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NORTH DAYTON POWER SYSTEM IMPROVEMENTS FINAL ENVIRONMENTAL ASSESSMENT

Meigs and Rhea Counties, Tennessee

Prepared by:
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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
AMA	American Medical Association
APE	Area of potential effect
ARAP	Aquatic Resource Alteration Permit
BMP	Best management practice or accepted construction practice designed to reduce environmental effects
bus	A conductor, which may be a solid bar or pipe, normally made of aluminum or copper, used to connect one or more circuits to a common interface. An example would be the bus used to connect a substation transformer to the outgoing circuits.
CAA	Clean Air Act
CDC	Center for Disease Control and Prevention
CEQ	Council on Environmental Quality
circuit	A section of conductors (three conductors per circuit) capable of carrying electricity to various points
conductors	Cables that carry electrical current
CWA	Clean Water Act
danger tree	A tree located outside the right-of-way that could pose a threat of grounding a line if allowed to fall near a transmission line or a structure
DATOS	Dry at time of survey
dB	Decibel
DNL	Day/night average sound level
EA	Environmental Assessment
easement	A legal agreement that gives TVA the right to use property for a purpose such as a right-of-way for constructing and operating a transmission line
EIS	Environmental Impact Statement
EMF	Electromagnetic field
endangered species	A species in danger of extinction throughout all or a significant part of its range
EO	Executive Order
ephemeral stream	Watercourses or ditches that only have water flowing after a rain event; also called a wet-weather conveyance
ESA	Endangered Species Act
extant	In existence; still existing; not destroyed or lost
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
FICON	Federal Interagency Committee on Noise
FIRM	Flood Insurance Rate Maps
GIS	Geographic Information System
groundwater	Water located beneath the ground surface in the soil pore spaces or in the pores and crevices of rock formations
guy	A cable connecting a structure to an anchor that helps support the structure

hydric soil	A soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop conditions of having no free oxygen available in the upper part
HUC	Hydrologic unit code
HUD	U.S. Department of Housing and Urban Development
hydrophytic vegetation	Aquatic and wetland plants that have developed physiological adaptations allowing a greater tolerance to saturated soil conditions including with limited or absence of oxygen
IPaC	Information, Planning, and Consultation database (USFWS)
kV	Symbol for kilovolt (1 kV equals 1,000 volts)
KY	Kentucky
load	That portion of the entire electric power in a network consumed within a given area; also synonymous with “demand” in a given area
LPC	Local Power Company
MW	Megawatt
NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Corporation
NESC	National Electric Safety Code
NFIP	National Flood Insurance Program
NHPA	National Historic Preservation Act
NIEHS	National Institute of Environmental Health Sciences
NLEB	Northern Long-eared Bat
NRHP	National Register of Historic Places
NRI	Nationwide Rivers Inventory
NWI	National Wetland Inventory
OPGW	Fiber Optic Groundwire
outage	An interruption of the electric power supply to a user
PA	Programmatic Agreement
PI	Point of intersection at which two straight transmission line sections intersect to form an angle
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 Office
SMZ	Streamside management zone
SR	State Route
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
surface water	Water collecting on the ground or in a stream, river, lake, or wetland; it is naturally lost through evaporation and seepage into the groundwater
switch	A device used to complete or break an electrical connection
SWPPP	Storm Water Pollution Prevention Plan
threatened species	A species likely to become endangered within the foreseeable future
TDEC	Tennessee Department of Environment and Conservation
TL	Transmission line
TN	Tennessee
TVA	Tennessee Valley Authority

TRAM	Tennessee Rapid Assessment Method, designed by the state of Tennessee to categorize wetland function
USACE	U.S. Army Corps of Engineers
USCB	U.S. Census Bureau
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
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
WHO	World Health Organization
WWC	Wet-weather conveyance (see ephemeral stream)

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CHAPTER 1

1.0 PURPOSE AND NEED FOR ACTION

1.1 Proposed Action – Improve Power Supply

The Tennessee Valley Authority (TVA) proposes to provide power for the Nokian Tyres Manufacturing Facility and increase the power reliability in Dayton, Tennessee (TN) located within Rhea County, TN. To accomplish this, TVA proposes to construct, operate, and maintain 12 miles of new double circuit 161-kV transmission line (TL) with Optical Ground Wire, as shown in Figure 1-1. This would be done by looping TVA's Sequoyah Nuclear Plant (NP)-Watts Bar Hydro Plant (HP) 161-kV TL, to two new bays at the existing TVA North Dayton, TN 161-kV Switching Station. Breakers would be installed in the TVA North Dayton, TN 161-kV Switching Station, thus splitting the Sequoyah NP-Watts Bar HP, into two TLs. The proposed new Loop to North Dayton 12-mile TL would be built using double-circuit, steel pole structures centered on existing and new 100-foot-wide right of way (ROW). Of the proposed 12 miles, 7.8 miles would consist of vacant existing 75ft wide ROW of the Athens-Dayton TL with an additional 12.5ft of clearing proposed on each side of the ROW for this portion of the route to expand from 75 to 100 feet wide.

1.2 Need for the Proposed Action

TVA plans its transmission system according to industry-wide standards established by the North American Electric Reliability Corporation (NERC). Those standards state that the TVA transmission system must be able to survive single-failure events while continuing to serve customer loads[1] with adequate voltage and no overloaded facilities while maintaining adequate TL clearances as required by the National Electric Safety Code (NESC).

The Nokian Tyres Manufacturing Facility was recently constructed, and is fed from the North Dayton 161-kV Switching Station on Back Valley Road. The new electrical load from Nokian Tyres would bring the North Dayton 161-kV Switching Station near capacity in its present configuration. Nokian Tyres is planning an expansion through 2025 which would cause voltage and thermal violations on the current TVA transmission system. The proposed transmission system improvement project is needed to accommodate the forecasted electrical load increases for the Dayton TN area after the planned expansion is complete.

[1] "Load" is defined as that portion of the entire electric power in a network that is consumed within a given area. The term is synonymous with "demand" in a given area.

North Dayton,TN
Proposed Transmission Project

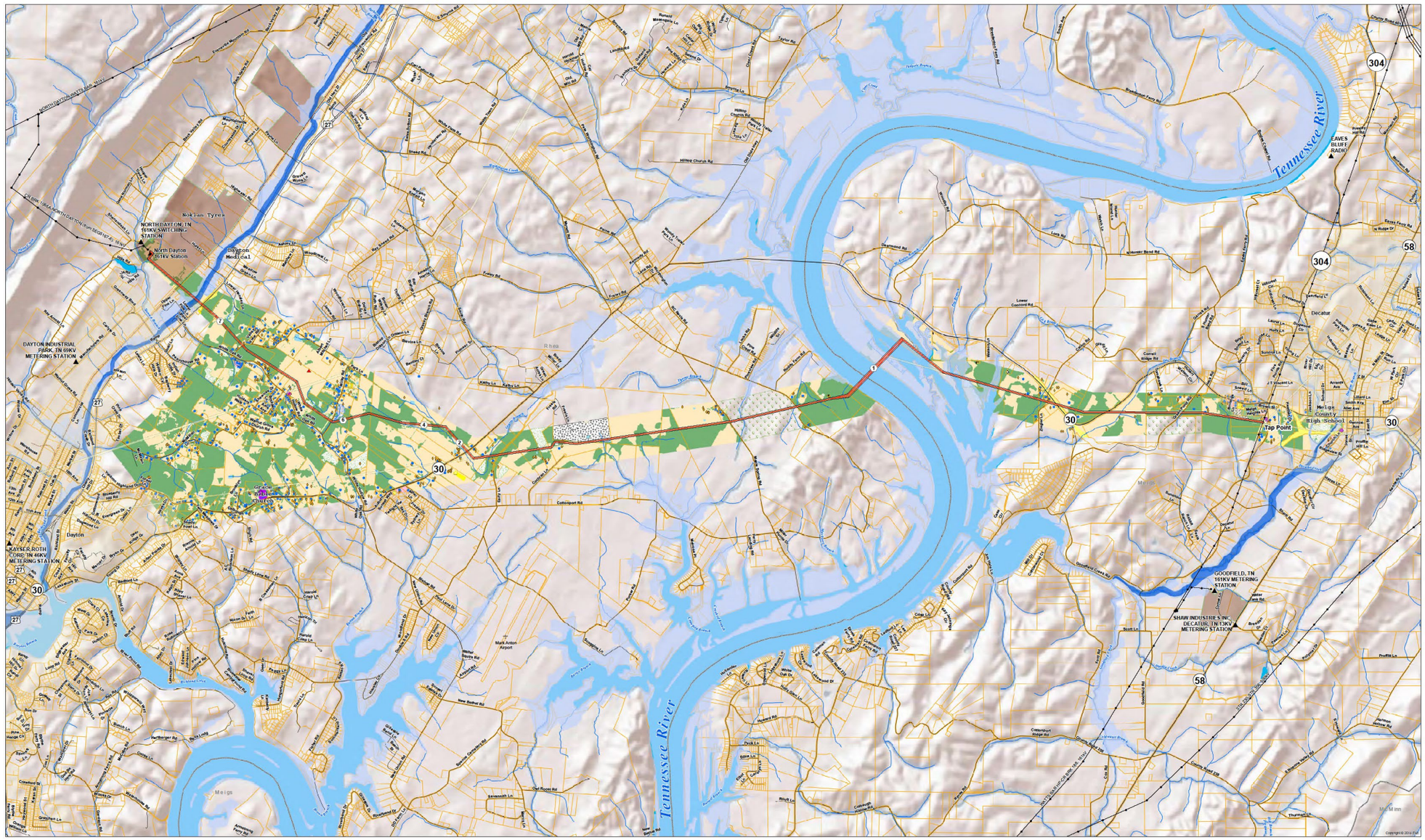

Figure 1-1 TVA's Proposed Preferred Route for the Proposed N. Dayton 161-kV Transmission Line Located in Meigs and Rhea Counties, TN

1.3 Decision to be Made

The primary decisions before TVA are whether to ensure that the areas within Meigs and Rhea Counties, TN have a continuous reliable source of power, and whether the Nokian Tyres Manufacturing Facility has additional electrical capacity for future load growth. If the proposed project is implemented, other secondary decisions are involved. These include:

- Timing of the proposed improvements;
- Most suitable route for the proposed TL, and;
- Any necessary mitigation and/or monitoring to meet TVA standards and to minimize the potential for damage to environmental resources.

A detailed description of the alternatives is provided in Section 2.1.

1.4 Related Environmental Reviews and Consultation Requirements

In June 2019, TVA released the final 2019 Integrated Resource Plan and the associated EIS (TVA 2019a). These documents provide direction on how TVA can best deliver clean, reliable and affordable energy in the Valley over the next 20 years, and the associated EIS analyzed the natural, cultural and socioeconomic impacts associated with the IRP. TVA's Board of Directors approved the Recommendation at its August 2019 meeting and a Record of Decision was published on September 17, 2019.

In August 2019, TVA released the final Transmission System Vegetation Management Programmatic EIS (TVA 2019b). This programmatic level document encompassed ROW vegetation management across TVA's transmission system. Four alternatives were evaluated. TVA's preferred alternative (Alternative C) includes an initial re-clearing of vegetation; thereafter, the full extent of the actively managed transmission ROW would be maintained in a meadow-like end-state. This alternative is considered to provide the best balance in enhancing system reliability and safety, minimization of environmental impacts, and striving for cost effectiveness. Current vegetation management practices are prescribed by the court injunction order currently in place in the *Sherwood v. TVA* litigation under which TVA has stopped removing woody vegetation except for trees that are an immediate hazard and will remain in place until TVA's Transmission System Vegetation Management Programmatic EIS has received court approval.

1.5 Scope of the Environmental Assessment

TVA contacted the following federal and state agencies, as well as federally recognized Indian tribes, concerning the proposed project:

- Tennessee Department of Environment and Conservation
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- Absentee Shawnee Tribe of Oklahoma
- Alabama-Coushatta Tribe of Texas
- Cherokee Nation
- Coushatta Tribe of Louisiana
- Eastern Band of Cherokee Indians
- Eastern Shawnee Tribe of Oklahoma
- Jena Band of Choctaw Indians
- Kialegee Tribal Town

- Shawnee Tribe
- The Muscogee (Creek) Nation
- The Seminole Nation of Oklahoma
- Thlopthlocco Tribal Town
- United Keetoowah Band of Cherokee Indians in Oklahoma

TVA developed a public communication plan that included a website with information about the project, a map of the alternative TL routes and numerous feedback mechanisms. TVA held an open house in Dayton, TN on September 20, 2018. The 116 property owners who could be potentially affected by, or near to, any of the route alternative segments as well as elected officials were invited to the open house. TVA used local news outlets and notices placed in local newspapers to notify other interested members of the public. This open house was attended by 62 people.

At the open house, TVA presented maps with a network of alternative TL routes, comprised of 7 different TL segments, to the public for comment (see Figure 1-3). The primary interests of those who attended the open houses pertained to the effects of the proposed TL on the individual landowners, including impacts on farming, development and/or property values.

A 30-day public review and comment period was held following the open house, during which TVA accepted public comments on the alternative TL routes and other issues. A toll-free phone number and facsimile number were made available to facilitate comments. There were a total of 10 property owners who submitted comments during the Open House and 30-day comment period. Segments 5 and 7 received four comments each, followed by one comment each for segments 3 and 6. Most of these comments centered on decreased development potential and negative impacts to property values that would result from the proposed TL. Comments regarding negative impacts to farming were also received.

At the conclusion of the comment period, TVA considered the comments and additional information, described in Section 2.3, and developed a preferred route. TVA announced the preferred route to the public in Winter 2018. Letters were sent to affected property owners, elected officials, and information was provided to the public through TVA's website.

As a result of information obtained following the announcement of the preferred route from public comments, as well as from environmental field surveys, TVA made additional route adjustments to preferred TL route to develop the proposed and preferred route as shown in Figure 1-1. These adjustments are described in Section 2.5.

1.6 Issues to be Addressed

TVA prepared this environmental assessment (EA) to comply with the National Environmental Policy Act (NEPA) and regulations promulgated by the Council of Environmental Quality (CEQ) and TVA to implement NEPA. The EA investigates the construction, operation, and maintenance of a new TL and associated loop TLs, as well as the purchase of TL ROW easements, or taking no action.

TVA has determined the resources listed below are potentially affected by the alternatives considered. These resources were identified based on internal scoping as well as comments received during the scoping period.

- Water quality (surface waters and groundwater)
- Aquatic ecology
- Vegetation
- Wildlife
- Endangered and threatened species and their critical habitats
- Floodplains
- Wetlands
- Aesthetic resources (including visual, noise, and odors)
- Archaeological and historic resources
- Land use
- Recreation, parks, and managed areas
- Socioeconomics and environmental justice

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), and applicable laws including the Farmland Protection Policy Act, the National Historic Preservation Act of 1966 (NHPA), the Endangered Species Act of 1973 (ESA) as amended, the Clean Air Act (CAA), and the Clean Water Act (CWA). Correspondence received from agencies related to this review and coordination is included in Appendix A.

Potential effects related to air quality and global climate change, solid and hazardous waste, and health and safety were considered. Because of the nature of the action, any potential effects to these resources would be minor and insignificant. Thus, any further analysis for effects to these resources was deemed unnecessary.

1.7 Necessary Permits or Licenses

A permit would be required from the State of TN and/or the local municipality for the discharge of construction site storm water associated with the construction of TLs. TVA would prepare the required erosion and sedimentation control plans and coordinate them with the appropriate state and local authorities. A permit may also be required if removed trees or other vegetation are disposed of through burning and for other combustible materials removed during construction of the proposed project. A Section 401 Water Quality Certification would be obtained as required for physical alterations to waters of the State. A Section 404 nationwide permit would be obtained from the USACE, if construction activities result in the discharge of dredge or fill into waters of the United States. A permit would be obtained from the TN Departments of Transportation for crossing state highways or federal interstates during TL construction. A general permit for application of pesticides, as part of construction or maintenance activities, would be obtained from TDEC.

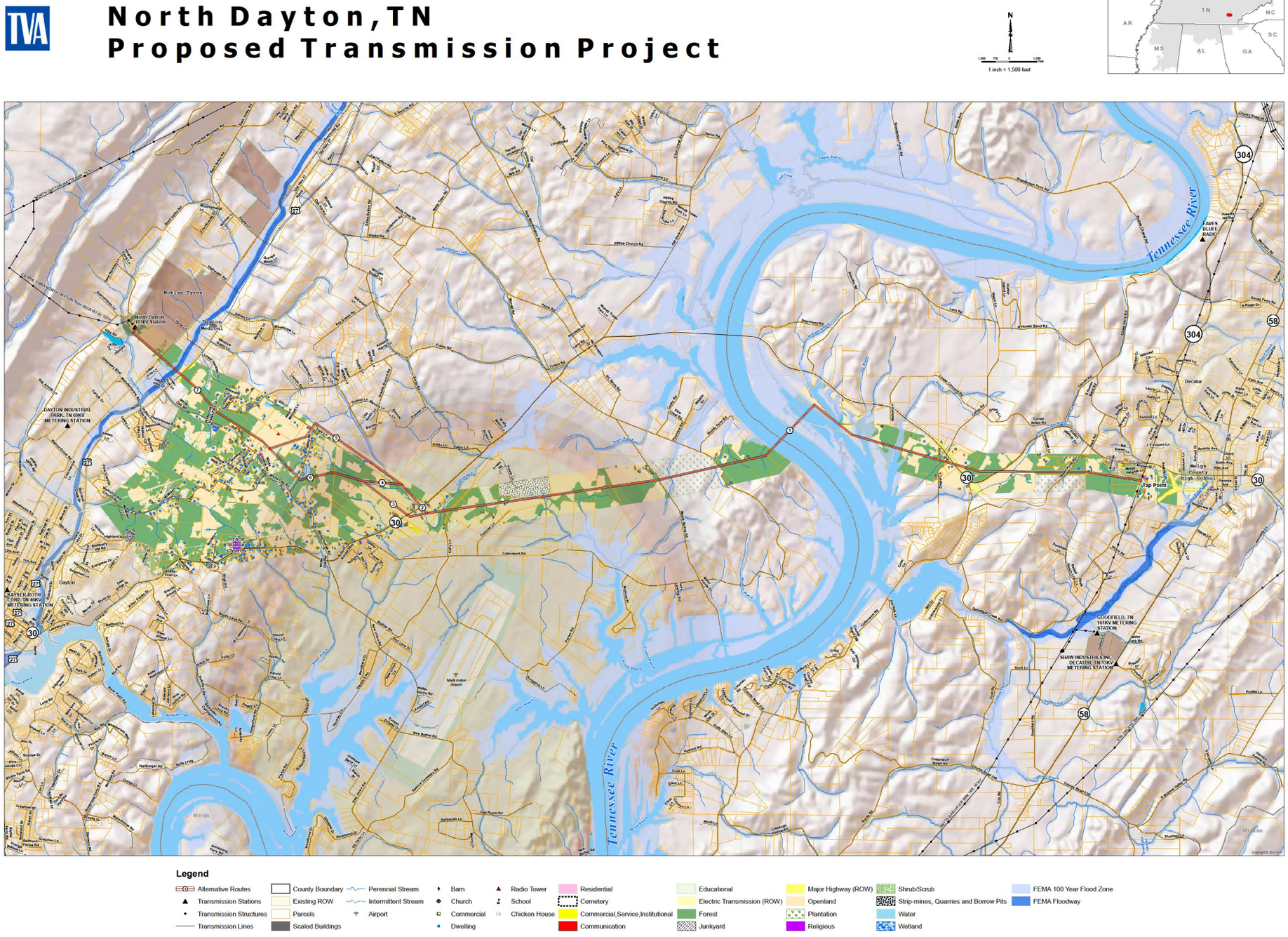

Figure 1-2 Alternative Route Segments for the Proposed Loop to North Dayton 161-kV Transmission Line

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CHAPTER 2

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

As described in Chapter 1, TVA proposes to construct the Loop to North Dayton 12-mile 161-kV TL and associated North Dayton 161-kV Switching Station expansion. A description of the proposed action is provided below in Section 2.1.2. Additional background information about construction, operation, and maintenance of a Switching Station and TL is also provided and would be applicable if the Action Alternative is chosen.

This chapter has seven major sections:

- A description of alternatives;
- A description of the construction, operation, and maintenance of the proposed TL;
- An explanation of the siting process;
- A comparison of the proposed alternative TL routes;
- A comparison of anticipated environmental effects by alternative;
- Identification of mitigation measures; and
- Identification of the preferred alternative.

2.1 Alternatives

After several alternatives were considered and subsequently eliminated, two alternatives (i.e., the No Action Alternative and the Action Alternative) are addressed in this EA. Under the No Action Alternative, TVA would not implement the proposed action. The Action Alternative involves the easements for ROW, the construction, operation, and maintenance of the proposed TLs and switching station upgrades.

2.1.1 The No Action Alternative – TVA Does Not Provide a New Power Supply within the Meigs and Rhea Counties, TN Area

Under the No Action Alternative, TVA would not construct the proposed Loop to North Dayton 12-mile double circuit 161-kV TL and associated North Dayton 161-kV Switching Station expansion. As a result, the TVA power system within the Meigs and Rhea Counties, TN areas would continue to operate under current conditions, increasing the risk of voltage and thermal loading problems, loss of service, and occurrences of violations to NERC reliability criteria. TVA's ability to provide reliable service and add electrical capacity to support economic development within the area, including Nokian Tyres Manufacturing Facility, would be jeopardized, which would not support TVA's overall mission.

Considering TVA's obligation to provide reliable electric service and support economic development within the Valley, the No Action Alternative is not a reasonable alternative. However, the potential environmental effects of adopting the No Action Alternative were considered in the EA to provide a baseline for comparison with respect to the potential effects of implementing the proposed action.

2.1.2 Action Alternative – TVA Provides a New Power Supply to Meigs and Rhea Counties, TN Area

Under the Action Alternative, TVA would construct, operate, and maintain the proposed Loop to North Dayton 12-mile 161-kV TL and the existing ROW would be expanded from 75 to 100 feet wide. Proposed upgrades to the existing TVA North Dayton 161-kV Switching Station include two new bays and breakers.

Additional information describing implementation of the proposed Action Alternative and how the most suitable TL route were determined is provided below in Sections 2.2 through 2.4.

2.1.3 Alternatives Considered but Eliminated From Further Discussion

During the development of this proposal, other alternatives were considered. However, upon further study, TVA determined that these alternatives were not feasible for the reasons provided below.

Underground Utility Lines

A frequent objection to the construction of new TLs involves their adverse visual effects. Thus, a frequently suggested alternative is the installation of underground TLs.

Although power lines can be buried, most buried TLs tend to be low-voltage distribution lines (lines that are 13-kV or less) rather than high-voltage TLs, which tend to be 69-kV and above. Although low-voltage distribution lines can be laid into trenches and buried without the need for special conduits, burying higher voltage TLs requires extensive excavation, as these TLs must be encased in special conduits or tunnels. Additionally, measures to ensure proper cooling and to provide adequate access are required. Usually, a road along or within the ROW for buried TLs must be maintained for routine inspection and maintenance.

Although buried TLs are much less susceptible to catastrophic storm damage, especially wind damage, they tend to be very expensive to install and maintain. Depending on the type of cable system used, special equipment or ventilation systems may be required to provide adequate cooling for the underground conductors. Similarly, special construction methods/equipment that are highly intrusive to the landscape must be used to protect the buried lines from flooding, which could cause an outage. High-voltage underground cables typically require the use of an underground vault that would require extensive excavation along the entire TL route for initial installation, and would also require excavation to make repairs in the event of a cable fault. Locating an electrical fault in a buried cable can be time consuming, and is often exacerbated by the need to perform excavation to locate the damaged section. Roadways and water bodies also increase the difficulties of locating faults, since the cables could be buried under roadways and streams. These issues make the installation of high-voltage underground cables cost prohibitive and impractical.

The potential adverse environmental effects of constructing and operating a buried high-voltage TL would likely be greater overall than those associated with a traditional aboveground TL. In addition, the expense of a buried high-voltage TL would be prohibitive. For these reasons, burying the proposed TL is not a feasible option and this alternative was eliminated from further consideration.

2.2 Construction, Operation, and Maintenance of the Proposed Transmission Line Connections

2.2.1 Right-of-Way Acquisition and Clearing

A ROW utilizes an easement that would be designated for a TL and associated assets. The easement would require maintenance to maintain performance, avoid the risk of fires and other accidents, and to ensure reliable operation. The ROW provides a buffer and safety margin between the high-voltage conductors and surrounding structures and vegetation. The ROW for this project is described in Section 2.1.2.

TVA would purchase easements from landowners whose land the proposed new ROW would cross. These easements would give TVA, among other things, the right to clear the ROW, to construct, operate, and maintain the TL, and to remove “danger trees” adjacent to the ROW. Danger trees include any trees located off the ROW that, under maximum sag and blowout conditions, would strike a TL structure or come within an unsafe distance of a TL if it were to fall toward the TL. For most TLs, this distance is five feet, but for higher voltage TLs, the distance is generally 10 feet. The fee simple ownership of the land within the ROW would remain with the landowner, and many activities and land uses could continue to occur on the property. However, the terms of the easement agreement prohibit certain activities, such as construction of buildings and any other activities within the ROW that could interfere with the operation or maintenance of the TL or create a hazardous situation.

Because of the need to maintain adequate clearance between tall vegetation and the TL conductors, as well as to provide access for construction equipment, all trees and most shrubs would be removed from the entire width of the ROW. Equipment used during this ROW clearing would include chain saws, skidders, bulldozers, tractors, and/or low ground-pressure feller-bunchers. Marketable timber would be salvaged where feasible; otherwise, woody debris and other vegetation would be piled and burned, chipped, or taken off-site. Prior to burning, TVA would obtain any necessary permits (See Section 1.7). In some instances, vegetation may be windrowed along the edge of the ROW to serve as sediment barriers[2].

Vegetation removal in streamside management zones (SMZs) and wetlands would be restricted to trees tall enough, or with the potential to soon grow tall enough, to interfere with the conductors. Clearing in SMZs would be accomplished using handheld equipment or remote-handling equipment, such as a feller-buncher, to limit ground disturbance[3].

TVA has developed guidance and specification documents (listed below) for ROW clearing and construction activities. These documents are provided on TVA’s transmission system projects web page and are taken into account when considering the effects of the proposed Action Alternative (TVA 2019c). TVA transmission projects also utilize best management

[2] The emission of criteria pollutants or their precursors would not exceed de minimis levels specified in 40 CFR § 93.153(b). Thus, consistent with Section 176(c) of the CAA, project activities would be in conformity with the requirements of Tennessee and Mississippi’s state implementation plan for attaining air quality standards.
[3] A feller-buncher is a self-propelled machine with a cutting head that is capable of holding more than one stem at a time. Tracked feller-bunchers are capable of operating on wet and loose soils, have a lower ground-pressure than wheeled equipment, and are less prone to rutting and compaction.

practices (BMPs) to provide guidance for clearing and construction activities (TVA 2017a) and ROW Vegetation Management Guidelines (TVA 2017b).

1. *TVA ROW Clearing Specifications*
2. *Environmental Quality Protection Specifications for Transmission Line Construction*
3. *Transmission Construction Guidelines Near Streams*
4. *Environmental Quality Protection Specifications for Transmission Substation or Communications Construction*
5. *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities* (TVA 2017a)
6. *Transmission Environmental Protection Procedures Right-of-Way Vegetation Management Guidelines*

Following clearing and construction, an appropriate vegetative cover on the ROW would be restored. TVA would utilize appropriate seed mixtures as described in TVA's 2017 BMP manual or work with property owners with impacted cropland to ensure restoration supports or minimize impacts to production. Erosion controls would remain in place until the plant communities become fully established. Streamside areas would be revegetated as described in the above documents. Failure to maintain adequate clearance can result in dangerous situations, including ground faults. As such, native vegetation or plants with favorable growth patterns (slow growth and low mature heights) would be maintained within the ROW following construction per BMPs.

2.2.2 **Access Roads**

Access roads would be needed to allow vehicular access to each structure and other points along the ROW. Typically, new permanent or temporary access roads used for TLs are located on the ROW wherever possible and are designed and located to avoid severe slope conditions and to minimize impacts to environmental resources. Access roads are typically about 12 to 16 feet wide and are surfaced with dirt, mulch, or gravel.

Culverts and other drainage devices, fences, and gates would be installed as necessary. Culverts installed in any perennial streams would be removed following construction.

However, in ephemeral[4] streams, the culverts would be left or removed, depending on the wishes of the landowner or any permit conditions that might apply. If desired by the property owner, TVA would restore to previous conditions areas occupied by constructed temporary access roads.

Additional applicable ROW clearing and environmental quality protection specifications are listed in *TVA ROW Clearing Specifications, Environmental Quality Protection Specifications for Transmission Line Construction,* and *Transmission Construction Guidelines Near Streams* (TVA 2019c).

2.2.3 **Construction Assembly Areas**

A construction assembly area (or "laydown" area) would be required for worker assembly, vehicle parking, and material storage. This area may be on existing substation property or

[4] Ephemeral streams are also known as wet-weather conveyances or streams that run only following sufficient amounts of rainfall.

may be leased from a private landowner for the duration of the construction period. Properties utilized for laydown yards are typically leased by TVA about a month before construction begins. Properties such as existing parking lots or areas used previously as car lots are ideal laydown areas because site preparation is minimal. Selection criteria used for locating potential laydown areas include areas that are typically five acres in size; relatively flat; well drained; previously cleared; preferably graveled and fenced; preferably with wide access points with appropriate culverts; sufficiently distant from streams, wetlands, or sensitive environmental features; and located adjacent to an existing paved road near the TL. TVA initially attempts to use or lease properties that require no site preparation. However, at times, the property may require some minor grading and installation of drainage structures such as culverts.

Likewise, the area may require graveling and fencing. Trailers used for material storage and office space would be parked on the site. Following completion of construction activities, all trailers, unused materials, and construction debris would be removed from the site. Removal of TVA-installed fencing and site restoration would be performed by TVA at the discretion of the landowner.

2.2.4 **Structures and Conductors**

Most of the proposed 12-mile TL would utilize two pole double circuit steel-pole structures. Tower structures would be needed near the Tennessee River Crossing. Examples of these structure types are shown in Figure 2-2 and double-circuit steel poles as depicted in Figure 2-1 below. Pole structure heights would vary according to the terrain, but would range between 80 and 120 feet above ground. The tower structures are proposed to be 198 feet above ground.

Figure 2-1 Typical Double-Circuit Steel-Pole

Figure 2-2 Typical River Crossing Tower Structure

Three conductors (the cables that carry the electrical current) are required to make up a single circuit in alternating current TLs. Similarly, six conductors are required to make up a double-circuit in alternating current TLs. For a 161-kV TL, each single-cable conductor is attached to harden glass insulators that are either suspended from the structure cross arms or attached directly to the structure. A smaller overhead ground wire or wires are attached to the top of the structures.

Poles at angles (angle points) in the TL may require supporting screw, rock, or log anchored guys. Most poles would be directly embedded in holes augured into the ground to a depth

equal to 10 percent of the pole's length plus an additional two feet. Normally, the holes would be backfilled with the excavated material, but, in some cases, gravel or a concrete-and-gravel mixture would be used, depending on local soil conditions.

Equipment used during the construction phase would include trucks, truck-mounted augers and drills, excavators, as well as tracked cranes and bulldozers. Low ground-pressure-type equipment would be used in specified locations (such as areas with soft ground) to reduce the potential for environmental impacts per TVA BMPs.

2.2.5 Conductor and Ground Wire Installation

Reels of conductor and ground wire would be delivered to the construction assembly area(s), and temporary clearance poles would be installed at road crossings to reduce interference with traffic. A small rope would be pulled from structure to structure. The rope would be connected to the conductor and ground wire and used to pull them down the line through pulleys suspended from the insulators. A bulldozer and specialized tensioning equipment would be used to pull conductors and ground wires to the proper tension. Crews would then clamp the wires to the insulators and remove the pulleys.

2.2.6 Operation and Maintenance of the Proposed Transmission Line

Inspection

Periodic inspections of 161-kV TLs are performed by helicopter aerial surveillance after operation begins. Foot patrols or climbing inspections are performed to locate damaged conductors, insulators, or structures, and to discover any abnormal conditions that might hamper the normal operation of the line or adversely affect the surrounding area. During these inspections, the condition of vegetation within the ROW, as well as that immediately adjoining the ROW, is noted. These observations are then used to plan corrective maintenance and routine vegetation management.

Vegetation Management

Management of vegetation along the ROW would be necessary to ensure access to structures and to maintain an adequate distance between TL conductors and vegetation. Adequate ground clearance is important to account for construction, design, and survey tolerances (e.g., conductor sagging). TVA uses more conservative distances than NESC requirements in order to ensure reliability. TVA uses a minimum ground clearance of 24 feet for a 161-kV TL at the maximum line operating temperature. TVA released the final Transmission System Vegetation Management Programmatic EIS in 2019 which outlines TVA's preferred vegetation management alternative moving forward (TVA 2019b). Current vegetation management practices are prescribed by the court injunction order currently in place in the *Sherwood v. TVA* litigation under which TVA has stopped removing woody vegetation except for trees that are an immediate hazard. Upon court approval of the Transmission System Vegetation Management Programmatic EIS, vegetation management along the ROW would consist of two different activities: felling danger trees adjacent to the cleared ROW, and controlling vegetation within the total width of the cleared ROW. These activities would occur periodically as identified by LIDAR inspections.
After tall trees and other tall-growing vegetation are removed from the ROW during construction, routine management of vegetation within the cleared ROW would include an integrated vegetation management approach designed to encourage the low-growing plant

species and discourage tall-growing plant species. A vegetation maintenance plan would be developed for each TL sector, based on the results of the periodic inspections described above. Vegetation control methods or tools and their appropriate uses for various TL ROW conditions have been described in TVA's final Transmission System Vegetation Management Programmatic EIS (TVA 2019b). These methods include manual (chainsaw, machete, brush hooks, axes, bush blades), mechanical cutting or trimming (mower or brush hog, bulldozer, track-hoe, skid steer, shears [e.g., feller-buncher], mulcher/chipper, Hydro-ax [including various other attachments], tracked equipment such as compact track loader, helicopter tree saw, Jarraff & Kershaw line trimmers, or aerial lifts) and herbicide spraying and growth regulators.

Herbicides are normally applied in areas where heavy growth of woody vegetation is occurring on the ROW and mechanical or manual methods are not practical. Herbicides can be applied in a variety of ways; however, all herbicides would be applied under the supervision of a licensed applicator in accordance with applicable state and federal laws and regulations. Additionally, only TVA approved herbicides registered with the U.S. Environmental Protection Agency (USEPA) or those approved by another managing agency as appropriate are used and applied in accordance with manufacturers' label directions. A list of the herbicides currently used by TVA in ROW vegetation control and pre-emergent herbicides TVA currently uses on bare ground areas in TL ROWs is presented in TVA's *Transmission Environmental Protection Procedures Right-Of- Way Vegetation Management Guidelines* (TVA 2017b).

2.3 Structure Replacement

Steel towers make up the majority of the TL with a few wooden poles at the terminus. Upon retirement, the steel structures would be evaluated for recycling. Any retired wooden poles would be offered to the local power company or property owners. If any wooden poles remain and require disposal, a special permit would be obtained and TVA would follow its Transmission Environmental Protection Procedures for reuse and/or disposal (TVA 2019c). Likewise, any lead pins removed from the retired insulators would be handled according to TVA's transmission environmental protection procedures and guidelines (TVA 2019c).

Other than vegetation management within ROWs, only minor maintenance work is generally required once TL structures and other components (e.g., conductor, insulators, arms) are installed as these items typically last several decades. In the event that a structure needs to be replaced, the structure would normally be lifted out of the ground by crane-like equipment. The replacement structure would be inserted into the same hole or an adjacent hole. Access to the structures would be via existing roads. Replacement of structures may require leveling the area surrounding the replaced structures, but additional area disturbance would be minor compared to the initial installation of the structure.

2.4 Siting Process

The process of siting the proposed TL followed the basic steps used by TVA to determine a TL route. These include:

- Determine the potential existing power sources to supply the TL.
- Define the study area.

- Collect data to minimize potential impacts to social, engineering, and environmental (cultural and natural) features.
- Identify general route segments producing potential routes.
- Gather public input.
- Redefine general route segments.
- Incorporate public input into the final selection of the TL route.

2.4.1 Definition of the Study Area

The study area was chosen to meet the following basic objectives: provide necessary TL access to the Nokian Tyres Manufacturing Facility; and allow a reasonable area for multiple candidate corridors to be identified in multiple alignments.

2.4.2 Description of the Study Area

The study area boundary was defined by the desired main line loop point location, existing right-of-way corridors, land use, and new line termination location. The eastern boundary was defined to include the loop point which was identified to be the intersection of the existing TVA Sequoyah NP – Watts Bar HP 161-kV TL, and the existing, vacant, TVA Athens-Dayton 69-kV ROW. From the easternmost boundary, the northern and southern edges of the study area followed the existing, vacant TVA right-of-way for the Athens – Dayton 69-kV for approximately 8 miles. At this point, the northern boundary proceeded northwest to cross U.S. Highway 27, and included the previously surveyed TL corridor through the Industrial Development Board of the City of Dayton property (Nokian Tyres Plant location), and the existing North Dayton Switching Station. The western boundary was defined to include the new line termination point, the North Dayton 161-kV Switching Station. From the point on the existing Athens- Dayton 69-kV ROW where the northern boundary proceeded northwest, the southern boundary continued to follow the existing right-of-way for another approximately 3 miles, before extending to the northwest. The southern boundary loosely followed available land for routing the new TL, avoiding residential development, and surrounding development around U.S. Highway 27, south of the termination point. Extending the southern edge of the southern boundary provided for studying route options that would result in greater overall line length, but utilize more of the existing ROW and less new ROW.

2.4.3 Data Collection

TVA collected geographic data such as topography, land use, transportation, environmental features, and cultural resources for the study area. Information sources used in the TL study included design drawings for area TLs, data collected into a geographic information system (GIS), including U.S. Geological Survey (USGS) digital line graphs, National Wetland Inventory (NWI) maps, wetland modelling results, floodplains, photo-interpreted land use/land cover data and Rhea County and Meigs County tax maps. Also used were various proprietary data maintained by TVA in a corporate geo-referenced database (i.e., TVA Regional Natural Heritage file data on sensitive plants and animals and archaeological and historical resources).

TVA used NAIP, BING, and World imagery from various years for the study area. This aerial photography was then photo-interpreted to obtain land use and land cover data such

as forests, agriculture, wetlands, dwellings, barns, commercial and industrial buildings, churches, and cemeteries.

The data was then analyzed both manually and with GIS. The use of GIS allows substantial flexibility in examining various types of spatially superimposed information. This system allowed the multitude of study area factors to be examined simultaneously for developing and evaluating numerous options and scenarios to select the TL route that would best meet project needs, which included avoiding or reducing potential environmental impacts.

Calculations from aerial photographs, tax maps, and other sources included, but were not limited to, the number of road crossings, stream crossings, and property parcels. The aerial photography, GIS-based map, and other maps and drawings were supplemented by reconnaissance, where possible by TVA.

2.4.4 Establishment and Application of Siting Criteria

TVA uses a set of evaluation criteria that represent opportunities and constraints for development of alternative TL routes. These criteria include social, engineering, and environmental factors such as existing land use, ownership patterns, environmental features, cultural resources, and visual quality. Cost is also an important factor, with engineering considerations, materials, and ROW acquisition costs being important elements. Identifying feasible TL routes involves weighing and balancing these criteria.

Specific criteria used to evaluate TL route options are described below. For each feature identified as occurring along a proposed route option, specific considerations related to these features were identified and scored. In the evaluation, a higher score means a bigger constraint or obstacle for locating a TL. For example, a greater number of streams crossed, a longer TL route length, or a greater number of historic resources affected would produce a higher, more unfavorable score.

- **Engineering and Constructability Criteria** include considerations such as terrain (steeper slopes can present major challenges for design and construction), wetlands with standing water, total length of the TL route, number of primary and secondary road crossings, accessibility, the presence of pipeline and TL crossings, and total TL cost.

- **Social Criteria** include the total acreage of new ROW, number of affected property parcels, public comments, consideration of visual aesthetics, and proximity to schools, houses, commercial or industrial buildings, and barns.

- **Environmental Criteria** include the number of forested acres within the proposed ROW, the number of open water crossings, the number of floodplain or floodway crossings, the presence of wetlands, rare species habitat, sinkholes, and sensitive stream crossings (i.e., those supporting endangered or threatened species), the number of perennial and intermittent stream crossings, and the presence of archaeological and historic sites, churches, and cemeteries.

A tally of the number of occurrences for each of the individual criteria was calculated for each potential alternative route. Next, a normalized ranking of alternative routes was performed for each individual feature based on each route's value as it related to the other alternative routes. Weights reflecting the severity of potential effects were then developed for each individual

criterion. These criterion-specific weights were multiplied by the individual alternative rankings to create a table of weighted rankings. The weighted rankings for each alternative were added to develop overall scores for each alternative route based on engineering, social, and environmental criteria, then summed for an overall total. For each of these criteria, a ranking of each alternative route was calculated based on the relationship between the scores of various routes.

These rankings made it possible to recognize which routes would have the least and the greatest impact on engineering, social, and environmental resources based on the data available at this stage in the siting process. Finally, the scores from each category were combined into an overall score. The alternative route options were then rank ordered by their overall scores.

2.4.5 Development of General Route Segments and Potential Transmission Line Routes

As described in Section 2.3.3, the collected data were analyzed to develop possible TL route segments that would best meet the project needs while avoiding or reducing conflict with constraints.

Using the siting criteria identified in Section 2.3.4 and the identified termination points in Section 2.3.5, a total of 19 potential TL route segments were developed and presented at the open house (Figure 1-2).

2.4.6 Potential Transmission Line Corridors

As a result of the constraints mentioned in the previous section, 7 alternative TL routes were developed, consisting of a combination of 3 constituent segments (see Figure 1-2 and Table 2-1).

Table 2-1 Alternative Route Corridors with Constituent Segments

Route #	Route Segments
1	1.2.5.7
2	1.3.6.7
3	1.2.4.6.7

2.5 Identification of the Preferred Transmission Line Route

Each alternative offers different opportunities and constraints for TL construction. Opportunities include characteristics such as open land, areas less suitable for development and lack of sensitive environmental areas and land use conflicts. The assessment of the opportunities and constraints for the alternative routes are evaluated using engineering, environmental, and social criteria. Some of the key considerations used in identifying and assessing alternative route locations are line length, amount of existing ROW, road/highway crossings, construction access, substation locations, amount of ROW needed, forest clearing, wetlands, sensitive stream and/or stream crossings, number of parcel/property tracts, development (both commercial and residential), historical areas and structures, archaeological, recreational, and airport flight zones.

A total of seven route segments, and three alternative routes were considered for this project. As the existing North Dayton Switching Station was located to the west from the loop point location, route options proceeding west from the loop location were investigated. Given the availability of existing, vacant TVA ROW, only one alternative segment (1) was identified for the first approximately 8 miles, utilizing the 75-foot wide ROW, which would be expanded to 100 feet wide.

The Mark Anton Airport was located to the south of the study area, with the northernmost end of the runway, approximately 1.3 miles due south of segment 1. The proximity of the airport, and associated airport glide path surface prevented expanding route options at the southernmost end of the study area, branching off from the existing, vacant TVA ROW. Routing options were studied extensively within the study area to ensure the structures would fall underneath the glide path surface, using available digital elevation models prior to LiDAR acquisition.

The total length of segment 1 was approximately 8 miles, at which route options for segment 2 deviated from the existing ROW to the west, while segment 3 proceeded along existing ROW. The entirety of segment 1 followed the existing ROW, with the exception of a short section which deviated to avoid a dwelling. Segment 2 crossed State Highway 30, and proceeded in roughly paralleling the north side of the grassy branch stream onto a wooded section of property utilized for mostly cattle, with the intersection of segment 2, 4 and 5 being utilized for row cropping. Segment 5 proceeded to the northwest, mostly paralleling property lines before intersecting perpendicular to the existing, vacant Spring City – Dayton 69-kV TVA ROW. The existing 100-foot wide ROW was followed to the southwest for approximately 3000 feet through a small residential area, then farmland before intersecting segment 6. From the intersection of segment 1 and 2, segment 3 continued for approximately 900 more feet closely following the existing ROW before deviating to the west. Proceeding west, segment 3 crossed highway 30, affecting the same landowner in the vicinity of the highway as segment 2. Segment 3 bisected a large row crop field for a distance of approximately 1500 feet. Segment 3 continued on for another 1400 feet to intersect with segment 4 and 6 on land utilized for cattle. Segment 6 continued to the southwest through a wooded area, increasing in elevation before turning to the southwest to a turn on the east side of Wilky Road. Crossing Wilky Road, segment 6 continued northwest, through a larger wooded parcel and farmland, ending at the intersection with segment 5 from the northeast. Segment 6 was adjusted after the open house, and prior to analysis being performed. This adjustment was made to lessen the impact to the property, by more closely following the property line, and reduce the distance for which the segment paralleled a creek. Segment 7 was the only route option from the intersection of segment 5 and 6 to the North Dayton Switching Station. Segment 7 proceed through large parcels used for cattle and timber, crossing Oak Hill Road and through a planned subdivision development, which was discovered at the Open House. The route then crossed U.S. Highway 27, a railroad and then onto the Industrial Development Board of the City of Dayton property leased by Nokian Tyres, and into the two new bays at the North Dayton Switching Station.

Alternative Route 3, made up of route segments 1, 2, 4, 6 and 7, resulted in the top rankings in the analysis, and was chosen as the preferred route. Analysis was performed prior to the preferred route being announced, and prior to adjustments during the survey process. This route ranked second in engineering, first in social, and second in environmental.

In the Engineering category, alternative route 3 effectively tied for the shortest, most direct route, although all three routes' length were within two percent of each other. The preferred

route also had the greatest length of route within 20 to 30% slope- 1.4 miles compared to 1.1 miles for the shortest length. Most of this can be attributed to the elevation change seen for segment 6 versus the flatter segment 5.

In the Social category, route 3 affected the least number of homes within 300 feet, and impacted the second fewest number of existing parcels. Route 3 also received the fewest number of negative public comments at 5, with the greatest number of comments received on route 1, which included segment 5. Segment 5 had several public comments pertaining to planned development that made the route unfeasible. Comments pertained to one structure already built on the segment, and a house planned very close to the route segment. Avoiding these would require shifting the route and negatively affecting environmental factors, in closely paralleling a creek, and additional tree clearing. The other public comments pertained to impacts to current and planned land use or development, property values, and impacts to farming.

In the Environmental category, alternative route 3 showed the greatest amount of forestland within ROW to be cleared, and was just under three acres from the second most. Route 1 had the least amount of forestland within ROW, but due to conflicts with development, would have required adjustment to impact approximately four acres of additional forestland. Route 3 had the second most minor stream crossings with 18, the just two more than the route with the least. All routes had equal impacts to floodplain, floodway, and major stream crossings, due to the Tennessee River crossing on segment 1. Route 3 tied for second for impacts to forested wetlands. All routes were equal in impact to non-forested wetlands. For each of the three routes, there were four architectural/historic sites within a half mile of the route. All of the sites were classified during desktop review as potentially eligible. Two of the sites were in the proximity of the segment 1 and existing ROW. A site located between segments 2 and 3 appeared to have been in poor repair according to historical aerial imagery, and was confirmed to be demolished upon visiting the field. Based on desktop review there were no archeological sites within 50 feet of the preferred route ROW.

2.5.1 **Transmission Line Changes**

The following changes were made to the original preferred route as a result of contacting owners for survey permission and field surveys:

- PI 7 was shifted from the east side of the road, just across the road to the west side. This change was required due to the original location of PI 7 on existing ROW not having adequate room for guying due to close proximity to road.

- PI 11 was shifted back along existing ROW approximately 100 feet at the suggestion of the property owner.

- PI 12 was moved to the south to reduce impact of the structure on row crops.

- PI 15 was shifted “back” 15 feet at the suggestion of the TVA Survey crew due to the original location being in a ditch.

- PI 16 was shifted slightly to the north keep guy wires on original property owner impacted by alternative route segment 6.

- PI 17 was shifted ahead approximately 350 feet after meeting with property owner.

- PI 20 was shifted “back” to reduce impacts to creek and locate on a flat, graded area suitable for structure construction.
- PI 21 was shifted “back” and to the northeast to reduce impacts to creek.

2.6 Comparison of Environmental Effects by Alternative

A summary of the anticipated potential effects of implementing the No Action Alternative or the Action Alternative is provided in Table 2-2.

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

Resource Area	Impacts From Implementing the No Action Alternative	Impacts From Implementing the Action Alternative
Groundwater and Geology	No effects to local groundwater quality or quantity are expected.	Any direct or indirect short-term and long- term effects to groundwater quality or quantity are anticipated to be insignificant and would be controlled with standard BMPs.
Surface Water	No changes in local surface water quality are anticipated.	Proper implementation of these controls and mitigation measures identified in the permitting process are expected to result in only minor, temporary and insignificant impacts to surface waters.
Aquatic Ecology	Aquatic life in local streams would not be affected.	With the implementation of BMPs, effects to aquatic life in local surface waters are expected to be minor, and insignificant.
Vegetation	Local vegetation would not be affected.	Site preparation and clearing of the proposed 161-kV TL ROW would have a minor, temporary effect on most local vegetation. An insignificant direct long-term effect on approximately 93 acres of forested area is anticipated.
Wildlife	Local wildlife would not be affected.	Wildlife inhabiting onsite forest, early successional, and edge habitats along the proposed 161-kV TL ROW and within the Switching Station expansion site would be displaced. Because there are sufficient adjacent local habitats, any effects to wildlife are expected to be temporary and insignificant.

Resource Area	Impacts From Implementing the No Action Alternative	Impacts From Implementing the Action Alternative
Endangered and Threatened Species	No effects to endangered or threatened species or any designated critical habitats are anticipated.	Tree clearing would remove approximately 13.3 acres of potentially suitable summer roosting habitat for the federally endangered Indiana bet and the federally protected Indiana and northern long-eared bat (NLEB). To remove any potential for direct effects to both bat species, TVA would follow the guidelines in its programmatic assessment for bats (Appendix B).
Floodplains	No changes in local floodplains or their functions are expected.	With the implementation of standard mitigation measures, no significant impact on floodplains would occur.
Wetlands	No changes in local wetland extent or function are expected.	Although TVA was able to minimize potential wetland impacts through its routing process, TVA found no practicable alternative that avoids all wetlands. A total of 12.42 acres of wetland are located within the proposed ROW, of which 4.62 would be permanently impacted. With the implementation of identified minimization and mitigation measures, there would be insignificant direct, indirect, and cumulative impacts.
Aesthetics	Aesthetic character of the area is expected to remain virtually unchanged.	Minor visual discord and noise above ambient levels would be produced during construction and maintenance activities. The proposed TL would present a minor cumulative visual effect.
Socioeconomics and Environmental Justice	Over time, the lack of reliable power service could have adverse economic effects to local businesses and residents.	Any adverse social, economic, or environmental justice effects would be minor and would diminish over time.
Archaeological and Historic Resources	No effects to archaeological or historic resources are anticipated.	TVA completed consultation with the TN SHPO and federally-recognized Indian Tribes on all the proposed undertakings. The TN SHPO concurred with TVA's finding of no effect. TVA received no disagreement from the federally recognized tribes with TVA's eligibility determinations and findings of effect.

Resource Area	Impacts From Implementing the No Action Alternative	Impacts From Implementing the Action Alternative
Recreation, Parks, and Natural Areas	No changes in local recreation opportunities.	There would be no significant direct or indirect impacts to natural areas and parks under this Alternative. Construction of the proposed TL and associated access roads could cause minor and insignificant recreation impacts.

2.7 Identification of Mitigation Measures

TVA employs standard practices when constructing, operating, and maintaining TLs, structures, and the associated ROW and access roads. These can be found on TVA's transmission website (TVA 2019c). Some of the more specific routine measures which would be applied to reduce the potential for adverse environmental effects during the construction, operation, and maintenance of the proposed switching stations, TLs and access roads are as follows:

- TVA would utilize standard BMPs, as described in the BMP manual (TVA 2017a), to minimize erosion during construction, operation, and maintenance activities.

- 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 as amended by 13751 (Invasive Species) for revegetating with noninvasive plant species as defined in the BMP manual (TVA 2017a).

- Ephemeral streams that could be affected by the proposed construction would be protected by implementing standard BMPs as identified in the BMP manual (TVA 2017a).

- Perennial and intermittent streams would be protected by the implementation of standard stream protection (Category A) as defined in the BMP manual (TVA 2017a).

- TVA would utilize *Environmental Quality Protection Specifications for Transmission Substation or Communications Construction* during the proposed work at the substations (TVA 2019c).

- Pesticide/herbicide use as part of construction or maintenance activities would comply with the TDEC general permits for application of pesticides, which also requires a pesticide discharge management plan. In areas requiring chemical treatment, only USEPA-registered and TVA-approved herbicides would be used in accordance with manufacturer label directions designed in part to restrict applications near receiving waters and to prevent unacceptable aquatic impacts (TVA 2017b).

- Any retired wooden poles would be offered to the Local Power Association or property owners. If any wooden poles remain and require disposal, TVA would

follow its environmental protection procedures for reuse and/or disposal (TVA 2019c).

- Any lead pins removed from the retired insulators would be handled according to TVA's environmental protection procedures (TVA 2019c).

By implementing the following mitigation measures, the proposed TL and access roads would have no significant impact on floodplains and their natural and beneficial values:

- Any fill, gravel or other modifications in the floodway that extend above the pre-construction road grade will be removed after completion of the project
- This excess material will be spoiled outside of the published floodway
- The area will be returned to its pre-construction condition
- Standard BMPs would be used during construction activities
- Road construction other than within the Little Richland Creek floodway would be done in such a manner that upstream flood elevations would not be increased by more than 1.0 foot
- Construction would adhere to the TVA subclass review criteria for TL location in floodplains

The following non-routine measures would be applied during the construction, operation, and maintenance of the proposed TL and access roads to reduce the potential for adverse environmental effects.

- Wetland mats would be placed along the access route where it crosses two sites, plus a "do not disturb" 30 meter buffer would be placed around a small cemetery in the APE
- Construction schedules in this area will be coordinated with the TWRA site manager (Greg Atchley at 423-693-6604) contact to minimize impacts to hunting.
- To compensate for the impacted 4.62 acres of forested and scrub-shrub wetlands to emergent wetlands, TVA would mitigate the loss of trees by purchasing wetland mitigation credits prior to construction of the proposed TL.
- As part of TVA's Programmatic Agreement (PA) biological assessment for bats, TVA would track and document the removal of potentially suitable summer roost trees and include this information in annual reporting in accordance with ESA Section 7(a)(2) consultation. Additionally, if removal of suitable bat roost tree habitat needs to occur when bats may be present on the landscape, TVA would set aside funding to be applied towards future bat-specific conservation projects in accordance with the PA biological assessment.
- ROW Forester or Environmental Technician would contact TVA botanist before construction to coordinate avoidance measures and access in Prairie goldenrod portions of the ROW.

- Prairie goldenrod sites would be added to the O-SAR database so the species can be protected, to the extent practicable, during future vegetation management activities.

- To avoid impacts to a recorded osprey nest, No construction, vegetation removal, or ground disturbing activities may occur within 660ft of this nest while the nest is active (typically March- July).

2.8 The Preferred Alternative

The Action Alternative — TVA Provides a New Power Supply to the Meigs and Rhea Counties, TN Area is TVA's preferred alternative for this proposed project. TVA would purchase ROW easements and any associated easements for the permanent access road to accommodate the construction of a new 161-kV TL.

TVA's preferred alternative route for the Action Alternative is Alternative Route 3. This approximate 12-mile TL route is comprised of alternative route segments 1, 2, 4, 6, and 7.

CHAPTER 3

3.0 AFFECTED ENVIRONMENT

The existing condition of environmental resources that could be affected by the proposed Action Alternative during construction, operation, or maintenance of the proposed 12-mile TL is described in this chapter. The descriptions below of the potentially affected environment are based on field surveys conducted between 2017 and 2019, on published and unpublished reports, 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 a 10-digit hydrologic unit code[5] (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 access roads. The area of potential effect (APE) for architectural resources included all areas within a 0.5-mile radius from the proposed TL route and proposed substation construction, 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 as described in Section 2.2 for the proposed route, associated access roads, and substation construction areas.

3.1 Groundwater and Geology

Geologically, the project area is underlain by Ordovician and Cambrian aged rocks of the Valley and Ridge physiographic province. The Valley and Ridge consists of folded and faulted carbonate, sandstone, and shale rock units. Soluble carbonate rock and some easily eroded shale underlie the valleys in the province, and more erosion- resistant siltstone, sandstone, and cherty dolomite underlie ridges.

Groundwater in the Valley and Ridge aquifers primarily is stored in and moves through fractures, bedding planes, and solution openings in the rocks. These aquifers are typically present in valleys and rarely present on the ridges. Most of the carbonate-rock aquifers are directly connected to sources of recharge, such as rivers or lakes, and solution activity has enlarged the original openings in the carbonate rocks. In the carbonate rocks, the fractures and bedding planes have been enlarged by dissolution of part of the rocks. Slightly acidic water dissolves some of the calcite and dolomite that compose the principal aquifers. Most of this dissolution takes place along fractures and bedding planes where the largest volumes of acidic groundwater flow (Lloyd and Lyke, 1995).

Groundwater movement in the Valley and Ridge Province is localized and is restricted by the repeating lithology created by thrust faulting. Older rocks, primarily the Conasauga Group and the Rome Formation, have been displaced upward over the top of younger rocks (the Chickamauga and the Knox Groups) along thrust fault planes, thus forming a repeating sequence of permeable and less permeable hydrogeologic units. The repeating sequence, coupled with the stream network, divides the area into a series of adjacent, isolated, shallow

[5] 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.

groundwater flow systems. The water moves from the ridges where the water levels are high toward lower water levels adjacent to major streams that flow parallel to the long axes of the valleys. Most of the groundwater is discharged directly to local springs or streams (Lloyd and Lyke, 1995).

The carbonate rocks that form the valleys of the Valley and Ridge aquifer are typical of karst systems. The term karst refers to carbonate rocks (limestone and dolostone) in which groundwater flows through solution-enlarged channels and bedding planes within the rock. Karsts are characterized by sinkholes, springs, disappearing streams, and caves. Karst systems are quite easily contaminated, since the waters can travel long distances through conduits with no chance for natural filtering processes of soil or bacterial action to diminish the contamination. The chemical quality of water in the freshwater parts of the Valley and Ridge aquifers is similar for shallow wells and springs. The water is hard, calcium-magnesium-bicarbonate type. In places where the residuum that overlies the carbonate rocks is thin, the Valley and Ridge aquifers are susceptible to contamination by human activities.

Sources for public water supply in the region are from both groundwater and surface water. These water sources are located outside the project area. The systems served by groundwater resources are primarily located on the plateau region of Rhea County with the predominance of the area served by surface water resources. While public water is available to local residents, private water wells are common in the region and it is possible some may be in use near the project area (EPA 2019).

3.2 Surface Water

This project area drains to water ways within the Richland Creek (0602000102) and Tennessee River (0602000106) 10-digit HUC watersheds. According to the Aquatics field survey conducted in August 2019 and a surface water desktop survey, a total of 26 watercourses intersections—including 3 perennial, 6 intermittent and 17 ephemeral/ wet-weather conveyances (WWCs) streams—occur along the proposed TL route right-of-way (ROW) (TVA, 2019). The surface water streams in the project area and the vicinity of this project are listed below in Table 3.1.

Precipitation in the general area of the proposed project averages about 55 inches per year. The wettest month is December with approximately 5.4 inches of precipitation, and the driest month is October with 3.27 inches. The average annual air temperature is 58.8 degrees Fahrenheit, ranging from a monthly average of 58.4 degrees Fahrenheit to 69.4 degrees Fahrenheit (US Climate Data, 2019). Stream flow varies with rainfall and averages about 24.85 inches of runoff per year, i.e., approximately 1.83 cubic feet per second, per square mile of drainage area (USGS 2008).

The federal Clean Water Act requires all states to identify all waters where required pollution controls are not sufficient to attain or maintain applicable water quality standards and to establish priorities for the development of limits based on the severity of the pollution and the sensitivity of the established uses of those waters. States are required to submit reports to the USEPA. The term “303(d) list” refers to the list of impaired and threatened streams and water bodies identified by the state. Rattan Branch and Grassy Branch are currently listed as impaired for alteration in stream-side or littoral vegetative covers due to grazing riparian or shoreline zones. Grassy Branch, Lick Branch, and an unnamed tributary of Dry Branch are also listed for E.coli pollination for the above mentioned reason. Little Richland Creek is currently listed as impaired for alteration in stream-side or littoral vegetative cover and sedimentation/siltation due to Municipal (urbanized high density area) and physical substrate habitat alterations, due to

channelization. (TDEC, 2018). Decatur Creek is listed as impaired for E.coli due to sanitary sewer overflows and grazing riparian or shoreline zones. Additionally, a portion of the Tennessee River/Chickamauga Reservoir (presence of federally listed aquatic species) and Richland Creek (State Natural Park) are listed as Exceptional TN Waters. Table 3-1 provides a listing of local streams with their state (TDEC 2013) designated uses.

Table 3-1 Designations for Streams in the Vicinity of the Proposed Loop to North Dayton TL EA

Stream	Use Classification[1]						
	NAV	DOM	IWS	FAL	REC	LWW	IRR
Tennessee River/Chickamauga Reservoir	X	X	X	X	X	X	X
Richland Creek[2]			X	X	X	X	X
Little Richland Creek			X	X	X	X	X
Stewart Branch				X	X	X	X
Mud Creek [2]				X	X	X	X
Rattan Branch				X	X	X	X
Crawford Branch				X	X	X	X
Grassy Branch				X	X	X	X
McKinley Branch				X	X	X	X
Poe Branch				X	X	X	X
Lick Branch				X	X	X	X
Dry Branch				X	X	X	X
Goodfield Creek				X	X	X	X
Decatur Creek				X	X	X	X

[1] Codes: DOM = Domestic Water Supply; IWS = Industrial Water Supply; FAL = Fish and Aquatic Life; REC = Recreation; LWW = Livestock Watering and Wildlife; IRR = Irrigation, NAV = Navigation
[2] Not in project area, shown for flow network.

3.3 Aquatic Animals

3.3.1 Aquatic Ecology

A total of 26 aquatic features including 3 perennial streams, 6 intermittent streams, 17 WWC/ephemeral streams were observed during on-site field studies.

Because TL construction and maintenance activities mainly affect riparian conditions and in-stream habitat, TVA evaluated the condition of both of these at each stream crossing along the proposed route. A listing of stream crossings in the project area, excluding WWC/ephemeral conveyances, is provided in Appendix C. From these habitat assessments, riparian condition was assigned to one of three classes to indicate the current condition of streamside vegetation across the length of the proposed TL (Table 3-2). The assigned classes are as follows:

- Forested - Riparian area is fully vegetated with trees, shrubs, and herbaceous plants. Vegetative disruption from mowing or grazing is minimal or not evident. Riparian width extends more than 60 feet on either side of the stream.

- Partially forested - Although not forested, sparse trees and/or scrub-shrub vegetation is present within a wider band of riparian vegetation (20 to 60 feet). Disturbance of the riparian zone is apparent.

- Non-forested - No or few trees are present within the riparian zone. Significant clearing has occurred, usually associated with pasture or cropland.

Table 3-2 Riparian Condition of Streams Located within Proposed 161-kV TL

Riparian Condition	# Perennial Streams	# Intermittent Streams	Total
Forested	1	2	**3**
Partially forested	2	4	**6**
Non-forested	0	0	**0**
Total	**3**	**6**	**9**

TVA then assigns appropriate SMZs and BMPs based on these evaluations and other considerations (such as State 303(d) listing and presence of endangered or threatened aquatic species). Appropriate application of the BMPs minimizes the potential for impacts to water quality and instream habitat for aquatic organisms.

3.3.2 Aquatic Threatened and Endangered Species

The TVA Natural Heritage database indicated that seven federally-listed mussel species and two federally listed fish species with and additional two state-listed species state-listed are known to occur in within the Richland Creek (0602000102) and Tennessee River (0602000106) watersheds (Table 3-3). The following are descriptions of the federally- and state-listed species that occur within the watersheds affected by the proposed project.

Table 3-3 Records of federal and state-listed aquatic animal species within the Richland Creek (0602000102) and Tennessee River (0602000106) 10-digit HUC watersheds (TVA Request ID 34543).[1]

Common Name	Scientific Name	Element Rank[2]	Federal Status[3]	State Status (rank[4])
FISH				
Highfin Carpsucker	*Carpiodes velifer*	E		D (S2S3)
Lake Sturgeon	*Acipenser fulvescens*	E		E (S1)
Laurel Dace	*Chrosomus saylori*	E	LE	D (S1)
Snail Darter	*Percina tanasi*	H?	LT	T (S2S3)
MUSSELS				
Dromedary Pearlymussel	*Dromus dromas*	H?	LE	E (S1)
Fanshell	*Cyprogenia stegaria*	E	LE	E (S1)
Orange-foot Pimpleback	*Plethobasus cooperianus*	H?	LE	E (S1)
Pink Mucket	*Lampsilis abrupta*	E	LE	E (S2)
Rough Pigtoe	*Pleurobema plenum*	H?	LE	E (S1)
Sheepnose	*Plethobasus cyphyus*	E	LE	E (S2S3)
Shiny Pigtoe Pearlymussel	*Fusconaia cor*	H	LE	E (S1)

[1] Source: TVA Natural Heritage Database, queried on 9/12/2019
[2] Heritage Element Occurrence Rank; E = extant record ≤25 years old; H=historical record ≥ 25 years old; H?=possibly historical
[3] Status Codes: LE or E = Listed Endangered; LT or T = Listed Threatened; D = Deemed In Need of Management
[4] State Ranks: S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable

Highfin carpsucker is a large river species, found mostly in the Tennessee River drainage. Lake sturgeon is commonly found at the bottom of large, clean rivers and lakes. Laurel dace prefer cool water in 1st- to 2nd-order streams with slabrock and rubble substrate. Known to exist on Walden Ridge on the Cumberland Plateau in the Tennessee River watershed. Snail darter prefer sand and gravel shoals of moderately flowing, vegetated, large creeks in the upper Tennessee River watershed. The Dromedary pearly mussel prefers medium-large rivers with riffles and shoals w/ relatively firm rubble, gravel, and stable substrates; Tennessee & Cumberland systems. Fanshell adults reach a maximum length of 70 mm. All viable populations are restricted to unimpounded stretches of the Clinch River on substrate of coarse sand gravel in strong flowing waters. It is bradytictic with the glochidia host unknown. However, goldfish have served as host under laboratory conditions. The orangefoot pimpleback can be found primarily in big rivers. Individuals have been found at depths of 12 to 18 feet in sand and coarse gravel substrate. It is considered to be tachytictic but host fish for glochidia is currently unknown. The pink mucket is typically a big river species but occasionally individuals become established in small to medium sized tributaries of large rivers. It inhabits rocky bottoms with swift current usually in less than three feet of water. Rough pigtoe can be found in medium to large rivers in sand, gravel, and cobble substrates of shoals in the Tennessee & Cumberland river systems. The sheepnose can be found in the Ohio, Cumberland, and Tennessee River systems; upper Mississippi River north to Minnesota. Adults can reach up to 110-120 mm in length. The species prefers substrate of mixed coarse sand and gravel. It is tachytictic with most reproductive activity occurring in the summer. The glochidia host fish has been identified

as sauger. Shiny Pigtoe lives in shoals and riffles of small-medium sized rivers with mod-fast current over sand-cobble substrates within the upper Tennessee River watershed.

3.4 Vegetation

3.4.1 Terrestrial Ecology (Plants)

The proposed transmission system upgrades would occur in the Southern Limestone/Dolomite Valleys and Low Rolling Hills Level IV ecoregion (Griffith et al. 1998). This ecoregion is comprised of undulating to rolling valleys with rounded hills and some steep ridges in the north. The Appalachian oak forest prevalent in this region supports an assortment of oaks, hickories, pines, poplar, birch, and maples. Bottomland oak and mesophytic forests in this region occurring in riparian areas and on rich slopes, respectively, are adapted to neither particularly dry nor particularly wet sites. Dry cedar barrens are also found on shallow soils over limestone in the Southern Limestone/Dolomite Valleys and Low Rolling Hills Level IV ecoregion. Land cover is a mixture of cropland, mixed forest, pasture, and some pine plantations and land use is rural residential, urban, and industrial.

August and September 2019 field surveys of the project area were focused on documenting plant communities, infestations of invasive plants, and to search for possible threatened and endangered plant species. All areas along the proposed new ROW and within the ROW proposed for widening were visited during the surveys. Using the National Vegetation Classification System (Grossman et al. 1998), vegetation types observed during field surveys can be classified as a combination of deciduous, evergreen, mixed evergreen-deciduous forest, and herbaceous vegetation. No forested areas in the proposed project area had structural characteristics indicative of old growth forest stands (Leverett 1996). The plant communities observed on-site are mostly common and well represented throughout the region, except for a few calcareous cedar barrens of varying quality and diversity present in the existing ROW. Vegetation in the proposed new TL and existing ROW are characterized by two main types: forest (55 percent) and herbaceous (45 percent). Some of the existing ROW are forested with small diameter trees (< 3” diameter at breast height [dbh]) due to lack of ROW maintenance, while the rest is mowed fields and grazed pastures. The majority of the new TL ROW is forested with mature trees that average 18” dbh, while other parts of the proposed ROW are comprised of herbaceous fields and pastures.

Deciduous forest, where deciduous trees account for more than 75 percent of total canopy cover, is the most common forest type and constitutes about 80 percent of the forests cover in the proposed project area. Deciduous forests are dominated by a variety of tree species including American beech, black cherry, black tupelo, boxelder, hickories (Carolina, mockernut, pignut, and shagbark), oaks (chestnut oak, chinkapin oak, northern red, post, scarlet, southern red, water, white and willow), eastern red cedar, red maple; sassafras, slippery elm, sourwood, southern hackberry, sugar maple, sweetgum, tree of heaven, tulip poplar, and white ash. The understory consisted of Carolina buckthorn, Chinese privet, eastern redbud, farkleberry, flowering dogwood, hophornbeam, lowbush blueberry, multiflora rose, persimmon, winged elm, and winged sumac, as well as saplings of many of the trees previously listed. Herbaceous plants and woody vines observed included cat greenbrier, Christmas fern, crossvine, ebony spleenwort, Japanese honeysuckle, Japanese stiltgrass, jumpseed, muscadine, poison ivy, roundleaf greenbrier, spotted wintergreen, trumpet vine, and Virginia creeper. Forested wetlands were found in several locations in the proposed and existing ROW and are described in more detail in section 3.7.

Evergreen forest, which accounts for about 11 percent of total forest cover, has very low species diversity and is dominated mostly by natural eastern red cedar, loblolly and Virginia pine thickets. One loblolly pine plantation was observed where trees are all approximately the same size and age and bear little resemblance to native plant communities found in the region. Herbaceous layer is scarce due to prior disturbances.

Mixed evergreen-deciduous forest, defined as stands where both evergreen and deciduous species contribute between 25-75 percent of total canopy cover, occurs in about 9 percent of total forest cover observed in the entire proposed project, where work would occur. In general, these forest types are similar to the deciduous forests described above, but contain a greater percentage of eastern red cedar, loblolly and Virginia pine.

Herbaceous vegetation is characterized as sites with greater than 75 percent cover of forbs and grasses and less than 25 percent cover of other types of vegetation. The majority of this habitat type occurs along the existing TL ROW, but cropland, hayfields, and heavily grazed pastures also support herbaceous vegetation. Most of these sites are dominated by plants indicative of early successional habitats including many non-native species. Early successional areas with naturalized vegetation contain herbaceous species like American pokeweed, annual ragweed, anisescented goldenrod, beaked panic grass, broomsedge, common selfheal, dallis grass, field thistle, fringeleaf wild petunia, giant ironweed, hairy lespedeza, hyssopleaf thoroughwort, Indian goose grass, Japanese honeysuckle, Japanese stiltgrass, Johnson grass, lanceleaf ragweed, narrowleaf mountain mint, orange coneflower, partridge pea, poorjoe, purpletop tridens, sawtooth blackberry, sericea lespedeza, tall fescue, tall goldenrod, velvet panicum, western bracken fern, and yellow bristle grass.

Five small cedar barrens are also found and account for approximately 0.60 acres. This rare plant community usually contains an unusual assemblage of plant species, sometimes with rare and special concern plant species. In these communities, herbaceous perennial plants are found in shallow, rocky limestone soil openings with stunted eastern red cedar surrounded by deeper soils that support forests. Cedar barren species were comprised mainly of big bluestem, butterfly milkweed, false aloe, fringeleaf wild petunia, hyssopleaf thoroughwort, narrowleaf mountain mint, orange coneflower, pinnate prairie coneflower, Queen Anne's lace, roundseed St. Johnswort, sericea lespedeza, slenderstalk beeblossum, stiff goldenrod, tall lespedeza, whorled milkweed, and whorled rosinweed. The Tennessee state endangered prairie goldenrod was found in two high quality calcareous cedar barrens, in the existing ROW. Areas of emergent wetlands were present throughout the project area. See the wetland section (3.7) or species indicative of those areas.

Executive Order (EO) 13112 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 amends EO 13112 and directs actions by federal agencies to continue coordinated federal prevention and control efforts related to invasive species. This order incorporates considerations of human and environmental health, climate change, technological innovation, and other emerging priorities into federal efforts to address invasive species; and strengthens coordinated, cost efficient federal action. Some invasive plants have been introduced accidentally, but most were brought here as ornamentals or for livestock forage. Because these robust plants arrived without their natural predators (insects and diseases) their populations spread quickly across the landscape displacing native species and degrading ecological communities or ecosystem processes (Miller 2010). No federal-noxious weeds were observed, but many non-native invasive plant species were observed throughout the project area (Table 3-4). No federal-noxious weeds were

observed, but populations of seven plant species designated by the Tennessee Exotic Plant Council as an established threat were observed sporadically throughout the project area (TN-IPC 2018). During field surveys, invasive plants were most prevalent in sections of the herbaceous vegetation types. This likely reflects the frequency and magnitude of disturbance present in areas of herbaceous vegetation. Disturbances associated with agriculture, grazing, and mowing prevent tree species from becoming established, but can also encourage invasion and establishment of weedy plants.

Table 3-4 Invasive plant species observed in the proposed Loop to North Dayton project area.

Common Name	Scientific Name
Mimosa	*Albizia julibrissin*
Sericea lespedeza	*Lespedeza cuneata*
Chinese privet	*Ligustrum sinense*
Japanese honeysuckle	*Lonicera japonica*
Japanese Stilitgrass	*Microstegium vimineum*
Multiflora rose	*Rosa multiflora*
Johnson grass	*Sorghum halepense*

3.4.2 Threatened and Endangered Species (Plants)

Review of the TVA Natural Heritage Database indicates that six state and no federally listed plant species have been previously reported within a five-mile vicinity of the project area (Table 3-4.2). One federally listed plant species has been previously reported from Rhea County, Tennessee. No designated critical habitat for plants occurs in the project area. Field surveys of the proposed project occurred in August and September 2019. No potential habitat for the federally listed Virginia Spiraea was observed in the project area. During field reviews, two occurrences of the state endangered plant species prairie goldenrod were observed within the ROW along the proposed rebuild section of the project. Prairie goldenrod was observed in a cedar barren in an existing ROW bisecting a pine plantation and in a cedar barren in an existing ROW about 1,000 feet southwest of Vulcan Materials Company limestone mining property. Respectively, about 100-200 flowering plants and 100 individual flowering plants were observed in these locations.

Table 3-5 Plant species of conservation concern previously reported from within five miles of the proposed Loop to North Dayton project and federally listed species in Rhea County, Tennessee.[1]

Common Name	Scientific Name	Federal Status[2]	MS State Status[2]	State Rank[3]
PLANTS				
Spreading False-foxglove	*Aureolaria patula*	–	SPCO	S3
Small's Stonecrop	*Diamorpha smallii*	–	END	S1S2
Northern Bush-honeysuckle	*Diervilla lonicera*	–	THR	S2
Alabama Snow-wreath	*Neviusia alabamensis*	–	THR	S2
Roundleaf Fameflower	*Phemeranthus teretifolius*	–	THR	S2
Prairie Goldenrod[5]	*Solidago ptarmicoides*	–	END	S1S2
Virginia Spiraea[4]	*Spiraea virginiana*	THR	END	S2

[1] Source: TVA and Tennessee Natural Heritage Database, queried August 2019
[2] Status Codes: END = Listed as Endangered; SPCO = Listed as Special Concern; THR = Listed as Threatened
[3] State Ranks: S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable; S#S# = Denotes a range of ranks because the exact rarity of the element is uncertain (e.g., S1S2)
[4] Federally listed species occurring within Rhea County where work would occur, but not necessarily within 5 miles of the project area
[5] State-listed plant species documented from an existing ROW where work would occur.

3.5 Wildlife

3.5.1 Terrestrial Ecology (Animals)

Habitat assessments for terrestrial animal species were conducted in the field on August 14th-21st, 2019 for the proposed new 12-mile TL and associated 100' right-of-way (ROW) in Meigs and Rhea Counties, Tennessee. Field survey for access roads was later conducted from June 23-25, 2020. The remaining 3.9 miles of the line will consist of new 100ft ROW. The total footprint reviewed for both lines was approximately 171.3 acres. Landscape features within and surrounding the project area consist of a variety of fragmented and contiguous forested habitat, wetlands, stream crossings, ponds, early successional habitat (i.e., existing ROW, pasture and agricultural), and residential or otherwise disturbed areas. Approximately 92.8 acres of forested habitat exist within the project footprint and would be cleared and maintained as early successional habitat. Approximately 13.3 acres of forested habitat within the ROW footprints is suitable bat habitat and would be cleared for the new TL and maintained as early successional habitat. Each of the varying community types offers suitable habitat for species common to the region, both seasonal individuals and permanent residents.

Forest types present within the project footprint include deciduous, evergreen, and mixed deciduous-evergreen and occupy approximately 92.8 acres or 55 percent of the habitat within the project footprint. Evergreen forests occupy approximately 11 percent of forested habitat within the project footprint where work would occur. Common evergreen species observed during field survey included loblolly pine and Virginia pine. These forests provide habitat for common terrestrial wildlife. Tufted titmouse, white-throated sparrow, Carolina chickadee, yellow-bellied sapsucker, cedar waxwing, downy woodpecker, and red-shouldered hawk all utilize this

habitat (Sibley 2003, National Geographic 2002). Eastern fox squirrel, Seminole bat, wild pig, and nine-banded armadillo are mammals that may utilize resources found in pine forests (Kays and Wilson 2002, Whitaker 1996). Eastern spadefoot, eastern hognose snake, corn snake, and ground skink are common reptiles and amphibians in open pine forests in this region (Bailey et al., 2006).

Deciduous and mixed deciduous-evergreen forests in the project footprint include upland and bottomland hardwood types. Deciduous forested habitat and deciduous-evergreen mixed forested habitat comprises approximately 80 percent and 9 percent of forested cover within proposed project area, respectively. Upland deciduous forests within the project footprint contain a mixture of canopy species that include: white oak, black cherry, southern red oak, chestnut oak, and shagbark hickory. Deciduous forest types provide habitat for an array of terrestrial animal species. Birds typical of this habitat include eastern whip-poor-will, chuck-wills-widow, scarlet tanager, summer tanager, yellow-billed cuckoo, white-eyed vireo, red-eyed vireo, yellow-throated vireo, yellow-throated warbler, Kentucky warbler, red-bellied woodpecker, pileated woodpecker, wood thrush, wild turkey, red-tailed hawk, red-shouldered hawk, blue jay, and eastern towhee (National Geographic 2002, Sibley 2003). This area also provides foraging and roosting habitat for several species of bat, particularly in areas where the forest understory is partially open. Bat species likely found within this habitat include big brown bat, eastern red bat, evening bat, tricolored bat, northern long-eared bat, and Indiana bat. Eastern chipmunk, eastern woodrat, gray fox, and white-tailed deer are other mammals likely to occur within this habitat (Kays and Wilson 2002, Whitaker 1996). Eastern box turtle, five-lined skink, broad-headed skink, smooth earth snake, timber rattlesnake, and gray ratsnake are common reptiles of eastern deciduous forests (Conant and Collins 1998, Dorcas and Gibbons 2005). In forests with aquatic features, amphibians likely found in the area include eastern newt, dusky salamander, northern slimy salamander, Cope's gray treefrog, and upland chorus frog (Bailey et al. 2006, Petranka 1998).

Approximately 12.42 acres (7.25%) of wetland were recorded within the project footprint. Emergent, forested, and scrub-shrub wetlands make up 59.5%, 37.2%, and 3.3% of wetland cover, respectively. Sweetgum, sycamore, red maple, willow oak, are common in this habitat type. Such habitat provides resources for birds including green heron, great blue heron, great egret, common yellowthroat, black-billed cuckoo, prothonotary warbler, Acadian flycatcher, Canada goose, wood duck, blue-winged teal, northern harrier, red-winged blackbird, Wilson's snipe, barred owl, and swamp sparrow (National Geographic 2002, Sibley 2003). American beaver, southeastern shrew, and mink are common mammals in emergent wetland and aquatic communities (Kays and Wilson 2002, Whitaker 1996). Eastern painted turtle, spiny softshell, pond slider, common garter snake, northern water snake, rough green snake, and copperhead are common reptiles likely present within this habitat along the proposed ROW (Conant and Collins 1998, Dorcas and Gibbons 2005). Amphibians typical of this region found in and around emergent wetlands and open streams include American bullfrog, northern cricket frog, green frog, spotted salamander, marbled salamander, and southern two-lined salamander (Bailey et al. 2006, Petranka 1998).

Pastures, agricultural fields, and other early successional habitats comprise approximately 75.1 acres or 45.0 percent of the project footprint. Common inhabitants of this type of habitat include killdeer, mourning dove, brown-headed cowbird, brown thrasher, American goldfinch, indigo bunting, eastern bluebird, blue-winged warbler, and eastern meadowlark (National Geographic 2002, Sibley 2003). Bobcat, white-tailed deer, groundhog, coyote, eastern cottontail, and red fox are mammals typical of fields and cultivated land (Kays and Wilson 2002, Whitaker 1996). Amphibians such as eastern narrow-mouthed toad and reptiles including southern black racer,

ring-necked snake, and Dekay's brown snake are also known to occur in this habitat type (Bailey et al. 2006, Conant and Collins 1998, Dorcas and Gibbons 2005). Pollinators such as red-spotted purple, gulf fritillary, great spangled fritillary, eastern tiger swallowtail, and monarch butterflies may be observed in this region (Brock and Kaufman 2003).

Developed areas and areas otherwise previously disturbed by human activity are home to a large number of common species. American robin, American crow, eastern phoebe, common nighthawk, Carolina wren, northern cardinal, northern mockingbird, black vulture, and turkey vulture are birds commonly found along ROWs, road edges, and residential neighborhoods (National Geographic 2002, Sibley 2003). Mammals found in this community type include eastern gray squirrel, striped skunk, raccoon, and Virginia opossum (Kays and Wilson 2002, Whitaker 1996). Road-side ditches provide potential habitat for amphibians including American toad, and spring peeper (Bailey et al. 2006). Reptiles potentially present include red-bellied snake, green anole, and eastern fence lizard (Conant and Collins 1998, Dorcas and Gibbons 2005).

Phased reviews of the TVA Regional Natural Heritage database were performed in March 2019, and resulted in six cave records within three miles of the project area, with the nearest approximately 0.31 miles from the proposed actions. No additional caves were identified during field review. No other unique or important terrestrial habitats were identified within the project area. Six wading bird colonies and one osprey nesting record have been documented within three miles of the project area. No new wading bird colony or osprey records were recorded during field review, but the previously identified osprey record was confirmed as active on a transmission structure on Access Road 22 just east of the Tennessee River during field survey in June 2020.

Additionally, the US Fish & Wildlife Service's Information for Planning and Consultation (IPaC) website outlines seven migratory species of conservation concern that potentially occur in the project region (black-billed cuckoo, eastern whip-poor-will, prairie warbler, red-headed woodpecker, rusty blackbird, wood thrush, and yellow-bellied sapsucker). Suitable habitat exists for all of these species in the action area.

3.5.2 **Threatened and Endangered Species (Animals)**

The Endangered Species Act (ESA) requires federal agencies to conserve endangered and threatened species and to determine the effects of proposed actions on endangered and threatened species and Designated Critical Habitat. Endangered species are those determined to be in danger of extinction through all or a significant portion of their range. Threatened species are those determined likely to become endangered within the foreseeable future. Section 7 of the ESA requires federal agencies to consult with the U.S. Fish and Wildlife Service (USFWS) when proposed actions may affect endangered or threatened species or Designated Critical Habitat.

Reviews of literature and the TVA Regional Heritage database in July 2018 resulted in one state-listed species (Norton's cave beetle), two federally listed species (gray bat and northern long-eared bat), and one federally protected species (bald eagle) within a three-mile radius of the project area. Within Meigs and Rhea Counties, Tennessee, records exist for two federally listed species (gray bat and northern long-eared bat), and one federally protected species (bald eagle). Additionally, the USFWS has determined that the federally endangered Indiana bat has the potential to occur throughout the project area and will be included in this assessment (Table 3-6).

Table 3-6 Federally listed terrestrial animal species reported from Meigs and Rhea Counties, Tennessee and other species of conservation concern documented within three miles of Project # 437881, Loop to North Dayton 161kV Transmission Line[1]

Common Name	Scientific Name	Status[2]	
		Federal	State (Rank[3])
Mammals			
Gray bat	*Myotis grisescens*	LE	E(S2)
Indiana bat[4]	*Myotis sodalis*	LE	E(S1)
Northern long-eared bat	*Myotis septentrionalis*	LT	T(S1S2)
Birds			
Bald eagle	*Haliaeetus leucocephalus*	DM	D(S3)
Invertebrates			
Norton's Cave beetle	*Pseudanophthalmus nortoni*	-	-(S1)

[1] Source: TVA Regional Natural Heritage Database and USFWS Information for planning and consultation (IPaC; https://ecos.fws.gov/ipac/) extracted 9/24/2019.
[2] Status Codes: D = Deemed in Need of Management; DM = Delisted and Monitored; E or LE = Listed Endangered; LT or T = Listed Threatened.
[3] State Ranks: S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable.
[4] Federally endangered species that has not been documented within three miles of the project area or from Meigs or Rhea Counties; USFWS has determined this species has the potential to occur statewide.

Bald eagles are protected under the Bald and Golden Eagle Protection Act (USFWS 2013) and the Migratory Bird Treaty Act (16 United States Code §§ 703–712). This species is associated with large mature trees capable of supporting its massive nests, which are usually found near large waterways where the eagles forage. The closest extant bald eagle nesting record is approximately 2.5 miles away.

Norton's Cave beetle is known only from a cave in Rhea County, TN. Like other species of the genus *Pseudanophthalmus*, this cave-obligate species occurs primarily in the twilight zone of the cave, often in moist soils under rocks or other debris. Six caves have been documented within three miles, the nearest approximately 0.31 miles from the proposed project. However the closest known record of this species is from a cave approximately 1.02 miles away.

Gray bat are a federally listed species associated year-round with caves, roosting in different caves throughout the year (Brady et al. 1982, Tuttle 1976). Gray bats disperse from colonies at dusk to forage along waterways (Harvey 1992). The nearest gray bat record is from a mist net capture approximately 0.22 miles from the proposed actions. Six caves have been documented within three miles, the nearest approximately 0.31 miles from the proposed project. The proposed transmission ROW is bisected by the Tennessee River which is suitable foraging habitat for gray bat. Seasonally flooded streams also offer ephemeral foraging habitat for gray bat.

Indiana bats hibernate in caves in winter and use areas around them in fall and spring (for swarming and staging), prior to migration back to summer habitat. During the summer, Indiana bats roost under the exfoliating bark of dead and living trees (typically greater than 5 inches in

diameter) in mature forests with an open understory, often near sources of water (USFWS 2018). Indiana bats are known to change roost trees frequently throughout the season, yet still maintain site fidelity, returning to the same summer roosting areas in subsequent years. This species forages over forest canopies, along forest edges and tree lines, and occasionally over bodies of water (Pruitt and TeWinkel 2007, Kurta et al. 2002, USFWS 2018). There are no known records of Indiana bat within 10 miles of the proposed project or from Meigs or Rhea Counties, Tennessee; although, these counties are within the species' range. Six caves have been documented within three miles, the nearest approximately 0.31 miles from the proposed project. Foraging habitat for Indiana bat exists throughout the project footprint over forest fragments, fence rows, and seasonally over ephemeral streams. Suitable summer roosting habitat for Indiana bat exists throughout forested areas of the project footprint.

Northern long-eared bat predominantly overwinters in large hibernacula such as caves, abandoned mines, and cave-like structures. During the fall and spring they utilize entrances of caves and the surrounding forested areas for swarming and staging. In the summer, northern long-eared bats roost individually or in colonies beneath exfoliating bark or in crevices of both live and dead trees (typically greater than 3 inches in diameter). Roost selection by northern long-eared bat is similar to that of Indiana bat, however northern long-eared bats are thought to be more opportunistic in roost site selection. This species also roosts in abandoned buildings and under bridges. Northern long-eared bats emerge at dusk to forage below the canopy of mature forests on hillsides and roads, and occasionally over forest clearings and along riparian areas (USFWS 2014). The nearest northern long-eared bat record is from a mist net capture approximately 0.52 miles from the proposed actions. Six caves have been documented within three miles, the nearest approximately 0.31 miles from the proposed project. Foraging habitat for northern long-eared bat exists throughout the project footprint over forest fragments, fence rows, and seasonally over ephemeral streams. Suitable summer roosting habitat for northern long-eared bat exists throughout forested areas of the project footprint.

Assessment of the project area for presence of summer roosting habitat for Indiana bats and northern long-eared bat followed federal guidance (USFWS 2019, 2020). Field surveys in August 2019 resulted in the identification of 27 suitable roost trees scattered throughout the 13.2 acres of suitable forested habitat within the combined ROW footprints. Additional field survey in June 2020 resulted in one additional snag proposed for clearing (0.09 acres) that offered suitable summer roosting habitat along proposed access roads, bringing the total of proposed suitable habitat for clearing to 13.3 acres. Habitat quality ranged from moderate to high, based on the presence of trees with exfoliating bark, flaky bark, or crevices (i.e., 21 snags, 2 shagbark hickories, 3 willow oaks, 1 sassafrass, 1 poplar) within the proposed ROW. Solar exposure and proximity to water sources was also considered. Suitable summer roosting areas included diverse habitats such as evergreen, upland deciduous and mixed forest, and bottomland hardwood.

3.6 Floodplains

A floodplain is the relatively level land area along a stream or river that is subject to periodic flooding. The area subject to a one-percent chance of flooding in any given year is normally called the 100-year floodplain. The area subject to a 0.2-percent chance of flooding in any given year is normally called the 500-year floodplain. It is necessary to evaluate development in the floodplain to ensure that the project is consistent with the requirements of Executive Order (EO) 11988, Floodplain Management.

3.7 Wetlands

Wetlands are those areas inundated or saturated by surface or groundwater such that vegetation adapted to saturated soil conditions are prevalent. Examples include bottomland forests, swamps, wet meadows, isolated depressions, and fringe wetland along the edges of watercourses and impoundments. Wetlands provide many societal benefits such as toxin absorption and sediment retention for improved downstream 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. Therefore, a wetland assessment was performed to ascertain wetland presence, condition, and extent to which wetland functions are provided within the proposed project area. Field surveys were conducted in August 2019, September 2019, and June 2020 to delineate wetland areas potentially affected by the proposed Action Alternative. The review footprint included proposed access and the proposed loop from the Sequoyah NP-Watts Bar HP 161-kV TL into the North Dayton Switching Station using double circuit structures.

Wetland determinations were performed according to the USACE standards, which require documentation of hydrophytic (wet-site) vegetation, hydric soil, and wetland hydrology (Environmental Laboratory 1987; Lichvar et al. 2016; USACE 2010). Using the Tennessee Rapid Assessment Method (TRAM) wetlands were evaluated by their functions and classified into three categories: low, moderate quality, or exceptional resource value (TDEC 2015). Low quality wetlands are degraded aquatic resources which may exhibit low species diversity, minimal hydrologic input and connectivity, recent or on-going disturbance regimes, and/or predominance of non-native species. These wetlands provide low functionality and are considered low value. Moderate quality wetlands provide functions at a greater value due to a lesser degree of degradation and/or due to their habitat, landscape position, or hydrologic input. Moderate quality wetlands are considered healthy water resources of value. Disturbance to hydrology, substrate and/or vegetation may be present to a degree at which valuable functional capacity is sustained. Wetlands with exceptional resource value provide high functions and values within a watershed or are of regional/statewide concern. Those wetlands would exhibit little, if any, recent disturbance, provide essential and/or large scale storm water storage, sediment retention, and toxin absorption, contain mature vegetation communities, and/or offer habitat to rare species.

The proposed project traverses a rural landscape, dominated by pastureland, forested uplands and bottomlands, pine plantations, and agricultural fields from Meigs County to Rhea County, Tennessee for 12 miles total. This includes a crossing of the Tennessee River at TVA's McKinley Branch Wildlife Management Area (WMA). The 7.8 miles of existing 75 foot right-of-way has left been unmaintained long enough to allow for forest regeneration where ever land use practices did not preclude natural succession. The proposed 12.5 foot expansion footprint on either side of this right-of-way exhibited the same on-going land use practices in the corresponding vicinity of the original right-of-way footprint. The project area is located across the Richland Creek watershed (10-HUC 0602000102) and the Tennessee River watershed (10-HUC 0602000106) at the upper reaches of Chickamauga Lake. The project footprint for the Action Alternative was field surveyed to identify actual wetland extent and quality. Twenty wetland complexes, comprising 26 delineated habitats and totaling 12.42 acres, were identified within the proposed project footprint (APPENDIX D). However, no wetlands were found on the proposed new 3.9 mile right-of-way, nor within the Richland Creek watershed. All wetlands are located within the Tennessee River/Chickamauga Lake watershed along the existing 7.8 mile vacant right-of-way proposed for use and expansion. The combination of land-use practices and landscape position dictates the wetland habitat type, wetland functional capacity, and wetland

value. The identified wetlands consisted of emergent, scrub-shrub, forested, and large vegetated shallow ponds, all exhibiting low to moderate condition, thus providing poor to healthy wetland value to the surrounding landscape (Table 3-7 and 3-8).

Table 3-7 Acreage of wetlands representing low, moderate, or exceptional resource value within the action alternative footprint and relative to total mapped wetland occurrence within the watershed.

Watershed (10-HUC)	NWI Estimated Total Wetland Acres in Watershed*	Delineated Wetland Acreage in Project Area			
		Low Value	Moderate Value	Exceptional Resource Value	TOTAL
Tennessee River/Upper Chickamauga (0602000106)	**1216.75**	4.46	7.96	0	**12.42**

*National Wetland Inventory (USFWS 1982)

Table 3-8 Acreage of wetlands by habitat type within the action alternative footprint and relative to total mapped wetland occurrence within the watershed.

Watershed (10-HUC)	NWI Estimated Total Wetland Acres in Watershed	Delineated Total Wetland Acreage in Proposed Project			
		Emergent*	Scrub-Shrub	Forested	TOTAL
Tennessee River/Upper Chickamauga (0602000106)	**1216.75**	7.39	0.41	4.62	**12.42**

Emergent* = Includes wetland habitat of inundated standing dead forest and aquatic bed with vascular rooted vegetation.

Emergent wetland area within the project footprint totaled 7.39 acres across 15 delineated wetland areas. Emergent wetlands are generally devoid of woody vegetation with predominant cover by non-woody species across areas periodically saturated and/or inundated. Emergent wetlands identified within the project footprint included mowed depressional features, vegetated impoundments within the McKinley Branch WMA dominated by American lotus (*Nelumbo lutea*), excavated quarry ponds dominated by cattails (*Typha latifolia*) and wetlands where emergent vegetation coupled with open water are present under standing dead forest. Standing dead trees would not have the same functional value as live forest considering they are unable to uptake water and contribute to ecosystem functions, except for wildlife purposes (see section 3.5).

Emergent wetlands in this general vicinity are often found where land-use practices or inundation deter growth of woody species. Emergent wetland habitats encountered within the route proposed for the new TL construction consisted of inundated standing dead forest in W002a (0.06 acres total), inundated American lotus beds in W004b, W005, W006, and W007b (3.68 acres total), mowed or farmed wetlands comprising W008, W009, W010, W011, W012, W013, W015, W016b (0.71 acres total), and excavated cattail ponds in W017 and W018 (2.94 acres total). All of these wetland areas contained indicators of wetland hydrology influencing soil

physiology such that coloration indicative of wetland conditions were evident in the soil profile. Within the McKinley Branch WMA, wetland hydrology indicators were strong due to practices sustaining impounded waters sufficient for American lotus and associated wildlife benefits this habitat provides. Elsewhere, wetland hydrology indicators were present, but weak, due to the dry weather during the late summer sampling period. These wetlands exhibited cracked soil surfaces. All emergent wetlands were dominated by common emergent wetland vegetation, including wetland grasses, sedges, and several forb species in addition to cattails and lotus. Emergent wetland habitat encountered within the McKinley Branch WMA scored as moderate value using TRAM, indicating healthy wetland quality, as would be expected for a natural area actively managed to provide adequate wetland functions. All other emergent wetlands within the project footprint scored as low value due to small size, surrounding land use, and evidence of disturbance (e.g. mowing, excavation, farming, etc.) (Table 3-8).

Scrub-shrub wetlands are dominated by woody vegetation generally less than 15 feet tall and three inches diameter (Cowardin et al. 1979). This habitat type totaled 0.41 acres across two delineated wetland areas, W002b and W014, within the project footprint (Table 3-7, APPENDIX D). W002b was dominated by black willow and button bush and exhibited moderate quality and functional capacity due to hydrological influence, buffer size, habitat features, and its protected location within the McKinely Creek WMA. W014 was dominated by button bush and exhibited low quality conditions and functional capacity due to its size, surrounding land use, and habitat disturbances. All delineated scrub-shrub wetland areas exhibited wetland hydrology indicators and hydric soil coloration within the soil profile.

Forested wetlands in general have deeper root systems and contain greater biomass (quantity of living matter) per acre than do emergent and scrub-shrub wetlands, which do not grow as tall. As a result, forested wetlands provide higher levels of wetland functions, such as sediment retention, carbon storage, and pollutant retention and transformation (detoxification), storm water storage, and flood attenuation, all of which support better water quality and protection of downstream infrastructure (Ainslie et al. 1999; Scott et al. 1990; Wilder and Roberts 2002). 4.62 acres of forested wetland were delineated across 10 wetland areas within the proposed Loop to North Dayton TL project footprint. Due to buffer composition, hydrologic influence, disturbance history, and habitat features, these forested wetlands varied in condition and associated value provided to the surrounding watershed from low to moderate. Of the total forested wetland acreage, 3.82 acres were assessed as moderate resource value, providing adequate healthy function to the surrounding landscape. The remaining 0.80 acres were assessed as having low value, offering less than desirable wetland function (Table 3-9).

Table 3-9 Acreage of Low, Moderate, and Exceptional Resource Value Forested Wetlands by Watershed within the Action Alternative Footprint.

Watershed (10-HUC)	NWI Estimated Forested Wetland Acres in Watershed	Delineated Forested Wetland Acreage In Proposed Project Area			
		Low Value	Moderate Value	Exceptional Resource Value	TOTAL
Tennessee River/Upper Chickamauga	**1041.73**	0.80	3.82	0	**4.62**

Watershed (10-HUC)	NWI Estimated Forested Wetland Acres in Watershed	Delineated Forested Wetland Acreage In Proposed Project Area			
		Low Value	Moderate Value	Exceptional Resource Value	TOTAL
(0602000106)					

The Tennessee River at Upper Chickamauga watershed (0602000106) contains forested wetlands W000, W001, W003a, W003b, W004a, W004c, W007a, W007c, W016a, and W019a/b within the proposed new ROW corridor for the Loop to North Dayton TL. Of an estimated total 1,041.73 forested wetland acres in this watershed, the proposed ROW corridor contains 4.62 acres, or 0.34 percent (Table 3-7c). W000, W001, W003a, and W003b scored as low resource value due to small size, hydrological influence, and habitat degradation (0.80 acre total). W004a, W004c, W007a, W007c, W016a, and W019a/b were valued as moderate functional capacity values due to size, hydrological influence, and lack of habitat disturbance (3.82 acres total). In addition, W004a, W004c, W007a, and W007c are located on TVA's McKinely Branch WMA, affording these habitats protection (see section 3.10). Wetland hydrology indicators, such as inundation, saturation, high water table, drainage patterns, surface soil cracks, and geomorphic position were exhibited within these wetland. These hydrology parameters influenced the soil profile, and hydric soil coloration was evident. Hydrophytic forested vegetation was dominant and included American elm, back willow, and silver maple. The understory across thes forestd wetland areas was either dominated by rice cutgrass, false nettle, fox sedge, common rush, and velvet panicgrass, or sufficiently lacking.

3.8 Aesthetic Resources

3.8.1 Visual Resources

This assessment provides a review and classification of the visual attributes of existing scenery, along with the anticipated attributes resulting from the proposed action. The classification criteria used in this analysis are adapted from a scenic management system developed by the U.S. Forest Service (USFS) and integrated with planning methods used by TVA (USFS 1995). Potential visual impacts to cultural and historic resources are not included in this analysis as they are assessed separately in Section 3.10.

The visual landscape of an area is formed by physical, biological, and man-made features that combine to influence both landscape identifiability and uniqueness. The scenic value of a particular landscape is evaluated based on several factors that include scenic attractiveness, scenic integrity, and visibility. Scenic attractiveness is a measure of scenic quality based on human perceptions of intrinsic beauty as expressed in the forms, colors, textures, and visual composition of each landscape. Scenic attractiveness is expressed as one of the following three categories: distinctive, common, or minimal. Scenic integrity is a measure of scenic importance based on the degree of visual unity and wholeness of the natural landscape character. The scenic integrity of a site is classified as high, moderate, low, or very low. The subjective perceptions of a landscape's aesthetic quality and sense of place are dependent on where and how it is viewed.

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

The project area encompasses portions of Rhea and Meigs counties in southeastern Tennessee and is comprised of gently undulating to strongly rolling terrain. The landscape is characterized by forested areas fragmented by suburban and rural features including commercial development, agricultural fields and pastures, roadways, existing utility corridors, and scattered residences. The easternmost approximately 8 miles of the proposed TL follow an existing 75-foot wide TVA utility ROW. This segment of ROW, which primarily spans rural agricultural and forested land as well as Chickamauga Lake, is currently vacant but remains largely cleared of woody vegetation, creating a visible corridor. Abandoned transmission structures also remain in a few areas. The remaining western portion of the proposed TL passes through forested land and pasture with only scattered rural development, until nearing the western terminus. Near the North Dayton Switching Station, the viewshed is dominated by existing transmission infrastructure, the Nokian Tyres manufacturing facility, and commercial development along U.S. Route 27. Thus, the project area combines natural elements, such as rolling fields and forested areas, with human development, including commercial properties and cleared utility corridors, creating a somewhat disjointed visual landscape.

The composition and patterns of vegetation are the prominent natural features of the landscape within the project area. Vegetation within the project area consists of a variety of deciduous and evergreen trees. The forms, colors, and textures of the natural features of the project area are not considered to have distinctive visual quality. Therefore, scenic attractiveness of the project area is considered common, due to the ordinary or common visual quality in the foreground, middleground, and background (Table 3-8). The scenic integrity is considered moderate due to noticeable human alteration, including utility, agricultural, commercial, and residential uses. The scenic value class of a landscape is determined by combining the levels of scenic attractiveness, scenic integrity, and visibility and can be excellent, good, fair, or poor. Based on the criteria used for this analysis, the overall scenic value class for the project area is good.

Table 3-10 Visual Assessment Ratings for Project Area

	Exiting Landscape	
View Distance	**Scenic Attractiveness**	**Scenic Integrity**
Foreground	Common	Moderate
Middleground	Common	Moderate
Background	Common	Moderate

In a visual impact assessment, sensitive receptors generally include any scenic vistas, scenic highways, residential viewers, and public recreational facilities located in the project's viewshed. The proposed TL would be visible to passing motorists from U.S. Route 27, TN-30, and various local roads along the route. Other sensitive visual receptors in the foreground include scattered farmsteads and residences, as well as recreationists on Chickamauga Lake. In addition, as shown in Figure 3-1, there are a number of churches, cemeteries, schools, parks, and recreational areas within the viewshed of the proposed TL. The majority of these facilities occur within the middleground of the project area, at distances between 0.5 and 4 miles. Three churches and ten cemeteries occur within the foreground. The closest of these are the Five Point Baptist Church and adjacent cemetery, located approximately 200 feet northeast of the eastern terminus of the proposed TL where it intersects the Sequoyah NP – Watts Bar HP 161-kV TL. The proposed TL also crosses through the Chickamauga Wildlife Management Area (WMA), just east of the Chickamauga Lake crossing.

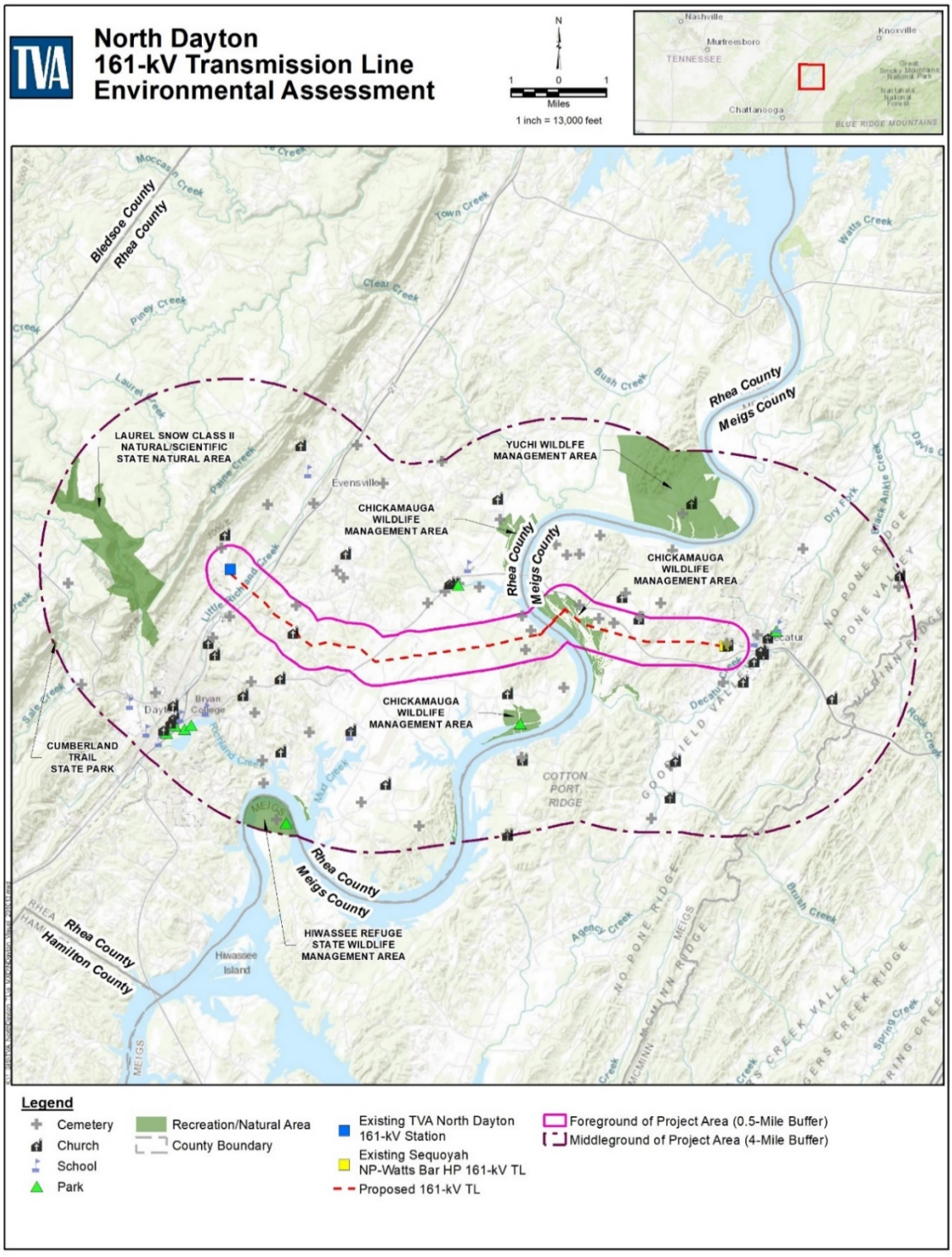

Figure 3-1 Sensitive Visual Receptors within Foreground and Middleground of the Project Area

3.8.2 Noise and Odors

The Mark Anton Airport is located in close proximity to the proposed TL route. Also, some traffic noise is generated along State Route (SR) 30, SR 58, and US 72, and from the towns of Dayton and Decatur, which are in close proximity to the proposed TL route. The traffic noise has become part of the ambient noise.

There are no known major sources of objectionable odors along the route or in the vicinity of the proposed TL.

3.9 Socioeconomics and Environmental Justice

As the study area spans Rhea and Meigs counties, these two counties and the state of Tennessee are included as appropriate secondary geographic areas of reference (Figure 3-2). Comparisons at multiple spatial scales provide a more detailed characterization of populations that may be affected by the proposed actions, including any environmental justice populations (e.g., minority and low-income). Demographic and economic characteristics of populations within the study area were assessed using the 2014-2018 American Community Survey 5-year estimates provided by the U.S. Census Bureau (USCB) (USCB 2020a).

3.9.1 Demographic and Socioeconomic Conditions

Demographic characteristics of the study area and of the secondary reference geographies are summarized in Table 3-9. The study area has a resident population of 7,495 and is characterized by suburban and rural residential development. It includes portions of the cities of Dayton and Decatur, as well as the unincorporated community of Evensville. Rhea and Meigs counties have resident populations of 32,628 and 11,962, respectively, each of which make up less than 0.5 percent of the total population of Tennessee. Since 2010, the block groups that make up the study area have experienced moderate growth, with a population increase of 14.4 percent. This is notably higher than the overall population increases experienced at the county and state levels. During the same period, population increases of 2.6 and 1.8 percent were recorded in Rhea and Meigs counties, while the population of the state of Tennessee increased 4.8 percent.

Approximately 92 percent of the study area population is white; correspondingly, minority populations in the study area are relatively small. Minorities in the study area include: Hispanic or Latino (4.7 percent), Black or African American (1.7 percent), American Indian and Alaska Native (0.1 percent), and persons who identified as two or more races (1.8 percent). Minority population percentages in the study area are generally comparable to those of Rhea and Meigs counties and are notably lower than those of the state of Tennessee (Table 3-2).

The average median household income in the block groups that make up the study area is $47,102, which is higher than the median household income reported for Rhea County ($39,451) and Meigs County ($43,250) but lower than that of the state of Tennessee ($50,972) (Table 3-11). Correspondingly, the percentage of the study area population falling below the poverty level is 16.9 percent, slightly lower than that of Rhea and Meigs counties (21.9 and 17.0 percent, respectively) but slightly higher than the state, where 16.1 percent of the population lives below the poverty level.

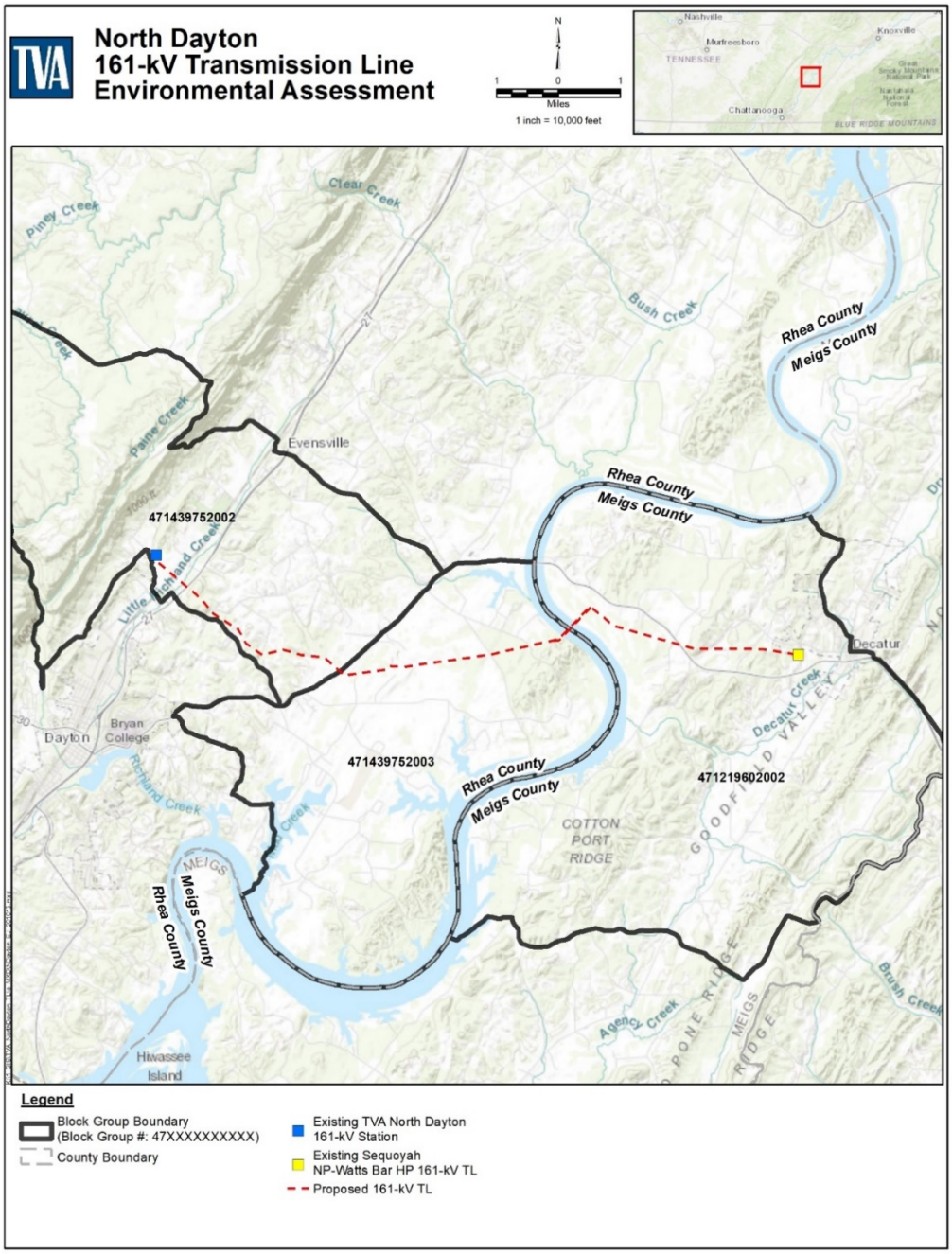

Figure 3-2 Census Block Groups Comprising the Study Area

Table 3-11 Demographic and Economic Characteristics of Study Area and Secondary Reference Geographies

	Study Area (3 Census Block Groups Containing Proposed TL ROW)	Rhea County, Tennessee	Meigs County, Tennessee	State of Tennessee
Population[1, 2]				
Population, 2018 estimate	7,495	32,628	11,962	6,651,089
Population, 2010	6,554	31,809	11,753	6,346,105
Percent Change 2010-2018	14.4%	2.6%	1.8%	4.8%
Persons under 18 years, 2018	25.8%	23.3%	21.5%	22.6%
Persons 65 years and over, 2018	17.9%	17.9%	20.6%	15.7%
Racial Characteristics[1]				
Not Hispanic or Latino				
White alone, 2018 (a)	91.7%	90.6%	94.3%	74.0%
Black or African American, 2018 (a)	1.7%	2.2%	2.0%	16.6%
American Indian and Alaska Native, 2018 (a)	0.1%	0.1%	0.2%	0.2%
Asian, 2018 (a)	0.0%	0.3%	0.1%	1.7%
Native Hawaiian and Other Pacific Islander, 2018 (a)	0.0%	0.0%	0.0%	0.0%
Some Other Race alone, 2018 (a)	0.0%	0.0%	0.0%	0.1%
Two or More Races, 2018	1.8%	1.8%	1.4%	1.9%
Hispanic or Latino, 2018	4.7%	4.9%	2.0%	5.3%
Income[1]				
Median household income, 2014-2018	$ 47,102	$ 39,451	$ 43,250	$ 50,972
Persons below poverty level, 2014-2018	16.9%	21.9%	17.0%	16.1%
Persons below low-income threshold, 2014-2018 (b)	37.7%	46.0%	36.4%	36.4%

(a) Includes persons reporting only one race.

(b) Low-income threshold is defined as two times the poverty level

Sources: [1]USCB 2020a; [2]USCB 2011

3.9.2 Community Facilities and Services

Community facilities and services include public or publicly funded facilities such as police protection and other emergency services (ambulance/fire protection), schools, hospitals and other health care facilities, libraries, day care centers, churches, and community centers. To identify facilities and emergency services that could be potentially impacted by proposed project activities or emergency incidents along the length of the TL, the study area is identified as the service area of various providers, where applicable, or the area within a 5-mile radius along the entirety of the TL corridor.

Based on a review of aerial imagery and online information including the U.S. Geological Survey (USGS) Geographic Names Information System database (USGS 2020),

community facilities and services available within a 5-mile radius of the proposed project area include schools, churches, cemeteries, libraries, health care facilities, police and emergency services, and an airport. The highest concentrations of these facilities are found near the communities of Dayton, southwest of the western terminus of the proposed TL, and Decatur, east of the eastern terminus. Community facilities located in close proximity (within 0.5 mile) of the proposed TL are the Rhea Medical Center and Ambulance Services, three churches, and ten cemeteries.

3.9.3 Environmental Justice

On February 11, 1994, President Clinton signed EO 12898 Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. EO 12898 mandates some federal-executive agencies to consider environmental justice as part of the NEPA. Environmental justice has been defined as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income (EPA 2018) and ensures that minority and low-income populations do not bear disproportionately high and adverse human health or environmental effects from federal programs, policies, and activities. Although TVA is not one of the agencies subject to this order, TVA routinely considers environmental justice impacts as part of the project decision-making process.

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

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

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

The nationwide poverty level is determined annually by the USCB and varies by the size of family and number of related children under 18 years of age. The 2019 USCB Poverty Threshold for an individual is an annual income of $13,300, and for a family of four it is an annual household income of $26,370 (USCB 2020b). For the purposes of this assessment, low-income individuals are those whose annual household income is less than two times the poverty level. More encompassing than the base poverty level, this low-income threshold, also used by the EPA in their delineation of low-income populations, is an appropriate measure for environmental justice consideration because current poverty thresholds are often too low to adequately capture the populations adversely affected by low-income levels, especially in high-cost areas (EPA 2017). According to EPA, the effects of income on baseline health and other aspects of susceptibility are not limited to those below the poverty thresholds. For example, populations having an income level from one to two times the poverty level also have worse health overall than those with higher incomes

(Centers for Disease Control and Prevention 2011). A low-income environmental justice population exists if either of the following two conditions is met:

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

Based on a preliminary review of the EPA's EJSCREEN tool, the proposed project is not located in an area with high concentrations of environmental justice populations; minority populations in particular make up a very small percentage of the total population. However, as EJSCREEN did identify some communities within the study area with appreciable percentages of low-income residents, a more detailed evaluation was completed using the 2014-2018 American Community Survey data to identify whether any specific block groups within the study area exceed environmental justice thresholds.

Total minority populations (i.e., all non-white and Hispanic or Latino racial groups combined) comprise approximately 26 percent of the population of Tennessee. Rhea and Meigs counties are somewhat less racially diverse than the state, with total minority populations accounting for 9.4 and 5.7 percent of the population, respectively. Approximately 8.3 percent of people living within the study area are minorities, with percentages for individual block groups ranging from 5.3 to 12.7 percent of the population. Thus, none of the block groups within the study area have minority populations that either exceed 50 percent of the total population or significantly exceed the minority percentage of any of the reference geographies. Therefore, they do not meet the criterion for consideration as minority population groups subject to environmental justice considerations.

The percentage of the population of Tennessee living below the low-income threshold is 36.4 percent. Meigs County is consistent with the state, having the same percentage of low-income individuals, while Rhea County has a higher percentage (46.0 percent). Generally consistent with these reference geographies, approximately 37.7 percent of people living within the study area are considered low-income, with percentages for individual block groups ranging from 35.0 to 39.5 percent of the population. As none of the block groups within the study area have low-income populations that either exceed 50 percent of the total population or significantly exceed that of any of the reference geographies, they do not meet the criterion for consideration as low-income population groups subject to environmental justice considerations.

3.10 Cultural Resources

Cultural resources include prehistoric and historic archaeological sites, districts, buildings, structures, and objects, as well as locations of important historic events that lack material evidence of those events. Cultural resources that are listed, or considered eligible for listing, on the National Register of Historic Places (NRHP) are called historic properties. Cultural resources become historic properties when they possess both integrity and significance. A historic property's integrity is based on its location, design, setting, materials, workmanship, feeling, and association. The significance is established when historic properties meet at least one of the following criteria: (a) are associated with important historical events or are associated with the lives of significant historic persons; (b) embody distinctive characteristics of a type, period, or method of construction; (c) represent the work of a master or have high artistic value; or (d) have yielded or may yield information important in history or prehistory.

Federal agencies are required by the National Historic Preservation Act (NHPA) and NEPA to consider the possible effects of their undertakings on historic properties. The term "undertaking" means any project, activity, or program that is funded under the direct or indirect jurisdiction of a federal agency, or requires a federal license, permit, or federal approval.

An agency may fulfill its statutory obligations under NHPA by following the process outlined in the implementing regulations, Section 106 of NHPA, at 36 CFR Part 800. Under these regulations, considering an undertaking's possible effects on historic properties is accomplished through a four-step review process: (1) initiation (defining the undertaking and the area of potential effects [APE], and identifying the consulting parties); (2) identification (studies to determine whether cultural resources are present in the area of potential effects (APE) and whether they qualify as historic properties); (3) assessment of adverse effects (determining whether the undertaking would damage the qualities that make the property eligible for the NRHP); and (4) resolution of adverse effects (by avoidance, minimization, or mitigation).

Throughout the process, the agency must consult with the appropriate State Historic Preservation Officer (SHPO) and federally recognized Indian tribes that have an interest in the undertaking, and should provide public notice of the undertaking when actions could affect historic and cultural resources, including archaeological resources. These resources are also protected under the Archaeological Resources Protection Act (ARPA), and the Native American Graves Protection and Repatriation Act (NAGPRA), in addition to the NHPA.

An APE is defined as the "geographic area or areas within which the undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist" (36 CFR § 800.16). TVA defined the APE for this undertaking as all areas that have the potential for ground disturbance, which includes the entire proposed TL corridor (100 feet wide) and all associated access routes (generally no more than 20 feet wide). The APE also includes areas within a half-mile radius of the proposed TL from which the project would be visible, where visual effects on above-ground resources could occur.

The Tennessee Valley region has been an area of human occupation for the last 12,000 years. This includes five broad cultural periods: Paleo-Indian (11,000-8,000 BC), Archaic (8000-1000 BC), Woodland (1000 BC-AD 1000), Mississippian (AD 1000-1700), and Historic (AD 1700-present). Prehistoric land use and settlement patterns vary during each period, but short- and long-term habitation sites are generally located on flood plains and alluvial terraces along rivers and tributaries. Specialized campsites tend to be located on older alluvial terraces and in the uplands.

In the early historic period, the area was claimed by the Cherokee tribe, but numerous Native American groups claim ancestry in the east Tennessee region. The influx of European settlers into the region forced cession of Cherokee lands through a series of treaties in the 1800s and 1810s. Rhea County was founded in 1807, taken from portions of neighboring Roane County; Meigs County was carved out of Rhea County in 1836.

3.10.1 **Archaeological Resources**

TVA Cultural Compliance staff conducted a desktop study of available documents pertaining to the APE's potential to contain archaeological sites. Multiple sites have been recorded in and immediately adjacent to the APE. Portions of the APE in the Tennessee

River valley have been previously surveyed, from as early as the early 1940s up through recent years. While informative, these investigations did not always meet the rigorous standards required for Section 106 compliance. Therefore, TVA contracted with TRC Environmental, Inc., to conduct a cultural resources survey of the 12 mile long TL corridor. Since access routes were not known at the time of the TL corridor survey, TRC completed a second survey of the approximately 17.1 miles of access routes to be used during construction.

Seven archaeological sites (40MG9, 40MG15, 40MG74, 40MG75, 40MG289, 40MG303, and 40RH317) have been previously recorded in the APE. These sites are primarily prehistoric artifact scatters, ranging in age from the Late Archaic period through the Mississippian period. One nineteenth century cemetery was also given an archaeological site number in 2001; current Tennessee State Site files policy is to record the locations of historic cemeteries, but generally not to issue site numbers for them. These sites, plus a recently identified small family cemetery were investigated during the surveys. TRC recommended that the portions of four of the sites (40MG15, 40MG74, 40MG303, and 40RH317) were non-contributing elements of their overall NRHP eligibility. Site 40MG289, the cemetery, was incorrectly mapped within an access route. Its true location is adjacent to the access route, outside of the APE. Sites 40MG9 and 40MG75 are prehistoric artifact scatters that contain deeply buried archaeological deposits. TRC recommended that they are potentially eligible for the NRHP.

The recently identified family cemetery was investigated via pedestrian survey and ground-penetrating radar (GPR). Up to 45 burials were identified, most of which were unmarked. Although TRC recommended that the cemetery was not eligible for the NRHP, they did recommend that the cemetery and a “Do Not Disturb” buffer area around it be avoided by construction (Greene and Detty 2020; Price, et al. 2020).

3.10.2 **Architectural Resources**

During the cultural resources study of the TL corridor, TRC Environmental, Inc., also conducted an architectural assessment of the APE. Thirteen architectural resources and one NRHP-listed property have been previously recorded within one-half mile and in line of sight of aspects of the project. These resources were identified during countywide architectural surveys in the 1980s. TRC documented that 11 of the 13 previously recorded architectural resources have been destroyed since their initial identification. The NRHP-listed property is extant, but has been altered since being added to the NRHP. TRC’s survey documented 22 additional architectural resources that have reached the 50 year age requirement since the 1980s survey (Price, et al. 2020).

The Jim Godsey house (MG-11), located on the south side of State Route 30, is a two-story frame I-house. The property was originally listed in the NRHP in 1981 under the Historic Resources of Meigs County, Tennessee, Multiple Resource Nomination. Listed under Criterion C for architecture, it was described as “representative of the turn-of-the-century tastes reflected in the details of its I-house form, with its two-tiered porch with bracketed posts and sawn balustrade, bargeboards, decorative window and door surrounds, and cornerboards with molded heads” (Toplovich and Rogers 1981). Due to recent alterations that removed nearly all of the house’s original exterior decorative details, TRC recommended that the Godsey House was no longer eligible for listing in the NRHP under Criterion C. During consultation with the Tennessee Historic Commission (THC), TVA and THC concurred that the Godsey House retained adequate characteristics to remain listed on the NRHP.

The additional 24 historic resources include residences and farmsteads, commercial buildings, a church, and cemeteries. Ages range from late-nineteenth through mid-twentieth centuries. Background research did not reveal associations with significant historic events or people. Furthermore, many of these resources are typical examples of construction which fail to exhibit distinctive characteristics of its architectural style or workmanship. Some have poor integrity due to substantial alterations since their original construction while others suffer from neglect. Based on these characteristics, TRC recommended that the 24 properties are considered not eligible for the NRHP (Price, et al. 2020).

3.11 Recreation

There is one developed outdoor recreation area in close proximity to this TL project. B&B Shooting Range is located approximately 0.25 miles south of an existing section of the line. In addition, some dispersed outdoor recreation activity such as hunting, nature observation or walking for pleasure may occur within both the existing and proposed new transmission line corridors.

3.12 Managed and Natural Areas

Natural areas include ecologically significant sites, federal, state, or local park lands, national or state forests, wilderness areas, scenic areas, conservation easements, wildlife management areas, recreational areas, greenways, trails, Nationwide Rivers Inventory (NRI) streams, and Wild and Scenic Rivers.

This section addresses natural areas (managed areas and sites) that are on, immediately adjacent to (within 0.5 mi), or within the region of the project area (3 mi radius).

A review of the TVA Natural Heritage database indicates the proposed project crosses McKinley Branch TVA Hunting Area/Chickamauga Wildlife Management Area (WMA) on the eastern side of the Tennessee River, south of Highway 30. This site is owned by TVA and managed by the Tennessee State Wildlife Management Agency (TWRA) for small game hunting.

The project also crosses the Chickamauga Reservoir State Mussel Sanctuary – refer to aquatics input for specifics on impacts to this area.

There are seven natural areas within three miles of the proposed project:

- Harris Cave (0.86-miles)
- Lauren Snow Designated State Natural Area (1.4-miles)
- Cumberland Trail 1 (1.7 miles)
- Butcher Bluff TVA Habitat Protection Area (1.9-miles)
- Bryan College Arboretum (2.2-miles)
- Eaves Bluff TVA Habitat Protection Area (2.2 miles)
- Yuchi Wildlife Refuge (2.4-miles)

CHAPTER 4

4.0 ENVIRONMENTAL CONSEQUENCES

The potential effects of adopting and implementing the No Action Alternative and the Action Alternative on the various resources described in Chapter 3 were analyzed, and the findings are documented in this chapter. The potential effects are presented below by resource in the same order as in Chapter 3. Cumulative effects are discussed, as appropriate and necessary, under the respective resource areas.

4.1 No Action Alternative

As stated in section 2.1.1, under the No Action Alternative, TVA would not construct the proposed TL to improve the existing power supply in an area of Meigs and Rhea Counties, TN. As a result, no property easements for locating the proposed TL would be purchased by TVA, and the proposed transmission facilities would not be built. TVA would continue to supply power to this power service area under the current conditions. TVA would also not to complete the related project associated activities.

Because the proposed construction, operation, and maintenance of the new TL would not occur under the No Action Alternative, no direct effects to those environmental resources listed in Chapter 3 are anticipated. However, changes to the project area and resources in this area may occur over time, independently of TVA's actions, due to factors such as population increases, changes in land use, and development in the area. These changes are not expected to be the result of implementing the No Action Alternative.

Under the No Action Alternative, a future decline in the reliability of electric service for some customers would be likely. Service problems and interruptions likely would gradually become more frequent and more severe. These outages would have negative impacts on the ability of businesses in the area to operate. Residents of the area would also incur negative impacts from outages, such as more frequent loss of power for household heating or cooling, as well as other activities such as cooking or clothes washing. These conditions would clearly diminish the quality of life for residents in the area and would likely have negative impacts on property values in the area. Any such impacts would negatively affect all populations in the region.

4.2 Action Alternative

4.3 Groundwater and Geology

Under the Action Alternative, BMPs as described in Muncy (2017) would be used to avoid contamination of groundwater in the proposed project area. Construction activities would seek to avoid springs and sinkholes as practicable

Contaminants such as herbicides and fertilizers could easily be transported to groundwater by storm water runoff. During revegetation and maintenance activities, fertilizers and herbicides would be avoided in areas that flow to springs or would be used sparingly to avoid contamination of groundwater. With the use of these BMPs, impact on groundwater from this action would be insignificant.

4.4 Surface Water

4.4.1 Surface Runoff

Construction activities have the potential to temporarily affect surface water via storm water runoff. Soil erosion and sedimentation can clog small streams and threaten aquatic life. TVA would comply with all appropriate state and federal permit requirements. Appropriate BMPs 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 pollution materials to the receiving waters would be minimized. A general construction storm water permit would be needed if more than 1 acre is disturbed. This permit also requires the development and implementation of a Storm Water Pollution Prevention Plan. Additionally, aquatic resource alteration permit (ARAP)/ 401 Water Quality Certifications and 404 US Army Corp of Engineer would be required for stream crossings. The SWPPP would identify specific BMPs to address construction-related activities that would be adopted to minimize storm water impacts.

Additionally, BMPs, as described in the Tennessee Erosion and Sediment Control Handbook (TDEC, 2012) and *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority* (TVA, 2017), would be used to avoid contamination of surface water in the project area. Proper implementation of these controls would be expected to result in only minor, temporary impacts to surface waters. See the Aquatics Section for buffer zone sizes and additional stream crossing details.

Additionally, impervious buildings and infrastructure prevent rain from percolating through the soil and result in additional runoff of water and pollutants into storm drains, ditches, and streams. This project would not significantly increase impervious flows in the area. All flows would need to be properly treated with either implementation of the proper BMPs or to engineer a discharge drainage system that could handle any increased flows prior to discharge into the outfall(s).

4.4.2 Domestic Sewage

Portable toilets would be provided for the construction workforce as needed. These toilets would be pumped out regularly, and the sewage would be transported by tanker truck to a publicly-owned wastewater treatment works that accepts pump out.

4.4.3 Equipment Washing and Dust Control

Equipment washing and dust control discharges would be handled in accordance with BMPs described in the Storm Water Pollution Prevention Plan for water-only cleaning.

TVA routinely includes precautions in the design, construction, and maintenance of its TL projects to minimize these potential impacts. Permanent stream crossings that cannot be avoided are designed to not impede runoff patterns and the natural movement of aquatic fauna. Temporary stream crossings and other construction and maintenance activities would comply with appropriate state permit requirements and TVA requirements as described in *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority* (TVA, 2017). Right-of-way maintenance would employ manual and low-impact methods wherever possible. Proper implementation of these controls is expected to result in only minor temporary impacts to surface waters.

4.4.4 Transmission Line Maintenance

Improper use of herbicides to control vegetation could result in runoff to streams and subsequent aquatic impacts. Therefore any pesticide/herbicide use as part of construction or maintenance activities would have to comply with the TDEC General Permit for Application of Pesticides, which also requires a pesticide discharge management plan. In areas requiring chemical treatment, only USEPA-registered and TVA approved herbicides would be used in accordance with label directions designed in part to restrict applications near receiving waters and to prevent unacceptable aquatic impacts. Proper implementation and application of these products would be expected to have no significant impacts to surface waters.

4.5 Aquatic Animals

4.5.1 Aquatic Ecology

Aquatic life could be affected by the proposed action either directly by the alteration of habitat conditions within the stream or indirectly due to modification of the riparian zone and storm water runoff resulting from construction and maintenance activities along the TL corridor. Potential impacts due to removal of streamside vegetation within the riparian zone include increased erosion and siltation, loss of instream habitat, and increased stream temperatures. Other potential construction and maintenance impacts include alteration of stream banks and stream bottoms by heavy equipment and runoff of herbicides into streams.

Siltation has a detrimental effect on many aquatic animals adapted to riverine environments. Turbidity caused by suspended sediment can negatively impact spawning and feeding success of many fish species (Sutherland et al. 2002). Mussel species adapted to a sand and gravel bottom environment cannot long survive in one composed of fine sediment and are quickly destroyed by silt that clogs the gills, smothering the animal (Parmalee and Bogan 1998).

Watercourses that convey only surface water during storm events (i.e., wet-weather conveyances) and that could be affected by the proposed TL route would be protected by standard BMPs as identified in TVA 2017. These BMPs are designed in part to minimize disturbance of riparian areas, and subsequent erosion and sedimentation that can be carried to streams.

All perennial and intermittent streams along the proposed TL would be protected by Standard Stream Protection (Category A) of 50 ft as defined in TVA 2017. The width of the SMZs is determined by the type of watercourse, primary use of the water resource, topography, or other physical barriers (TVA 2017). These categories of protection are based on the variety of species and habitats that exist in the streams as well as the state and federal requirements to avoid harming certain species.

Since appropriate BMPs and SMZs would be implemented during construction, operation, and maintenance of the proposed TL, any impacts to aquatic life resulting from the proposed action would be insignificant.

4.5.2 Aquatic Threatened and Endangered Species

Clearing of riparian vegetation and soil disturbance associated with construction of stream crossings and other construction or maintenance activities have the potential to result in runoff entering watercourses in the Richland Creek (0602000102) and Tennessee River (0602000106) watersheds. However, appropriate BMPs and SMZs would be implemented to minimize runoff and instream impacts.

4.6 Vegetation

4.6.1 Terrestrial Ecology (Plants)

Adoption of the Action Alternative would not significantly affect the terrestrial ecology of the region. Converting forest land to herbaceous vegetation for the construction and operation of the proposed TL would be long-term in duration, but insignificant. Adoption of this alternative would require clearing of approximately 93 acres of forest. Virtually all of the forest in the project area has been previously cleared and the plant communities found there are mostly common and well represented throughout the region. As of 2016, there were well over 1,274,000 acres of forest land in Meigs and Rhea, and the surrounding Tennessee counties (U.S. Forest Service 2019). Cumulatively, project-related effects to forest resources would be negligible when compared to the total amount of forest land occurring in the region.

Most herbaceous plant communities found throughout the project area are heavily disturbed, early successional habitats dominated by invasive species. However, a few small areas totaling less than 1 acre support cedar barrens, which are very rare in the Ridge and Valley physiographic region. These areas support a diverse native flora including the state-endangered species prairie goldenrod. Given that species that occur in cedar barrens require high light levels, the plant community is not mutually exclusive with the construction and operation of a TL ROW. Since this habitat overlaps with populations of prairie goldenrod, TVA would avoid significant impacts to this plant community by implementing avoidance measures designed to protect that species. Project-related work would temporarily affect other herbaceous plant communities, but these areas would likely recover to their pre-project condition in less than one year.

Nearly the entire project area currently has a substantial component of invasive terrestrial plants and adoption of the Action Alternative would not significantly affect the extent or abundance of these species at the county, regional, or state level. The use of TVA standard operating procedure of vegetating with noninvasive species (TVA 2017) would serve to minimize the potential introduction and spread of invasive species in the project area.

4.6.2 Endangered, Threatened, and Rare Species (Plants)

Adoption of the Action alternative would not affect federally listed plant species or designated critical habitat because neither occurs in the existing ROW, proposed ROW, or along proposed access roads. Prairie goldenrod is very rare in Tennessee and is listed as endangered (Tennessee Natural Heritage Program 2016). This primarily Midwestern plant species is very rare in the southeastern United States with Tennessee being near the southernmost range for this species. It has only been previously observed at eight locations in the state, seven of the sites in the Southern Limestone/Dolomite Valleys and Low Rolling Hills Level IV ecoregion, the same ecoregion the two new populations were found (TVA Natural Heritage Database 2019). One of the collections was made in the 1970s, five of the collections were made in the 1980’s, one in 1999, and the last one in 2010. Generally the

population size ranged from a few individuals to thousands of plants and most of these locations haven't been revisited since the initial observation.

TVA plans to implement avoidance measure during widening of the existing ROW that will prevent the species from being extirpated from the ROW. Future ROW vegetation maintenance could negatively affect prairie goldenrod if herbicide is applied indiscriminately, but this outcome would be avoided using TVA's computer-based Office Level - Sensitive Area Review process to record the location of prairie goldenrod on the ROW. This would trigger coordination between TVA ROW Foresters and biologists when the proposed TL requires vegetation maintenance in the future. The resulting vegetation management would use targeted application of herbicide and/or mowing to control woody species while avoiding impacts to prairie goldenrod.

4.7 Wildlife

4.7.1 Terrestrial Ecology (Animals)

In portions of the proposed TL that are pre-existing, vegetation clearing would occur to extend the ROW to 100ft from the current 75ft by clearing an additional 12.5ft on either edge of the ROW. In portions of new ROW construction, a 100ft ROW would be cleared. TVA would maintain the 75.1 acres of early-successional, herbaceous habitat (pastures, cultivated fields, residential areas) and clear the 93 acres of forest and permanently maintain it as early successional habitat. In many areas, the TL would span across agricultural and developed areas. Impacts to wildlife habitat would thus be limited to locations where the structures would be established. Ground disturbance would occur in these areas. Any wildlife (primarily common, habituated species) currently using these heavily disturbed areas may be displaced by increased levels of disturbance during construction actions, but it is expected that they would return to the project area upon completion of actions.

Areas of forest would be removed and permanently maintained as early successional habitat. Direct effects to some individuals that may be immobile during the time of construction may occur, particularly if construction activities took place during breeding/nesting seasons. However, the actions are not likely to affect populations of species common to the area, as similar forested and herbaceous habitat exists in the surrounding landscape.

Construction-associated disturbances and habitat removal would likely disperse wildlife into surrounding areas in an attempt to find new food and shelter sources and to re-establish territories. The landscape on which the project occurs is already highly fragmented and impacted by human activity (i.e. forestry practices, agricultural fields, residential homes, farm ponds, and roads). Thus it is unlikely that species currently occupying adjacent habitat would be negatively impacted by the influx of new residents. Further, it is expected that over time those species utilizing early successional habitat would return to the project area upon completion of actions.

Cumulative effects of the project on common wildlife species are expected to be negligible. Most of the proposed project footprint has previously been heavily impacted by agriculture and other development, leaving only small areas of natural, undisturbed vegetation. Proposed actions across the TL would permanently remove existing forested habitat for common wildlife. Following completion of the project, the ROW would be maintained as

early successional herbaceous fields which would provide habitat for several common wildlife species that utilize early successional fields and agricultural/developed areas.

Several local species benefit from disturbance. Construction of the ROW could create habitat for several mammals and birds. Mourning dove, American robin, Carolina chickadee, blue jay, eastern towhee, gray catbird, house finch, house sparrow, northern cardinal, northern mockingbird, raccoon, song sparrow, tufted titmouse, eastern cottontail, Virginia opossum, white-tailed deer, and white-throated sparrow are just a few of the species known to thrive in highly disturbed areas.

Six records of wading bird colonies and one osprey nest are present within three miles of the proposed project. Foraging habitat for these species is present in the Tennessee River and the surrounding streams and wetlands in the project area. The recorded osprey nest was confirmed as still active as of June 2020 and is on a transmission structure on Access Road 22 just east of the Tennessee River. No construction, vegetation removal, or ground disturbing activities may occur within 660ft of this nest while the nest is active (typically March- July). BMPs (TVA 2017) would be used to minimize impacts to water bodies within the affected area, thus wading birds and osprey foraging habitat would not be impacted by the proposed actions. Additionally, the US Fish & Wildlife Service's Information for Planning and Consultation (IPaC) website outlines seven migratory species of conservation concern that potentially occur in the project region (black-billed cuckoo, eastern whip-poor-will, prairie warbler, red-headed woodpecker, rusty blackbird, wood thrush, and yellow-bellied sapsucker). Those species that are only found in the TVA region during winter would be expected to flush if disturbed thus impacts would be minimal. Those species that nest in the TVA region could be directly impacted by the proposed actions should vegetation removal occur during the nesting season. Due to similarly suitable habitat nearby, and the relatively small amounts of habitat to be removed scattered across the entire project area, proposed actions are not expected to impacts to populations of migratory birds are not anticipated in association with the proposed actions.

4.7.2 **Threatened and Endangered Species (Animals)**

In portions of the proposed TL that are pre-existing, vegetation clearing would occur to extend the ROW to 100ft from the current 75ft by clearing an additional 12.5ft on either edge of the ROW. In portions of new ROW construction, a 100ft ROW would be cleared. TVA would maintain all of the 75.1 acres of early-successional, herbaceous habitat (pastures, cultivated fields, residential areas) and clear the 93 acres of forest and permanently maintain it as early successional habitat. In many areas, the TL would span across agricultural and developed areas so impacts to habitat for terrestrial animal species would be limited to the areas where TL structures are established.

Records of one state-listed species (Norton's Cave beetle), two federally listed species (gray bat and northern long-eared bat), and one federally protected species (bald eagle) are present within three miles of the proposed project footprint. In addition, records of the federally listed (Indiana bat) were not present in Meigs or Rhea Counties, but were assessed due to the potential for the species to occur in the project region.

Norton's Cave beetle is known from a cave a mile away. Proposed actions are far enough away from this cave such that no impacts are expected to occur. None of the other caves reported within three miles are known in close proximity to the ROW and thus are not

expected to be impacted by the proposed actions. No impacts to Norton's Cave beetle are anticipated in association with the proposed actions.

Nesting and foraging habitat for bald eagle is present in the project footprint along the Tennessee River. While the nearest known bald eagle nest record is approximately 1.08 miles from the project footprint, the pine tree in which the nest was located was destroyed by pine beetles in 2002. The nearest known potentially active bald eagle nest is approximately 2.5 miles from the project area. No nests or individuals are known from the project action area, and none were observed during field surveys in August 2019 and June 2020. Proposed actions are in compliance with the National Bald Eagle Management Guidelines. BMPs (TVA 2017) would be used to minimize impacts to water bodies within the affected area, thus any potential impacts to bald eagle foraging habitat would be minimized. Impacts to bald eagle are not anticipated in association with the proposed actions.

No suitable roosting habitat for gray bats would be impacted by the proposed actions as no caves are expected to be impacted. Gray bat foraging habitat exists over the Tennessee River, farm ponds, and streams in and near the project area. BMPs and Conservation Measures will be implemented during construction to minimize potential impacts to foraging habitat as described and in accordance with TVA's Programmatic Consultation on Bats on routine actions (TVA 2017b).

The federally threatened northern long-eared bat and the federally endangered Indiana bat were assessed based on the potential to occur in within the project area in Meigs and Rhea Counties. While no suitable winter roosting habitat for either Indiana or northern long-eared bats was identified in the action area, foraging habitat was identified. Foraging habitat for both species exists throughout the proposed project area in forest fragments and over streams, ponds, and wetlands. BMPs (TVA 2017) and Conservation Measures will be implemented during construction to minimize potential impacts to foraging habitat as described and in accordance with TVA's Programmatic Consultation on Bats on routine actions (TVA 2017b). Additional foraging habitat for Indiana bat and northern long-eared bat exists along fence rows and within forest fragments. This foraging habitat would be removed in association with the proposed actions; however, similarly suitable foraging habitat is plentiful in the surrounding landscape.

Summer roosting habitat surveys for Indiana bat and northern long-eared bat were performed between August 14-21st, 2019 at the site of the proposed new 12-mile TL and ROW. During these surveys, 27 suitable roost trees were identified along the proposed ROW. Additional field surveys in June 2020 resulted in one additional snag proposed for removal (0.09 acres) that offers suitable summer roosting habitat along proposed access roads, bringing the total of proposed suitable habitat for clearing to 13.3 acres Suitability was determined based on the high number of snags, willow oak, shagbark hickory, and other trees with exfoliating bark or cavities and their proximity to water sources. A total of 13.3 acres of suitable summer roosting habitat for Indiana and northern long-eared bat would be removed for the proposed ROW.

A number of activities associated with the proposed project were addressed in TVA's programmatic consultation with the U.S. Fish and Wildlife Service on routine actions and federally listed bats in accordance with ESA Section 7(a)(2) (TVA 2017b). For those activities with potential to affect bats, TVA committed to implementing specific conservation measures. These activities and associated conservation measures are identified on pages

5 and 6 of the TVA Bat Strategy Project Screening Form (Appendix B) and need to be reviewed/implemented as part of the proposed project.

4.8 Floodplains

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

The proposed TL would cross several streams in Meigs and Rhea counties, Tennessee. The proposed route and access roads are shown in Figure 4-1.

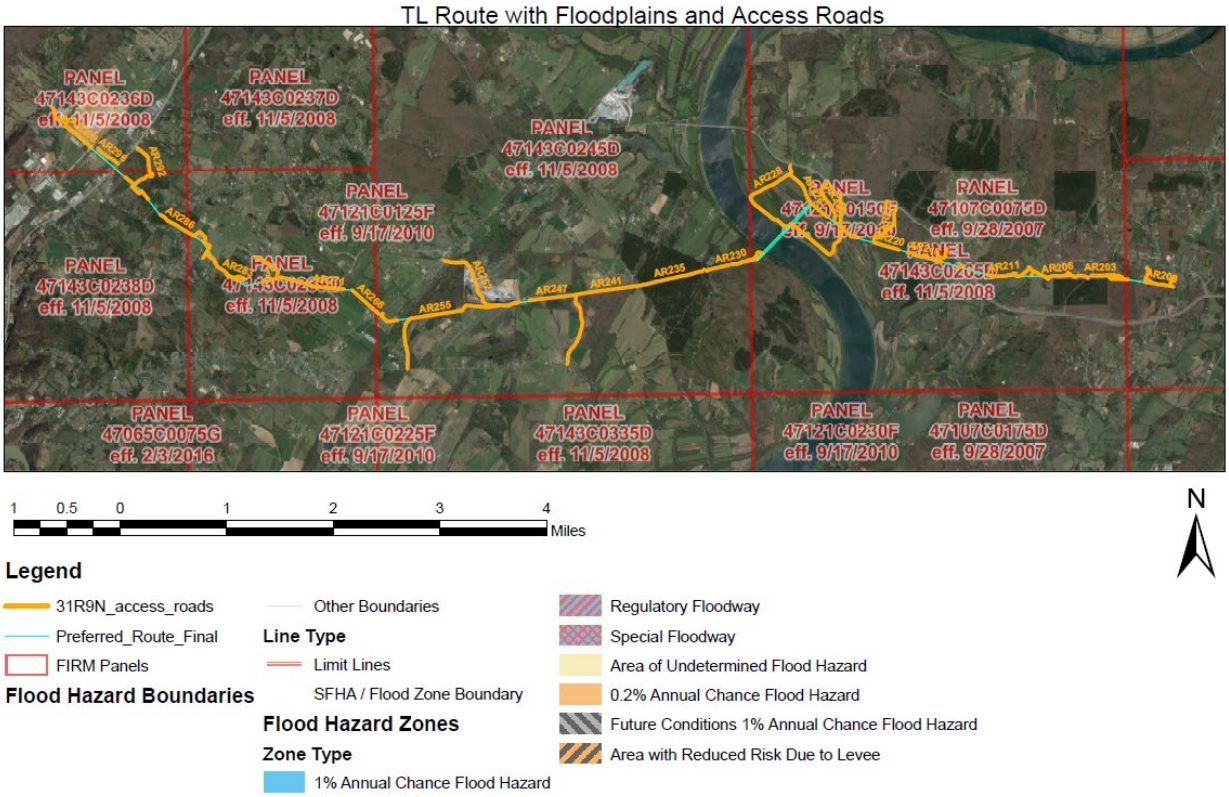

Figure 4-1 TL route and access roads with floodplains.

The support structures for the TL would not be expected to result in any increase in flood hazard, either as a result of increased flood elevations or changes in flow-carrying capacity of the streams being crossed. Construction in the floodplain would be consistent with EO 11988 provided the TVA subclass review criteria for TL location in floodplains are followed.

Based upon a review of Meigs and Rhea counties, Tennessee, Flood Insurance Rate Maps (FIRMs), portions of access roads AR216, AR220, AR225, AR226, the unnamed access road near AR226, AR228, AR247 and AR296 would be located within 100 year floodplains. Access roads except for AR296 are shown in Figure 4-2. Consistent with EO 11988, roads are considered to be repetitive actions in the 100-year floodplain that should result in minor impacts. To minimize adverse impacts, any road improvements would be done in such a manner that upstream flood elevations would not be increased by more than 1.0 foot.

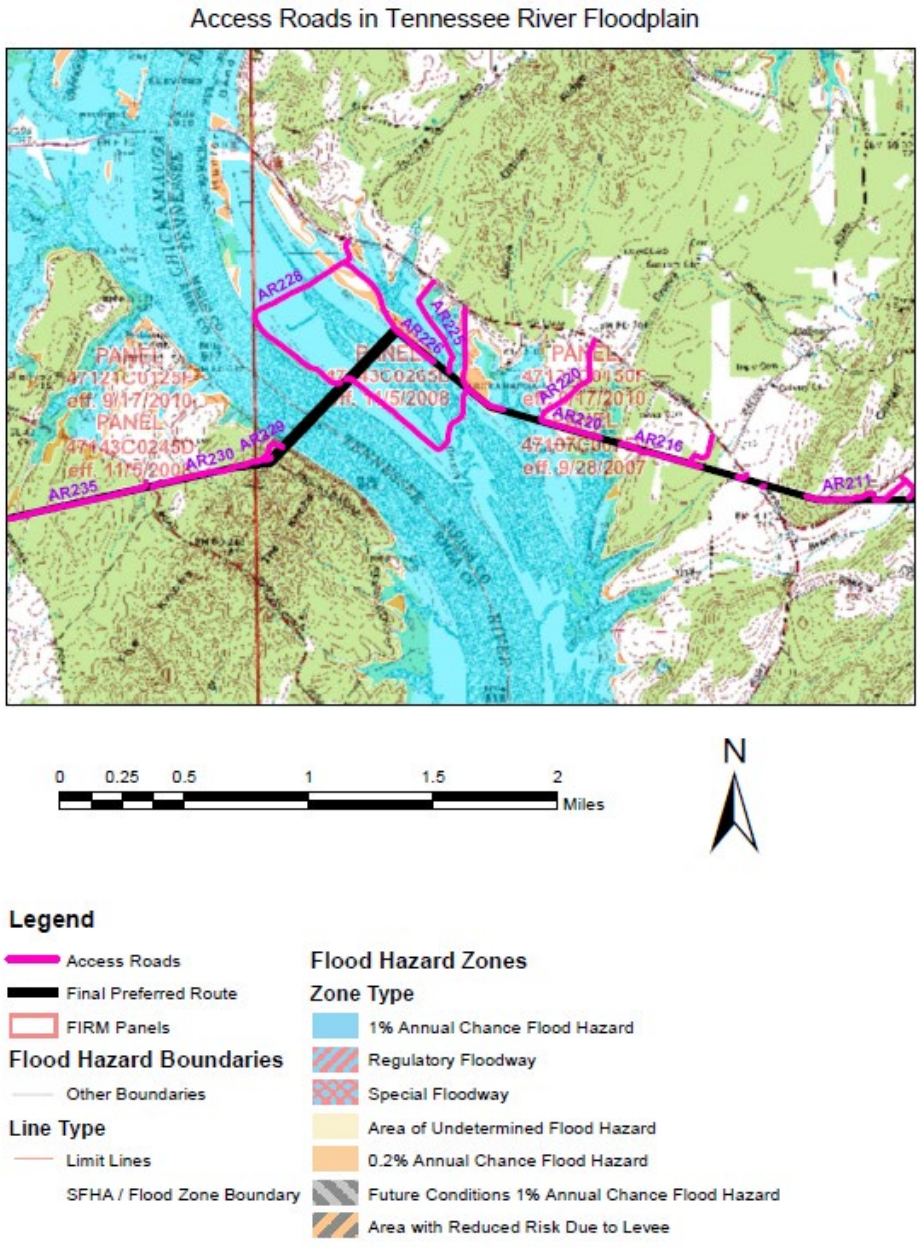

Figure 4-2 Access roads in Tennessee River floodplain.

Portions of access road AR296 would be located within the 100-year floodway of Little Richland Creek, as shown in Figure 4-3.

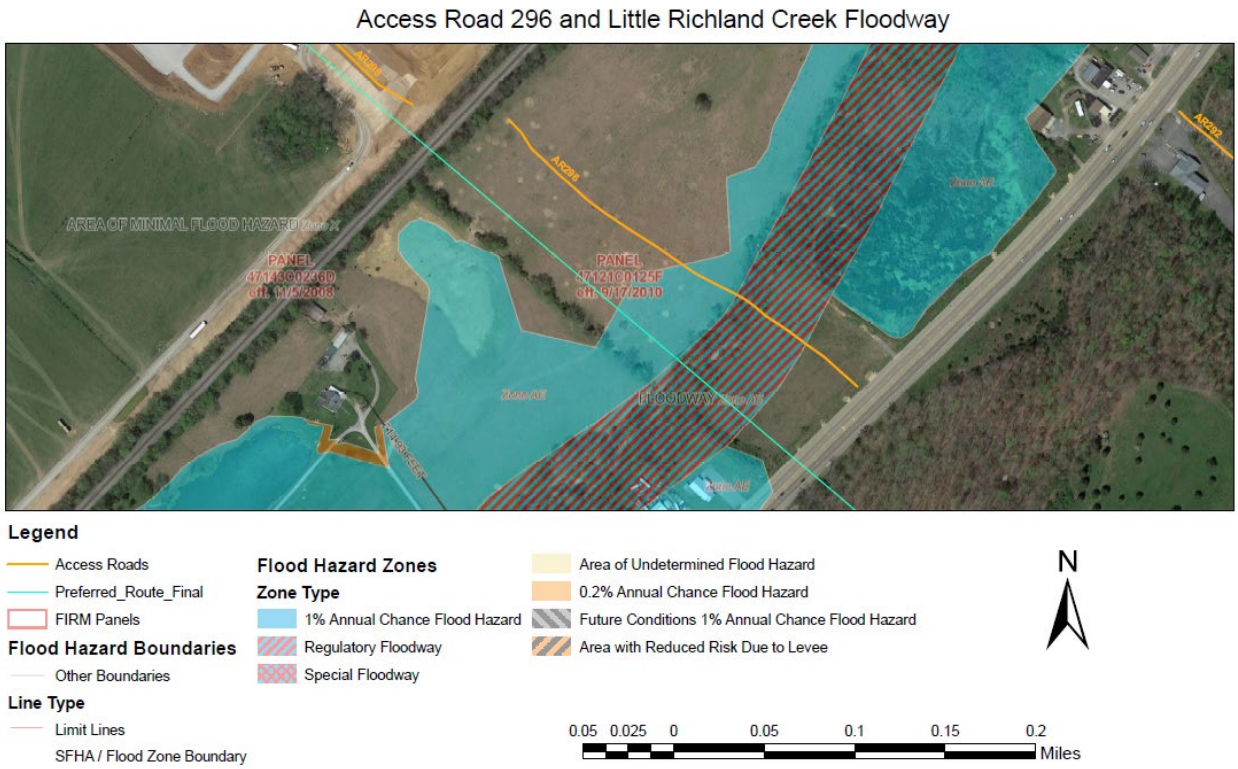

Figure 4-3 Access Road 296 and the Little Richland Creek floodway.

Rhea County participates in the National Flood Insurance Program, and any development must be consistent with its floodplain regulations. To prevent an obstruction in the floodway: (1) any fill, gravel or other modifications in the floodway that extend above the pre-construction road grade would be removed after completion of the project; (2) this excess material would be spoiled outside of the published floodway; and (3) the area would be returned to its pre-construction condition.

By implementing the following mitigation measures, the proposed TL and access roads would have no significant impact on floodplains and their natural and beneficial values:

1. Any fill, gravel or other modifications in the floodway that extend above the pre-construction road grade will be removed after completion of the project
2. This excess material will be spoiled outside of the published floodway
3. The area will be returned to its pre-construction condition
4. Standard BMPs would be used during construction activities
5. Road construction other than within the Little Richland Creek floodway would be done in such a manner that upstream flood elevations would not be increased by more than 1.0 foot

6. Construction would adhere to the TVA subclass review criteria for TL location in floodplains

4.9 Wetlands

Activities in wetlands are regulated by state and federal agencies to ensure no net loss of wetland resources. Under the CWA Section 404, activities resulting in the discharge of dredge, fill, and associated secondary impacts to waters of the U. S., including wetlands, must be authorized by the U.S. Army Corps of Engineers (USACE) through a Nationwide, Regional, or Individual Permit. This project is located in the Nashville District USACE. CWA Section 401 mandates state water quality certification for projects requiring USACE approval. In Tennessee, the Department of Environment and Conservation (TDEC) certifies CWA Section 404 permits and impacts to intrastate wetland resources through a general or individual aquatic resources alteration permit. In Tennessee, this permit is required for any alteration to the physical, chemical, or biological properties of any waters of the state, including wetlands, pursuant to the Tennessee Water Quality Control Act (T.C.A. §69-3-108, Tenn. Rules and Regs. 0400-40-07). TDEC's permit process ensures compliance with Tennessee's anti-degradation policy as well (T.C.A. §69-3-108, Tenn. Rules and Regs. 0400-40-04). Lastly, EO 11990 requires federal agencies to minimize wetland destruction, loss, or degradation, avoid new construction in wetlands wherever there is a practicable alternative.

Efforts were made during project planning and siting to avoid wetlands to the extent practicable. However, because of project and topographic constraints, and because of the goal of minimizing impacts to other resources, no practicable alternative was available that would allow complete avoidance of wetlands. The process for detecting and avoiding wetland resources identified during the office level review, prior to field surveys, is described in Section 2.4.

Under the Action Alternative, the proposed TLs would be constructed. As described in Section 1.1, adequate clearance between tall vegetation and TL conductors would require trees within the proposed ROWs be cleared. Establishing a TL corridors would require vegetation clearing within the full extent of the ROW, and future maintenance of low stature vegetation to accommodate clearance and abate interference with overhead wires.

The proposed new Loop to North Dayton TL ROW contains a total of 7.39 acres emergent wetland, 0.41 acre scrub-shrub wetland, and 4.62 acres forested wetland. Emergent wetlands located on the proposed new ROW corridors would experience temporary impacts to accommodate access during construction. These wetlands would be maintained long term in their current state and functional capacity, due to their existing height being compatible and consistent with TL ROW vegetation management objectives. The scrub-shrub wetlands are dominated by buttonbush (*Cephalanthus occidentalis*), a low growing shrub with no threat of interference with overhead wires. Although some black willow saplings would be removed, the buttonbush shrub would persist and continue to provide the wetland functions currently realized and typical of a buttonbush scrub-shrub swamp in these settings. The 4.62 acre of forested wetland area within the ROW proposed for construction would be cleared and permanently converted to emergent, meadow like wetland habitat for the perpetuity of the TL's existence. Woody vegetation would be removed with a feller buncher. This involves a grip and blade attachment on a mechanized tracked or wide tire (low ground pressure) vehicle. The grip holds the tree trunk while the blade cuts below the grips. This method allows for removal of the cut aerial portion of a tree

to an upland location for deposition, while leaving <12” stumps and the below ground root system entirely intact with minimal soil disturbance.

Wooded wetland conversion to emergent habitat results in reduction in wetland function. Due to the rate of water uptake, extensive root system, and structural integrity of trees and shrubs relative to herbaceous plants, wooded wetlands function at a greater capacity to impede and hold storm water, absorb toxins, retain sediment, and provide the shaded forage and spawning habitat necessary for its aquatic and terrestrial inhabitants to exist. Therefore, conversion of this community type to a habitat devoid of woody vegetation would result in a reduction of existing functional capacity.

Forested wetland conversion to accommodate structure locations and spans is considered a secondary impact under section 404b of the CWA. Therefore, forested wetland loss is subject to the authority of the regulatory agencies to ensure no net loss of wetland functions and values, per the directive of the CWA and the federal no net loss of wetland policy (EPA 1990). The CWA authorizes regulatory oversight for these impacts. The USACE and Tennessee exert this oversight through an established permit process that ensures maintenance of the physical, biological, and chemical integrity of national and state waters, including wetlands, and the objectives of the CWA are upheld. The permitting process involves a demonstration of wetland avoidance, minimization of disturbance, and compensation for loss of wetland functions and values. In compliance with the CWA and EO11990, TVA has considered all options to avoid and minimize wetland impacts, resulting in the least wetland disturbance practicable (Section 2.1).

Wetland habitat located in areas proposed for heavy equipment travel could experience minor and temporary impacts during TL construction or long term asset and vegetation management. TVA would minimize wetland disturbance through adherence to wetland BMPs for any and all work necessary within the delineated wetland boundaries (TVA 2017). This includes the use of low ground pressure vehicles, mats, or other wetland crossings to minimize rutting to less than 12 inches, erosion control techniques to deter indirect impacts through siltation into adjacent wetland area, dry season work, etc. Vehicular traffic would be limited to narrowed access corridors along the ROWs for structure and conductor placement, fiber installation, and long term maintenance.

With wetland avoidance and wetland minimization techniques in place, TVA would comply with all USACE/TDEC mitigation requirements to compensate for the proposed loss of wetland resources, functions, and values resulting from this Action Alternative. TVA would obtain the necessary Section 404/401 CWA permits and required compensatory mitigation to ensure the proposed wetland impacts are compensated to the extent deemed appropriate such that wetland functions and values remain at the current capacity within the larger affected watershed. Required compensatory mitigation would be purchased through an approved wetland mitigation bank per the directive of the USACE and Tennessee to ensure no more than minimal impacts to the aquatic environment result and the objectives of the CWA and Tennessee’s anti-degradation policy are upheld.

Cumulative impact analysis of wetland effects takes into account wetland loss and habitat conversion at a watershed scale currently and within the reasonable and foreseeable future. Loss of wetland habitat due to wetland fill would be compensated through wetland mitigation banking, resulting in no cumulative wetland impacts. Loss of wetland functions and values from forested wetland clearing would be compensated for at the discretion of the USACE engineer. Forested wetland conversion for this project would take place across

one watershed. 4.62 acres of proposed forested wetland clearing would occur in this watershed, which feed the Tennessee River, comprising about 0.34 percent of mapped forested wetland within this watershed.

Similarly, general trends in wetland impacts resulting from development within the watershed would be subject to CWA, USACE, and TDEC mandates, and these regulatory requirements are in place to ensure wetland impacts do not result in cumulative loss. In this context, the proposed wetland impacts should be kept to a minimum on a cumulative scale due to the avoidance, minimization, and compliance measures in place. Therefore, in compliance and accordance with the CWA and the directives of USACE and TDEC ensuring no more than minimal adverse effects on the aquatic environment, the Action Alternative's impacts to wetland would be insignificant.

4.10 Aesthetic Resources

4.10.1 Visual Resources

The potential impacts to the visual environment from a given action are assessed by evaluating the potential for changes in the scenic value class ratings based upon landscape scenic attractiveness, integrity, and visibility. Sensitivity of viewing points available to the general public, their viewing distances, and visibility of the proposed action are also considered during the analysis. These measures help identify changes in visual character based on commonly held perceptions of landscape beauty and the aesthetic sense of place. The extent and magnitude of visual changes that could result from the proposed alternatives were evaluated based on the process and criteria outlined in the scenic management system as part of the environmental review required under NEPA.

Under the Action Alternative, construction of the proposed 161-kV TL would result in both short-term and long-term impacts to visual resources. During the construction period (approximately 96 working days), there would be some visual discord from existing conditions due to an increase in personnel and equipment coupled with disturbances of the current site characteristics. However, this would be contained within the immediate vicinity of the construction activities and would only last until all project activities have been completed and the disturbed areas have been seeded and restored through the use of TVA's standard BMPs (TVA 2017). Because of their temporary nature, construction-related impacts to local visual resources are expected to be minor.

Long-term impacts consist of the visible alterations associated with new transmission structures, overhead wires, ROW clearing, and access road development. The most visible elements of the electric transmission system are the transmission structures and the permanent removal of woody vegetation within the new TL ROW which creates a visible corridor. The addition of lines on or near existing structures or within existing ROW increases compatibility with the landscape and minimizes visual impacts. Therefore, along the easternmost approximately 8-mile segment where the proposed project would utilize the existing 75-foot ROW and expand it to a width of 100 feet, changes to the viewshed would be minimized, as the project would slightly expand the existing corridor feature rather than create a new visible corridor. The removal of woody vegetation from the ROW along the remaining 4 miles of the proposed TL and the installation of double-circuit steel poles (ranging in height from 70 to 140 feet) and overhead wires along the entire TL corridor would add discordantly contrasting elements and colors to the environment. Although much of the proposed TL would not be visible to the public due to the distance from developed

areas and presence of forested buffers, it would be visible in the foreground to motorists on nearby roadways, recreationists on Chickamauga Lake at the proposed crossing, and a number of residences. In the case of boaters and motorists, observers would be transient and thus would only be exposed to these features for short periods of time. Additionally, the majority of residents would only view the TL over expanses of pasture or obscured by vegetated buffers or outbuildings, making it less obtrusive. Only a very small number of residences are located at a distance where they have an unobstructed view of the TL; typically, these homes are also in close proximity to major roadways and existing transmission or distribution lines that increase the landscape's ability to absorb the visual change. While the proposed TL would add some discordant visual elements to the existing landscape, the view of these elements would be limited by the minimal number of residential receptors in the immediate foreground and would be somewhat absorbed into the overall landscape character near existing utility corridors and roadways.

In addition to nearby residents, motorists, and recreationists on Chickamauga Lake, sensitive visual receptors, including three churches, ten cemeteries, and the Chickamauga WMA were identified in the foreground of the proposed 161-kV TL (Figure 3-8). The proposed TL would pass through portions of the Chickamauga WMA, resulting in manmade alterations to an area adjacent to the lake that remains largely undeveloped and natural in appearance. However, since there are no trails or other amenities in this portion of the WMA, viewers would likely be infrequent, limited to occasional hunters. The Five Point Baptist Church and its adjacent cemetery are the next closest sensitive visual receptors to the TL, located approximately 200 feet northeast of the eastern terminus of the proposed TL. The presence of the existing Sequoyah NP – Watts Bar HP TL, which runs directly adjacent to these facilities, increases the visual compatibility for the construction of a new TL and prevents significant changes to the viewshed. The proposed TL would also be visible from the White Oak Church, located approximately 350 feet from the proposed ROW. However, the view would be partially obstructed by mature vegetation, and existing distribution lines also increase visual compatibility. The remaining church and cemeteries within the foreground are located 500 feet or more from the TL ROW and are either shielded from view by dense vegetation and/or topography, or are themselves located in wooded areas such that views of the TL would be largely, if not completely obstructed. For visual receptors located at further distances, in the middleground and background, the proposed TL would be less visible and obtrusive as it would largely fall into an observer's view where objects are less distinguishable.

The human alterations already in place within the project area, including commercial development, roadways, and existing transmission system elements, currently contribute some visual discord with the natural landscape. These elements contribute to the landscape's ability to absorb negative visual change. Therefore, while the forms, colors, and textures of the landscape that make up the scenic attractiveness would be affected by the construction of the TL, it would still remain common or ordinary (Table 4-10). Impacts to scenic integrity are anticipated to be greatest in the foreground along the proposed TL. At this distance, scenic integrity would be reduced from moderate to low, as visual alterations associated with the proposed TL (transmission structures, lines, and clear-cut ROW corridors that disrupt the tree canopy) would be dominant features on the landscape. However, there would be no change in the ratings for the middleground and background as the alterations associated with the TL would not be substantive enough to dominate the view from these distances (Table 4-1). Based on the criteria used for this analysis, the scenic value class for the affected environment after the proposed modifications would be reduced to fair in the foreground along the length of the proposed TL but remain classified

as good in the middleground. While the Action Alternative would contribute to a minor decrease in visual integrity of the landscape, the existing scenic class would not be reduced by two or more levels, which is the threshold of significance of impact to the visual environment. Therefore, visual impacts resulting from the implementation of the Action Alternative would be minor.

Table 4-1 Visual Assessment Ratings for Project Area Resulting from Action Alternative

	Resulting Landscape	
View Distance	**Scenic Attractiveness**	**Scenic Integrity**
Foreground	Common	Low
Middleground	Common	Moderate
Background	Common	Moderate

4.10.2 Noise and Odors

During construction of the proposed TL, equipment could generate noise above ambient levels. Because of the short construction period, noise-related effects are expected to be temporary and minor. For similar reasons, noise related to periodic TL maintenance is also expected to be insignificant. TLs may produce minor noise during operation under certain atmospheric conditions. Off the ROW, this noise is below the level that would interfere with speech.

There are no known major sources of objectionable odors along the route or in the vicinity of the proposed TL.

4.11 Socioeconomics and Environmental Justice

4.11.1 Demographic and Socioeconomic Impacts

Under the Action Alternative, proposed TL construction activities would occur over approximately 96 working days and would entail the use of mobile crews comprised of contractors and/or full-time TVA staff. Due to the linear nature of the project, the construction workforce, totaling approximately 25 personnel at a given time, would be transient as work progresses along the TL. Similarly, in the long term, there would be work crews present in the study area for occasional maintenance activities. In both cases, there would be no notable effects on local demographics due to the relatively small workforce and short-term presence of work crews in any given location.

Potential economic impacts associated with the proposed project relate to direct and indirect effects of property acquisition, construction, and operations. Under the Action Alternative, TVA would purchase approximately 82 acres of ROW easements, across 73 parcels, from private landowners. Those easements would give TVA the right to construct, operate, and maintain the TL across the property owner's land. Only one structure, a horse barn, is located within the ROW and would require removal. The barn would be appraised, and the owner compensated for its value. Additional easements may be required to

construct new temporary or permanent access roads on privately-owned land. In certain cases, it may also be necessary for TVA to acquire ownership of a property. In each case, landowners would be compensated for the value of such rights or properties. Given the relatively minor acquisitions, the direct local economic effect from the purchase of additional property or ROW easements would be minor relative to the total regional economy. Construction and maintenance activities would also result in minor but beneficial impacts to the local economy through the purchases of materials and supplies, potential procurement of contract workers or additional services, and expenditure of the wages earned by the transient workforce in the local communities.

In addition, the implementation of the proposed Action Alternative would provide power for the future load associated with the planned expansion of Nokian Tyres and increase reliability in the Dayton service area. The Nokian Tyres manufacturing facility in northeast Dayton was recently completed and is supplied power from the North Dayton Switching Station, bringing the electrical load of this station near capacity in its present configuration. Nokian Tyres is planning further expansion of this facility through 2025, which would cause voltage and thermal violations on the current transmission system. Implementation of the Action Alternative would alleviate these issues, increasing the reliability of the transmission system and supporting economic development such as the Nokian Tyres expansion, which could result in long-term indirect economic benefits to the area.

There is also the potential for a decrease in property value for those parcels intersected by or adjacent to the new TL ROW. However, the vast majority of the new construction would take place in forested or agricultural areas or along existing TVA ROW; residential properties have been avoided to the greatest extent possible. Although a small number of residences are located in close proximity and would have a direct line of sight to the TL, most area residences are located a considerable distance from the proposed TL ROW and/or are separated from the TL by a vegetated buffer. Thus, overall effects to local property values would be minor.

4.11.2 **Community Facilities and Services**

Direct impacts to community facilities occur when a community facility is displaced or access to the facility is altered. Construction of the proposed 12-mile 161-kV TL would not result in the displacement of any community facilities nor impede access to the facilities. Therefore, there would be no direct impacts to community facilities or services under the Action Alternative.

Indirect impacts occur when a proposed action or project results in a population increase that would generate greater demands for services and/or affect the delivery of such services. As the TL construction and maintenance would not result in notable impacts to local demographics, increased demands for services such as schools, churches, and healthcare facilities are not anticipated. In the event of an emergency along the TL ROW, local law enforcement, fire, and/or EMS response would likely be required. Rhea County operates a Sheriff’s Department, Fire Department, and Rescue Squad out of the city of Dayton, which could respond in the event of an emergency. Additionally, the eastern portion of the project area is served by both the Meigs County and Decatur Fire Departments. As the adjacent communities provide an extensive network of emergency services, and emergencies along the TL are anticipated to be a rare occurrence, implementation of the Action Alternative would not have a notable impact on the demand for emergency services in the area.

4.11.3 Environmental Justice

Under the Action Alternative, the construction and operation of the 12-mile 161-kV TL could result in impacts to nearby residents, including temporary impacts such as increased noise, fugitive dust, and air emissions during the construction period, as well as long-term visual impacts, land use limitations, and the potential for decreased property values. However, these impacts would be minor due to the considerable distance between the majority of residences and the proposed ROW and have been further minimized through community and landowner involvement in the selection of the proposed TL route. In addition, the proposed TL would not result in any substantial long-term emissions or releases of air pollutants, noise, or hazardous materials that would have a direct impact on human health or welfare. As impacts to area residents would be minor and no minority or low-income populations subject to environmental justice considerations were identified in the block groups encompassing the proposed TL, the construction and operation of the TL would have no disproportionate adverse impacts on environmental justice populations.

4.12 Cultural Resources

Under the Action Alternative, TVA would build the new TL. The portions of four sites in the APE (40MG15, 40MG74, 40MG303, and 40RH317) have been determined to be non-contributing elements of their overall NRHP eligibility and the proposed activities would have no effect. Site 40RH289 is located outside of the APE. Two archaeological sites, 40MG9 and 40MG75, as well as a small cemetery in the APE, could be adversely affected by the project. Sites 40MG9 and 40MG75 would be crossed by an access route used during line construction and maintenance. In order to avoid adverse effects, TVA has committed to placing wetland mats along the access route where it crosses the sites, plus a 30 meter buffer. In order to ensure the sites would not be disturbed by future activities, the matting requirement would be added to design sheets that are used by construction and maintenance groups. These drawings are consulted each time TVA is considering any type of physical work on a TL.

The small cemetery is located within the proposed TL corridor. Beyond TRC's recommended "Do Not Disturb" buffer, TVA would take additional steps to ensure that the cemetery is undisturbed. TVA would place an additional 15-meter (50 feet) buffer around the "Do Not Disturb" limits and ensure that the buffer is clearly marked on all plans and profiles. No TL structures are proposed to be built within either buffer and the closest TL structure would be approximately 30 meters (100 feet) to the south of the outermost protective buffer. No ground disturbance would be permitted within the "Do Not Disturb" limits and vegetation clearing would be accomplished by hand or by using low ground pressure equipment. In the 15-meter buffer around the "Do Not Disturb" limits, vegetation could be cleared with standard equipment provided that no ground disturbance would occur. Under these circumstances, there would be no effect to sites 40MG9, 40MG75, and the cemetery.

The Jim Godsey House, an NRHP-listed property, is within the APE. At its closest, the proposed TL would be over 1/3 of a mile to the southwest. Although construction of the TL may result in a change to the properties' viewshed, the change would not result in an adverse effect.

With the added site buffers and aforementioned commitments in place, TVA finds that no historic properties would be affected by the undertaking as currently designed.

TVA has consulted with the TN SHPO regarding these findings and determinations. In a letter dated March 26, 2020 and an email dated June 22, 2020, the Tennessee SHPO concurred with TVA's findings in regard to the cultural resources survey of the TL corridor. In a letter dated September 11, 2020, the Tennessee SHPO concurred with TVA's findings in regard to the archaeological survey of the access routes. TVA also consulted with federally recognized tribes on the proposed undertaking. The Cherokee Nation responded to the TL survey, expressing concern about TVA's survey of only the portion of site 40MG303 within the APE. TVA responded stating that alternatives for avoiding the entirety of the site had been considered, but rerouting the TL here would have resulted in a significant redesign of a portion of the line. Furthermore, TVA stated that for undertakings considered "critical infrastructure" projects (e.g., TL and associated access routes), it was TVA's practice to limit its archaeological survey and archaeological APE to the project footprint. No other tribal responses were received. TVA also consulted with federally recognized tribes on the results of the archaeological survey for the access routes. No responses were received.

4.13 Recreation

Under the action alternative, the project would be implemented. Because there is sufficient distance between the B&B Shooting Range and the existing TL that comprises a part of the project, no significant impacts on use of the range is expected. Work on the existing TL and development of the new section could cause some minor shifts in any dispersed outdoor recreation activities that occur within or immediately adjacent to the project pathway but any shifts in use patterns during or after completion of the project should be minor.

4.14 Managed and Natural Areas

One natural area lies within the footprint of the proposed project. Direct impacts to Chickamauga State WMA will be associated with improvements to the TL. Access to the TL will be confined to designated access roads, and the use of standard BMPs will minimize impacts to the existing TL ROW. Construction schedules in this area will be coordinated with the TWRA site manager (Greg Atchley at 423-693-6604) contact to minimize impacts to hunting; standard BMPs will minimize direct impacts to this area to an insignificant level.

There are seven natural areas within three miles of the proposed project:

- Harris Cave (0.86-miles)
- Lauren Snow Designated State Natural Area (1.4-miles)
- Cumberland Trail 1 (1.7 miles)
- Butcher Bluff TVA Habitat Protection Area (1.9-miles)
- Bryan College Arboretum (2.2-miles)
- Eaves Bluff TVA Habitat Protection Area (2.2 miles)
- Yuchi Wildlife Refuge (2.4-miles)
-

These sites are located a sufficient distance such that there would be no direct, indirect, nor cumulative impacts to these areas associated with the proposed project.

4.15 Post-construction Effects

TLs, like all other types of electrical wiring, generate both electric and magnetic fields (EMF). The voltage on the conductors of a TL generates an electric field that occupies the space between the conductors and other conducting objects such as the ground, TL

structures, or vegetation. A magnetic field is generated by the current (i.e., the movement of electrons) in the conductors. The strength of the magnetic field depends on the current, the design of the TL, and the distance from the TL. The fields from a TL are reduced by mutual interference of the electrons that flow around and along the conductors and between the conductors. The result is even greater dissipation of the low energy. Most of this energy is dissipated on the ROW, and the very low amount of residual energy is reduced to background levels near the ROW or energized equipment.

Magnetic fields can induce currents in conducting objects. Electric fields can create static charges in ungrounded conducting materials. The strength of the induced current or charge under a TL varies with: (1) the strength of the electric or magnetic field; (2) the size and shape of the conducting object; and (3) whether the conducting object is grounded. Induced currents and charges can cause shocks under certain conditions by making contact with objects in an electric or magnetic field.

The proposed TL has been designed to minimize the potential for such shocks. This is done, in part, by maintaining sufficient clearance between the conductors and objects on the ground. Stationary conducting objects, such as metal fences, pipelines, and highway guardrails that are near enough to the TL to develop a charge (typically these would be objects located within the ROW) would be grounded by TVA to prevent them from being sources of shocks.

Under certain weather conditions, high-voltage TLs, such as the proposed 161-kV TL, may produce an audible low-volume hissing or crackling noise (Appendix E). This noise is generated by the corona resulting from the dissipation of energy and heat as high voltage is applied to a small area. Under normal conditions, corona-generated noise is not audible.

The noise may be audible under some wet conditions, but the resulting noise level away from the ROW would be well below the levels that can produce interference with speech. Corona-generated noise is not associated with any adverse health effects in humans or livestock.

Other public interests and concerns related to EMFs include potential interference with A.M.-band radio reception, television reception, satellite television, and implanted medical devices. Older implanted medical devices historically had a potential for power equipment strong- field interference when they came within the influence of low-frequency, high-energy workplace exposure. However, these older devices and designs (i.e., those beyond five to ten years old) have been replaced with different designs and different shielding that prevent potential for interference from external field sources up to and including the most powerful magnetic resonance imaging medical scanners. Unlike high-energy radio frequency devices that can still interfere with implanted medical devices, low-frequency and low- energy powered electric or magnetic devices, such as the proposed TL, no longer interfere (Journal of the American Medical Association 2007).

Research has been done on the effects of EMFs on animal and plant behavior, growth, breeding, development, reproduction, and production. Research has been conducted in the laboratory and under environmental conditions, and no such adverse effects have been reported for the low-energy power frequency fields (World Health Organization [WHO] 2007a). Effects associated with ungrounded, metallic objects' static charge accumulation and with discharges in dairy facilities have been found when the connections from a

distribution line meter have not been properly installed on the consumer's side of a distribution circuit.

There is some public concern as to the potential for adverse health effects that may be related to long-term exposure to EMF. A few studies of this topic have raised questions about cancer and reproductive effects on the basis of biological responses observed in cells or in laboratory animals or on associations between surrogate measures of power line fields and certain types of cancer. Research has been ongoing for several decades.

The consensus of scientific panels reviewing this research is that the evidence does not support a cause-and-effect relationship between EMFs and any adverse health outcomes (American Medical Association [AMA] 1994; National Research Council 1997; National Institute of Environmental Health Sciences [NIEHS] 2002). Some research continues on the statistical association between magnetic field exposure and a rare form of childhood leukemia known as acute lymphocytic leukemia. A recent review of this topic by the WHO concluded that this association is very weak, and there is inadequate evidence to support any other type of excess cancer risk associated with exposure to EMFs (International Association for Research on Cancer 2002).

TVA follows medical and health research related to EMFs, and thus far, no controlled laboratory research has demonstrated a cause-and-effect relationship between low-frequency electric or magnetic fields and health effects or adverse health effects even when using field strengths many times higher than those generated by power TLs. Statistical studies of overall populations and increased use of low-frequency electric power have found no associations (WHO 2007b).

TVA also follows media reports which suggest such associations, but these reports do not undergo the same scientific or medical peer review that medical research does. Neither medical specialists nor physicists have been able to form a testable concept of how these low-frequency, low-energy power fields could cause health effects in the human body where natural processes produce much higher fields. To date, there is no agreement in the scientific or medical research communities as to what, if any, electric or magnetic field parameters might be associated with a potential health effect in a human or animal. There are no scientifically or medically defined safe or unsafe field strengths for low-frequency, low-energy power substation or line fields.

The current and continuing position of the scientific and medical communities regarding the research and any potential for health effects from low-frequency power equipment or line fields is that there are no reproducible or conclusive data demonstrating an effect or an adverse health effect from such fields (WHO 2007c). In the United States, national organizations of scientists and medical personnel have recommended no further research on the potential for adverse health effects from such fields (AMA 1994; U.S. Department of Energy 1996; NIEHS 1998).

Although no federal standards exist for maximum EMF strengths for TLs, two states (New York and Florida) do have such regulations. Florida's regulation is the more restrictive of the two, with field levels limited to 150 milligauss at the edge of the ROW for TLs of 230-kV and less. The expected magnetic field strengths at the edge of the proposed ROW would fall well within these standards. Consequently, the construction and operation of the proposed TL connectors are not anticipated to cause any significant impacts related to EMFs.

Under this alternative, EMFs would be produced along the length of the proposed TL. The strength of the fields within and near the ROW varies with the electric load on the TL and with the terrain. Nevertheless, EMF strength attenuates rapidly with distance from the TL and is usually equal to local ambient levels at the edge of the ROW. Thus, public exposure to EMFs would be minimal, and no significant impacts from EMFs are anticipated.

Lightning Strike Hazard

TVA TLs are built with overhead ground wires that lead a lightning strike into the ground for dissipation. Thus, a safety zone is created under the ground wires at the tops of structures and along the TL, for at least the width of the ROW. NESC standards are strictly followed when installing, repairing, or upgrading TVA TLs or equipment. TL structures are well grounded, and the conductors are insulated from the structure. Therefore, touching a structure supporting a TL poses no inherent shock hazard.

Transmission Structure Stability

The structures that would be used on the proposed TL are similar to those shown in Section 2.2.5 and are the result of detailed engineering design. They have been used by TVA, with minor technological upgrades over time, for over 70 years with an exceptional safety record. They are not prone to rot or crack like wooden poles, nor are they subject to substantial storm damage due to their low cross-section in the wind.

Additionally, all TVA transmission structures are examined visually at least once a year. Thus, the proposed structures do not pose any significant physical danger. For this reason, TVA does not typically construct barricades or fences around structures.

4.16 Long Term and Cumulative Impacts

The presence of the TL would present long-term visual effects to the mostly rural/undeveloped character of the local areas. However, because the route of the proposed TL would traverse mainly rural portions of Meigs and Rhea Counties, TN with few residences, the TL would not be especially prominent in the local landscape. Likewise, the establishment of easements for the proposed ROW with local landowners would not pose a long-term encumbrance on the affected properties. Various agricultural land uses could be practiced within the ROW, but any timber production within the ROW would be foregone for the life of the TL.

The increase in power supply is one factor in improving the overall infrastructure in the local area, which over time could attract future commercial and residential development, benefitting the local area in an economic capacity. However, the extent and degree of such development depends on a variety of factors and cannot be predicted. Therefore, residential and commercial growth in this predominantly rural area would be minor, long-term, and a cumulative consequence of the proposed transmission system improvements.

There would be no cumulative impacts to natural areas as the result of this project.
Unavoidable Adverse Environmental Impacts

The following unavoidable effects would result from implementing the proposed actions as described under the Action Alternative in Section 2.1.2.

- Clearing associated with construction of the proposed TL could result in a small amount of localized siltation; however, with BMPs any impact would be minor and temporary.

- Clearing and construction would result in the removal of trees, but due to the amount of acres of forested land in the surrounding area, the impact on forest resources is minimal.

- No incompatible, tall-growing trees would be permitted to grow within the TL ROW and only low-growing vegetation would be permitted to grow adjacent to the ROW. In areas where the ROW would traverse forested areas, this would cause a change in the visual character of the immediate area and would segment some forested areas.

- Clearing and construction would result in the disruption and/or loss of some plants and wildlife, and the loss of about 121 acres of forested habitat for the life of the TL.

- Any burning of cleared material would result in some short-term air pollution.

- ROW construction would involve tree clearing and conversion of 26.62 acres of wetlands containing woody vegetation (24.84 acres of forested wetland and 1.78 acre scrub-shrub wetland) to emergent, meadow-like wetland habitat.

- The proposed TL would result in minor long-term visual effects on the landscape in the immediate local area.

4.17 Relationship of Short-Term Uses and Long-Term Productivity

Land within the ROW of the proposed TL would be committed to use for electrical system needs for the foreseeable future. Some of the ROW would be converted from its current use as pasture, agricultural fields, and forest to use as an ROW (as described in Sections 1.1 and 2.2.1). The proposed ROW would support the 161-kV TL (see Figure 1-1), with use of existing access roads outside the ROW. Agricultural uses of the ROW could and would likely continue. However, routine vegetation management along the ROW would preclude forest management within or adjacent to (e.g., danger trees) the ROW for the operational life of the TL. These losses of long-term productivity with respect to timber production and as wildlife habitat are minor both locally and regionally.

4.18 Irreversible and Irretrievable Commitments of Resources

Irreversible commitments of resources are those uses of resources that cannot be undone. An example of an irreversible commitment is the mining and use of an ore, which once mined, cannot be replaced. Irretrievable commitments of resources are those that may occur over a period of time but that may be recovered. For example, filling a wetland area for a parking lot would irretrievably commit the property for as long as the parking lot remains.

The materials used for construction of the proposed TL would be committed for the life of the TL. Some materials, such as ceramic insulators and concrete foundations, may be irrevocably committed, but the metals used in equipment, conductors, and supporting steel structures could be recycled. The useful life of steel-pole transmission structures or laced-

steel towers is expected to be at least 60 years. Thus, recyclable materials would be irretrievably committed until they are eventually recycled.

The ROW used for the TL would constitute an irretrievable commitment of onsite resources, such as wildlife habitat, forest resources, and forested wetlands in that the approximate previous land use and land cover could be returned upon retirement of these facilities. In the interim, compatible uses of the ROW for the TL could continue.

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CHAPTER 5

5.0 LIST OF PREPARERS

5.1 NEPA Project Management

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Experience:	21 years of experience in ecological restoration and plant ecology and 15 years in botany
Involvement:	Vegetation, Threatened and Endangered Species (Plants)

Michael Angst

Position:	Archaeologist
Education:	M.A., Anthropolody; B.A., Anthropology
Experience:	28 years in Cultural Resources Management
Involvement:	Cultural Resources Compliance

Britta P. Lees

Position:	Biologist, Wetlands
Education:	M.S., Botany-Wetlands Ecology Emphasis; B.A., Biology
Experience:	15 years in Wetlands Assessments, Botanical Surveys, Wetlands Regulations, and/or NEPA Compliance
Involvement:	Wetlands

Robert A. Marker

Position:	Contract Recreation Representative
Education:	B.S., Outdoor Recreation Resources Management
Experience:	40 years in Recreation Planning and Management
Involvement:	Recreation

Craig L. Phillips

Position:	Biologist, Aquatic Community Ecology
Education:	M.S., and B.S., Wildlife and Fisheries Science
Experience:	11 years Sampling and Hydrologic Determinations for Streams and Wet-Weather Conveyances; 9 years in Environmental Reviews
Involvement:	Aquatic Ecology; Threatened and Endangered Aquatic Animals

Kim Pilarski-Hall

Position:	Specialist, Wetlands and Natural Areas
Education:	M.S. and B.S., Geography, Minor in Ecology
Experience:	22 years in Wetlands Assessment and Delineation
Involvement:	Wetlands and Natural Areas

Amos L. Smith, PG

Position:	Geology and Groundwater
Education:	B.S., Geology
Experience:	30 years in Environmental Analyses and Groundwater Evaluations
Involvement:	Geology and Groundwater

Liz Hamrick

Position:	Biologist, Zoology
Education:	M.S. Wildlife and Fisheries Science B.S., Biology, B.A. Anthropology
Experience:	20 years in Biological Data Collection
Involvement:	Wildlife; Threatened and Endangered Terrestrial Animals

Carrie C. Williamson, P.E., CFM

Position:	Civil Engineer, Flood Risk
Education:	M.S. and B.S., Civil Engineering
Experience:	7 years in Floodplains and Flood Risk; 11 years in Compliance Monitoring; 3 years in River Forecasting
Involvement:	Floodplains

Chevales Williams

Position:	Water Specialist
Education:	B.S., Environmental Engineering
Experience:	15 years of experience in water quality monitoring and compliance; 13 years in NEPA planning and environmental services
Involvement:	Surface Water and Soil Erosion

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CHAPTER 6

6.0 ENVIRONMENTAL ASSESSMENT RECIPIENTS

6.1 Federal Agencies

U.S. Army Corps of Engineers
U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service
USDA, Natural Resources Conservation Service
USDA, U.S. Forest Service

6.2 Federally Recognized Tribes

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

6.3 State Agencies

Tennessee Department of Agriculture
Tennessee Department of Environment and Conservation
Tennessee Department of Transportation
Tennessee Historical Commission
Tennessee Wildlife Resources Agency

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Appendix A – Correspondence

TENNESSEE HISTORICAL COMMISSION
STATE HISTORIC PRESERVATION OFFICE
2941 LEBANON PIKE
NASHVILLE, TENNESSEE 37243-0442
OFFICE: (615) 532-1550
www.tnhistoricalcommission.org

March 26, 2020

Mr. Clinton E. Jones
Tennessee Valley Authority
Biological and Cultural Compliance
400 West Summit Hill Drive
Knoxville, TN 37902

RE: TVA / Tennessee Valley Authority, North Dayton-Goodfield Transmission Line (TL) Project, Meigs and Rhea Counties, TN

Dear Mr. Jones:

Pursuant to your request, this office has reviewed documentation concerning the above-referenced undertaking. Our review of and comment on your proposed undertaking are among the requirements of Section 106 of the National Historic Preservation Act. This Act requires federal agencies or applicants for federal assistance to consult with the appropriate State Historic Preservation Office before they carry out their proposed undertakings. The Advisory Council on Historic Preservation has codified procedures for carrying out Section 106 review in 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739).

Based on the information provided, we find that the project area contains a cultural resource- the Jim Godsey House which was listed on the National Register of Historic Places under the Historic Resources of Meigs County Multiple Resource Nomination. We do not concur that the property is no longer eligible as it still has intact features such as the I-House form, porch detailing, and windows. We further find that the project as currently proposed will not adversely affect the historic resource.

In accordance with the TN State Historic Preservation Office Standards and Guidelines for Archaeological Resource Management Studies, please submit an updated Site Record for site 40MG303 to the Tennessee Division of Archaeology.

This office has no objection to the implementation of this project as currently planned. If project plans are changed or previously unevaluated archaeological resources are discovered during project construction, please contact this office to determine what further action, if any, will be necessary to comply with Section 106 of the National Historic Preservation Act. Questions and comments may be directed to Claire Meyer (615-770-1099). We appreciate your cooperation.

Sincerely,

E. Patrick McIntyre, Jr.

cem

E. Patrick McIntyre, Jr.
Executive Director and
State Historic Preservation Officer

EPM/cem

Angst, Michael G

From: Claire Meyer <Claire.Meyer@tn.gov>
Sent: Monday, June 22, 2020 2:38 PM
To: Angst, Michael G
Subject: RE: RE: TVA_North Dayton-Goodfield_TL_Meigs_Rhea_cos_TN_SHPO_CID76150_23March2020.pdf

This is an EXTERNAL EMAIL from outside TVA. THINK BEFORE you CLICK links or OPEN attachments. If suspicious, please click the "Report Phishing" button located on the Outlook Toolbar at the top of your screen.

Hi Michael,
Thank you for sending this over, it looks good to us.

Let me know if you have any other questions!
Best,
Claire Meyer

CLAIRE MEYER
Historic Preservation Specialist, Section 106
Tennessee Historical Commission
State Historic Preservation Office
2941 Lebanon Pike, Nashville, TN 37214
Direct line: (615) 770-1099
Claire.Meyer@tn.gov
www.tnhistoricalcommission.org
Pronouns: she, her, hers

From: Angst, Michael G <mgangst@tva.gov>
Sent: Thursday, June 18, 2020 12:23 PM
To: Section 106 <Section.106@tn.gov>
Subject: [EXTERNAL] RE: TVA_North Dayton-Goodfield_TL_Meigs_Rhea_cos_TN_SHPO_CID76150_23March2020.pdf

***** This is an EXTERNAL email. Please exercise caution. DO NOT open attachments or click links from unknown senders or unexpected email - STS-Security. *****

Good afternoon Claire and Jennifer –
I just want to follow up on this project in order to close the loop on our consultation. In our letter dated March 23, 2020, we determined that the Jim Godsey house, listed on the National Register of Historic Places (NRHP) under the Historic Resources of Meigs County Multiple Resource Nomination, was no longer eligible for the NRHP and that the proposed undertaking would have No Effect to historic properties. In your response letter dated March 26, 2020, you disagreed with our determination that the Jim Godsey House was no longer eligible, but that the project as currently proposed would not adversely affect the historic resource. As a result, we will change our determination to No Adverse Effect. An update will also be made to the final report.

Furthermore, your office requested an updated copy of the site form for site 40MG303. Our contractor, TRC Environmental Corporation, Inc., submitted the form via email on March 24, 2020.

If you would reply in the affirmative, I will move forward in the process of closing out this project. Thanks so much, Mike

Due to COVID-19 safety precautions enacted by TVA, I am currently teleworking.

My mobile phone is listed below and you can call or text until further notice.

Michael Angst
Archaeologist
Cultural Compliance

400 W Summit Hill Drive
WT 11A-K
Knoxville, TN 37902
865.632.6257 (w)
865.382.0931 (m)
mgangst@tva.gov

NOTICE: This electronic message transmission contains information that may be TVA SENSITIVE, TVA RESTRICTED, or TVA CONFIDENTIAL. Any misuse or unauthorized disclosure can result in both civil and criminal penalties. If you are not the intended recipient, be aware that any disclosure, copying, distribution, or use of the content of this information is prohibited. If you have received this communication in error, please notify me immediately by email and delete the original message.

TENNESSEE HISTORICAL COMMISSION
STATE HISTORIC PRESERVATION OFFICE
2941 LEBANON PIKE
NASHVILLE, TENNESSEE 37243-0442
OFFICE: (615) 532-1550
www.tnhistoricalcommission.org

September 11, 2020

Mr. Clinton E. Jones
Tennessee Valley Authority
Biological and Cultural Compliance
400 West Summit Hill Drive
Knoxville, TN 37902

RE: TVA / Tennessee Valley Authority, North Dayton-Goodfield Transmission Line (TL) Project Access Roads, Meigs and Rhea Counties, TN

Dear Mr. Jones:

In response to your request, we have reviewed the revised archaeological report of investigations addendum and accompanying documentation submitted by you regarding the above-referenced undertaking. Our review of and comment on your proposed undertaking are among the requirements of Section 106 of the National Historic Preservation Act. This Act requires federal agencies or applicants for federal assistance to consult with the appropriate State Historic Preservation Office before they carry out their proposed undertakings. The Advisory Council on Historic Preservation has codified procedures for carrying out Section 106 review in 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739).

Considering the information provided, we concur that sites 40MG9 and 40MG75 are potentially eligible for inclusion in the National Register of Historic Places. We further concur that if the proposed avoidance and minimization efforts are employed, no archaeological resources eligible for listing in the National Register of Historic Places will be affected by this undertaking. If project plans are changed or archaeological remains are discovered during project construction, please contact this office to determine what further action, if any, will be necessary to comply with Section 106 of the National Historic Preservation Act. Questions or comments may be directed to Jennifer M. Barnett ((615) 687-4780, Jennifer.Barnett@tn.gov).

Your cooperation is appreciated.

Sincerely,

E. Patrick McIntyre, Jr.
Executive Director and
State Historic Preservation Officer

EPM/jmb

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Appendix B – Bat Strategy Project Screening Form

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

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

Project Name: Mod. No. 1 - Loop to North Dayton161-kV Transmission Line **Date:** Jul 21, 2020

Contact(s): Robert Wilson **CEC#:** **Project ID:** 33166

Project Location (City, County, State): Rhea County, Meigs County, TN

Project Description:

TVA proposes power system improvements to accommodate the forecasted electrical load for the Dayton area. TVA proposes to build the approximately 12-mile Sequoyah Nuclear - Watts Bar HP, Loop to N. Dayton 161-kV transmission line, and string OPGW.

SECTION 1: PROJECT INFORMATION - ACTION AND ACTIVITIES

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

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

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

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

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

TABLE 2. Activities not likely to adversely affect bats with implementation of conservation measures. Conservation measures and completion of bat strategy project review form REQUIRED; review of bat records in proximity to project NOT required.

■ 18. Erosion control, minor	☐ 57. Water intake - non-industrial	☐ 79. Swimming pools/associated equipment
☐ 24. Tree planting	☐ 58. Wastewater outfalls	☐ 81. Water intakes – industrial
☐ 30. Dredging and excavation; recessed harbor areas	☐ 59. Marine fueling facilities	☐ 84. On-site/off-site public utility relocation or construction or extension
☐ 39. Berm development	☐ 60. Commercial water-use facilities (e.g., marinas)	☐ 85. Playground equipment - land-based
☐ 40. Closed loop heat exchangers (heat pumps)	☐ 61. Septic fields	☐ 87. Aboveground storage tanks
☐ 45. Stream monitoring equipment - placement and use	☐ 66. Private, residential docks, piers, boathouses	☐ 88. Underground storage tanks
☐ 46. Floating boat slips within approved harbor limits	☐ 67. Siting of temporary office trailers	☐ 90. Pond closure
☐ 48. Laydown areas	☐ 68. Financing for speculative building construction	☐ 93. Standard License
☐ 50. Minor land based structures	☐ 72. Ferry landings/service operations	☐ 94. Special Use License
☐ 51. Signage installation	☐ 74. Recreational vehicle campsites	☐ 95. Recreation License
☐ 53. Mooring buoys or posts	☐ 75. Utility lines/light poles	☐ 96. Land Use Permit
■ 56. Culverts	☐ 76. Concrete sidewalks	

Table 3: Activities that may adversely affect federally listed bats. Conservation measures AND completion of bat strategy project review form REQUIRED; review of bat records in proximity of project REQUIRED by OSAR/Heritage eMap reviewer or Terrestrial Zoologist.

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

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

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

a) Will project involve continuous noise (i.e., ≥ 24 hrs) that is greater than 75 decibels measured on the A scale (e.g., loud machinery)?
- (●) **NO** (NV2 does not apply)
- ( ) **YES** (NV2 applies, subject to records review)

b) Will project involve entry into/survey of cave?
- (●) **NO** (HP1/HP2 do not apply)
- ( ) **YES** (HP1/HP2 applies, subject to review of bat records)

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

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

d) Will the project involve vegetation piling/burning?
- ( ) **NO** (SSPC4/ SHF7/SHF8 do not apply)
- (●) **YES** (SSPC4/SHF7/SHF8 applies, subject to review of bat records)

e) If **tree removal (activity 33 or 34)**, estimated amount: 92.7 (●)**ac** ( )**trees** ( )**N/A**

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

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

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

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

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

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

Info below completed by:

☐ **Heritage Reviewer**	(name)		Date	
☐ **OSAR Reviewer**	(name)		Date	
☒ **Terrestrial Zoologist**	(name)	Joshua Argo	Date	Dec 9, 2019

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

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

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

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

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

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

Amount of SUITABLE habitat to be removed/burned (may differ from STEP 4e): 13.3 (●)**ac** ( )**trees)*** ( )**N/A**

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

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

Project footprint is within known habitat (11.4 acres) and potential habitat (1.93 acres) for bats. Clearing is scheduled during both winter and non-winter seasons. Non-winter clearing will be assumed and conservation funding will be charged for any acres the project does not commit to clear during the winter season

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

STEP 7) Project will involve:

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

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

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

STEP 10) Project ◉ **WILL** ○ **WILL NOT** require use of Incidental Take in the amount of [13.3] ◉ **acres or** ○ **trees** proposed to be used during the ■ **WINTER** ■ **VOLANT SEASON** ○ **NON-VOLANT SEASON** ○ **N/A**

STEP 11) Available Incidental Take (prior to accounting for this project) as of [Dec 12, 2019]

TVA Action	Total 20-year	Winter	Volant Season	Non-Volant Season
8 Expand or Construct New Electric Transmission Assets	11,707	7,026.4	2,360.1	2,320.4

STEP 12) Amount contributed to TVA's Bat Conservation Fund upon activity completion: $ [9,515] OR ○ **N/A**

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

SECTION 3: REQUIRED CONSERVATION MEASURES

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

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

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

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

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

Manual Override

Name: Joshua Argo

Check if Applies to Project	Activities Subject To Conservation Measure	Conservation Measure Description
		NV1 - Noise will be short-term, transient, and not significantly different from urban interface or natural events (i.e., thunderstorms) that bats are frequently exposed to when present on the landscape.
		SHF2 - Site-specific conditions (e.g., acres burned, transport wind speed, mixing heights) will be considered to ensure smoke is limited and adequately dispersed away from caves so that smoke does not enter cave or cave-like structures.
		SHF4 - If burns need to be conducted during April and May, when there is some potential for bats to present on the landscape and more likely to enter torpor due to colder temperatures, burns will only be conducted if the air temperature is 55° or greater, and preferably 60° or greater.
		SHF7 - Burning will only occur if site specific conditions (e.g. acres burned, transport wind speed, mixing heights) can be modified to ensure that smoke is adequately dispersed away from caves or cave-like structures. This applies to prescribed burns and burn piles of woody vegetation.
		SHF8 - Brush piles will be burned a **minimum of 0.25 mile from documented, known, or obvious caves or cave entrances** and otherwise in the center of newly established ROW when proximity to caves on private land is unknown.
		TR1* - Removal of potentially suitable summer roosting habitat during time of potential occupancy has been quantified and minimized programmatically. TVA will track and document alignment of activities that include tree removal (i.e., hazard trees, mechanical vegetation removal) with the programmatic quantitative cumulative estimate of seasonal removal of potential summer roost trees for Indiana bat and northern long-eared bat. Project will therefore communicate completion of tree removal to appropriate TVA staff.
		TR3* - Removal of suitable summer roosting habitat within documented bat habitat (i.e., within 10 miles of documented Indiana bat hibernacula, within 5 miles of documented northern long-eared bat hibernacula, within 2.5 miles of documented Indiana bat summer roost trees, within 5 miles of Indiana bat capture sites, within 1 mile of documented northern long-eared bat summer roost trees, within 3 miles of northern long-eared bat capture sites) will be tracked, documented, and included in annual reporting. Project will therefore communicate completion of tree removal to appropriate TVA staff.
		TR4* - Removal of suitable summer roosting habitat within potential habitat for Indiana bat or northern long-eared bat will be tracked, documented, and included in annual reporting. Project will therefore communicate completion of tree removal to appropriate TVA staff.
		TR9 - If removal of suitable summer roosting habitat occurs when bats are present on the landscape, a funding contribution (based on amount of habitat removed) towards future conservation and recovery efforts for federally listed bats would be carried out. Project can consider seasonal bat presence/absence surveys (mist netting or emergence counts) that allow for positive detections without resulting in increased constraints in cost and project schedule. This will enable TVA to contribute to increased knowledge of bat presence on the landscape while carrying out TVA's broad mission and responsibilities.

	SSPC1 (**Transmission only**) - Transmission actions and activities will continue to Implement A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities. This focuses on control of sediment and pollutants, including herbicides. Following are key measures: o BMPs minimize erosion and prevent/control water pollution in accordance with state-specific construction storm water permits. BMPS are designed to keep soil in place and aid in reducing risk of other pollutants reaching surface waters, wetlands and ground water. BMPs will undertake the following principles: • Plan clearing, grading, and construction to minimize area and duration of soil exposure. • Maintain existing vegetation wherever and whenever possible. • Minimize disturbance of natural contours and drains. • As much as practicable, operate on dry soils when they are least susceptible to structural damage and erosion. • Limit vehicular and equipment traffic in disturbed areas. Keep equipment paths dispersed or designate single traffic flow paths with appropriate road BMPs to manage runoff. • Divert runoff away from disturbed areas. • Provide for dispersal of surface flow that carries sediment into undisturbed surface zones with high infiltration capacity and ground cover conditions. • Prepare drainage ways and outlets to handle concentrated/increased runoff. • Minimize length and steepness of slopes. Interrupt long slopes frequently. • Keep runoff velocities low and/or check flows. • Trap sediment on-site. • Inspect/maintain control measures regularly & after significant rain. • Re-vegetate and mulch disturbed areas as soon as practical. o Specific guidelines regarding sensitive resources and buffer zones: • Extra precaution (wider buffers) within SMZs is taken to protect stream banks and water quality for streams, springs, sinkholes, and surrounding habitat. • BMPs are implemented to protect and enhance wetlands. Select use of equipment and seasonal clearing is conducted when needed for rare plants; construction activities are restricted in areas with identified rare plants. • Standard requirements exist to avoid adverse impacts to caves, protected animals, unique/ important habitat (e.g., cave buffers, restricted herbicide use, seasonal clearing of suitable habitat).
	SSPC2 - Operations involving chemical/fuel storage or resupply and vehicle servicing will be handled outside of riparian zones (streamside management zones) in a manner to prevent these items from reaching a watercourse. Earthen berms or other effective means are installed to protect stream channel from direct surface runoff. Servicing will be done with care to avoid leakage, spillage, and subsequent stream, wetland, or ground water contamination. Oil waste, filters, other litter will be collected and disposed of properly. Equipment servicing and chemical/fuel storage will be limited to locations greater than 300-ft from sinkholes, fissures, or areas draining into known sinkholes, fissures, or other karst features.
	SSPC4 (**Transmission only**) - Woody vegetation burn piles associated with transmission construction will be placed in the center of newly established ROWs to minimize wash into any nearby undocumented caves that might be on adjacent private property and thus outside the scope of field survey for confirmation. Brush piles will be burned a **minimum of 0.25 miles from documented caves** and otherwise in the center of newly established ROW when proximity to caves on private land is unknown.
	L1 - Direct temporary lighting away from suitable habitat during the active season.

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

Hide All Unchecked Conservation Measures

- (•) HIDE
- ( ) UNHIDE

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

- (•) HIDE
- ( ) UNHIDE

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

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

Robbie Wilson (name) is (or will be made) aware of the requirements below.

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

For Use by Terrestrial Zoologist Only

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

☒ For projects that require use of Take and/or contribution to TVA's Bat Conservation Fund, Terrestrial Zoologist acknowledges that Project Lead/Contact has been informed that project will result in use of Incidental Take 13.3 ◉ ac ○ trees and that use of Take will require $ 9,515 contribution to TVA's Conservation Fund upon completion of activity (amount entered should be $0 if cleared in winter).

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

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Appendix C – Stream Crossings Along the Proposed Transmission Line Right-of-Way

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Table C-1: Stream crossings along the proposed Loop to North Dayton TL PN: 437881 WO: 31R9N in Meigs and Rhea Counties, Tennessee

Stream ID	Sequence ID	Stream Type	Streamside Management Zone Category	Stream Name	Field Notes	Cowardin Code	HGM Code	Latitude	Longitude
BWA08	001	Perennial	Category A (50 ft)		TDEC score of 21.5, Mud Substrate, 5ft by 3ft, in between cattle pastures.	R4	Riverine	35.518809	-84.847635
BWA07	002	Perennial	Category A (50 ft)		Stream coming off big wetland, culverted/ beaver dam, fish present	R4	Riverine	35.519443	-84.849970
BWA09	003	Perennial	Category A (50 ft)		3ft by 1ft, fish present in puddles, stream was partially dry	R4	Riverine	35.516979	-84.882252
BWA13b	004	Intermittent	Category A (50 ft)		Continuation of BWA13	R4	Riverine	35.517594	-84.878262
BWA13	005	Intermittent	Category A (50 ft)		TDEC score of 20.5, rocky substrate, 3ft by 3ft	R4	Riverine	35.517590	-84.878779
BWA12	006	Intermittent	Category A (50 ft)		TDEC score of 19, rocky substrate, DATOS	R4	Riverine	35.517403	-84.879760
BWA21	007	Intermittent	Category A (50 ft)		Fish present, but stream is dry in some spots with pools present.	R4	Riverine	35.514768	-84.942004
BWA26	008	Intermittent	Category A (50 ft)	Little Richland Creek	fish present	R4	Riverine	35.532243	-84.981779
BWA27	009	Intermittent	Category A (50 ft)		fish present	R4	Riverine	35.537807	-84.989406

Appendix D – Detailed Wetland Descriptions

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Table D-1. Wetlands located within proposed Loop to North Dayton TL Project

Wetland Identifier	Wetland Type[1]	TRAM[2] Functional Capacity (Score)	Wetland Acreage in Footprint
W000	PFO1E	Low (33)	0.11
W001	PFO1E	Low (21)	0.40
W002a	PFO5H	Low (43)	0.06
W002b	PSS1H	Moderate (51)	0.40
W003a	PFO1E	Low (36)	0.13
W003b	PFO1E	Low (36)	0.10
W004a	PFO1Hh	Moderate (57)	0.18
W004b	L2AB3Hh	Moderate (56)	0.24
W004c	PFO1Hh	Moderate (57)	0.25
W005	L2AB3Hh	Moderate (51)	0.33
W006	L2AB3Hh	Moderate (51)	0.36
W007a	PFO1E	Moderate (56)	0.94
W007b	L2AB3Hh	Moderate (54)	2.81
W007c	PFO1E	Moderate (56)	1.11
W008	PEM1E	Low (22)	0.02
W009	PEM1E	Low (22)	0.02
W010	PEM1E	Low (22)	0.01
W011	PEM1E	Low (22)	0.01
W012	PEM1E	Low (22)	<0.01
W013	PEM1E	Low (22)	<0.01
W014	PSS1E	Low (42)	<0.01
W015	PEM1E	Low (34)	0.22
W016a	PFO1E	Moderate (47)	1.31
W016b	PEM1E	Low (32)	0.41
W017	PEM1Ex	Low (16)	1.75
W018	PEM1Ex	Low (16)	1.19
W019a/b	PFO1E	Moderate (46)	0.03
TOTAL ACRES			12.42

[1]Classification codes as defined in Cowardin et al. (1979): E = Seasonally flooded/saturated; EM1=Emergent, persistent vegetation; FO1=Forested, broadleaf deciduous vegetation; FO5=Forested, dead; P=Palustrine; L2=Lacustrine Littoral; AB3=Aquatic bed, Rooted vascular; SS1=Scrub-shrub, broadleaf deciduous vegetation; H=Permanently flooded; h=Diked/Impounded; x=Excavated

[2]TRAM = Tennessee Rapid Assessment Method that categorizes wetland quality by their functional capacity

Table D-2. Action Alternative Wetlands Impacts on the Loop to North Dayton TL Project

Wetland Identifier	Impact Type	Acreage of Forested Wetland Clearing (FO)
W000	Clearing for TL Construction	0.11
W001	Clearing for TL Spans	0.40
W002a	Clearing for TL Spans	0.06
W002b	Temporary, minimal, or avoid	--
W003a	Clearing for TL Spans	0.13
W003b	Clearing for TL Spans	0.10
W004a	Clearing for TL Spans	0.18
W004b	Temporary, minimal, or avoid	--
W004c	Clearing for TL Spans	0.25
W005	Temporary, minimal, or avoid	--
W006	Temporary, minimal, or avoid	--
W007a	Clearing for TL Spans	0.94
W007b	Temporary, minimal, or avoid	--
W007c	Clearing for TL Spans	1.11
W008	Temporary, minimal, or avoid	--
W009	Temporary, minimal, or avoid	--
W010	Temporary, minimal, or avoid	--
W011	Temporary, minimal, or avoid	--
W012	Temporary, minimal, or avoid	--
W013	Temporary, minimal, or avoid	--
W014	Temporary, minimal, or avoid	--
W015	Temporary, minimal, or avoid	--
W016a	Clearing for TL Spans	1.31
W016b	Temporary, minimal, or avoid	--
W017	Temporary, minimal, or avoid	--
W018	Temporary, minimal, or avoid	--
W019a/b	Clearing for TL Spans	0.03
	TOTAL ACRES	4.62 Acres

Appendix E – Noise During Transmission Line Construction and Operation

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Noise During Transmission Line Construction and Operation

At high levels, noise can cause hearing loss; at moderate levels, noise can interfere with communication, disrupt sleep, and cause stress; and at low levels, noise can cause annoyance. Noise is measured in decibels (dB), a logarithmic unit, so an increase of 3 dB is just noticeable, and an increase of 10 dB is perceived as a doubling of sound level. Because not all noise frequencies are perceptible to the human ear, A-weighted decibels (dBA), which filter out sound in frequencies above and below human hearing, are typically used in noise assessments.

Both the USEPA and the Department of Housing and Urban Development (HUD) have established noise guidelines. USEPA guidelines are based on an equivalent day/night average sound level (DNL), which is a 24-hour average sound level with 10 dB added to hours between 10 p.m. and 7 a.m., since people are more sensitive to nighttime noise. USEPA recommends a guideline of DNL less than 55 dBA to protect the health and well-being of the public with an adequate margin of safety. HUD guidelines use an upper limit DNL of 65 dBA for acceptable residential development and an upper limit DNL of 75 dBA for acceptable commercial development. TVA generally uses the USEPA guideline of 55 dBA DNL at the nearest residence and 65 dBA at the property line in industrial areas to assess the noise impact of a project. In addition, TVA gives consideration to the Federal Interagency Committee on Noise (FICON) 1992 recommendation that a 3-dB increase indicates possible impact, requiring further analysis when the existing DNL is 65 dBA or less.

Annoyance from noise is highly subjective. The FICON used population surveys to correlate annoyance and noise exposure (FICON 1992). Table 1 gives estimates of the percentage of typical residential populations that would be highly annoyed from a range of background noise and the average community reaction description that would be expected.

Table 1. Estimated Annoyance From Background Noise (FICON 1992)

Day/Night Level (dB)	Percent Highly Annoyed	Average Community Reaction
75 and above	37	Very severe
70	25	Severe
65	15	Significant
60	9	Moderate
55 and below	4	Slight

For comparative purposes, typical background DNLs for rural areas range from about 40 dBA in undeveloped areas to 48 dBA in mixed residential/agricultural areas (Cowan 1993). Noise levels are typically higher in higher-density residential and urban areas. Background noise levels greater than 65 dBA can interfere with normal conversations, requiring people to speak in a raised voice in order to carry on a normal conversation.

Construction Noise

Construction noise impacts would vary with the number and specific types of equipment on the job, the construction methods, the scheduling of the work, and the distance to sensitive noise receptors such as houses. Typical construction activities for a TL are described in Section 2.2. Maximum noise levels generated by the various pieces of construction equipment typically range from about 70 to 85 dBA at 50 feet (Bolt et al. 1971). An exception would be the use of

track drills for building roads and installing foundations in rocky areas; track drills have a typical maximum noise level of 98 dBA at 50 feet. Use of track drills is not expected to be widespread.

Project-related construction noise levels would likely exceed background noise levels by more than 10 dBA at distances from within 500 feet in developed areas to over 1,000 feet in rural areas with little development. These distances are without the use of track drills; drilling activities could increase the distances by an additional 500 feet. A 10-dBA increase would be perceived as a large increase over the existing noise level and could result in annoyance to adjacent residents. The residential noise level guideline of 55 dBA could also be temporarily exceeded for residences near construction activities.

Construction activities would be limited to daylight hours. Because of the sequence of construction activities, construction noise at a given point along the TL connections would be limited to a few periods of a few days each. The temporary nature of construction would reduce the duration of noise impacts on nearby residents.

Operational Noise

TLs can produce noise from corona discharge, which is the electrical breakdown of air into charged particles. Corona noise is composed of both broadband noise, characterized as a crackling noise, and pure tones, characterized as a humming noise. Corona noise is greater with increased voltage and is also affected by weather. It occurs during all types of weather when air ionizes near irregularities, such as nicks, scrapes, dirt, and insects on the conductors. During dry weather, the noise level is low and often indistinguishable off the ROW from background noise. In wet conditions, water drops collecting on the conductors can cause louder corona discharges.

For 500-kV TLs, this corona noise when present, is usually about 40-55 dBA. The maximum recorded corona noise has been 60-61 dBA (TVA unpublished data). During rain showers, the corona noise would likely not be readily distinguishable from background noise. During very moist, nonrainy conditions, such as heavy fog, the resulting small increase in the background noise levels is not expected to result in annoyance to adjacent residents.

Periodic maintenance activities, particularly vegetation management, would produce noise comparable to that of some phases of TL construction. This noise, particularly from bush-hogging or helicopter operation, would be loud enough to cause some annoyance. It would, however, be of very short duration and very infrequent occurrence.