localized potential for disturbance or degradation of prime farmland soils from use of mechanized equipment. Minimized using BMPs.	No impact.	No impact.	No impact.
Natural Areas, Parks, Recreation	Minor, short-term impacts from equipment noise and presence of work crews.	Minor, short-term impact from equipment noise and work crews associated with trimming. Impacts from clearing would be greater as the character of vegetation could change.	Potential impacts from noise and odors from application of selective targeting herbicides. Minor beneficial impact associated with erosion protection, enhanced wildlife food and cover, and greater diversity. Greater minor, temporary impact from aerial application indiscriminate treatment of vegetation.	Minor impacts from large debris left in place as it could interfere with recreation activities. Short-term impacts from burning due to presence of smoke and work crews.	Minor temporary impact associated with increased pedestrian traffic and noise. Long-term benefit due to enhancement of Natural Areas.

Appendix Table J-1. Summary of Impacts Associated with Vegetation Management Methods

Resource	Manual	Mechanical	Herbicides	Debris Management	Restoration
Cultural	No impact on subsurface cultural deposits when cutting methods are employed. Pulling methods have the potential to disturb cultural deposits depending on size of plant and root ball. Caution should be used when cutting or pulling near aboveground historic remains (i.e. foundations, cemeteries) and sacred sites.	If machinery causes soil disturbance, subsurface cultural deposits could be affected. Impacts would be minimized through adherence to BMPs and Section 106 program alternatives, such as the PA, where applicable. Activities that would have the potential to effect historic properties would require Section 106 review on an individual basis.	No impact to subsurface cultural deposits.	No impact to subsurface deposits.	No impact to subsurface deposits.
Visual Resources	Pruned trees and shrubs, exposed stumps, and the resulting debris may seem unsightly to some viewers.	Can leave swaths of disturbed areas that can contrast with surrounding vegetation.	Areas of browned vegetation can be unsightly. However, the impact would be temporary as vegetation would eventually reestablish.	Felled logs and scattered branches can contrast with the surrounding landscape; stacking as windrows can reduce the unkempt look. Mulching and chipping can improve the visual landscape by covering bare earth with woodchips.	Minor, temporary visual discord due to the presence of additional personnel and equipment. Long-term improvement aesthetic condition.

Appendix Table J-1. Summary of Impacts Associated with Vegetation Management Methods

Resource	Manual	Mechanical	Herbicides	Debris Management	Restoration
Public and Worker Health & Safety	Minimal impact on public safety, minor potential for worker safety in conjunction with type and frequency of tool use and environmental conditions.	Minor potential for public safety issues, improved worker safety in proportion to treated area.	Low potential for public exposure to herbicides; selectively higher risk to workers based on herbicide active ingredient, tool use, and environmental conditions. Potential adverse effects mitigated and minimized by training, safety equipment, and adherence to labeling guidelines.	Debris left in place has potential implications on worker safety. Burning has potential minor localized effects on public and worker health and safety.	Additional workforce increases short-term safety risk. Long-term increase in worker safety through development of a plant community that is compatible to ROW management.
Solid and Hazardous Waste	Low impact. Minor generation of waste oil/fluids from maintenance of equipment.	Maintenance on equipment generates waste oils/fluids. Potential spills/releases of fuel/fluids. Generation of waste containers.	Potential accidental releases/spills. Generation of waste containers for herbicides.	Low impact related to use of mechanized equipment. Reduction in solid waste when debris is left to compost.	Low impact related to use of mechanized equipment.
Transportation	Little to no impact.	No impact with side-wall trimming (from air). Minor traffic volume generated by construction workforce.	No impact with aerial spraying of herbicides. Minor traffic volume generated by construction workforce.	Short-term increase in traffic volumes due to additional haul trucks needed for debris transport. No impact when debris is managed on site.	Minor traffic volume generated by construction workforce.

Appendix Table J-1. Summary of Impacts Associated with Vegetation Management Methods

Resource	Manual	Mechanical	Herbicides	Debris Management	Restoration
Air Quality and Climate Change	No impact to overall air quality; mobilization of work crews to and from project sites represents a negligible increase in roadway traffic.	No impact to overall air quality; mobilization of work crews to and from project sites, represents minimal localized and temporary emissions from combustion engines.	No impact to overall air quality; in addition to crew mobilization, minor impacts may be from mechanical methods and airborne herbicide constituents.	Chipping, mulching, etc. would have impacts similar to manual control methods; pile burning would produce local smoke and particulate emissions; overall minor impacts to air quality would be temporary and local.	No impact to overall air quality; in addition to crew transport-related impacts minimal localized and temporary emissions from combustion engines.
Noise	Loud intermittent and short-term noise from use of chainsaws.	Loud intermittent and short-term increase in noise from transport of equipment and crews and use of chainsaws and mechanized equipment.	Limited and minor noise from crews on foot. Loud intermittent noise from aerial spraying.	Loud noise from transport of equipment and crews and use of heavy mulchers and chippers.	Intermittent and short-term increase in noise from transport of equipment and crews and use of chainsaw and mechanized equipment.
Socioeconomics and Environmental Justice	Minor short-term impact to local economies due to increased workforce.	Minor short-term impact to local economies due to increased workforce.	Minor short-term impact to local economies due to increased workforce.	Minor short-term impact to local economies due to increased workforce.	Minor short-term impact to local economies due to increased workforce.

Appendix K – List of Threatened and Endangered Species

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Appendix Table K-1. Federally Listed and State-Protected Animal and Plant Species Occurrences Previously Reported from Within 50 feet of TVA ROW Where Vegetation Management is Proposed in Fiscal Years 2022 and 2023[1]

Common Name[2]	Scientific Name[2]	Federal Status[3]	State	State Status[3]	State Rank[4]	Sites	Sector[5]
AQUATIC ANIMALS							
Cumberland Elktoe	*Alasmidonta atropurpurea*	E	TN	E	S1S2	1	NA
Anthony's River Snail	*Athearnia anthonyi*	E, XN	AL	SP	S1	1	MD
Hiwassee Crayfish	*Cambarus hiwasseensis*	-	NC	WL	S3S4	1	CL
Highfin Carpsucker	*Carpiodes velifer*	-	TN	D	S2S3	1	HV
Tennessee Dace	*Chrosomus tennesseensis*	-	TN	D	S23	1	OR
Blue Sucker	*Cycleptus elongatus*	-	TN	T	S2	2	HV, NA
Alabama Shiner	*Cyprinella callistia*	-	MS	-	S2	1	WP
Fanshell	*Cyprogenia stegaria*	E, XN	TN	T	S2	1	HV
Rockpile Liptooth	*Daedalochila auriformis*	-	TN	-	S1	1	MC
Egg-mimic Darter	*Etheostoma pseudovulatum*	-	TN	E	S1	1	CV
Arrow Darter	*Etheostoma sagitta*	-	KY	S	S3	1	MT
Tuscumbia Darter	*Etheostoma tuscumbia*	-	AL	SP	S2	1	MD
Flame Chub	*Hemitremia flammea*	-	TN	D	S3	1	CV
Fine-lined Pocketbook	*Lampsilis altilis*	T	GA	T	S2	1	CL
Ornate Rocksnail	*Lithasia geniculata*	-	TN	-	S2	1	MC
Rugose Rocksnail	*Lithasia jayana*	-	TN	-	SX	1	MC
Muddy Rocksnail	*Lithasia salebrosa*	-	TN	-	S2	1	HV
Northern Madtom	*Noturus stigmosus*	-	TN	D	S3	1	HV
Nashville Crayfish	*Orconectes shoupi*	E, PDL	TN	E	S2S3	3	NA
Tangerine Darter	*Percina aurantiaca*	-	TN	D	S3	1	MT
Snail Darter	*Percina tanasi*	T	TN	T	S2S3	4	CL
Blackside Dace	*Phoxinus cumberlandensis*	T	TN	T	S2	1	NA
Painted Clubshell	*Pleurobema chattanoogaense*	-	GA	-	S1	1	CL
Southern Pigtoe	*Pleurobema gergianum*	E	GA	E	S1	1	CL

Common Name[2]	Scientific Name[2]	Federal Status[3]	State	State Status[3]	State Rank[4]	Sites	Sector[5]
Georgia Pigtoe	*Pleurobema hanleyianum*	E	GA	E	S1	1	CL
Skirted Hornsnail	*Pleurocera pyrenella*	-	AL	-	S2	2	MD
Pink Heelsplitter	*Potamilus alatus*	-	MS	-	S2	1	HV
Triangular Kidneyshell	*Ptychobranchus greenii*	E	GA	E	S1	1	CL
Smooth Rabbitsfoot	*Quadrula cylindrica cylindrica*	T	AL	SP	S1	1	MD
Alabama Creekmussel	*Strophitus connasaugaensis*		GA	E	S1	1	CL
PLANTS							
Southern Maidenhair Fern	*Adiantum capillus-veneris*	-	MS	STNS	S2	1	HV
Ohio Buckeye	*Aesculus glabra*	-	MS	SLNS	S2	3	WP
Ridge-stem False-foxglove	*Agalinis oligophylla*	-	MS	STNS	S2	1	WP
Yellow Giant-hyssop	*Agastache nepetoides*	-	GA	STNS	S1	1	MC
Yellow Giant-hyssop	*Agastache nepetoides*	-	AL	STNS	S1	1	MC
Little River Canyon Onion	*Allium speculae*	-	AL	SLNS	S2	1	MD
Glade Onion	*Allium stellatum*	-	TN	E	S1	1	NA
Round-leaved Serviceberry	*Amelanchier sanguinea*	-	TN	T	S2	1	MC
Price's Potato-bean	*Apios priceana*	T	TN	E	S3	1	HK
Western Hairy Rock-cress	*Arabis hirsuta*	-	TN	T	S1	1	NA
Canada Wild-ginger	*Asarum canadense*	-	MS	STNS	S3	1	HV
Canadian Milkvetch	*Astragalus canadensis*	-	AL	STNS	S1	2	MD
Tennessee Milk-vetch	*Astragalus tennesseensis*	-	TN	S	S3	7	MC, NA
Spreading False-foxglove	*Aureolaria patula*	-	TN	S	S3	3	OR
Tall Blue Wild Indigo	*Baptisia australis* var. *aberrans*	-	GA	STNS	S2	1	CL
Cream Wild Indigo	*Baptisia bracteata* var. *leucophaea*	-	KY	S	S3	5	HK
Nuttall's Rayless Golden-rod	*Bigelowia nuttallii*	-	AL	SLNS	S3	1	MD
Smooth Blephilia	*Blephilia subnuda*	-	AL	STNS	S1S2	8	MD
Sideoats Grama	*Bouteloua curtipendula var. curtipendula*	-	KY	S	S3?	1	HK
Wild Hyacinth	*Camassia scilloides*	-	MS	STNS	S2	1	WP

Common Name[2]	Scientific Name[2]	Federal Status[3]	State	State Status[3]	State Rank[4]	Sites	Sector[5]
Broadwing Sedge	*Carex alata*	-	KY	T	S1S2	1	HK
Epiphytic Sedge	*Carex decomposita*	-	KY	T	S2	3	HK, OR
Asa Gray Sedge	*Carex grayi*	-	GA	STNS	S2?	1	CL
Hairy sharp-scaled Sedge	*Carex oxylepis* var. *pubescens*	-	MS	STNS	S2S3	1	WP
Straw Sedge	*Carex straminea*	-	KY	T	S2?	2	OR
Red Turtlehead	*Chelone obliqua*	-	TN	S	S1	1	ML
Yellowwood	*Cladrastis kentukea*	-	MS	STNS	S2	1	WP
Bastard Toad-flax	*Comandra umbellata*	-	AL	STNS	S1	5	MC, MS
Woodland Tickseed	*Coreopsis pulchra*	-	AL	STNS	S2	4	MD
Pale Corydalis	*Corydalis sempervirens*	-	KY	S	S3?	1	MT
American Smoke-tree	*Cotinus obovatus*	-	AL	STNS	S2	7	MD
Harper's Dodder	*Cuscuta harperi*	-	AL	STNS	S2	1	MD
Leafy Prairie-clover	*Dalea foliosa*	T	TN	E	S2S3	1	NA
Gattinger Prairie-clover	*Dalea gattingeri*	-	GA	STNS	S2S3	1	CL
Gattinger Prairie-clover	*Dalea gattingeri*	-	AL	STNS	S3	1	MS
Purple Prairie-clover	*Dalea purpurea*	-	KY	S	S3?	2	HK
Bog Oat-grass	*Danthonia epilis*	-	TN	S	S1S2	4	MC
Tall Larkspur	*Delphinium exaltatum*	-	TN	E	S2	3	OR
Dwarf Larkspur	*Delphinium tricorne*	-	GA	STNS	S2?	1	MC
Creamflower Tick-trefoil	*Desmodium ochroleucum*	-	AL	STNS	S2	2	MD
Dutchman's Breeches	*Dicentra cucullaria*	-	AL	STNS	S2	1	MC
Panic-grass	*Dichanthelium ensifolium* ssp. *curtifolium*	-	TN	E	S1	1	MC
Mountain Bush-honeysuckle	*Diervilla sessilifolia* var. *rivularis*	-	AL	STNS	S2	1	MS
Glade fern	*Diplazium pycnocarpon*	-	MS	STNS	S2S3	1	HV
Wedge-leaf Whitlow-grass	*Draba cuneifolia*	-	KY	E	S1	1	NA
Dwarf Sundew	*Drosera brevifolia*	-	TN	T	S2	1	MC
Crested Woodfern	*Dryopteris cristata*	-	TN	T	S2	1	MT

Common Name[2]	Scientific Name[2]	Federal Status[3]	State	State Status[3]	State Rank[4]	Sites	Sector[5]
Eastern Purple Coneflower	*Echinacea purpurea*	-	MS	STNS	S3	1	WP
Svenson's Wild-rye	*Elymus svensonii*	-	TN	T	S2	1	NA
Harper's Umbrella-plant	*Eriogonum harperi*	-	AL	STNS	S1	1	MS
Godfrey's Thoroughwort	*Eupatorium godfreyanum*	-	TN	S	S1	1	OR
White-bract Thoroughwort	*Eupatorium leucolepis*	-	TN	E	S1	1	MC
Creeping Aster	*Eurybia surculosa*	-	NC	W1	S3?	1	CL
Creeping Aster	*Eurybia surculosa*	-	AL	STNS	S1	1	MD
Viscid Bushy Goldenrod	*Euthamia gymnospermoides*	-	TN	E	S1	1	MS
Big-head Evax	*Evax prolifera*	-	MS	STNS	S1	1	WP
Evolvulus	*Evolvulus nuttallianus*	-	TN	S	S3	4	NA
Hairy Umbrella-sedge	*Fuirena squarrosa*	-	TN	S	S1	2	HV, ML
Dwarf Huckleberry	*Gaylussacia dumosa*	-	TN	T	S3	3	MC
Manna-grass	*Glyceria acutiflora*	-	KY	E	S1S2	2	OR
Short's Hedge-hyssop	*Gratiola viscidula*	-	KY	S	S3	1	OR
Shortleaf Beardgrass	*Gymnopogon brevifolius*	-	TN	S	S1S2	1	MC
Rough Pennyroyal	*Hedeoma hispida*	-	KY	T	S2	1	HK
Eggert's Sunflower	*Helianthus eggertii*	-	TN	S	S3	6	CV, MC, NA
Longleaf Sunflower	*Helianthus longifolius*	-	AL	STNS	S1S2	9	MC, MD
Naked-stem sunflower	*Helianthus occidentalis*	-	TN	S	S2	2	MC, OR
Whorled Sunflower	*Helianthus verticillatus*	E	MS	STNS	S1	1	HV
Green Violet	*Hybanthus concolor*	-	MS	STNS	S3	1	HV
Straggling St. John's-wort	*Hypericum dolabriforme*	-	GA	STNS	S3	1	CL
St. John's-wort	*Hypericum nudiflorum*	-	TN	S	S2	3	MC
Barrens St. Johnswort	*Hypericum sphaerocarpum*	-	GA	STNS	S1	1	MC
Narrow Blue Flag	*Iris prismatica*	-	TN	T	S2S3	1	MC
Butler's Quillwort	*Isoetes butleri*	-	AL	STNS	S2	1	MS
Butternut	*Juglans cinerea*	-	AL	STNS	S1	1	MD

Common Name[2]	Scientific Name[2]	Federal Status[3]	State	State Status[3]	State Rank[4]	Sites	Sector[5]
Plain's Rush	*Juncus filipendulus*	-	KY	T	S2?	3	HK, MS
Smooth Veiny Peavine	*Lathyrus venosus*	-	AL	STNS	S1	1	MD
Alabama Glade-cress	*Leavenworthia alabamica*	-	AL	STNS	S2	2	MS
Fleshy-fruit Gladecress	*Leavenworthia crassa*	E	AL	STNS	S2	1	MS
Glade Cress	*Leavenworthia exigua* var. *exigua*	-	GA	T	S2	1	CL
Michaux Leavenworthia	*Leavenworthia uniflora*	-	AL	STNS	S2	1	MS
Narrowleaf Bushclover	*Lespedeza angustifolia*	-	TN	T	S2	2	MC
Spring Creek Bladderpod	*Lesquerella perforata*	T	TN	E	S1	2	NA
Grooved Yellow Flax	*Linum sulcatum*	-	MS	STNS	S3	1	WP
Ear-flower Lobelia	*Lobelia appendiculata*	-	MS	STNS	S3	1	WP
Fraser Loosestrife	*Lysimachia fraseri*	-	TN	E	S2	2	MS
Hispid Falsemallow	*Malvastrum hispidum*	-	KY	T	S2?	1	HK
Hairy False Gromwell	*Onosmodium hispidissimum*	-	TN	E	S1	2	MC, MT
False Gromwell	*Onosmodium molle* ssp. *subsetosum*	-	AL	STNS	S1	2	MD
Limestone Adder's-tongue	*Ophioglossum engelmannii*	-	GA	STNS	S2S3	1	MC
Smoother Sweet-cicely	*Osmorhiza longistylis*	-	MS	STNS	S3	5	WP
Allegheny-spurge	*Pachysandra procumbens*	-	MS	STNS	S3	1	WP
American ginseng	*Panax quinquefolius*	-	GA	STNS	S3	1	CL
American ginseng	*Panax quinquefolius*	-	TN	S-CE	S3S4	1	OR
Duck River Bladderpod	*Paysonia densipila*	-	AL	STNS	S1	2	MS
Kral's Beardtongue	*Penstemon kralii*	-	AL	STNS	S1	1	MD
Limestone Fame-flower	*Phemeranthus calcaricus*	-	KY	E	S1	2	HK,
Limestone Fame-flower	*Phemeranthus calcaricus*	-	TN	S	S3	11	MC, NA
Fame-flower	*Phemeranthus mengesii*	-	TN	T	S2	3	MC
Roundleaf Fameflower	*Phemeranthus teretifolius*	-	AL	STNS	S1	2	MS
Yellow-crested Orchid	*Platanthera cristata*	-	TN	S	S2S3	3	MC
Yellow Fringeless Orchid	*Platanthera integra*	-	TN	E	S1	1	MC
White Fringeless Orchid	*Platanthera integrilabia*	T	TN	E	S2S3	5	MC

Common Name[2]	Scientific Name[2]	Federal Status[3]	State	State Status[3]	State Rank[4]	Sites	Sector[5]
Rose Pogonia	*Pogonia ophioglossoides*	-	TN	E	S2	3	MC
Maryland Milkwort	*Polygala mariana*	-	TN	S	S1	1	CV
Nuttall's Milkwort	*Polygala nuttallii*	-	TN	E	S1	1	MC
Prairie Parsley	*Polytaenia nuttallii*	-	MS	STNS	S2	1	WP
Pickerel Weed	*Pontederia cordata*	-	KY	T	S1S2	1	OR
Shadow-witch Orchid	*Ponthieva racemosa*	-	MS	STNS	S2	1	WP
Spotted Pondweed	*Potamogeton pulcher*	-	KY	T	S1S2	1	OR
Barbed Rattlesnake-root	*Prenanthes barbata*	-	TN	S	S2	3	CV, HV
Barbed Rattlesnake-root	*Prenanthes barbata*	-	AL	STNS	S1S2	1	MD
Mountain-mint	*Pycnanthemum curvipes*	-	AL	STNS	S1?	1	MD
Mountain-mint	*Pycnanthemum muticum*	-	MS	STNS	S2S3	9	HV, WP
Nuttall's Oak	*Quercus texana*	-	KY	T	S2S3	2	HK, ML
Lance-leaved Buckthorn	*Rhamnus lanceolata*	-	MS	STNS	S2	1	WP
Tall Beakrush	*Rhynchospora macrostachya*	-	KY	E	S1	1	OR
Beakrush	*Rhynchospora perplexa*	-	TN	T	S2	1	MC
Granite Gooseberry	*Ribes curvatum*	-	AL	STNS	S2	5	MC, MD
Missouri gooseberry	*Ribes missouriense*	-	TN	S	S2	1	MC
Sun-facing Coneflower	*Rudbeckia heliopsidis*	-	AL	STNS	S2	1	MD
Cumberland Rose Gentian	*Sabatia capitata*	-	TN	E	S2	5	MC
Sessile-fruited Arrowhead	*Sagittaria rigida*	-	TN	E	S1	1	MC
Pussy Willow	*Salix humilis*	-	AL	STNS	S2S3	1	MD
Bay Starvine	*Schisandra glabra*	-	TN	T	S2	1	HV
Sunnybell	*Schoenolirion croceum*	-	TN	T	S3	1	NA
Sunnybell	*Schoenolirion croceum*	-	AL	STNS	S2	3	MC, MS
Large-flowered Skullcap	*Scutellaria montana*	T	TN	T	S4	5	MC
Spikemoss	*Selaginella arenicola* ssp. *riddellii*	-	AL	STNS	S2	1	MD
Spikemoss	*Selaginella rupestris*	-	AL	STNS	S2S3	1	MS
Wild Pink	*Silene caroliniana* ssp. *pensylvanica*	-	TN	T	S1S2	1	MT

Common Name[2]	Scientific Name[2]	Federal Status[3]	State	State Status[3]	State Rank[4]	Sites	Sector[5]
Ovate Catchfly	*Silene ovata*	-	TN	E	S2	1	MS
Cumberland Rosinweed	*Silphium brachiatum*	-	AL	STNS	S2	9	MC, MD
Mohr's Rosin-weed	*Silphium mohrii*	-	AL	STNS	S1	5	MC, MD
Prairie-dock	*Silphium pinnatifidum*	-	AL	STNS	S2	2	MS
Steeple-bush	*Spiraea tomentosa*	-	AL	STNS	S1	1	MD
Great Plains Ladies'-tresses	*Spiranthes magnicamporum*	-	MS	STNS	S2	1	WP
Water Stitchwort	*Stellaria fontinalis*	-	TN	S	S3	4	MC, NA
White Heath Aster	*Symphyotrichum ericoides*	-	MS	STNS	S2	1	WP
White Heath Aster	*Symphyotrichum priceae*	-	KY	E	S1	2	HK, NA
Soft-haired Thermopsis	*Thermopsis mollis*	-	AL	STNS	S1	1	MD
Zigzag Bladderwort	*Utricularia subulata*	-	TN	T	S1	1	MC
Ozark Bunchflower	*Veratrum woodii*	-	TN	S	S2	1	OR
Mapleleaf Viburnum	*Viburnum acerifolium*	-	MS	STNS	S1	1	WP
Eggleston's Violet	*Viola egglestonii*	-	GA	STNS	S2	1	MC
Northern Prickly-ash	*Zanthoxylum americanum*	-	TN	S	S2	1	MC
Death-camas	*Zigadenus leimanthoides*	-	TN	T	S2	2	MC
Southern Wildrice	*Zizaniopsis miliacea*	-	KY	T	S1S2	1	HK
TERRESTRIAL ANIMALS							
Streamside Salamander	*Ambystoma barbouri*	-	TN	E	S2	4	NA
Green salamander	*Aneides aeneus*	-	AL	SP	S3	1	MC
Red-tailed Hawk	*Buteo jamaicensis*	-	TN	-	S5	3	ML
Fish crow	*Corvus ossifragus*	-	KY	S	S3	1	HK
Hellbender	*Cryptobranchus alleganiensis*	PS	TN	E	S3	1	HV
Black Mountain Salamander	*Desmognathus welteri*	-	TN	D	S3	1	OR
Southeastern Five-lined Skink	*Eumeces inexpectatus*	-	KY	S	S2S3	1	HK
Gray bat	*Myotis grisescens*	E	KY	T	S2	2	HK
Gray bat	*Myotis grisescens*	E	TN	E	S2	2	MC, OR
Eastern small-footed bat	*Myotis leibii*	-	TN	D	S2S3	2	OR

Common Name[2]	Scientific Name[2]	Federal Status[3]	State	State Status[3]	State Rank[4]	Sites	Sector[5]
Little Brown Bat	*Myotis lucifugus*	-	TN	T	S3	1	OR
Northern long-eared bat	*Myotis septentrionalis*	T	NC	T	S2	2	CL
Northern long-eared bat	*Myotis septentrionalis*	T	TN	T	S1S2	2	OR
Indiana bat	*Myotis sodalis*	E	KY	E	S1S2	1	HK
Indiana bat	*Myotis sodalis*	E	TN	E	S1	1	OR
A Cave Obligate Spider	*Nesticus barri*	-	AL	-	S3	1	MD
Evening Bat	*Nycticeius humeralis*	-	KY	-	-	1	HK
Acuminate Snaketail	*Ophiogomphus acuminatus*	-	TN	-	S2	1	CV
Tricolored Bat	*Perimyotis subflavus*	-	KY	T	S2	4	HK
Tricolored Bat	*Perimyotis subflavus*	-	TN	T	S2S3	2	MC, OR
Bachman's Sparrow	*Peucaea aestivalis*	-	TN	E	S1B	2	HV, OR
Duck River Cave Beetle	*Pseudanophthalmus tullahoma*	-	TN	-	S1	1	MC
Northern Crawfish Frog	*Rana areolata circulosa*	-	KY	S	S3	3	HK
Cerulean Warbler	*Setophaga cerulea*	-	TN	D	S3B	1	OR
Cerulean warbler	*Setophaga cerulea*	-	TN	D	S3B	1	MC
Southeastern Shrew	*Sorex longirostris*	-	TN	-	S4	1	HK
Golden-winged Warbler	*Vermivora chrysoptera*	-	TN	T	S3B	1	OR
Blue-winged Warbler	*Vermivora pinus*	-	NC	SR	S2B	1	CL
Meadow Jumping Mouse	*Zapus hudsonius*	PS	AL	SP	S1	1	MD
Meadow Jumping Mouse	*Zapus hudsonius*	PS	TN	-	S4	1	NA

[1] Source: TVA Natural Heritage Database, queried April 2021.
[2] Species can be listed in the table multiple times if they occur more than one state.
[3] Status Codes: D = Deemed in Need of Management; DM = Delisted but still Monitored; E = Listed Endangered; PS = Partial Status; SR = Significantly Rare; SLNS = State Listed, no status assigned; S = Listed Special Concern; S-CE = Special Concern/ Commercially Exploited; T = Listed Threatened;
[4] State Ranks: S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable; S4 = Apparently Secure; B = Breeding; N = Nonbreeding; S? = Inexact or uncertain; S#S# = Denotes a range of ranks because the exact rarity of the element is uncertain (e.g., S1S2)
[5] ROW Sector Abbreviations: CL = Cleveland, CV = Centerville, HK = Hopkinsville, HV = Hickory Valley, MC = Manchester, MD = Madison, ML = Muscle Shoals, MT = Morristown, NA = Nashville, OR = Oak Ridge, WP = West Point

Appendix L – Fiscal Year 2022 Planning Cycle - Natural Areas Crossed by or Occurring within 50 Feet of Transmission Line Segments Proposed for Vegetation Management

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Appendix Table L-1. Fiscal Year 2022 - Natural Areas Crossed by or Occurring within 50 Feet of Transmission Line Segments Proposed for Vegetation Management in the Centerville Sector

CENTERVILLE SECTOR	NAME	ACRES	COUNTY	STATE
CV	Duck River State Mussel Sanctuary	0.67067	Multiple	TN
CV	Designated Critical Habitat (DCH) Slabside Pearlymussel (TN)	0.01805	Multiple	Multiple
CV	DCH Fluted Kidneyshell (TN)	0.01805	Multiple	Multiple
CV	DCH For Rabbitsfoot, Slabside Pearlymussel, Fluted Kidneyshell	0.01696	Multiple	Multiple
CV	Kentucky Reservoir Reservation	4.38361	Multiple	Multiple
CV	Richland Creek	0.28093	Multiple	TN
CV	DCH For Rabbitsfoot, Slabside Pearlymussel, Fluted Kidneyshell	0.00994	Multiple	Multiple
CV	Little Piney Creek	43.61116	Hickman (TN)	TN
CV	Natchez Trace National Parkway	4.94418	Multiple	Multiple
CV	M.T.S.U. State Wildlife Management Area	1.77009	Hickman (TN)	TN
CV	Kentucky Reservoir Reservation	41.31970	Multiple	Multiple
CV	Natchez Trace State Scenic Trail	1.38496	Multiple	TN
CV	The Land Trust for Tennessee Easement	22.74503	Hickman (TN)	TN
CV	Happy Hollow Wildlife Management Area – Tennessee Wildlife Resources Agency	13.31525	Hickman (TN)	TN
CV	MTSU Wildlife Management Area (Hickman Co.)	0.03190	Hickman (TN)	TN
CV	Johnsonville Coal Generating Facility	3.51667	Humphreys (TN)	TN
CV	Tennessee National Wildlife Refuge	3.84391	Multiple	TN
CV	DCH Slabside Pearlymussel (TN)	3.39240	Multiple	Multiple
CV	DCH Fluted Kidneyshell (TN)	3.39240	Multiple	Multiple
CV	Tennessee National Migratory Wildlife Refuge/Duck River Unit	11.38822	Multiple	TN
CV	DCH for Rabbitsfoot, Slabside Pearlymussel, Fluted Kidneyshell	0.02605	Multiple	Multiple
CV	Kentucky Reservoir Reservation	1.73609	Multiple	Multiple

CENTERVILLE SECTOR	NAME	ACRES	COUNTY	STATE
CV	Hurricane Creek Farms - Conservation Easement Land Trust of TN	20.90621	Humphreys (TN)	TN
CV	Tennessee National Wildlife Refuge	0.07087	Multiple	TN
CV	Piney River	0.13455	Hickman (TN)	TN
CV	DCH Slabside Pearlymussel (TN)	0.06143	Multiple	Multiple
CV	DCH Fluted Kidneyshell (Tn)	0.06143	Multiple	Multiple
CV	DCH For Rabbitsfoot, Slabside Pearlymussel, Fluted Kidneyshell	0.03723	Multiple	Multiple
CV	DCH Slabside Pearlymussel (TN)	0.01739	Multiple	Multiple
CV	DCH Fluted Kidneyshell (TN)	0.01739	Multiple	Multiple
CV	Natchez Trace National Parkway	9.05136	Multiple	Multiple
CV	Natchez Trace State Scenic Trail	1.32418	Multiple	TN
CV	Drop Tine Farms - Conservation Easement Land Trust of Tennessee	32.12682	Multiple	TN
CV	Duck River Wildlife Management Area	25.40142	Maury (TN)	TN
CV	Yanahli Wildlife Management Area	25.42087	Maury (TN)	TN
CV	Richland Creek	0.16152	Multiple	TN
CV	DCH Oyster Mussel (TN)	1.46574	Multiple	Multiple
CV	DCH For Rabbitsfoot, Slabside Pearlymussel, Fluted Kidneyshell	0.01024	Multiple	Multiple
CV	Duck River State Scenic River	0.00516	Multiple	TN
CV	Duck River State Mussel Sanctuary	0.00516	Multiple	TN
CV	DCH Slabside Pearlymussel (TN)	0.05638	Multiple	Multiple
CV	DCH Fluted Kidneyshell (TN)	0.05638	Multiple	Multiple
CV	DCH Duck River for 5 Endangered Mussels in Tennessee and Cumberland River Basin Unit 1	0.00001	Multiple	TN
CV	Duck State Scenic River	0.02501	Multiple	TN
CV	DCH Cumberlandian Combshell	0.08731	Multiple	Multiple
CV	Cumberland Fossil Plant	0.93719	Stewart (TN)	TN
CV	Kentucky Reservoir Reservation	25.66041	Multiple	Multiple
CV	Cumberland Coal Generating Facility	3.52437	Stewart (TN)	TN
CV	Lake Barkley	12.43424	Multiple	Multiple
CV	Cheatham Reservoir Reservation	6.60655	Multiple	TN

CENTERVILLE SECTOR	NAME	ACRES	COUNTY	STATE
CV	Barkley Reservoir Reservation	1.81469	Multiple	Multiple
CV	Red River	0.19573	Multiple	Multiple
CV	Cheatham Lake - US Army Corps Of Engineers	2.81625	Multiple	TN
CV	Sycamore Creek	0.04307	Multiple	TN
CV	Cheatham Reservoir Wildlife Management Area Wildlife Observation Area	10.63607	Cheatham (TN)	TN
CV	Cheatham State Wildlife Management Area	10.63607	Cheatham (TN)	TN

Appendix Table L-2. Fiscal Year 2022 - Natural Areas Crossed by or Occurring within 50 Feet of Transmission Line Segments Proposed for Vegetation Management in the Cleveland Sector

CLEVELAND SECTOR	NAME	ACRES	COUNTY	STATE
CL	Bendabout Farms Easement - The Nature Conservancy - Conservation Easement	28.80226	Bradley (TN)	TN
CL	Circle V Farm Conservation Easement - Land Trust For TN	10.13935	Hamilton (TN)	TN
CL	Chickamauga Reservoir Reservation	8.61848	Hamilton (TN)	TN
CL	Hiwassee Refuge State Wildlife Management Area	17.65421	Multiple	TN
CL	Cherokee (South) State Wildlife Management Area	111.02591	Multiple	Multiple
CL	Chilhowee Dairy Farm	19.87728	Polk (TN)	TN
CL	John Muir National Recreation/State Scenic Trail	0.77871	Polk (TN)	TN
CL	Cherokee National Forest	0.00145	Multiple	Multiple
CL	Hiwassee River State Mussels Sanctuary	0.29171	Polk (TN)	TN
CL	Cherokee National Forest Ownership Boundaries	0.00043	Multiple	Multiple
CL	South Cherokee National Forest And Wildlife Management Area	0.00074	Multiple	Multiple
CL	DCH Slabside Pearlymussel (TN)	0.81497	Multiple	Multiple
CL	DCH Fluted Kidneyshell (TN)	0.81497	Multiple	Multiple
CL	Hiwassee River	0.07097	Multiple	Multiple
CL	Nantahala National Forest	313.24559	Multiple	Multiple
CL	Nantahala State Game Land	0.06558	Multiple	Multiple
CL	Hiwassee Reservoir Reservation	22.07183	Cherokee (NC)	NC
CL	National Forest - North Carolina	0.00003	Multiple	Multiple
CL	North Carolina National Forest (Partial)	0.00724	Multiple	Multiple
CL	Cherokee (South) State Wildlife Management Area	95.73444	Multiple	Multiple
CL	Apalachia Reservoir Reservation	5.07108	Multiple	Multiple
CL	Cherokee National Forest	0.00103	Multiple	Multiple
CL	Cherokee National Forest Ownership Boundaries	0.00183	Multiple	Multiple
CL	Ocoee State Bear Reserve	22.07218	Multiple	Multiple

CLEVELAND SECTOR	NAME	ACRES	COUNTY	STATE
CL	Fourth Fractional Township Wildlife Management Area	17.04126	Polk (TN)	TN
CL	Cherokee (South) State Wildlife Management Area	37.39415	Multiple	Multiple
CL	Apalachia Reservoir Reservation	7.42947	Multiple	Multiple
CL	Cherokee National Forest	0.00041	Multiple	Multiple
CL	Ocoee No. 3 Reservoir Reservation	3.16311	Polk (TN)	TN
CL	Cherokee National Forest Ownership Boundaries	0.00010	Multiple	Multiple
CL	South Cherokee National Forest and Wildlife Management Area	0.00611	Multiple	Multiple
CL	Ocoee River/Ruths Golden Aster Protection Planning Site	0.85001	Polk (TN)	TN
CL	Ocoee River Gorge	0.85001	Polk (TN)	TN
CL	Ocoee No. 2 Reservoir Reservation	0.76644	Polk (TN)	TN
CL	Ocoee No. 2 Dam Reservation	0.76644	Polk (TN)	TN
CL	Ocoee River	0.08040	Polk (TN)	TN
CL	Atlantic Coast Conservancy/Pelican Coast Conservancy Conservation Easement E201427a	2.86140	Hamilton (TN)	TN
CL	South Chickamauga Creek	0.12043	Catoosa (GA)	GA
CL	Agricultural Conservation Easement	2.31263	Bradley (TN)	TN
CL	Shadwick Farm Conservation Easement - Land Trust For TN	2.31581	Hamilton (TN)	TN
CL	Griffin Conservation Property	28.31865	Multiple	TN
CL	Watts Bar Reservoir Reservation	12.46313	Multiple	TN
CL	Watts Bar Dam Reservation	12.46313	Multiple	TN
CL	Watts Bar State Wildlife Management Area	19.97345	Multiple	TN
CL	Meigs County Park	0.63551	Meigs (TN)	TN
CL	Watts Bar Reservoir Reservation	32.96837	Multiple	TN
CL	Watts Bar Dam Reservation	32.96837	Multiple	TN
CL	DCH Interrupted (Georgia) Rocksnail 2	0.00050	Multiple	Multiple
CL	DCH Logperch Conasauga River Unit 25	0.24571	Multiple	Multiple
CL	Chattahoochee-Oconee National Forests Boundary (2 of 4)	124.52152	Multiple	GA
CL	DCH Interrupted Rocksnail Oostanaula River Unit 2	0.02213	Multiple	Multiple
CL	DCH Georgia Pigtoe Terrapin Creek/Coosa River Unit 2	0.00028	Multiple	Multiple

CLEVELAND SECTOR	NAME	ACRES	COUNTY	STATE
CL	DCH Coosa Moccasinshell	0.00010	Multiple	Multiple
CL	DCH Fine Lined Pocketbook	0.00010	Multiple	Multiple
CL	DCH Ovate Clubshell	0.00010	Multiple	Multiple
CL	DCH Southern Acornshell	0.00010	Multiple	Multiple
CL	DCH Southern Clubshell	0.00010	Multiple	Multiple
CL	DCH Southern Pigtoe	0.00010	Multiple	Multiple
CL	DCH Upland Combshell	0.00010	Multiple	Multiple
CL	DCH Alabama Moccasinshell	0.00010	Multiple	Multiple
CL	DCH Triangular Kidneyshell	0.00010	Multiple	Multiple
CL	DCH Interrupted (Georgia) Rocksnail 1	0.07834	Multiple	Multiple
CL	Chattahoochee-Oconee National Forests Boundary (2 Of 4)	64.09709	Multiple	GA
CL	Sleepy Hollow Herb Farm	6.54998	Whitfield (GA)	GA
CL	Prater Island Mitigation Bank	0.04729	Multiple	GA
CL	DCH Georgia Pigtoe Terrapin Creek/Coosa River Unit 2	0.00003	Multiple	Multiple
CL	DCH Amber Darter	0.09503	Multiple	Multiple
CL	DCH Logperch Conasauga River Unit 25	0.09503	Multiple	Multiple
CL	Crockford-Pigeon Mountain Wildlife Management Area	4.27649	Multiple	GA
CL	Prater Island Conservation Easement - US Army Corps Of Engineers	10.34233	Multiple	GA
CL	Conasauga River	0.02498	Multiple	Multiple
CL	DCH Ovate Clubshell	0.02157	Multiple	Multiple
CL	DCH Southern Acornshell	0.02157	Multiple	Multiple
CL	DCH Coosa Moccasinshell	0.02157	Multiple	Multiple
CL	DCH Southern Clubshell	0.02157	Multiple	Multiple
CL	DCH Southern Pigtoe	0.02157	Multiple	Multiple
CL	DCH Upland Combshell	0.02157	Multiple	Multiple
CL	DCH Alabama Moccasinshell	0.02157	Multiple	Multiple
CL	DCH Triangular Kidneyshell	0.02157	Multiple	Multiple
CL	DCH Fine Lined Pocketbook	0.02157	Multiple	Multiple
CL	South Chickamauga Creek	0.15397	Catoosa (GA)	GA

Appendix Table L-3. Fiscal Year 2022 - Natural Areas Crossed by or Occurring within 50 Feet of Transmission Line Segments Proposed for Vegetation Management in the Hickory Valley Sector

HICKORY VALLEY SECTOR	NAME	ACRES	COUNTY	STATE
HV	Hatchie River	0.12999	Multiple	Multiple
HV	Kentucky Reservoir No. 2 State Mussel Sanctuary	4.31434	Hardin (TN)	TN
HV	Pickwick Dam Reservation	2.87907	Hardin (TN)	TN
HV	Kentucky Reservoir Reservation	8.65380	Multiple	Multiple
HV	DCH For Rabbitsfoot, Slabside Pearlymussel, Fluted Kidneyshell	2.24297	Multiple	Multiple
HV	Divide Canal Section Wildlife Management Area	15.95069	Multiple	MS
HV	Tenn-Tom Mitigation Protection Planning Site	0.00019	Multiple	Multiple
HV	Tennessee-Tombigbee Waterway	0.00019	Multiple	Multiple
HV	Oak Grove Plantation- Cotton Unit-Conservation Easement - Land Trust for TN	17.08180	Hardeman (TN)	TN
HV	Divide Canal Section Wildlife Management Area	27.58403	Multiple	MS
HV	Tenn-Tom Mitigation Protection Planning Site	0.00040	Multiple	Multiple
HV	Tennessee-Tombigbee Waterway	0.00042	Multiple	Multiple
HV	Chambers Creek Wetland - Tennessee Wildlife Resources Agency (TWRA)	14.07466	Hardin (TN)	TN
HV	Sharp Forest - Mississippi State University College of Forestry Resources	4.08632	Multiple	Multiple
HV	Holly Springs National Forest	731.83803	Multiple	MS
HV	Shelby Farms Forest Public Recreation Area	2.27325	Shelby (TN)	TN
HV	Shelby Farms Park	2.52759	Shelby (TN)	TN
HV	Presidents Island Wildlife Management Area	45.68661	Shelby (TN)	TN
HV	US Naval Air Station at Millington	0.00042	Shelby (TN)	TN
HV	Richardson's Landing - Boat Launch Area/Fossil Site	5.88026	Tipton (TN)	TN
HV	Naval Support Activity Mid-South	0.65163	Shelby (TN)	TN

Appendix Table L-4. Fiscal Year 2022 - Natural Areas Crossed by or Occurring within 50 Feet of Transmission Line Segments Proposed for Vegetation Management in the Hopkinsville Sector

HOPKINSVILLE SECTOR	NAME	ACRES	COUNTY	STATE
HK	Tennessee River Outstanding State Resource Water	0.35756	Multiple	KY
HK	Tennessee River (RM 12 to 22.4 - KY Lake Dam) Outstanding Resource Waters	0.00383	Multiple	KY
HK	Tennessee River Outstanding State Resource Water	0.32747	Multiple	KY
HK	Barkley Reservoir Reservation	18.06784	Multiple	Multiple
HK	Land Between the Lakes National Recreation Area	0.01526	Multiple	Multiple
HK	Tennessee River (RM 12 to 22.4 - KY Lake Dam) Outstanding Resource Water	1.65359	Multiple	KY
HK	Lake Barkley	39.52097	Multiple	Multiple
HK	Land Between the Lakes National Recreation Area - Ownership Boundaries	0.02581	Multiple	Multiple
HK	Land Between the Lakes Potential National Natural Landmark	1.36563	Multiple	Multiple
HK	Land Between the Lakes/KY State Wildlife Management Area	1.36563	Multiple	Multiple
HK	Land Between the Lakes Area Biosphere Reserve	1.36563	Multiple	Multiple
HK	Environmental Education Biosphere Reserve Core Area	0.01105	Multiple	KY
HK	Land Between the Lakes Environmental Education Area	0.01105	Multiple	KY
HK	Wooten's Bluff	2.02423	Montgomery (TN)	TN
HK	Fort Campbell Military Reservation	0.48844	Multiple	Multiple
HK	Dyers Creek Recreation Area	3.42514	Stewart (TN)	TN
HK	ACUB / REPI – Funded Easement	10.79956	Montgomery (TN)	TN
HK	Lake Barkley	0.59723	Multiple	Multiple
HK	Barkley Reservoir Reservation	54.72075	Multiple	Multiple
HK	Land Between the Lakes National Recreation Area - Ownership Boundaries	0.05588	Multiple	Multiple
HK	Fort Campbell Military Reservation Protection Planning Site	0.00015	Multiple	Multiple
HK	Land Between the Lakes National Recreation Area	9.19287	Multiple	Multiple
HK	Cumberland River Mussel Sanctuary (KY)	6.21151	Lyon (KY)	KY

HOPKINSVILLE SECTOR	NAME	ACRES	COUNTY	STATE
HK	Land Between the Lakes Wildlife Management Area - TWRA	0.77253	Multiple	Multiple
HK	Land Between the Lakes Potential National Natural Landmark	0.09180	Multiple	Multiple
HK	Land Between the Lakes/KY State Wildlife Management Area	0.09180	Multiple	Multiple
HK	Land Between the Lakes Area Biosphere Reserve	0.09180	Multiple	Multiple
HK	Cumberland River 3	0.11713	Multiple	KY
HK	Long Creek	0.09218	Stewart (TN)	TN
HK	Ft. Campbell Military Reservation/State Wildlife Mgmt Area	152.72183	Multiple	Multiple
HK	Fort Campbell Military Reservation Protection Plan	152.72183	Multiple	Multiple
HK	Pond Hollow Biosphere Reserve Core Area	56.96699	Trigg (KY)	KY
HK	Barkley Reservoir Reservation	21.02590	Multiple	Multiple
HK	Pace-00055 Purchase of Agricultural Easement Corporation KY - Conservation Easement	23.91419	Trigg (KY)	KY
HK	Sand Creek Outstanding Resource Waters	0.82957	Hickman (KY)	KY
HK	Mayfield Creek Swamp Macrosite	31.16268	Multiple	KY
HK	Obion Creek Nature Preserve	72.46917	Hickman (KY)	KY
HK	Wetlands Reserve Program (WRP)	0.54254	Hickman (KY)	KY
HK	Murphys Pond	1.54661	Hickman (KY)	KY

Appendix Table L-5. Fiscal Year 2022 - Natural Areas Crossed by or Occurring within 50 Feet of Transmission Line Segments Proposed for Vegetation Management in the Madison Sector

MADISON SECTOR	NAME	ACRES	COUNTY	STATE
MD	United Cherokee Ani-Yun-Wiya Nation	14.62916	Marshall (AL)	AL
MD	Section Bluff TVA Small Wild Area	4.76988	Jackson (AL)	AL
MD	Farm and Ranchlands Protection Program - Conservation Easement	14.95124	DeKalb (AL)	AL
MD	Spring Pygmy Sunfish Greenbrier Site	5.85947	Limestone (AL)	AL
MD	Wheeler National Wildlife Refuge	66.02130	Multiple	AL
MD	Redstone Arsenal Military Reservation	84.38896	Madison (AL)	AL
MD	Swan Creek State Wildlife Management Area	0.00742	Multiple	AL
MD	Wheeler Reservoir Reservation	39.46346	Multiple	AL
MD	Crow Creek State State Wildlife Management Area	10.86598	Jackson (AL)	AL
MD	Mud Creek Wetlands Registered Heritage Area	25.77111	Jackson (AL)	AL
MD	Mud Creek State Wildlife Management Area	25.77111	Jackson (AL)	AL
MD	Wheeler Reservoir Reservation	14.15489	Multiple	AL
MD	North Alabama Land Trust - Tract 1	11.43832	Madison (AL)	AL
MD	Muddy Bottoms	11.65285	Madison (AL)	AL
MD	Muddy Bottoms TVA Habitat Protection Area	11.65285	Madison (AL)	AL
MD	Redstone Arsenal Military Reservation	2.42648	Madison (AL)	AL
MD	Mathis Mountain Conservation Easement - North Alabama Land Trust	2.90577	Madison (AL)	AL
MD	Legacy Preserve Greenspace -North Alabama Land Trust	2.53863	Madison (AL)	AL
MD	Cove Creek Drive Greenspace - North Alabama Land Trust	3.77311	Madison (AL)	AL
MD	Bice Mountain/Bingham Mountain Potential National Natural Landmark	5.41621	Multiple	AL
MD	James D. Martin/Skyline State Wildlife Management Area	169.01665	Multiple	Multiple
MD	Paint Rock River Project	4.33237	Multiple	Multiple
MD	Echota Cherokee	162.48466	Multiple	AL
MD	North Alabama Land Trust - Watts Properties Mountain Land	15.30994	Madison (AL)	AL
MD	North Alabama Land Trust - Berry Property	1.89390	Madison (AL)	AL
MD	DCH Slabside Pearlymussel (AL)	0.00967	Multiple	Multiple
MD	DCH For Rabbitsfoot, Slabside Pearlymussel, Fluted Kidneyshell	0.00336	Multiple	Multiple

MADISON SECTOR	NAME	ACRES	COUNTY	STATE
MD	Wetlands Reserve Program (WRP)	0.64107	Limestone (AL)	AL
MD	Wheeler Reservoir Reservation	31.77607	Multiple	AL
MD	Agricultural Conservation Easement	1.45428	Limestone (AL)	AL
MD	North Alabama Land Trust - Matthews Property	8.74666	Limestone (AL)	AL
MD	DCH Slabside Pearlymussel (TN)	1.39158	Multiple	Multiple
MD	DCH Fluted Kidneyshell (TN)	1.39158	Multiple	Multiple
MD	Elk River	0.14921	Multiple	Multiple
MD	Wade Mountain Nature Preserve - North Alabama Land Trust	56.34229	Madison (AL)	AL
MD	Echota Cherokee	236.32676	Multiple	AL
MD	Huntsville Land Trust - Conservation Easement (East)	0.31364	Madison (AL)	AL

Appendix Table L-6. Fiscal Year 2022 - Natural Areas Crossed by or Occurring within 50 Feet of Transmission Line Segments Proposed for Vegetation Management in the Manchester Sector

MANCHESTER SECTOR	NAME	ACRES	COUNTY	STATE
MC	Normandy Reservoir Reservation	18.06362	Multiple	TN
MC	Duck River State Mussel Sanctuary	0.41665	Multiple	TN
MC	DCH Slabside Pearlymussel (TN)	8.31011	Multiple	Multiple
MC	Collins River	1.78056	Multiple	TN
MC	Woerner Bledsoe Farm Conservation Easement - Land Trust for TN	8.19141	Bledsoe (TN)	TN
MC	Johnson Creek	0.05142	Multiple	TN
MC	Laurel Snow Class Ii Natural/Scientific State Natural Area	0.00026	Rhea (TN)	TN
MC	Cumberland Trail 1	0.02085	Multiple	TN
MC	Sequatchie River	0.91504	Multiple	TN
MC	Mill Creek	0.17170	Grundy (TN)	TN
MC	Watts Bar Reservoir Reservation	7.86209	Multiple	TN
MC	Watts Bar Dam Reservation	7.86209	Multiple	TN
MC	Laurel Snow Designated State Natural Area	0.02256	Rhea (TN)	TN
MC	Nickajack Dam Reservation	1.04643	Marion (TN)	TN
MC	Nickajack Cave TVA Habitat Protection Area/Small Wild Area	0.00190	Multiple	Multiple
MC	Nickajack Cave	0.00067	Multiple	Multiple
MC	Nickajack Cave State Wildlife Observation Area	0.00067	Marion (TN)	TN
MC	Tennessee River Gorge	0.17366	Multiple	TN
MC	Raccoon Mountain Pumped Storage State Wildlife Obs	22.50836	Multiple	TN
MC	DCH Braun's Rock-Cress	10.21130	Multiple	TN
MC	Overall Creek	0.09183	Rutherford (TN)	TN
MC	Scales Mountain Knobs Protection Planning Site	3.51914	Rutherford (TN)	TN
MC	Georgia - Alabama Land Trust - Conservation Easement	17.08756	Multiple	GA
MC	AEDC Tullahoma Barrens	117.12740	Multiple	TN
MC	AEDC Rowland (Rollins) Creek	117.12740	Multiple	TN
MC	Arnold Engineering Development Center (AEDC)	117.12740	Multiple	TN

MANCHESTER SECTOR	NAME	ACRES	COUNTY	STATE
MC	Military Reservation	117.12740	Multiple	TN
MC	AEDC And Woods State Wildlife Management Area	117.12740	Multiple	TN
MC	Double Powerline Barrens	189.25821	Multiple	TN
MC	AEDC Powerline Barrens Registered State Natural Area	26.52039	Coffee (TN)	TN
MC	Great Falls Reservoir Reservation	2.57046	Multiple	TN
MC	Mountain Creek	0.16721	Multiple	TN
MC	Charles Creek	0.18679	Multiple	TN
MC	Collins Scenic River	0.00067	Multiple	TN
MC	Collins River	0.00069	Multiple	TN
MC	Tim’s Ford Reservoir Reservation	16.68648	Multiple	TN
MC	Military Reservation	0.03330	Multiple	TN
MC	AEDC Tullahoma Barrens	12.11957	Multiple	TN
MC	AEDC Rowland (Rollins) Creek	12.11957	Multiple	TN
MC	Arnold Engineering Development Center (AEDC)	12.11957	Multiple	TN
MC	AEDC and Woods State Wildlife Management Area	12.11957	Multiple	TN
MC	Woods Reservoir Reservation	4.77564	Multiple	TN
MC	University of Tennessee Space Institute	0.00177	Franklin (TN)	TN
MC	Nickajack Reservoir State Mussel Sanctuary	0.16125	Hamilton (TN)	TN
MC	Atlantic Coast Conservancy/Pelican Coast Conservancy Conservation D201401a	5.37334	Hamilton (TN)	TN
MC	Watts Bar Reservoir Reservation	11.23704	Multiple	TN
MC	Watts Bar Dam Reservation	11.23704	Multiple	TN
MC	DCH Laurel Dace	2.53513	Multiple	TN
MC	Bridgestone/Firestone Centennial Wilderness	50.43855	Multiple	TN
MC	Great Falls Reservoir Reservation	0.67852	Multiple	TN
MC	Bledsoe State Forest	49.35513	Multiple	TN
MC	Timberland Investment Resources Recreation Area (Formerly Bowater)	121.47483	Multiple	TN
MC	Sequatchie River	0.11507	Multiple	TN
MC	Center Hill Lake - US Army Corps Of Engineers	0.12470	Multiple	TN
MC	Sapp/ Alvarez Property Conservation Easement - Land Trust For TN	0.01889	Multiple	TN

MANCHESTER SECTOR	NAME	ACRES	COUNTY	STATE
MC	Fall Creek Falls State Natural Area	14.51485	Multiple	TN
MC	Glade Creek Property Conservation Easement - Land Trust For TN	0.00629	Multiple	TN
MC	Cumberland Trail State Park	0.12743	Multiple	TN
MC	Cumberland Trail 1	0.25472	Multiple	TN
MC	Rock Island State Park	1.82262	Multiple	TN
MC	Georgia - Alabama Land Trust - Conservation Easement	7.98056	Multiple	GA
MC	Cumberland Springs Protection Planning Site	0.00060	Multiple	TN
MC	Cumberland Springs Former Wildlife Management Area Privately Owned	0.00053	Multiple	TN
MC	AEDC and Woods State Wildlife Management Area	0.00043	Multiple	TN
MC	AEDC Tullahoma Barrens	0.17983	Multiple	TN
MC	AEDC Rowland (Rollins) Creek	0.17983	Multiple	TN
MC	Arnold Engineering Development Center (AEDC)	0.17983	Multiple	TN
MC	AEDC Spring Creek Road Barrens	3.11564	Franklin (TN)	TN
MC	Military Reservation	18.97730	Multiple	TN
MC	Double Powerline Barrens	48.68031	Multiple	TN
MC	Whites Creek Public Hunting Area	1.07735	Multiple	TN
MC	Watts Bar Reservoir Reservation	13.35744	Multiple	TN
MC	Watts Bar Dam Reservation	13.35744	Multiple	TN
MC	Rock Island State Park	0.91600	Multiple	TN
MC	Center Hill Lake - US Army Corps of Engineers	1.66106	Multiple	TN
MC	Raccoon Creek State Wildlife Management Area	18.68176	Jackson (AL)	AL
MC	Cummings Cove Wildlife Management Area	12.84513	Multiple	TN
MC	Tennessee River Gorge Trust Easement	34.10865	Multiple	TN
MC	West Harpeth River	0.08422	Williamson (TN)	TN
MC	Bag End Farm - Land Trust Of TN Conservation Easement	9.87043	Williamson (TN)	TN

Appendix Table L-7. Fiscal Year 2022 - Natural Areas Crossed by or Occurring within 50 Feet of Transmission Line Segments Proposed for Vegetation Management in the Milan Sector

MILAN SECTOR	NAME	ACRES	COUNTY	STATE
ML	Wetlands Reserve Program (WRP)	3.61949	Obion (TN)	TN
ML	Bayou Du Chien Outstanding Resource Water	1.38352	Multiple	KY
ML	Tigrett State Wildlife Management Area	28.68210	Multiple	TN
ML	Agricultural Conservation Easement	0.08304	Dyer (TN)	TN
ML	Agricultural Conservation Easement	0.15467	Gibson (TN)	TN
ML	Cane Creek Of Bayou De Chien Outstanding Resource Water	1.36674	Multiple	KY
ML	Sand Creek Outstanding Resource Water	0.43677	Hickman (KY)	KY
ML	South Fork Of Bayou De Chien Outstanding Resource Water	0.25222	Multiple	KY
ML	Bayou Du Chien Outstanding Resource Water	0.95246	Multiple	KY
ML	Murray State University Campus	12.76280	Calloway (KY)	KY
ML	J. Clark Akers Wildlife Complex - TWRA	1.18391	Multiple	TN
ML	Emergency Watershed Protection Program - Floodplain Easement	5.56513	Multiple	TN
ML	Obion River State Wildlife Management Area	12.31304	Multiple	TN
ML	Kentucky Reservoir Reservation	0.04589	Multiple	Multiple
ML	Camden State Wildlife Management Area	0.11058	Benton (TN)	TN
ML	Obion River State Wildlife Management Area	0.39806	Multiple	TN
ML	Hop-In Refuge	0.00026	Obion (TN)	TN
ML	J. Clark Akers Wildlife Complex - TWRA	0.27627	Multiple	TN
ML	Hop-In Wildlife Refuge - TWRA	0.01472	Obion (TN)	TN
ML	Agricultural Conservation Easement	10.11687	Obion (TN)	TN
ML	Kentucky Reservoir Reservation	6.88521	Multiple	Multiple
ML	Agricultural Conservation Easement	15.43037	Dyer (TN)	TN
ML	Bogota State Wildlife Management Area	33.40014	Dyer (TN)	TN
ML	Obion River	0.10171	Multiple	TN
ML	Agricultural Conservation Easement	11.16171	Dyer (TN)	TN
ML	Obion River State Wildlife Management Area	4.21240	Multiple	TN

ML	J. Clark Akers Wildlife Complex - TWRA	0.45112	Multiple	TN
ML	Kentucky Reservoir Reservation	0.03891	Multiple	Multiple
ML	Camden State Wildlife Management Area	0.19387	Benton (TN)	TN
ML	Hatchie River	0.22143	Multiple	Multiple

Appendix Table L-8. Fiscal Year 2022 - Natural Areas Crossed by or Occurring within 50 Feet of Transmission Line Segments Proposed for Vegetation Management in the Morristown Sector

MORRISTOWN SECTOR	NAME	ACRES	COUNTY	STATE
MT	South Holston Dam Reservation	0.72222	Multiple	Multiple
MT	Cherokee National Forest	0.00081	Multiple	Multiple
MT	North Cherokee National Forest and Wildlife Management Area	0.34192	Multiple	Multiple
MT	Cherokee National Forest Ownership Boundaries	0.00048	Multiple	Multiple
MT	Cherokee (North) State Wildlife Management Area	31.27669	Multiple	Multiple
MT	Fort Loudon Dam Reservation	0.00198	Multiple	TN
MT	UT Organic Farms Unit	12.45485	Knox (TN)	TN
MT	Ft. Loudoun Reservoir Reservation	0.00221	Multiple	TN
MT	Mossy Creek TVA Ecological Study Area	7.44934	Multiple	TN
MT	Cherokee Reservoir Reservation	7.44934	Multiple	TN
MT	DCH Fluted Kidneyshell (TN)	0.00512	Multiple	Multiple
MT	Lower French Broad And Lower Holston Nonessential Experimental Population Status	0.03072	Multiple	TN
MT	Douglas Dam Reservation	0.51503	Sevier (TN)	TN
MT	Cherokee Dam Reservation	9.21415	Multiple	TN
MT	TVA Programmatic Agreement 2003 (French Broad)	0.00007	Multiple	TN
MT	TVA Programmatic Agreement 2003 (Holston)	0.32645	Multiple	TN
MT	Holston River	0.07821	Multiple	TN
MT	French Broad River (West)	0.11526	Multiple	TN
MT	Mossy Creek TVA Ecological Study Area	183.43805	Multiple	TN
MT	Cherokee Reservoir Reservation	183.43805	Multiple	TN
MT	Mossy Creek TVA Ecological Study Area	2.46527	Multiple	TN
MT	Cherokee Reservoir Reservation	2.46527	Multiple	TN
MT	Lower French Broad and Lower Holston Nonessential Experimental Population Status	0.15333	Multiple	TN
MT	Douglas Dam Reservation	9.58641	Sevier (TN)	TN
MT	TVA Programmatic Agreement 2003 (French Broad)	1.92341	Multiple	TN
MT	Trotter Bluff TVA Small Wild Area	3.73831	Sevier (TN)	TN

MORRISTOWN SECTOR	NAME	ACRES	COUNTY	STATE
MT	DCH Fluted Kidneyshell (TN)	1.24937	Multiple	Multiple
MT	French Broad River (West)	0.14023	Multiple	TN
MT	Foothills National Parkway	3.46736	Blount (TN)	TN
MT	Foothills Wildlife Management Area	16.22145	Blount (TN)	TN
MT	DCH Indiana Bat Habitat 1	6.74263	Multiple	Multiple
MT	Great Smoky Mountains National Park	6.74263	Multiple	Multiple
MT	Cherokee National Forest	0.00002	Multiple	Multiple
MT	North Cherokee National Forest And Wildlife Management Area	0.01322	Multiple	Multiple
MT	Cherokee National Forest Ownership Boundaries	0.00015	Multiple	Multiple
MT	DCH Indiana Bat Habitat 1	6.18141	Multiple	Multiple
MT	Great Smoky Mountains National Park	6.18141	Multiple	Multiple
MT	Waterfall Creek Potential National Natural Landmark	3.55936	Multiple	Multiple
MT	Pisgah National Forest	3.55936	Multiple	Multiple
MT	National Forest - North Carolina	0.00008	Multiple	Multiple
MT	Mt. Pisgah Proposed State Natural Area	0.00000	Multiple	Multiple
MT	Pisgah State Game Land	0.00000	Multiple	Multiple
MT	North Carolina National Forest (Partial)	0.05368	Multiple	Multiple
MT	Fort Loudon Dam Reservation	0.00420	Multiple	TN
MT	Ft. Loudoun Reservoir Reservation	0.00428	Multiple	TN
MT	DCH Purple Bean	1.73652	Multiple	Multiple
MT	Buffalo Springs State Wildlife Management Area	23.61746	Grainger (TN)	TN
MT	Mossy Creek TVA Ecological Study Area	147.35676	Multiple	TN
MT	Cherokee Reservoir Reservation	147.35676	Multiple	TN
MT	Dch Beech Creek Unit 7	0.62607	Hawkins (TN)	TN
MT	Berry Island TVA Ecological Study Area	38.85554	Hawkins (TN)	TN
MT	DCH Slender Chub	0.01740	Multiple	Multiple
MT	DCH Rough Rabbitsfoot	0.00005	Multiple	Multiple
MT	DCH Purple Bean	0.00005	Multiple	Multiple
MT	DCH Slabside Pearlymussel (TN)	0.09614	Multiple	Multiple
MT	DCH Fluted Kidneyshell (TN)	0.09614	Multiple	Multiple
MT	DCH Oyster Mussel (TN)	0.23494	Multiple	Multiple

MORRISTOWN SECTOR	NAME	ACRES	COUNTY	STATE
MT	DCH Clinch River Unit 5	0.18236	Multiple	Multiple
MT	DCH Cumberlandian Combshell	0.00002	Multiple	Multiple
MT	Boone Reservoir Reservation	31.05069	Multiple	TN
MT	Hughes Dawson Farm I Conservation Easement - Land Trust for TN	17.23105	Greene (TN)	TN

Appendix Table L-9. Fiscal Year 2022 - Natural Areas Crossed by or Occurring within 50 Feet of Transmission Line Segments Proposed for Vegetation Management in the Muscle Shoals Sector

MUSCLE SHOALS SECTOR	NAME	ACRES	COUNTY	STATE
MS	Wheeler National Wildlife Refuge	2.99078	Multiple	AL
MS	Wheeler Reservoir Reservation	0.91021	Multiple	AL
MS	Wheeler Reservoir Reservation	52.26549	Multiple	AL
MS	Joe Wheeler State Park	42.07137	Multiple	AL
MS	Wheeler Dam Tailwater Restricted Mussel Harvest Area	71.00508	Multiple	AL
MS	Wheeler Dam Reservation	71.00508	Multiple	AL
MS	Colbert Coal Generating Facility	27.75219	Colbert (AL)	AL
MS	Colbert Fossil Plant	5.27160	Multiple	AL
MS	Wheeler Reservoir Reservation	3.56736	Multiple	AL
MS	Bull Mountain Creek Protection Planning Site	6.40199	Itawamba (MS)	MS
MS	Natchez Trace National Parkway	6.26249	Multiple	Multiple
MS	Pickwick Landing State Resort Park	0.08396	Hardin (TN)	TN
MS	Dry Creek Wildlife Management Area	13.32636	Hardin (TN)	TN
MS	Bruton Branch Recreation Area	0.05717	Hardin (TN)	TN
MS	Lauderdale Wildlife Management Area	38.27597	Multiple	Multiple
MS	Freedom Hills Wildlife Management Area	14.90432	Multiple	AL
MS	Muscle Shoals Reservation	0.09232	Multiple	AL
MS	Wilson Dam Reservation	0.02417	Multiple	AL
MS	Wilson Dam Tailwater Restricted Mussel Harvest Area	0.18028	Multiple	AL
MS	River Heritage Park	9.65488	Lauderdale (AL)	AL
MS	Veterans Park	15.14986	Lauderdale (AL)	AL
MS	Tennessee River/Wilson Dam Nonessential Experimental Population	0.00044	Multiple	AL
MS	Tennessee River/Wilson Dam Nonessential Experimental Population Status	0.06947	Multiple	AL
MS	DCH Oyster Mussel (MS)	0.63389	Tishomingo (MS)	MS

MS	East Fork Tombigbee River Macrosite	5.07673	Multiple	MS
MS	Bear Creek Macrosite	0.00048	Multiple	Multiple
MS	DCH Bear Creek Unit 2	0.41875	Multiple	Multiple
MS	DCH Bear Creek for 5 Endangered Mussels in Tennessee and Cumberland River Basin Unit 2	0.00507	Multiple	Multiple
MS	DCH For Rabbitsfoot, Slabside Pearlymussel, Fluted Kidneyshell	0.63503	Multiple	Multiple
MS	Colbert Fossil Plant	0.68298	Multiple	AL
MS	Canal Section WMA	0.08514	Multiple	MS
MS	Colbert Coal Generating Facility	1.16655	Colbert (AL)	AL
MS	Freedom Hills Wildlife Management Area	346.53264	Multiple	AL
MS	Muscle Shoals Reservation	204.20610	Multiple	AL
MS	Wilson Dam Reservation	59.89718	Multiple	AL
MS	Muscle Shoals National Recreation Trail	4.26220	Multiple	AL

Appendix Table L-3. Fiscal Year 2022 - Natural Areas Crossed by or Occurring within 50 Feet of Transmission Line Segments Proposed for Vegetation Management in the Nashville Sector

NASHVILLE SECTOR	NAME	ACRES	COUNTY	STATE
NA	Caney Fork Access Site	2.56620	DeKalb (TN)	TN
NA	Center Hill Lake - US Army Corps of Engineers	8.35464	Multiple	TN
NA	Center Hill Marsh	1.01895	DeKalb (TN)	TN
NA	Dale Hollow Reservoir Reservation	0.13761	Multiple	Multiple
NA	Obed National Wild and Scenic River	0.14330	Clay (TN)	TN
NA	The Land Trust For Tennessee Easement	9.58091	Multiple	TN
NA	Dale Hollow Lake - US Army Corps of Engineers	26.17383	Multiple	Multiple
NA	Cordell Hull Lake - US Army Corps of Engineers	0.82209	Multiple	Multiple
NA	Roaring State Scenic River	0.33281	Multiple	TN
NA	Standing Stone State Forest and Wildlife Management Area	37.97195	Multiple	TN
NA	Dale Hollow National Fish Hatchery	0.09619	Clay (TN)	TN
NA	Roaring River	0.00083	Multiple	TN
NA	Shelby Bottoms Natural Area	9.70228	Davidson (TN)	TN
NA	Cheatham Lake - US Army Corps of Engineers	2.01494	Multiple	TN
NA	Edgar Evans State Park Wildlife Management Area	1.09607	DeKalb (TN)	TN
NA	Great Falls Reservoir Reservation	1.67887	Multiple	TN
NA	Pine Creek	0.26826	DeKalb (TN)	TN
NA	Center Hill Lake - US Army Corps of Engineers	34.07172	Multiple	TN
NA	Sink Creek	0.12372	Multiple	TN
NA	Rock Island State Park	87.83386	Multiple	TN
NA	Collins Scenic River	0.00003	Multiple	TN
NA	Great Falls Dam Reservation	7.10884	Warren (TN)	TN
NA	Collins River	0.00101	Multiple	TN
NA	Spring Creek Bottom and Glade	11.20753	Wilson (TN)	TN
NA	Cumberland River No. 3 State Mussel Sanctuary	8.07749	Smith (TN)	TN
NA	Old Hickory Reservoir Reservation	2.90194	Multiple	TN
NA	Old Hickory State Wildlife Management Area	29.89267	Multiple	TN
NA	Gallatin Fossil Plant	8.15671	Multiple	TN

NASHVILLE SECTOR	Name	ACRES	COUNTY	STATE
NA	Caney Fork	0.32409	Multiple	TN
NA	Gallatin Steam Plant Wildlife Management Area	0.00759	Sumner (TN)	TN
NA	Cordell Hull Lake - US Army Corps of Engineers	12.91113	Multiple	Multiple
NA	Center Hill Lake - US Army Corps of Engineers	29.99721	Multiple	TN
NA	Knight Farm A - Conservation Easement Land Trust of TN	35.76797	Smith (TN)	TN
NA	Cordell Hull State Wildlife Management Area	3.09387	Multiple	TN
NA	Upper Cumberland Wildlife Rehabilitation Center	2.68234	Putnam (TN)	TN
NA	East Blackburn Fork	0.07709	Multiple	TN
NA	Roaring River	0.13105	Multiple	TN
NA	Spring Creek	0.11504	Multiple	TN
NA	Cheatham Lake - US Army Corps of Engineers	4.21629	Multiple	TN
NA	Bells Bend Park	23.46241	Davidson (TN)	TN
NA	Cheatham Lake - US Army Corps of Engineers	3.64687	Multiple	TN
NA	Old Hickory Reservoir Reservation	7.78216	Multiple	TN
NA	Old Hickory State Wildlife Management Area	7.78216	Multiple	TN
NA	Mill Creek Macrosite	20.18108	Multiple	TN
NA	Smith Fork Creek	0.11580	Multiple	TN
NA	West Harpeth River	0.19895	Williamson (TN)	TN
NA	DCH For Rabbitsfoot, Slabside Pearlymussel, Fluted Kidneyshell	2.11807	Multiple	Multiple
NA	Highland Rim Experiment Station	1.53520	Robertson (TN)	TN
NA	Goodman Farm	20.07079	Robertson (TN)	TN
NA	Sulphur Fork Red River	0.89460	Multiple	TN
NA	Red River	0.22722	Multiple	Multiple
NA	Old Hickory Reservoir Reservation	24.72317	Multiple	TN
NA	Old Hickory State Wildlife Management Area	24.72317	Multiple	TN

Appendix Table L-4. Fiscal Year 2022 - Natural Areas Crossed by or Occurring within 50 Feet of Transmission Line Segments Proposed for Vegetation Management in the Oak Ridge Sector

OAK RIDGE SECTOR	NAME	ACRES	COUNTY	STATE
OR	DCH Spotfin Chub - Little Tennessee River	6.81793	Multiple	Multiple
OR	Emory River	31.26592	Multiple	TN
OR	Sundquist Wildlife Management Area	27.58513	Multiple	TN
OR	Cumberland Trail State Park	0.02126	Multiple	TN
OR	North Cumberlands Wildlife Management Area	8.73225	Multiple	TN
OR	TDEC Emory River Conservation Easement	175.74373	Multiple	TN
OR	Cumberland Trail 1	0.02126	Multiple	TN
OR	DCH Oyster Mussel (TN)	0.33614	Multiple	Multiple
OR	DCH Cumberland Elktoe	0.33614	Multiple	Multiple
OR	DCH Cumberlandian Combshell	0.31253	Multiple	Multiple
OR	DCH Big South Fork Unit 9	0.13388	Multiple	Multiple
OR	White Oak Creek	0.02451	Multiple	TN
OR	Norris Dam State Resort Park	1.71056	Multiple	TN
OR	Norris Dam Reservation	1.40393	Multiple	TN
OR	Clinch River 1	0.09459	Multiple	TN
OR	North Cumberlands Wildlife Management Area	88.14527	Multiple	TN
OR	River Bluff	0.37790	Anderson (TN)	TN
OR	River Bluff TVA Small Wild Area	0.37790	Anderson (TN)	TN
OR	Norris Songbird Trail State Wildlife Observation Area	0.05642	Multiple	TN
OR	Royal Blue State Wildlife Management Area	15.83981	Multiple	TN
OR	Browder Woods Registered State Natural Area	0.00025	Loudon (TN)	TN
OR	Browder Woods Protection Planning Site	10.72626	Loudon (TN)	TN
OR	Watts Bar Reservoir Reservation	3.97675	Multiple	TN
OR	Watts Bar Dam Reservation	3.97675	Multiple	TN
OR	Sterchi Hills Park	2.00838	Knox (TN)	TN
OR	Adrian Burnette Elementary School Park	0.43604	Knox (TN)	TN
OR	Tommy Schumpert Park	14.83711	Knox (TN)	TN
OR	Fort Loudon Dam Reservation	0.00466	Multiple	TN

OAK RIDGE SECTOR	NAME	ACRES	COUNTY	STATE
OR	Ft. Loudoun Reservoir Reservation	0.00539	Multiple	TN
OR	Cline Property - Foothills Land Conservancy	10.29136	Loudon (TN)	TN
OR	Watts Bar Reservoir Reservation	5.34868	Multiple	TN
OR	Watts Bar Dam Reservation	5.34868	Multiple	TN
OR	Tellico Dam Reservation	43.28463	Multiple	TN
OR	Tellico Reservoir Reservation	43.28463	Multiple	TN
OR	Watts Bar Reservoir Reservation	7.42194	Multiple	TN
OR	Watts Bar Dam Reservation	7.42194	Multiple	TN
OR	Norris Songbird Trail State Wildlife Observation Area	1.14732	Multiple	TN
OR	Melton Hill Dam Reservation	1.81971	Anderson (TN)	TN
OR	Norris Dam State Resort Park	36.30618	Multiple	TN
OR	Norris Dam Reservation	0.67500	Multiple	TN
OR	Norris Municipal Watershed	5.05444	Anderson (TN)	TN
OR	Eagle Bend Hatchery State Wildlife Observation Area	4.01998	Anderson (TN)	TN
OR	Eagle Bend State Fish Hatchery	4.01998	Anderson (TN)	TN
OR	Clinch River 1	0.09191	Multiple	TN
OR	Bullrun Knobs	1.43589	Knox (TN)	TN
OR	Melton Hill Dam Reservation	30.91951	Anderson (TN)	TN
OR	Powell High School Park	1.48435	Knox (TN)	TN
OR	Chaffiin Property - Conservation Easement Held by Foothills Land Conservancy	14.34319	Knox (TN)	TN
OR	Sweetser Property- Conservation Easement	0.06049	Knox (TN)	TN
OR	Clinch River 1	0.09118	Multiple	TN
OR	Haw Ridge Park	5.86056	Anderson (TN)	TN
OR	Clinch River 1	0.11560	Multiple	TN
OR	North Ridge Trail	1.92979	Anderson (TN)	TN
OR	Oak Ridge National Laboratory Reservation and Orr	0.00083	Multiple	TN
OR	Norris Dam State Resort Park	5.25416	Multiple	TN
OR	Norris Dam Reservation	2.87077	Multiple	TN
OR	Clinch River 1	0.42430	Multiple	TN
OR	University of Tennessee Arboretum/State Wildlife Observation Area	40.16793	Anderson (TN)	TN

OAK RIDGE SECTOR	NAME	ACRES	COUNTY	STATE
OR	Oak Ridge National Laboratory Lands Potential National Natural Landmark	0.00042	Multiple	TN
OR	Oak Ridge National Laboratory Reservation	0.00042	Multiple	TN
OR	Orr Bear Creek [ANA2]	1.54960	Multiple	TN
OR	Norris Dam State Park Potential National Natural Landmark	0.10262	Multiple	TN
OR	DCH Cumberland Darter	3.45588	Multiple	Multiple
OR	Marsh Creek (basin above RM 24) Outstanding Resource Water	1.07578	Multiple	Multiple
OR	Royal Blue State Wildlife Management Area	17.33301	Multiple	TN
OR	Norris Dam State Resort Park	27.55348	Multiple	TN
OR	Norris Dam Reservation	3.68351	Multiple	TN
OR	Oak Grove River Bluffs TVA Habitat Protection Area	1.04299	Campbell (TN)	TN
OR	Stinking Creek	0.06350	Campbell (TN)	TN
OR	North Cumberlands Wildlife Management Area	10.04236	Multiple	TN
OR	Clinch River 1	0.11346	Multiple	TN
OR	Norris Dam Cave #1 Protection Planning Site	0.28725	Campbell (TN)	TN
OR	Norris Dam Cave TVA Habitat Protection Area	0.28725	Anderson (TN)	TN
OR	Bullrun Knobs	6.16359	Knox (TN)	TN
OR	Bull Run Fossil Plant	42.85128	Anderson (TN)	TN
OR	Chaffiin Property - Conservation Easement Held by Foothills Land Conservancy	3.37150	Knox (TN)	TN
OR	Sweetser Property- Conservation Easement	4.02485	Knox (TN)	TN
OR	Oak Ridge National Laboratory Reservation and Orr	0.00042	Multiple	TN
OR	Watts Bar Reservoir Reservation	7.95841	Multiple	TN
OR	Watts Bar Dam Reservation	7.95841	Multiple	TN
OR	Oak Ridge National Laboratory Lands Potential National Natural Landmark	270.90843	Multiple	TN
OR	Oak Ridge National Laboratory Reservation	270.90843	Multiple	TN
OR	Orr Black Oak Ridge Conservation Easement	29.81652	Roane (TN)	TN
OR	Orr Mckinney Ridge Hemlocks [RA17]	1.30416	Roane (TN)	TN
OR	Orr Grassy Creek [Ara2]	0.75002	Roane (TN)	TN

Appendix Table L-5. Fiscal Year 2022 - Natural Areas Crossed by or Occurring within 50 Feet of Transmission Line Segments Proposed for Vegetation Management in the West Point Sector

WEST POINT SECTOR	NAME	ACRES	COUNTY	STATE
WP	Sardis Reservoir Reservation	5.52170	Multiple	MS
WP	Holly Springs National Forest	8.75189	Multiple	MS
WP	Nanih Waiya Wildlife Management Area	9.60672	Multiple	MS
WP	Sam D. Hamilton Noxubee National Wildlife Refuge	53.94992	Multiple	MS
WP	Noxubee River	0.11653	Multiple	Multiple
WP	Natchez Trace National Parkway	4.34632	Multiple	Multiple
WP	Enid Reservoir Reservation	99.37821	Multiple	MS
WP	Wildcat Brake Management Area	5.97256	Yalobusha (MS)	MS

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Appendix M – Fiscal Year 2023 Planning Cycle - Natural Areas Crossed by or Occurring within 50 Feet of Transmission Line Segments Proposed for Vegetation Management

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Appendix Table M-6. Fiscal Year 2023 - Natural Areas Crossed by or Occurring within 50 Feet of Transmission Line Segments Proposed for Vegetation Management in the Centerville Sector

CENTERVILLE SECTOR	NAME	ACRES	COUNTY	STATE
CV	Duck River State Mussel Sanctuary	0.34872	Multiple	TN
CV	DCH Slabside Pearlymussel (TN)	0.00794	Multiple	Multiple
CV	DCH Fluted Kidneyshell (TN)	0.00794	Multiple	Multiple
CV	DCH for Rabbitsfoot, Slabside Pearlymussel, Fluted Kidneyshell	0.00856	Multiple	Multiple
CV	DCH for Rabbitsfoot, Slabside Pearlymussel, Fluted Kidneyshell	0.00033	Multiple	Multiple
CV	Duck River State Mussel Sanctuary	0.47046	Multiple	TN
CV	DCH Slabside Pearlymussel (TN)	0.01235	Multiple	Multiple
CV	DCH Fluted Kidneyshell (TN)	0.01235	Multiple	Multiple
CV	Eagle Creek State Wildlife Management Area	6.65162	Wayne (TN)	TN
CV	Tie Camp Wildlife Management Area	0.99249	Wayne (TN)	TN
CV	DCH for Rabbitsfoot, Slabside Pearlymussel, Fluted Kidneyshell	0.00860	Multiple	Multiple
CV	Williamsport Public Fishing Lake and Wildlife Management Area	0.00037	Maury (TN)	TN
CV	Duck River State Mussel Sanctuary	1.07867	Multiple	TN
CV	Natchez Trace National Parkway	10.51750	Multiple	Multiple
CV	Natchez Trace State Scenic Trail	0.85230	Multiple	TN
CV	Ladd Property Conservation Easement - Land Trust for TN	4.91323	Maury (TN)	TN
CV	Williamsport Wildlife Management Area	0.00038	Maury (TN)	TN
CV	DCH Slabside Pearlymussel (TN)	0.03517	Multiple	Multiple
CV	DCH Fluted Kidneyshell (TN)	0.03517	Multiple	Multiple
CV	DCH Slackwater Darter Lawrence	46.48583	Multiple	TN
CV	Duck River State Mussel Sanctuary	0.35702	Multiple	TN
CV	DCH Slabside Pearlymussel (TN)	0.00947	Multiple	Multiple
CV	DCH Fluted Kidneyshell (TN)	0.00947	Multiple	Multiple
CV	DCH for Rabbitsfoot, Slabside Pearlymussel, Fluted Kidneyshell	0.00946	Multiple	Multiple
CV	Barkley Reservoir Reservation	1.98377	Multiple	Multiple
CV	Red River	0.10721	Multiple	Multiple
CV	Cheatham Reservoir Wildlife Management Area Wildlife Observation Area	26.11555	Cheatham (TN)	TN

CENTERVILLE SECTOR	NAME	ACRES	COUNTY	STATE
CV	Cheatham State Wildlife Management Area	26.11555	Cheatham (TN)	TN
CV	Tennessee National Migratory Wildlife Refuge/Duck River Unit	1.03882	Multiple	TN
CV	Natchez Trace National Parkway	3.91986	Multiple	Multiple
CV	Swan Conservation Trust	30.58026	Lewis (TN)	TN
CV	Beaver Dam Creek Wildlife Management Area	41.87005	Hickman (TN)	TN
CV	Hick Hill Wildlife Management Area	63.40905	Lewis (TN)	TN
CV	The Land Trust for Tennessee Easement	31.35346	Lewis (TN)	TN
CV	Alexander Cave	0.01674	Multiple	TN
CV	Duck River Megasite Fee - The Nature Conservancy - Fee Ownership	0.01403	Multiple	TN
CV	DCH Slabside Pearlymussel (TN)	3.00972	Multiple	Multiple
CV	DCH Fluted Kidneyshell (TN)	3.00972	Multiple	Multiple
CV	Natchez Trace State Scenic Trail	0.96224	Multiple	TN
CV	Little Grinders Creek Registered State Natural Area	7.20628	Lewis (TN)	TN
CV	Shoal Creek Nonessential Experimental Population	11.64019	Multiple	Multiple
CV	Natchez Trace National Parkway	3.32100	Multiple	Multiple
CV	David Crockett State Park	22.08124	Lawrence (TN)	TN
CV	DCH Slackwater Darter Lawrence	250.36028	Multiple	TN
CV	Buffalo State Scenic River	1.92504	Multiple	TN
CV	Mark's Slough	10.63797	Montgomery (TN)	TN
CV	Wells Creek Cryptoexplosive Structure Potential NA	0.13729	Multiple	TN
CV	The Land Trust for Tennessee Easement	32.02805	Montgomery (TN)	TN
CV	Cumberland Fossil Plant	7.76727	Stewart (TN)	TN
CV	Lake Barkley	0.37983	Multiple	Multiple
CV	Barkley Reservoir Reservation	10.34254	Multiple	Multiple
CV	Red River	0.11777	Multiple	Multiple

Appendix Table M-2. Fiscal Year 2023 - Natural Areas Crossed by or Occurring within 50 Feet of Transmission Line Segments Proposed for Vegetation Management in the Cleveland Sector

CLEVELAND SECTOR	NAME	ACRES	COUNTY	STATE
CL	Nantahala National Forest	201.45230	Multiple	Multiple
CL	Hiwassee Reservoir Reservation	1.22927	Cherokee (NC)	NC
CL	River's Edge Farm	6.84200	Cherokee (NC)	NC
CL	Nantahala National Forest	78.80754	Multiple	Multiple
CL	Hiwassee Reservoir Reservation	6.03852	Cherokee (NC)	NC
CL	Chickamauga Reservoir State Mussel Sanctuary	7.98472	Multiple	TN
CL	Chickamauga and Chattanooga National Military Park	45.10044	Multiple	Multiple
CL	Nantahala National Forest	310.78991	Multiple	Multiple
CL	Chattahoochee-Oconee National Forests Boundary (1 of 4)	493.80222	Multiple	Multiple
CL	Hiwassee Reservoir Reservation	15.05946	Cherokee (NC)	NC
CL	Martins Creek II	4.19731	Cherokee (NC)	NC
CL	Nottely Reservoir Reservation	3.71968	Union (GA)	GA
CL	Mayfield Farm - Conservation Easement Land Trust of TN	0.01102	McMinn (TN)	TN
CL	Historic Mayfield Farm Conservation Easement - Land Trust for TN	0.13948	McMinn (TN)	TN
CL	Oostanaula Creek Stream Mitigation Site	4.52681	McMinn (TN)	TN
CL	Watts Bar Nuclear Generating Facility	46.76077	Rhea (TN)	TN
CL	Chickamauga Reservoir State Mussel Sanctuary	0.91634	Multiple	TN
CL	Chickamauga Shoreline TVA Habitat Protection Area	0.67646	Multiple	TN
CL	Chattahoochee-Oconee National Forests Boundary (2 of 4)	246.51953	Multiple	GA
CL	DCH Amber Darter	1.09281	Multiple	Multiple
CL	Chattahoochee-Oconee National Forests Boundary (2 of 4)	4.25573	Multiple	GA
CL	DCH Georgia Pigtoe Terrapin Creek/Coosa River Unit 2	0.00034	Multiple	Multiple
CL	DCH Ovate Clubshell	0.00038	Multiple	Multiple
CL	DCH Southern Acornshell	0.00038	Multiple	Multiple
CL	DCH Coosa Moccasinshell	0.00038	Multiple	Multiple
CL	DCH Southern Clubshell	0.00038	Multiple	Multiple
CL	DCH Southern Pigtoe	0.00038	Multiple	Multiple
CL	DCH Upland Combshell	0.00038	Multiple	Multiple

CLEVELAND SECTOR	NAME	ACRES	COUNTY	STATE
CL	DCH Alabama Moccasinshell	0.00038	Multiple	Multiple
CL	DCH Triangular Kidneyshell	0.00038	Multiple	Multiple
CL	DCH Fine Lined Pocketbook	0.00038	Multiple	Multiple
CL	DCH Logperch Conasauga River Unit 25	0.78360	Multiple	Multiple
CL	Conasauga River	0.16391	Multiple	Multiple

Appendix Table M-3. Fiscal Year 2023 - Natural Areas Crossed by or Occurring within 50 Feet of Transmission Line Segments Proposed for Vegetation Management in the Hickory Valley Sector

HICKORY VALLEY SECTOR	NAME	ACRES	COUNTY	STATE
HV	Holly Springs National Forest	349.70267	Multiple	MS
HV	Sardis Reservoir Reservation	31.99356	Multiple	MS
HV	Graham Waterfowl	6.14653	Multiple	MS
HV	Graham Lake Marsh Project	0.50601	Multiple	MS
HV	Allen Fossil Plant	9.95742	Shelby (TN)	TN
HV	DCH Unit 3 Prairie Branch, Whorled Sunflower	0.90489	McNairy (TN)	TN
HV	Kentucky Reservoir Reservation	1.09541	Multiple	Multiple
HV	Hatchie River	0.10949	Multiple	Multiple
HV	Emergency Watershed Protection Program - Floodplain Easement	2.97869	McNairy (TN)	TN
HV	DCH Whorled Sunflower	0.95962	Multiple	Multiple
HV	Pickwick Dam Reservation	3.40875	Hardin (TN)	TN
HV	Kentucky Reservoir Reservation	2.19874	Multiple	Multiple
HV	DCH for Rabbitsfoot, Slabside Pearlymussel, Fluted Kidneyshell	0.83340	Multiple	Multiple
HV	Hatchie River	0.20000	Multiple	Multiple
HV	Kentucky Reservoir No. 2 State Mussel Sanctuary	3.31372	Hardin (TN)	TN
HV	Pickwick Dam Reservation	5.59535	Hardin (TN)	TN
HV	Kentucky Reservoir Reservation	0.02126	Multiple	Multiple
HV	DCH for Rabbitsfoot, Slabside Pearlymussel, Fluted Kidneyshell	2.07770	Multiple	Multiple
HV	Hatchie National Wildlife Refuge	85.08305	Haywood (TN)	TN
HV	Hatchie River	0.14761	Multiple	Multiple
HV	Wolf River Macrosite	32.33266	Multiple	Multiple
HV	Brags, LLC	31.29506	Benton (MS)	MS
HV	William B. Clark Designated State Natural Area	1.29059	Fayette (TN)	TN
HV	William B. Clark Conservation Area State Natural Area	0.48748	Fayette (TN)	TN

Appendix Table M-4. Fiscal Year 2023 - Natural Areas Crossed by or Occurring within 50 Feet of Transmission Line Segments Proposed for Vegetation Management in the Hopkinsville Sector

HOPKINSVILLE SECTOR	NAME	ACRES	COUNTY	STATE
HK	Peabody Wildlife Management Area	12.95164	Multiple	KY
HK	Barren River	0.54155	Multiple	KY
HK	Gasper River	0.10802	Multiple	KY
HK	Fort Campbell Military Reservation	2.67155	Multiple	Multiple
HK	West Fork Red River	0.11352	Multiple	Multiple
HK	Fort Campbell Military Reservation Protection Planning Site	0.00100	Multiple	Multiple
HK	Ft. Campbell Military Reservation/State Wildlife Mgmt Area	26.47189	Multiple	Multiple
HK	Fort Campbell Military Reservation Protection Plan	26.47189	Multiple	Multiple
HK	ACUB / REPI – Funded Easement	5.66737	Christian (KY)	KY
HK	West Fork Red River	0.31666	Multiple	Multiple
HK	Jacob Glick (Farm)	21.02712	Christian (KY)	KY
HK	Buzzard Knob	16.27865	Logan (KY)	KY
HK	Briggs Lake	0.66684	Logan (KY)	KY
HK	The Land Trust for Tennessee Easement	0.35124	Robertson (TN)	TN
HK	Red River	0.12308	Multiple	Multiple
HK	Red River	0.12111	Multiple	Multiple
HK	Pace-00083 Purchase of Agricultural Easement Corporation KY - Conservation Easement	8.38124	Logan (KY)	KY
HK	Agricultural Conservation Easement	2.69299	Logan (KY)	KY
HK	Lake Malone State Fishing Lake	4.09081	Multiple	KY
HK	Lake Malone	0.09283	Multiple	KY
HK	Peabody Wildlife Management Area	238.12221	Multiple	KY
HK	Elk Fork	0.18346	Multiple	Multiple
HK	Hogskin Ridge Bottomland Forest	5.95149	Multiple	KY
HK	NRCS Wetland Reserve Program	0.04895	Multiple	KY
HK	Cross Creeks National Wildlife Refuge Wildlife Observation Area	0.75462	Stewart (TN)	TN
HK	Clarks River National Wildlife Refuge Acquisition Boundary	58.03002	Multiple	KY
HK	Cumberland Fossil Plant	4.01737	Stewart (TN)	TN

HOPKINSVILLE SECTOR	NAME	ACRES	COUNTY	STATE
HK	Kentucky Reservoir Reservation	1.65478	Multiple	Multiple
HK	Kentucky Reservoir	7.68176	Multiple	Multiple
HK	Stewart State Forest	32.94293	Stewart (TN)	TN
HK	Long Creek	0.12897	Stewart (TN)	TN
HK	Agricultural Conservation Easement	0.00797	Marshall (KY)	KY
HK	Grasslands Reserve Program	11.74101	Marshall (KY)	KY
HK	Cypress Creek Swamp Fee - The Nature Conservancy - Fee Ownership	4.00636	Marshall (KY)	KY
HK	Tennessee National Wildlife Refuge	0.72433	Multiple	TN
HK	NRCS Wetland Reserve Program (Permanent Easement)	0.01334	Multiple	Multiple
HK	Tennessee National Migratory Wildlife Refuge/Big Sandy Unit	0.00047	Multiple	TN
HK	Lake Barkley	0.02669	Multiple	Multiple
HK	Cumberland Coal Generating Facility	8.53927	Stewart (TN)	TN

Appendix Table M-5. Fiscal Year 2023 - Natural Areas Crossed by or Occurring within 50 Feet of Transmission Line Segments Proposed for Vegetation Management in the Madison Sector

MADISON SECTOR	NAME	ACRES	COUNTY	STATE
MD	Tim's Ford Reservoir Reservation	6.93252	Multiple	TN
MD	North Sauty Creek State Wildlife Management Area	0.84872	Jackson (AL)	AL
MD	North Sauty Refuge	5.50248	Jackson (AL)	AL
MD	Blevins Gap Preserve North Alabama Land Trust	12.38741	Madison (AL)	AL
MD	DCH Slabside Pearlymussel (AI)	0.00057	Multiple	Multiple
MD	DCH For Rabbitsfoot, Slabside Pearlymussel, Fluted Kidneyshell	0.01162	Multiple	Multiple
MD	James D. Martin/Skyline State Wildlife Management Area	14.45415	Multiple	Multiple
MD	Monte Sano Mountain Preserve - North Alabama Land Trust	16.72273	Madison (AL)	AL
MD	Agricultural Conservation Easement	3.90757	Jackson (AL)	AL
MD	Paint Rock River Project	1.10000	Multiple	Multiple
MD	North Sauty Refuge	0.32390	Jackson (AL)	AL
MD	Echota Cherokee	0.08925	Multiple	AL
MD	Flint River Mitigation Bank	6.25991	Madison (AL)	AL
MD	Cave Mountain TVA Small Wild Area	7.82359	Marshall (AL)	AL
MD	Guntersville Dam Reservation	8.99024	Marshall (AL)	AL
MD	Guntersville Dam Reservation	27.52347	Marshall (AL)	AL
MD	United Cherokee Ani-Yun-Wiya Nation	65.21299	Marshall (AL)	AL
MD	Cave Mountain TVA Small Wild Area	0.70984	Marshall (AL)	AL
MD	Cave Mountain TVA Small Wild Area	0.00532	Marshall (AL)	AL
MD	Hambrick Hollow TVA Habitat Protection Area	4.19199	Marshall (AL)	AL
MD	Guntersville Dam Reservation	20.55813	Marshall (AL)	AL
MD	Guntersville Dam Tailwater Restricted Mussel Harvest Area	1.95311	Marshall (AL)	AL
MD	North Sauty Creek State Wildlife Management Area	0.15403	Jackson (AL)	AL
MD	Georgia-Alabama Land Trust Easement #564	3.37152	Marshall (AL)	AL
MD	North Sauty Refuge	2.84759	Jackson (AL)	AL
MD	Honeycomb Creek TVA Small Wild Area	13.47192	Marshall (AL)	AL
MD	Mink Creek	7.61178	Jackson (AL)	AL
MD	Mink Creek TVA Habitat Protection Area	7.61178	Jackson (AL)	AL

MADISON SECTOR	NAME	ACRES	COUNTY	STATE
MD	Raccoon Creek State Wildlife Management Area	13.89824	Jackson (AL)	AL
MD	Dch Black Warrior Waterdog	0.13797	Multiple	AL
MD	Lake Guntersville State Park	11.17021	Marshall (AL)	AL
MD	Bellefonte Nuclear Generating Facility	81.75112	Jackson (AL)	AL
MD	Coon Gulf TVA Small Wild Area	34.61887	Jackson (AL)	AL
MD	Raccoon Creek State Wildlife Management Area	328.23817	Jackson (AL)	AL
MD	Georgia-Alabama Land Trust Easement #946	3.66813	Jackson (AL)	AL
MD	Cherokee Tribe of Northeast Alabama	59.84237	Multiple	AL
MD	Mulberry Fork	0.16059	Multiple	AL
MD	South Sauty Creek	19.49103	Multiple	AL
MD	South Sauty Creek TVA Small Wild Area	19.49103	Multiple	AL

Appendix Table M-6. Fiscal Year 2023 - Natural Areas Crossed by or Occurring within 50 Feet of Transmission Line Segments Proposed for Vegetation Management in the Manchester Sector

MANCHESTER SECTOR	NAME	ACRES	COUNTY	STATE
MC	DCH Slabside Pearlymussel (TN)	1.45296	Multiple	Multiple
MC	Caney Creek State Wildlife Management Area	0.00076	Multiple	TN
MC	Great Falls Reservoir Reservation	2.89200	Multiple	TN
MC	Atlantic Coast Conservancy/Pelican Coast Conservancy Conservation Easement E201105	7.87749	Rhea (TN)	TN
MC	Watts Bar Nuclear Generating Facility	0.28092	Rhea (TN)	TN
MC	Bledsoe State Forest	37.13552	Multiple	TN
MC	Cane Creek	0.00079	Multiple	TN
MC	Timberland Investment Resources Recreation Area (Formerly Bowater)	18.67947	Multiple	TN
MC	Sequatchie River	0.09732	Multiple	TN
MC	Center Hill Lake - US Army Corps of Engineers	0.17321	Multiple	TN
MC	Rumbling Falls Cave System	108.89237	Van Buren (TN)	TN
MC	Fall Creek Falls State Natural Area	22.69327	Multiple	TN
MC	Icses TVA Project (Carbon Offset Sites)	1.52590	Rhea (TN)	TN
MC	Rock Island State Park	0.19917	Multiple	TN
MC	White County Lumber Company Conservation Easement - Land Trust for TN	2.47317	Van Buren (TN)	TN
MC	Piney Creek	0.30227	Multiple	TN
MC	Georgia Alabama Land Trust - Conservation Easement (GA3)	13.71327	Dade (GA)	GA
MC	Hawkins Cove Designated State Natural Area	15.09356	Franklin (TN)	TN
MC	Franklin-Marion State Forest	187.97682	Multiple	TN
MC	Braswell Tract - Land Trust of TN Conservation Easement	5.89551	Franklin (TN)	TN
MC	Smith Tract Conservation Easement - Land Trust for TN	0.05895	Franklin (TN)	TN
MC	Post Property Conservation Easement - Land Trust for TN	5.58309	Marion (TN)	TN
MC	Lost and Champion Coves-Univ. of the South - Conservation Easement Land Trust of TN	0.00122	Franklin (TN)	TN

MANCHESTER SECTOR	NAME	ACRES	COUNTY	STATE
MC	Merritt Farm - Conservation Easement Land Trust of TN	10.49654	Franklin (TN)	TN
MC	Bear Hollow Mountain Wildlife Management Area - Tennessee Wildlife Resources Agency (TWRA)	38.69805	Multiple	Multiple
MC	Russell Cave	0.00063	Jackson (AL)	AL
MC	Carter Caves Protection Planning Site	0.00100	Franklin (TN)	TN
MC	Natural Bridge Designated State Natural Area	102.93709	Franklin (TN)	TN
MC	Russell Cave Potential National Natural Landmark	0.00087	Jackson (AL)	AL
MC	Russell Cave National Monument	0.00087	Jackson (AL)	AL
MC	Carter Caves Designated State Natural Area	4.36484	Franklin (TN)	TN
MC	Cummings Cove Wildlife Management Area	11.78897	Multiple	TN
MC	West Fork Stones River (South)	0.08697	Rutherford (TN)	TN
MC	Middle Fork Stones River	0.11237	Rutherford (TN)	TN
MC	DCH Slabside Pearlymussel (TN)	1.74545	Multiple	Multiple
MC	Tennessee River Gorge	38.58757	Multiple	TN
MC	Guntersville Reservoir State Mussel Sanctuary	10.22509	Multiple	Multiple
MC	Grant Property	0.00309	Multiple	TN
MC	Cummings Cove Wildlife Management Area	38.83226	Multiple	TN
MC	Aetna Slopes Property Tennessee River Gorge Trust	0.54702	Marion (TN)	TN
MC	Tennessee River Gorge Trust - Little Cedar Mountain Tract	6.54190	Marion (TN)	TN
MC	Tennessee River Gorge Trust - Grant Tract	0.00055	Marion (TN)	TN
MC	Raccoon Mountain Pumped Storage State Wildlife Obs	31.77322	Multiple	TN
MC	Boyd Farm - TVA Property	2.48126	Marion (TN)	TN
MC	Burns Island - TVA	7.66324	Marion (TN)	TN
MC	Sequatchie River	0.19165	Multiple	TN
MC	Tennessee River Gorge	4.94517	Multiple	TN
MC	Chickamauga and Chattanooga National Military Park	11.81192	Multiple	Multiple
MC	Cummings Cove Wildlife Management Area	46.66718	Multiple	TN
MC	Nickajack Cave	0.00038	Multiple	Multiple
MC	Nickajack Cave State Wildlife Observation Area	0.00038	Marion (TN)	TN

MANCHESTER SECTOR	NAME	ACRES	COUNTY	STATE
MC	Nickajack Cave TVA Habitat Protection Area/Small Wild Area	9.93170	Multiple	Multiple
MC	Normandy Reservoir Reservation	96.70329	Multiple	TN
MC	Duck River State Mussel Sanctuary	0.02148	Multiple	TN
MC	Normandy Dam Reservation	5.59745	Multiple	TN
MC	Short Springs State Natural Area	0.43949	Coffee (TN)	TN
MC	Normandy Fish Hatchery	0.00641	Bedford (TN)	TN
MC	AEDC Tullahoma Barrens	0.65205	Multiple	TN
MC	AEDC Rowland (Rollins) Creek	0.65205	Multiple	TN
MC	Arnold Engineering Development Center (AEDC)	0.65205	Multiple	TN
MC	AEDC and Woods State Wildlife Management Area	0.65205	Multiple	TN
MC	Military Reservation	128.51068	Multiple	TN
MC	AEDC Bluehole Hollow	0.00094	Coffee (TN)	TN
MC	AEDC Tullahoma Barrens	1.11060	Coffee (TN)	TN
MC	Railroad Barrens (Plant Habitat)	2.33762	Multiple	TN
MC	Rowland (Rollins) Creek	1.10039	Multiple	TN
MC	Bluehole Hollow	0.00006	Coffee (TN)	TN
MC	DCH Slabside Pearlymussel (TN)	8.92488	Multiple	Multiple
MC	Guntersville Reservoir State Mussel Sanctuary	12.51559	Multiple	Multiple
MC	Sequoyah Nuclear Generating Facility	107.12012	Hamilton (TN)	TN
MC	Nickajack Dam Reservation	0.53139	Marion (TN)	TN
MC	North Chickamauga Creek Gorge Designated State Natural Area	114.85053	Multiple	TN
MC	Georgia-Alabama Land Trust Easement #344	11.49866	Jackson (AL)	AL
MC	Standifer Creek	0.13442	Sequatchie (TN)	TN
MC	North Chickamauga Creek	0.22368	Multiple	TN
MC	Poe Branch Wetland - TWRA	2.53344	Hamilton (TN)	TN
MC	Georgia Alabama Land Trust - Conservation Easement (AL1)	11.51716	Jackson (AL)	AL
MC	Big Forks Tree Farm Conservation Easement - State of TN	29.60764	Multiple	TN
MC	Carter Patten Conservation Easement - State of TN	0.00050	Multiple	TN
MC	Sequatchie River	0.89989	Multiple	TN
MC	DCH Slabside Pearlymussel (TN)	1.24324	Multiple	Multiple

MANCHESTER SECTOR	NAME	ACRES	COUNTY	STATE
MC	Collins River	0.90772	Multiple	TN
MC	Upper Elk River Bottoms	0.00051	Multiple	TN
MC	Atlantic Coast Conservancy/Pelican Coast Conservancy Conservation Easement E201120	2.86052	Sequatchie (TN)	TN
MC	Cumberland Trail State Park	0.11128	Multiple	TN
MC	Johnson Creek	0.12940	Multiple	TN
MC	Military Reservation	1.34286	Multiple	TN
MC	North Chickamauga Creek Wildlife Management Area	48.06326	Multiple	TN
MC	Cumberland Trail 1	0.06035	Multiple	TN
MC	Grundy County LLC - Conservation Easement - The Land Trust for TN	47.76724	Grundy (TN)	TN
MC	Sequatchie River	0.13823	Multiple	TN
MC	AEDC Upper Elk River Bottoms	0.19077	Multiple	TN
MC	Mill Creek	0.13047	Grundy (TN)	TN
MC	AEDC and Woods State Wildlife Management Area	0.00064	Multiple	TN
MC	AEDC Tullahoma Barrens	0.00059	Multiple	TN
MC	AEDC Rowland (Rollins) Creek	0.00059	Multiple	TN
MC	Arnold Engineering Development Center (AEDC)	0.00059	Multiple	TN
MC	Woods Reservoir Reservation	0.00015	Multiple	TN
MC	Double Powerline Barrens	3.93044	Multiple	TN
MC	University of Tennessee Space Institute	0.33811	Franklin (TN)	TN
MC	Brumalow Creek	0.00001	Multiple	TN
MC	AEDC Brumalow Creek	0.01795	Multiple	TN

Appendix Table M-7. Fiscal Year 2023 - Natural Areas Crossed by or Occurring within 50 Feet of Transmission Line Segments Proposed for Vegetation Management in the Milan Sector

MILAN SECTOR	NAME	ACRES	COUNTY	STATE
ML	Cane Creek Of Bayou De Chien Outstanding Resource Water	1.90386	Multiple	KY
ML	Bayou Du Chien Outsanding Resource Water	0.69786	Multiple	KY
ML	South Fork of Bayou De Chien Outstanding Resource Water	1.11052	Multiple	KY
ML	Bayou Du Chien Outsanding Resource Water	1.10373	Multiple	KY
ML	Hatchie River	0.11571	Multiple	Multiple
ML	Col. Forrest V. Durand Wetland - State Habitat Area	4.49185	Madison (TN)	TN
ML	Emergency Watershed Protection Program - Floodplain Easement (EWPP-FPE)	17.75014	Madison (TN)	TN
ML	Natchez Trace State Wildlife Management Area	0.37249	Multiple	TN
ML	Agricultural Conservation Easement	0.15651	Henderson (TN)	TN
ML	Natchez Trace State Forest	87.72760	Multiple	TN
ML	Natchez Trace State Forest	1.21387	Multiple	TN
ML	Natchez Trace State Resort Park	0.77028	Multiple	TN
ML	Natchez Trace State Wildlife Management Area	3.16560	Multiple	TN
ML	Wetlands Reserve Program (WRP)	4.58504	Crockett (TN)	TN
ML	Parker Branch Wetland - TWRA	23.49448	Gibson (TN)	TN
ML	Agricultural Conservation Easement	1.89831	Gibson (TN)	TN

Appendix Table M-8. Fiscal Year 2023Natural Areas Crossed by or Occurring within 50 Feet of Transmission Line Segments Proposed for Vegetation Management in the Morristown Sector

MORRISTOWN SECTOR	NAME	ACRES	COUNTY	STATE
MT	Cherokee (North) State Wildlife Management Area	154.60124	Multiple	Multiple
MT	Wilbur Cliffs	5.16848	Carter (TN)	TN
MT	Wilbur Lake State Wildlife Observation Area	0.59402	Carter (TN)	TN
MT	Wilbur Reservoir Reservation	0.16033	Carter (TN)	TN
MT	North Cherokee National Forest And Wildlife Management Area	0.13644	Multiple	Multiple
MT	Cherokee National Forest	0.00032	Multiple	Multiple
MT	Cherokee National Forest Ownership Boundaries	0.01197	Multiple	Multiple
MT	Wilbur Dam Reservation	0.00008	Carter (TN)	TN
MT	Big Laurel Branch Wilderness Study Area	0.09637	Multiple	TN
MT	Ft. Patrick Henry Dam Reservation	3.77941	Sullivan (TN)	TN
MT	Warriors Path State Park	33.06353	Sullivan (TN)	TN
MT	Ft. Patrick Henry Reservoir Reservation	1.67587	Multiple	TN
MT	Ft. Patrick Henry Dam Reservation	2.44960	Sullivan (TN)	TN
MT	Davy Crockett Birthplace State Park	7.66165	Greene (TN)	TN
MT	Boone Reservoir Reservation	0.84315	Multiple	TN
MT	Overmountain Victory State Scenic Trail	1.24227	Multiple	Multiple
MT	Overmountain Victory State Scenic Trail	4.49842	Multiple	Multiple
MT	House Mountain Designated State Natural Area	16.84512	Knox (TN)	TN
MT	Chimney Rock	21.13722	Campbell (TN)	TN
MT	Ataya Tracts Molpus South	83.82515	Multiple	Multiple
MT	Lower Pine Mountain Macrosite	100.30967	Multiple	Multiple
MT	Cove Creek Peninsula State Wildlife Management Area	48.71116	Campbell (TN)	TN
MT	Sundquist Wildlife Management Area	15.64756	Multiple	TN
MT	North Cumberlands Wildlife Management Area	1.64308	Multiple	TN
MT	Corrigan Wildlife Management Area	3.32990	Multiple	Multiple
MT	Nantahala National Forest	11.21626	Multiple	Multiple
MT	Fontana Dam Reservation	8.69032	Multiple	NC
MT	DCH Indiana Bat Habitat 1	61.73630	Multiple	Multiple

MORRISTOWN SECTOR	NAME	ACRES	COUNTY	STATE
MT	Great Smoky Mountains National Park	61.73630	Multiple	Multiple
MT	Cherokee Dam Reservation	11.38516	Multiple	TN
MT	Grainger County Park	0.12435	Grainger (TN)	TN
MT	Panther Creek State Recreation Park (West)	0.12435	Grainger (TN)	TN
MT	Cherokee National Forest	0.00011	Multiple	Multiple
MT	DOE Mountain State Wildlife Management Area	116.89441	Johnson (TN)	TN
MT	North Cherokee National Forest and Wildlife Management Area	0.88236	Multiple	Multiple
MT	Cherokee National Forest Ownership Boundaries	0.00045	Multiple	Multiple
MT	Boone Reservoir Reservation	24.16464	Multiple	TN
MT	Boone Reservoir Reservation	1.38091	Multiple	TN
MT	Lick Creek II Mitigation Bank	6.04784	Greene (TN)	TN
MT	Ft. Patrick Henry Reservoir Reservation	3.32057	Multiple	TN
MT	Rocky Field Farm Conservation Easement - Land Trust for TN	12.44280	Greene (TN)	TN
MT	Cherokee National Forest	0.00091	Multiple	Multiple
MT	North Cherokee National Forest And Wildlife Management Area	0.25253	Multiple	Multiple
MT	Cherokee National Forest Ownership Boundaries	0.26929	Multiple	Multiple
MT	Overmountain Victory State Scenic Trail	2.55137	Multiple	Multiple
MT	Morril's Cave State Natural Area	5.90905	Sullivan (TN)	TN
MT	Boone Reservoir Reservation	1.45455	Multiple	TN

Appendix Table M-9. Fiscal Year 2023 Natural Areas Crossed by or Occurring within 50 Feet of Transmission Line Segments Proposed for Vegetation Management in the Muscle Shoals Sector

MUSCLE SHOALS SECTOR	NAME	ACRES	COUNTY	STATE
MS	Natchez Trace National Parkway	2.74440	Multiple	Multiple
MS	Muscle Shoals Reservation	69.41333	Multiple	AL
MS	Echota Cherokee	268.67438	Multiple	AL
MS	DCH Unit 7: Hillsboro Glade, Fleshy-Fruit Gladecress	1.11091	Lawrence (AL)	AL
MS	Wilson Dam Reservation	5.86661	Multiple	AL
MS	Muscle Shoals National Recreation Trail	1.42060	Multiple	AL
MS	DCH Slackwater Darter Lauderdale - Wayne	197.37180	Multiple	Multiple
MS	Shoal Creek Nonessential Experimental Population	1.19675	Multiple	Multiple
MS	Cypress Creek	0.44607	Lauderdale (AL)	AL
MS	Natchez Trace National Parkway	4.73186	Multiple	Multiple
MS	Colbert Fossil Plant	0.42051	Multiple	AL
MS	Colbert Coal Generating Facility	11.84925	Colbert (AL)	AL
MS	Joe Wheeler State Park	8.89315	Multiple	AL
MS	Wheeler National Wildlife Refuge	12.71852	Multiple	AL
MS	Wheeler Reservoir Reservation	7.77531	Multiple	AL
MS	Tennessee River/Wilson Dam Nonessential Experimental Population Status	0.00007	Multiple	AL
MS	DCH Slackwater Darter Lauderdale - Wayne	103.34423	Multiple	Multiple
MS	Mcfarland Park	13.16679	Lauderdale (AL)	AL
MS	Seven Mile Island State Wildlife Management Area	11.78903	Multiple	AL
MS	Tennessee River/Wilson Dam Nonessential Experimental Population	0.00015	Multiple	AL
MS	Wilson Dam Tailwater Restricted Mussel Harvest Area	0.01746	Multiple	AL
MS	DCH Slackwater Darter Lauderdale - Wayne	201.33801	Multiple	Multiple
MS	Pickwick Dam Reservation	0.71487	Hardin (TN)	TN
MS	Natchez Trace National Parkway	5.07818	Multiple	Multiple

MS	Devils Den TVA Habitat Protection Area	6.27566	Franklin (AL)	AL
MS	Echota Cherokee	434.08168	Multiple	AL
MS	Buttahatchee River	0.37856	Multiple	Multiple
MS	Browns Ferry Nuclear Generating Facility	0.12567	Limestone (AL)	AL
MS	Wheeler Reservoir Reservation	19.08585	Multiple	AL

Appendix Table M-10. Fiscal Year 2023 - Natural Areas Crossed by or Occurring within 50 Feet of Transmission Line Segments Proposed for Vegetation Management in the Nashville Sector

NASHVILLE SECTOR	NAME	ACRES	COUNTY	STATE
NA	Cumberland River No. 3 State Mussel Sanctuary	12.41649	Smith (TN)	TN
NA	Cordell Hull Lake - US Army Corps of Engineers	1.94761	Multiple	Multiple
NA	Williams Farm	20.00077	Sumner (TN)	TN
NA	Barren River	0.11019	Multiple	KY
NA	Harpeth State Scenic River	4.64261	Multiple	TN
NA	Branstetter Farm - Conservation Easement - Land Trust for TN	15.15973	Davidson (TN)	TN
NA	Cheatham Reservoir Reservation	0.80203	Multiple	TN
NA	Cheatham Lake - US Army Corps of Engineers	3.63966	Multiple	TN
NA	Beaman Park State Natural Area	29.44775	Davidson (TN)	TN
NA	Sycamore Creek	0.13576	Multiple	TN
NA	Overall Creek	0.19069	Rutherford (TN)	TN
NA	Trevecca Nazarene University	0.40097	Davidson (TN)	TN
NA	Mill Creek Macrosite	0.67798	Multiple	TN
NA	Ellington Agricultural Campus	8.58199	Davidson (TN)	TN
NA	Sevenmile Creek Stream Mitigation Site	1.44160	Davidson (TN)	TN
NA	Cheatham Lake - US Army Corps of Engineers	4.98838	Multiple	TN
NA	Barren River Reservoir Reservation	14.95756	Multiple	KY
NA	Barren River Lake State Wildlife Management Area	6.18227	Multiple	KY
NA	Mill Creek - Nolensville Headwaters	4.30194	Multiple	TN
NA	Hatcher Property Conservation Easement - Land Trust of TN	0.80801	Williamson (TN)	TN
NA	Ozburn Hollow Farm Conservation Easement - Land Trust for TN	15.34799	Williamson (TN)	TN
NA	Cedar Glades Protection Planning Site	29.79930	Wilson (TN)	TN
NA	Old Hickory State Wildlife Management Area	2.76739	Multiple	TN
NA	East Fork Stones River	0.25545	Rutherford (TN)	TN
NA	Mill Creek Macrosite	3.01106	Multiple	TN
NA	Mill Creek Macrosite	19.08050	Multiple	TN
NA	Falling Water River	0.07211	Multiple	TN
NA	Williams Mitigation Bank - Tennessee Wildlife Federation ILF Site	3.13390	Putnam (TN)	TN

NA	Chaney Lake State Nature Preserve	0.06095	Warren (KY)	KY
NA	Old Hickory State Wildlife Management Area	0.00041	Multiple	TN
NA	Gallatin Fossil Plant	66.38239	Multiple	TN
NA	Chaney Lake State Nature Preserve	0.79122	Warren (KY)	KY
NA	Barren River	0.68136	Multiple	KY
NA	Gallatin Steam Plant Wildlife Management Area	6.92710	Sumner (TN)	TN
NA	Kenny Perry Country Creek Golf Course	11.85866	SIMPSON	KY
NA	Old Hickory Reservoir Reservation	22.00141	Multiple	TN
NA	The Land Trust for Tennessee Easement	15.52798	Robertson (TN)	TN
NA	South Fork Red River	0.18913	Multiple	Multiple
NA	Highland Rim Experiment Station	13.80243	Robertson (TN)	TN
NA	South Fork Red River	0.12538	Multiple	Multiple
NA	Natchez Trace National Parkway	0.72321	Multiple	Multiple
NA	West Harpeth River	0.68303	Williamson (TN)	TN
NA	Foxhedge - Conservation Easement - The Land Trust for TN	17.27516	Williamson (TN)	TN
NA	Mill Creek Macrosite	43.50881	Multiple	TN
NA	Mill Creek - Indian Creek Drainage	10.44506	Davidson (TN)	TN
NA	Harpeth State Scenic River	1.85517	Multiple	TN
NA	Natchez Trace National Parkway	92.26092	Multiple	Multiple
NA	Natchez Trace State Scenic Trail	2.33052	Multiple	TN
NA	The Land Trust for Tennessee Easement	0.23284	Williamson (TN)	TN
NA	Mungovan- Conservation Easement - Land Trust for TN	3.86325	Davidson (TN)	TN
NA	Branstetter Farm - Conservation Easement - Land Trust for TN	20.65431	Davidson (TN)	TN
NA	Hobson Pike Glade	0.36200	Davidson (TN)	TN
NA	Percy Priest State Wildlife Management Area	0.00965	Multiple	TN
NA	Long Hunter State Park/ Jason Allen Arboretum	1.37899	Multiple	TN
NA	J. Percy Priest Lake - Army Corps of Engineers	55.83322	Multiple	TN
NA	Couchville Cedar Barrens Protection Planning Site	0.16629	Multiple	TN
NA	Couchville Cedar Glade Designated State Natural Area	0.16629	Davidson (TN)	TN
NA	Stones River	0.25874	Multiple	TN

Appendix Table M-11. Fiscal Year 2023 - Natural Areas Crossed by or Occurring within 50 Feet of Transmission Line Segments Proposed for Vegetation Management in the Oak Ridge Sector

OAK RIDGE SECTOR	NAME	ACRES	COUNTY	STATE
OR	Cumberland Forests	10.57698	Multiple	TN
OR	Frozen Head State Natural Area	10.51384	Multiple	TN
OR	Norris Dam State Resort Park	16.24189	Multiple	TN
OR	Sundquist Wildlife Management Area	11.27289	Multiple	TN
OR	Brushy Valley Park	5.27860	Anderson (TN)	TN
OR	Bull Run Fossil Plant	76.18242	Anderson (TN)	TN
OR	Upper Bull Run Bluffs TVA Habitat Protection Area	0.26156	Anderson (TN)	TN
OR	Oak Ridge National Laboratory Reservation and Orr	0.00558	Multiple	TN
OR	Kingston Fossil Plant	13.50357	Roane (TN)	TN
OR	Orr Black Oak Ridge Conservation Easement	3.13332	Roane (TN)	TN
OR	Clinch State Scenic River	7.56234	Multiple	TN
OR	Orr Duct Island Road Bluffs [NA-37]	0.25539	Roane (TN)	TN
OR	Orr Grassy Creek [ARA2]	1.52436	Roane (TN)	TN
OR	Oak Ridge National Laboratory Lands Potential National Natural Landmark	0.00323	Multiple	TN
OR	Oak Ridge National Laboratory Reservation	0.00323	Multiple	TN
OR	Grassy Creek	3.96971	Roane (TN)	TN
OR	Grassy Creek TVA Habitat Protection Area	3.96971	Roane (TN)	TN
OR	Watts Bar Reservoir Reservation	56.57304	Multiple	TN
OR	Watts Bar Dam Reservation	56.57304	Multiple	TN
OR	Orr Fringeless Orchid Wetlands	6.66208	Roane (TN)	TN
OR	Orr Chestnut Ridge Barren and Wetland [NA-35]	14.37217	Multiple	TN
OR	Orr Walker Branch Embayment Barren [NA7]	12.55919	Anderson (TN)	TN
OR	Orr East Fork Ridge Mesic Forest [NA2]	0.09152	Roane (TN)	TN
OR	Orr Pine Ridge Wetlands [NA13]	29.17174	Roane (TN)	TN
OR	Orr Unnamed Tributary to EFPC [ANA3]	0.70286	Roane (TN)	TN
OR	Orr Bear Creek [ANA2]	5.36276	Multiple	TN
OR	Kingston Coal Generating Facility	15.27263	Roane (TN)	TN

OAK RIDGE SECTOR	NAME	ACRES	COUNTY	STATE
OR	Orr Leatherwood Bluffs [RA2]	3.21136	Roane (TN)	TN
OR	Orr Haw Ridge Uplands/Raccoon Creek Goldenseal Area	2.48530	Roane (TN)	TN
OR	Orr Raccoon Creek Goldenseal Area [NA6]	2.48530	Roane (TN)	TN
OR	Norris Dam State Park Potential National Natural Landmark	0.15812	Multiple	TN
OR	Norris Dam State Resort Park	17.58399	Multiple	TN
OR	Norris Dam Reservation	3.51542	Multiple	TN
OR	Clinch River 1	0.04963	Multiple	TN
OR	Norris Dam Cave #1 Protection Planning Site	1.18073	Campbell (TN)	TN
OR	Norris Dam Cave TVA Habitat Protection Area	1.18073	Anderson (TN)	TN
OR	Hawkins Cave	0.00870	Campbell (TN)	TN
OR	DCH For Rabbitsfoot, Slabside Pearlymussel, Fluted Kidneyshell	0.01904	Multiple	Multiple
OR	Green River (RM 207.8 to 30.5-Green River Lake Dam) Outstanding Resource Water	0.10855	Multiple	KY
OR	Hundred Acre Pond Fee - The Nature Conservancy - Fee Ownership	0.29725	Hart (KY)	KY
OR	DCH Diamond Darter	0.53286	Multiple	KY
OR	DCH Green River	0.53286	Multiple	KY
OR	Green River (Ky)	0.17340	Multiple	KY
OR	Williams Tract Protection Planning Site	0.26243	Putnam (TN)	TN
OR	Falling Water River	0.52036	Multiple	TN
OR	Mt. Roosevelt State Wildlife Management Area	0.25637	Multiple	TN
OR	Mount Roosevelt Wildlife Management Area	2.41607	Multiple	TN
OR	North Eagle Bend TVA Habitat Protection Area	0.00834	Anderson (TN)	TN
OR	Melton Hill Dam Reservation	9.42213	Anderson (TN)	TN
OR	Haw Ridge Park	17.80945	Anderson (TN)	TN
OR	Railroad Slope TVA Habitat Protection Area	0.42655	Anderson (TN)	TN
OR	Pond Gap Elementary School Park	1.43735	Knox (TN)	TN
OR	Pellissippi State Community College Park	3.09678	Knox (TN)	TN
OR	Haw Ridge Park	66.05242	Anderson (TN)	TN
OR	John Tarleton Park	0.02779	Knox (TN)	TN
OR	Clinch River 1	0.10656	Multiple	TN

OAK RIDGE SECTOR	NAME	ACRES	COUNTY	STATE
OR	Kingston Fossil Plant	187.22282	Roane (TN)	TN
OR	Wetlands Reserve Program (WRP)	0.00188	Roane (TN)	TN
OR	Roane County Park	2.35006	Roane (TN)	TN
OR	Watts Bar Reservoir Reservation	2.91489	Multiple	TN
OR	Watts Bar Dam Reservation	2.91489	Multiple	TN
OR	Kingston Coal Generating Facility	25.83804	Roane (TN)	TN
OR	Little Tennessee River	0.05503	Multiple	TN
OR	Watts Bar Reservoir Reservation	6.04721	Multiple	TN
OR	Watts Bar Dam Reservation	6.04721	Multiple	TN
OR	Watts Bar Reservoir Reservation	9.59535	Multiple	TN
OR	Watts Bar Dam Reservation	9.59535	Multiple	TN
OR	Sundquist Wildlife Management Area	31.92665	Multiple	TN
OR	North Cumberlands Wildlife Management Area	162.38326	Multiple	TN
OR	Cave Burial	4.02976	Knox (TN)	TN
OR	Bullrun Knobs	16.13321	Knox (TN)	TN
OR	The Land Trust for Tennessee Easement	8.05305	Loudon (TN)	TN
OR	Fort Loudon Dam Reservation	0.00084	Multiple	TN
OR	Dunn Park	0.26274	Knox (TN)	TN
OR	Chaffiin Property - Conservation Easement Held by Foothills Land Conservancy	3.36476	Knox (TN)	TN
OR	Karns High School	8.36848	Knox (TN)	TN
OR	Ft. Loudoun Reservoir Reservation	0.00110	Multiple	TN
OR	Cline Property - Foothills Land Conservancy	7.38088	Loudon (TN)	TN
OR	Bull Run Wetland TVA Habitat Protection Area	2.17354	Anderson (TN)	TN
OR	Tellico Dam Reservation	43.77835	Multiple	TN
OR	Tellico Reservoir Reservation	43.77835	Multiple	TN
OR	Little Tennessee River	0.16674	Multiple	TN

Appendix Table M-12. Fiscal Year 2023 - Natural Areas Crossed by or Occurring within 50 Feet of Transmission Line Segments Proposed for Vegetation Management in the West Point Sector

WEST POINT SECTOR	NAME	ACRES	COUNTY	STATE
WP	Tenn-Tom Mitigation Protection Planning Site	0.00032	Multiple	Multiple
WP	Columbus Military Reservation	2.32580	Lowndes (MS)	MS
WP	Tennessee-Tombigbee Waterway	0.00033	Multiple	Multiple
WP	TN-Tom Columbus Reservoir Reservation	5.14751	Multiple	MS
WP	Plymouth Bluff Nature And Cultural Study Center	8.91853	Lowndes (MS)	MS
WP	Buttahatchie Macrosite	2.14508	Multiple	Multiple
WP	DCH Orangenacre Mucket	1.68297	Multiple	Multiple
WP	Columbus Military Reservation	1.85664	Lowndes (MS)	MS
WP	TN-Tom Columbus Reservoir Reservation	0.92720	Multiple	MS
WP	DCH Buttahatchee River Unit 3	2.23375	Multiple	Multiple
WP	Tenn-Tom Mitigation Protection Planning Site	0.00035	Multiple	Multiple
WP	Tennessee-Tombigbee Waterway	0.00037	Multiple	Multiple
WP	Buttahatchee River	0.41021	Multiple	Multiple
WP	Natchez Trace National Parkway	8.76777	Multiple	Multiple
WP	Choctaw Indian Reservation	20.20674	Multiple	MS
WP	Mississippi Choctaw Reservation	20.20674	Multiple	MS
WP	Coonewah Creek Chalk Bluffs	0.06129	Lee (MS)	MS
WP	Natchez Trace National Parkway	5.45428	Multiple	Multiple
WP	Private John Allen National Fish Hatchery	2.39741	Lee (MS)	MS
WP	Holly Springs National Forest	89.11933	Multiple	MS
WP	Grenada State Waterfowl Management Area	0.10972	Multiple	MS
WP	Grenada Reservoir Reservation	8.34985	Multiple	MS
WP	Tombigbee National Forest	105.50511	Multiple	MS
WP	Nanih Waiya Wildlife Management Area	16.66063	Multiple	MS
WP	Osm Choc 4	0.00031	Multiple	MS
WP	Choctaw Lake Recreation Area Equi-Site	0.04059	Multiple	MS
WP	Choctaw State Wildlife Management Area	0.04059	Multiple	MS

WP	Choctaw Wildlife Management Area	0.00003	Multiple	MS
WP	Noxubee River	0.17834	Multiple	Multiple
WP	Choctaw Indian Reservation	0.00032	Multiple	MS
WP	Mississippi Choctaw Reservation	0.00035	Multiple	MS
WP	Plum Creek Bluff	3.76291	Noxubee (MS)	MS
WP	Tenn-Tom Mitigation Protection Planning Site	0.00090	Multiple	Multiple
WP	Noxubee River at Shaqualak	10.93934	Noxubee (MS)	MS
WP	Luxapalila Creek Recreation Area	0.00035	Lowndes (MS)	MS
WP	Black Belt Branch Experiment Station	14.72851	Noxubee (MS)	MS
WP	Tennessee-Tombigbee Waterway	0.00090	Multiple	Multiple
WP	Noxubee River	0.18031	Multiple	Multiple
WP	Luxapallila Creek Recreation Area	0.00052	Lowndes (MS)	MS
WP	Buttahatchie Macrosite	3.05261	Multiple	Multiple
WP	Tenn-Tom Mitigation Protection Planning Site	0.00059	Multiple	Multiple
WP	Tennessee-Tombigbee Waterway	0.00004	Multiple	Multiple
WP	TN-Tom Columbus Reservoir Reservation	0.06110	Multiple	MS
WP	DCH Orangenacre Mucket	1.43190	Multiple	Multiple
WP	DCH Buttahatchee River Unit 3	0.65037	Multiple	Multiple
WP	Buttahatchie Macrosite	0.44197	Multiple	Multiple
WP	DCH Orangenacre Mucket	0.95994	Multiple	Multiple
WP	Tenn-Tom Mitigation Protection Planning Site	0.00013	Multiple	Multiple
WP	Ellis Tract	9.56048	Lowndes (MS)	MS
WP	TN-Tom Columbus Reservoir Reservation	1.00453	Multiple	MS
WP	DCH Buttahatchee River Unit 3	0.34615	Multiple	Multiple
WP	Tennessee-Tombigbee Waterway	0.00371	Multiple	Multiple
WP	Buttahatchee River	0.12662	Multiple	Multiple

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