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# **MOSCOW-MILLER POWER SYSTEM IMPROVEMENTS FINAL ENVIRONMENTAL ASSESSMENT**

**Fayette County, Tennessee; DeSoto County and Marshall County, Mississippi**

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## Acronyms, Abbreviations and Glossary of Terms Used

<b>acre</b>	A unit measure of land area equal to 43,560 square feet
<b>access road</b>	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
<b>AMA</b>	American Medical Association
<b>APE</b>	Area of potential effect
<b>ARAP</b>	Aquatic Resource Alteration Permit
<b>BMP</b>	Best management practice or accepted construction practice designed to reduce environmental effects
<b>bus</b>	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.
<b>CAA</b>	Clean Air Act
<b>CDC</b>	Center for Disease Control and Prevention
<b>CEQ</b>	Council on Environmental Quality
<b>circuit</b>	A section of conductors (three conductors per circuit) capable of carrying electricity to various points
<b>conductors</b>	Cables that carry electrical current
<b>CWA</b>	Clean Water Act
<b>danger tree</b>	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
<b>DATOS</b>	Dry at time of survey
<b>dB</b>	Decibel
<b>DNL</b>	Day/night average sound level
<b>EA</b>	Environmental Assessment
<b>easement</b>	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
<b>EIS</b>	Environmental Impact Statement
<b>EMF</b>	Electromagnetic field
<b>endangered species</b>	A species in danger of extinction throughout all or a significant part of its range
<b>EO</b>	Executive Order
<b>ephemeral stream</b>	Watercourses or ditches that only have water flowing after a rain event; also called a wet-weather conveyance
<b>ESA</b>	Endangered Species Act
<b>extant</b>	In existence; still existing; not destroyed or lost
<b>feller-buncher</b>	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
<b>FICON</b>	Federal Interagency Committee on Noise
<b>FIRM</b>	Flood Insurance Rate Maps
<b>GIS</b>	Geographic Information System
<b>groundwater</b>	Water located beneath the ground surface in the soil pore spaces or in the pores and crevices of rock formations
<b>guy</b>	A cable connecting a structure to an anchor that helps support the structure

<b>hydric soil</b>	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
<b>HUC</b>	Hydrologic unit code
<b>HUD</b>	U.S. Department of Housing and Urban Development
<b>hydrophytic vegetation</b>	Aquatic and wetland plants that have developed physiological adaptations allowing a greater tolerance to saturated soil conditions including with limited or absence of oxygen
<b>IPaC</b>	Information, Planning, and Consultation database (USFWS)
<b>kV</b>	Symbol for kilovolt (1 kV equals 1,000 volts)
<b>KY</b>	Kentucky
<b>load</b>	That portion of the entire electric power in a network consumed within a given area; also synonymous with “demand” in a given area
<b>LPC</b>	Local Power Company
<b>MDEQ</b>	Mississippi Department of Environmental Quality
<b>MDOT</b>	Mississippi Department of Transportation
<b>MLGW</b>	Memphis Light, Gas, & Water
<b>MS</b>	Mississippi
<b>MW</b>	Megawatt
<b>NEPA</b>	National Environmental Policy Act
<b>NERC</b>	North American Electric Reliability Corporation
<b>NESC</b>	National Electric Safety Code
<b>NFIP</b>	National Flood Insurance Program
<b>NHPA</b>	National Historic Preservation Act
<b>NIEHS</b>	National Institute of Environmental Health Sciences
<b>NLEB</b>	Northern Long-eared Bat
<b>NRHP</b>	National Register of Historic Places
<b>NRI</b>	Nationwide Rivers Inventory
<b>NWI</b>	National Wetland Inventory
<b>OPGW</b>	Fiber Optic Groundwire
<b>outage</b>	An interruption of the electric power supply to a user
<b>PA</b>	Programmatic Agreement
<b>PI</b>	Point of intersection at which two straight transmission line sections intersect to form an angle
<b>riparian</b>	Related to or located on the banks of a river or stream
<b>ROW</b>	Right-of-way, a corridor containing a transmission line
<b>runoff</b>	That portion of total precipitation that eventually enters a stream or river
<b>SHPO</b>	State Historic Preservation Office
<b>SMZ</b>	Streamside management zone
<b>SR</b>	State Route
<b>structure</b>	A pole or tower that supports a transmission line
<b>substation</b>	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
<b>surface water</b>	Water collecting on the ground or in a stream, river, lake, or wetland; it is naturally lost through evaporation and seepage into the groundwater
<b>switch</b>	A device used to complete or break an electrical connection
<b>SWPPP</b>	Storm Water Pollution Prevention Plan
<b>threatened species</b>	A species likely to become endangered within the foreseeable future
<b>TDEC</b>	Tennessee Department of Environment and Conservation



<b>TL</b>	Transmission line
<b>TN</b>	Tennessee
<b>TVA</b>	Tennessee Valley Authority
<b>TRAM</b>	Tennessee Rapid Assessment Method, designed by the state of Tennessee to categorize wetland function
<b>USACE</b>	U.S. Army Corps of Engineers
<b>USCB</b>	U.S. Census Bureau
<b>USDA</b>	U.S. Department of Agriculture
<b>USEPA</b>	U.S. Environmental Protection Agency
<b>USFS</b>	U.S. Forest Service
<b>USFWS</b>	U.S. Fish and Wildlife Service
<b>USGS</b>	U.S. Geological Survey
<b>wetland</b>	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
<b>WHO</b>	World Health Organization
<b>WWC</b>	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 growing load within the Chickasaw Trails Industrial Park in Olive Branch, Mississippi (MS) and increase the power reliability in both Fayette County, Tennessee (TN) and DeSoto and Marshall Counties, MS. To accomplish this, TVA would:

- Construct, operate, and maintain a new Duffee 161-kV Switching Station approximately 5.5 miles north of Moscow, TN at the intersection of the existing Cordova-Hickory Valley 161-kV Transmission Line (TL) and the Tap to Moscow 161-kV TL (Figure 1-1).
- TVA would also add Fiber Optic Groundwire (OPGW) beginning at the new switching station and heading south, along the existing 5.9 mile Tap to Moscow 161-kV TL.
- From that point, TVA would construct, operate and maintain a new 18.5-mile Duffee-Chickasaw Trails Industrial Park 161-kV TL extending southwest to a new TVA Chickasaw Trails Industrial Park 161-kV Switching Station.
- The existing Olive Branch-Cordova 161-kV TL is proposed to be looped into the new Chickasaw Trails Industrial Park 161-kV Switching Station.
- A 2.5-mile section of the de-energized Cordova-Holly Springs 161-kV TL is proposed to be rebuilt as double-circuit, utilizing existing ROW, with the new TLs and OPGW to be looped into the new Chickasaw Trails Industrial Park 161-kV Switching Station.
- The individual circuits would be renamed as Chickasaw Trails-Miller 161-kV and Holly Springs-Chickasaw Trails TLs.
- Finally, the existing OPGW would be replaced with new OPGW along the existing 4.4 mile Miller-Oliver Branch 161-kV TL. See Figure 1-2.

The proposed 18.5-mile Duffee-Chickasaw Industrial Park 161-kV TL would require approximately 207 acres of new right-of-way (ROW) and would be constructed using single steel-pole, single-circuit structures. The proposed 2.5 mile Cordova-Holly Springs 161-kV TL rebuild would be constructed using steel-pole, double-circuit structures. TVA proposes to purchase 9.04 acres for the new Duffee 161-kV Switching Station and 9.42 acres for the new Chickasaw Trails Industrial Park Switching Station. The ROW to be utilized for this project is as follows and shown in Figure 1-2:

- All of the ROW associated with the Cordova-Hickory Valley 161-kV TL loop into the Duffee 161-kV Switching Station would occur on property purchased for the Switching Station. This section is depicted in green on Figure 1-2.
- OPGW added to approximately 5.9 miles of existing 100-foot-wide ROW from the Duffee 161-kV Switching Station, depicted in red on Figure 1-2.

- Approximately 18.5 miles of new 100-foot-wide ROW to create the new Moscow–Chickasaw Trails industrial Park 161-kV TL with span of 2,200 feet of 200-foot-wide ROW required to facilitate the crossing of the Wolf River, depicted in blue on Figure 1-2.
- Approximately 800 feet of new 100-ROW to loop the Cordova-Olive Branch 161-kV TL into the Chickasaw Trails Industrial Park 161-kV Switching Station, with 400 feet of that on property purchased in-fee by TVA for the Switching Station, depicted in purple on Figure 1-2.
- Approximately 2.5 miles of currently de-energized Cordova-Holly Springs 161-kV TL would be rebuilt as double-circuit on existing 150-foot-wide ROW, depicted in yellow on Figure 1-2. Approximately 1,100 feet of new ROW would be required for this line to be looped into the Chickasaw Trails Industrial Park 161-kV Switching Station, of which 400 feet would be located on property proposed to be purchased in-fee by TVA for the Switching Station.
- Approximately 4.4 miles of OPGW would be replaced along existing 100-foot-wide ROW of the Miller-Oliver Branch 161-kV TL, depicted in orange on Figure 1-2.

Additionally, TVA proposes to replace relays and complete communications upgrades at the existing Hickory Valley, Holly Springs, Miller, and Olive Branch 161-kV substations as well as the Cordova 500-kV Substation. The map board display at TVA's System Operations Center and Regional Operations Center would be updated to reflect this work. The scheduled in-service date for this project would be winter of 2021 or as soon as possible after that date.

## 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<sup>1</sup> with adequate voltage and no overloaded facilities while maintaining adequate TL clearances as required by the National Electric Safety Code (NESC).

The area within Fayette County, TN and DeSoto and Marshall Counties, MS is primarily supported from the Freeport and Cordova 500-kV Substations via a series of connecting TLs. Several of these TLs have customer connection points along the length of the TLs that are on radial feeds with no source of electrical back-up in the event of an outage. Operation and maintenance of these TLs has historically been limited in this area due to NERC contingency constraints that could arise if the Cordova TLs were lost while the Freeport TL source is out-of-service for maintenance or vice versa. Chickasaw Trails Industrial Park is a 3,600 acre site located in Marshall County, MS that is served from these substations. This site has been the subject of several industrial inquires within the past few years and has been deemed a high growth area in the strategic planning effort. The current electrical capacity within the industrial

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<sup>1</sup> "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.

# Moscow - Miller, MS and TN Proposed Transmission Project

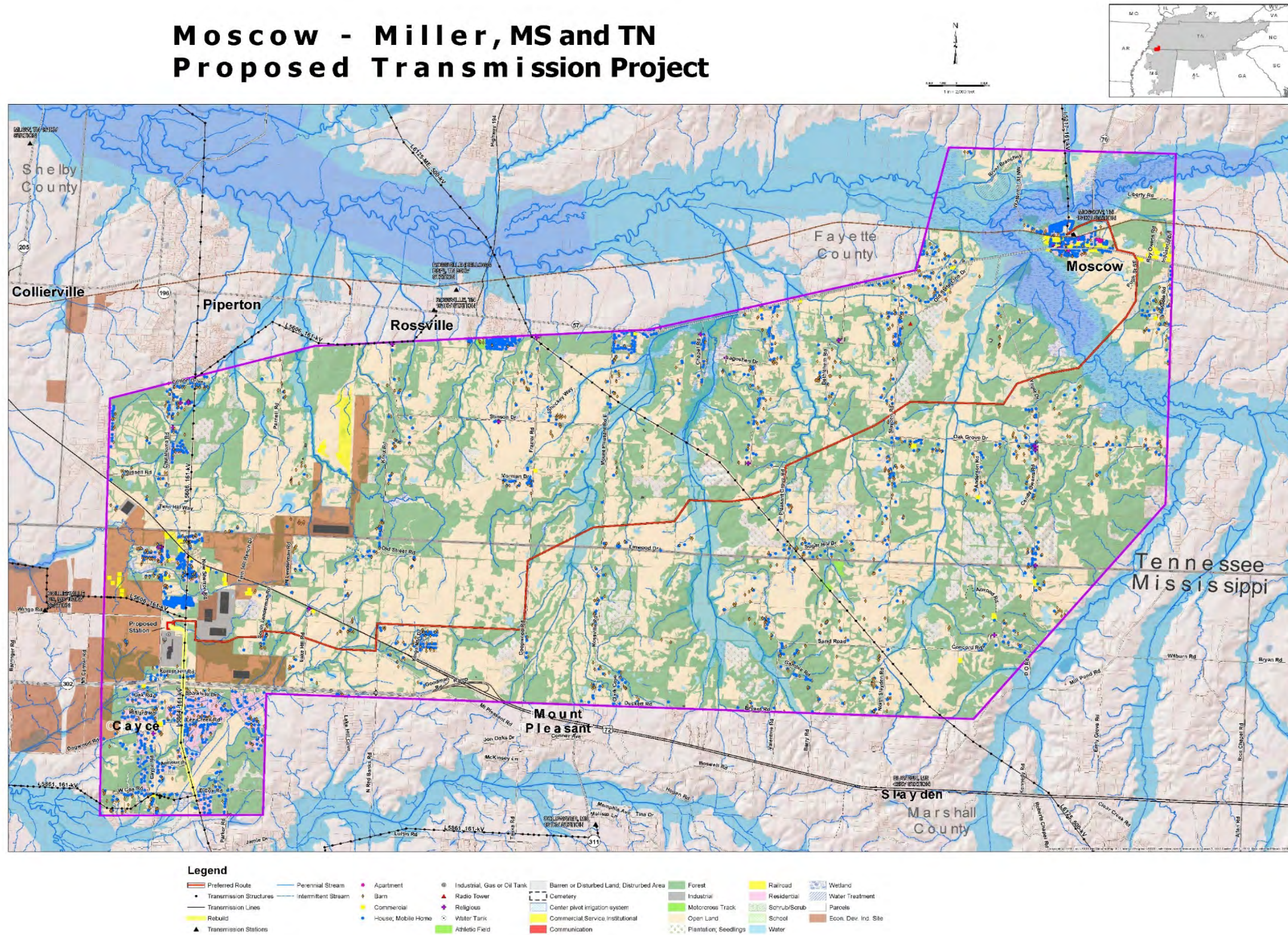


Figure 1-1 TVA's Preferred Route for the Proposed Moscow-Miller 161-kV Transmission Line Located in Fayette County, TN; Marshall County and DeSoto Counties, MS

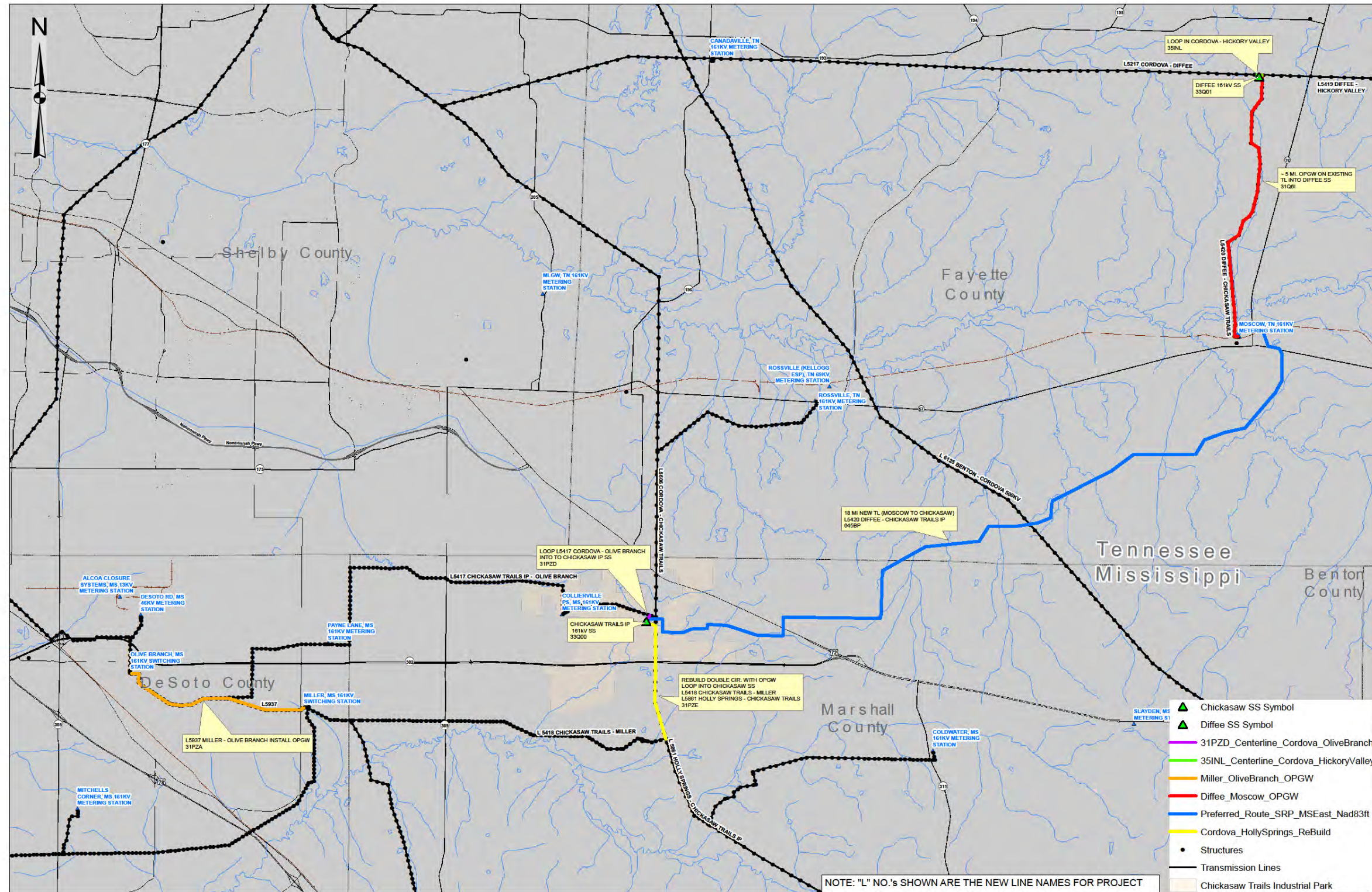


Figure 1-2 TVA's Preferred Route for the Proposed Moscow-Miller 161-kV Transmission Line Located in Fayette County, TN; Marshall County and DeSoto Counties, MS

park is 25 megawatts (MW), yet the average development inquiry is for a facility 60 MW in size. Attempting to serve this load without additional upgrades would result in multiple low voltage and thermal violations in adjoining TLs within the area thereby threatening reliability. The resulting lack of electrical capacity within the Chickasaw Trails Industrial Park has limited new industrial opportunities within the area.

TVA's proposed project would alleviate the voltage and thermal loading problems at this location, improve reliability for both the bulk system as well as individual customer delivery points, provide flexibility for TVA operations and maintenance of the TLs and ROW, and support additional economic development opportunities within the Chickasaw Trails Industrial Park.

To ensure that the areas within Fayette County, TN and DeSoto and Marshall Counties, MS have a continuous reliable source of power, and that the Chickasaw Trails Industrial Park has additional electrical capacity for future load growth, TVA needs to provide new electric service to the area. The construction of the Diffee and Chickasaw Trails Industrial Park 161-kV Switching Stations, associated 161-kV loop lines, OPGW additions, and the new 18.5-mile Diffee–Chickasaw Trails Industrial Park 161-kV TL would meet these needs. Additionally, the proposed project would further enhance TVA's Bulk Transmission System by improving operational and maintenance flexibility, and finally would support economic development in the Chickasaw Trails Industrial Park.

### **1.3 Decision to be Made**

The primary decisions before TVA are whether to ensure that the areas within Fayette County, TN and DeSoto and Marshall Counties, MS have a continuous reliable source of power, and whether the Chickasaw Trails Industrial Park has additional electrical capacity for future load growth. If the proposal is to be completed, other secondary decisions are involved. These include:

- Timing of the proposed improvements;
- Most suitable locations for the new switching stations;
- 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 looks at 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:

- Absentee Shawnee Tribe of Indians of Oklahoma
- Alabama-Coushatta Tribe of Texas
- Alabama-Quassarte Tribal Town
- Cherokee Nation
- Coushatta Tribe of Louisiana
- Eastern Shawnee Tribe of Oklahoma
- Jena Band of Choctaw Indians
- Kialegee Tribal Town
- Mississippi Band of Choctaw Indians
- Mississippi Department of Environmental Quality (MDEQ)
- Mississippi Department of Transportation (MDOT)
- Mississippi State Historic Preservation Office (SHPO)
- Shawnee Tribe
- The Chickasaw Nation
- The Choctaw Nation of Oklahoma
- The Muscogee (Creek) Nation
- Tennessee Department of Environment and Conservation (TDEC)
- Tennessee Department of Transportation (TDOT)
- Tennessee State Historic Preservation Office (SHPO)
- Thlopthlocco Tribal Town
- United Keetoowah Band of Cherokee Indians in Oklahoma
- United States Army Corps of Engineers
- United States Fish and Wildlife Service (USFWS)
- United States Forest Service (USFS)
- United States Department of Agriculture, Natural Resource Conservation Service
- United States Environmental Protection Agency

TVA developed a public communication plan that included a website with information about the project, a map of the alternative TL routes and switching station locations, and numerous feedback mechanisms. TVA held an open house in Slayden, MS, on August 10, 2017. The 177 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 100 people.

At the open house, TVA presented maps with a network of alternative TL routes, comprised of 19 different line 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 27 property owners who submitted comments during the Open House and 30-day comment period. Segments 6 and 10 received four comments each, followed by three comments each for segments 3, 10, 12 and 13. 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 2017 (Figure 1-2). 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 as shown in Figure 1-1. These adjustments are described in Section 2.4.

## **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 two new switching stations, a new TL and associated loop TLs, and OPGW, 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 States of TN and MS and/or the local municipality for the discharge of construction site storm water associated with the construction of the switching stations and associated 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 and MS 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 both TDEC and MDEQ. A permit would be required for a potable water well and septic system at the Diffie 161-kV Switching Station. The well would require registration with the State of Tennessee and the septic system would be permitted with the Fayette County.



# Moscow - Miller, MS and TN Proposed Transmission Project

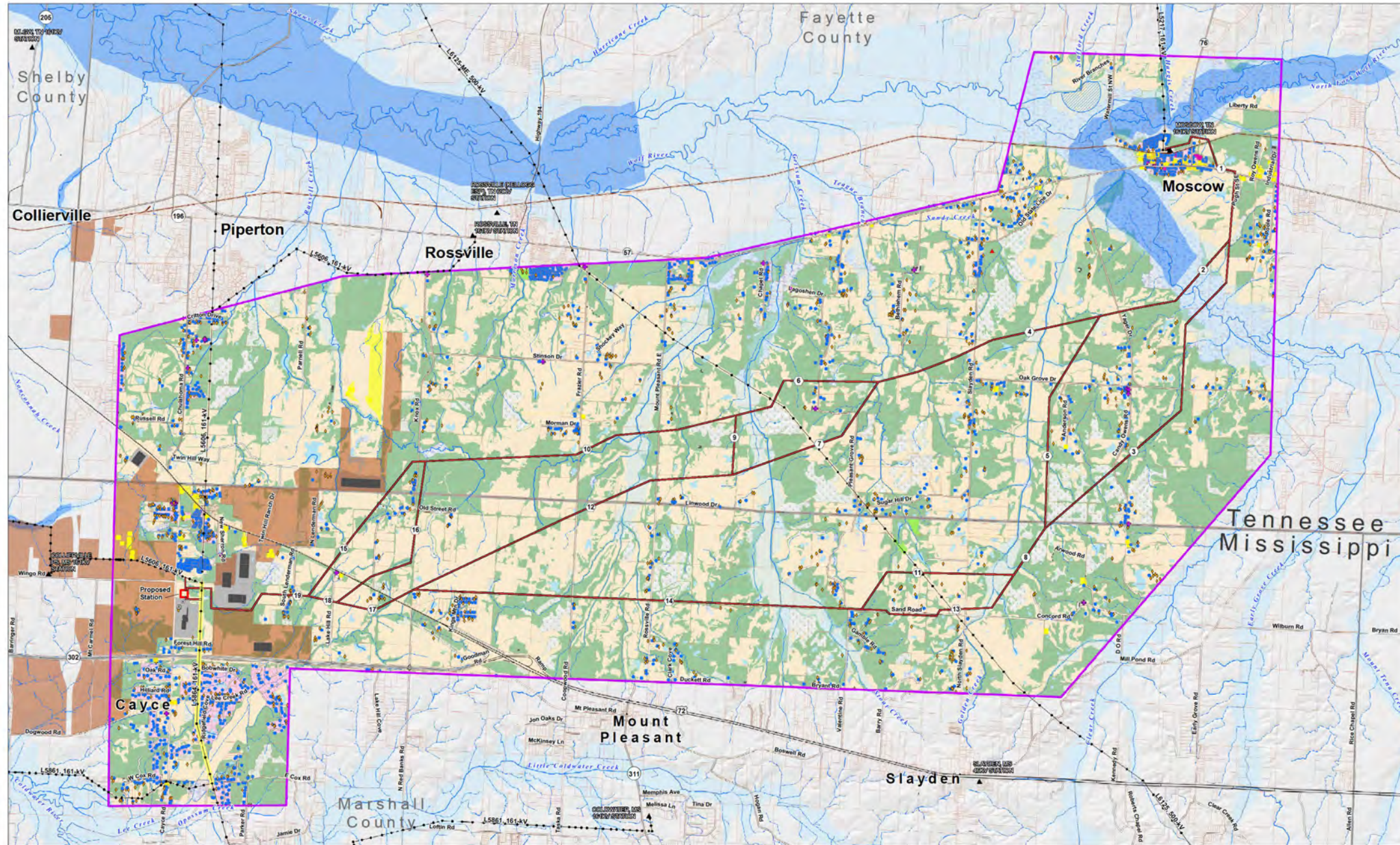


Figure 1-3 Alternative Route Segments for the Proposed Moscow-Miller 161-kV Transmission Line Located in Fayette County, TN; Marshall County and DeSoto Counties, MS



## CHAPTER 2

### 2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

As described in Chapter 1, TVA proposes to construct the Diffie and Chickasaw Trails Industrial Park 161-kV Switching Stations and associated 161-kV loop lines, add OPGW, and construct a new 18.5-mile Diffie-Chickasaw Trails Industrial Park 161-kV TL. 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 switching station and 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 purchase of property for the switching stations and easements for ROW, the construction, operation, and maintenance of the proposed stations and TLs and the addition of OPGW to an existing TL.

#### 2.1.1 The No Action Alternative – TVA Does Not Provide a New Power Supply within the Fayette County, TN and DeSoto and Marshall Counties, MS Area

Under the No Action Alternative, TVA would not construct the proposed switching stations, associated 161-kV loop lines, OPGW additions, or the new 18.5-mile Diffie-Chickasaw Trails Industrial Park 161-kV TL. As a result, the TVA power system within the Fayette County, TN and DeSoto and Marshall Counties, MS 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 Chickasaw Trails Industrial Park, 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 the Fayette County, TN and DeSoto and Marshall Counties, MS Area**

Under the Action Alternative, TVA would construct, operate, and maintain a new Diffie 161-kV Switching Station approximately 5.5 miles north of Moscow, TN at the intersection of the existing Cordova-Hickory Valley 161-kV TL and the Tap to Moscow 161-kV TL. The switching station would consist of a three position ring bus 161-kV yard with three 161-kV line terminations. OPGW is proposed to be added from the new station south, along the existing 5.9 mile Tap to Moscow 161-kV TL. From that point, TVA proposes to construct, operate, and maintain a new 18.5-mile Diffie-Chickasaw Trails Industrial Park 161-kV TL extending southwest to a new TVA Chickasaw Trails Industrial Park 161-kV Switching Station. The new switching station would be located within the existing Chickasaw Trails Industrial Park, on the southeast corner of Cayce and East Wingo/Gateway Global Drive. The switching station would consist of a three bay, breaker and a half 161-kV yard with five line terminations. The existing Olive Branch-Cordova 161-kV TL is proposed to be looped into the new Chickasaw Trails Industrial Park 161-kV Switching Station. South of the new switching station, a 2.5-mile section of the de-energized Cordova-Holly Springs 161-kV TL is proposed to be rebuilt as double-circuit, utilizing existing ROW, with the new lines and OPGW to be looped into the new Chickasaw Trails Industrial Park 161-kV Switching Station. The individual circuits would be renamed as the Holly Springs-Chickasaw Trails, and Chickasaw Trails-Miller 161-kVs. Finally, the existing OPGW is proposed to be replaced with OPGW along the existing 4.4 mile Miller-Oliver Branch 161-kV TL.

Additionally, TVA proposes to replace relays and complete communications upgrades at the existing Hickory Valley, Holly Springs, Miller and Olive Branch 161-kV substations as well as the Cordova 500-kV Substations. The map board display at TVA's System Operations Center and Regional Operations Center would be updated to reflect this work. Temporary access roads would be required for construction and maintenance of the proposed TL.

Additional information describing implementation of the proposed Action Alternative and how the most suitable switching station locations and 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.

#### **Installation of a 500-kV Switching Station at Chickasaw Trails Industrial Park**

Under this alternative, TVA would construct, operate, and maintain a new 500-kV three position ring bus, looping in the Cordova-Benton 500-kV TL via approximately eight miles of new 500-kV TL. A breaker and a half 161-kV substation would also be required at the Chickasaw Trails Industrial Park, looping the Miller-Holly Springs 161-kV TL via approximately two miles of new 161-kV double-circuit TLs. While this alternative would resolve some maintenance and reliability concerns, as well as reduce some customer exposure, the cost of this alternative was more than double the Action Alternative. Further, under this alternative, one Local Power

Company (LPC) Station would remain on a 6-mile radial feed, making maintenance problematic at these locations. Overall, this alternative did not meet all of the criteria set out by TVA in establishing the purpose and need for this project. For these reasons, this alternative was eliminated from further consideration.

### **Construction of an Interconnection with Memphis Light, Gas, and Water**

TVA would establish an interconnection with Memphis Light, Gas, and Water (MLGW) at the Northcentral Electric Power Association's, the Local Power Company, existing Collierville Pumping Station, MS 161-kV Metering Station, requiring the construction, operation and maintenance of a new 161-kV 4-position ring bus and approximately nine miles of new 161-kV TL. This alternative does not meet one of the purposes of the proposal to enhance the capacity of the Bulk Transmission System and thereby to support economic development in the Chickasaw Trails Industrial Park. For this reason, this alternative was eliminated from further consideration.

### **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 would 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 Switching Stations and Transmission Line Connections**

### **2.2.1 Switching Station Property Acquisition, Clearing and Construction**

Property for the proposed Diffee and Chickasaw Trails Industrial Park 161-kV Switching Stations would be purchased from landowners. Approximately 9 acres would be purchased for the new Diffee 161-kV Switching Station and approximately 9 acres for the Chickasaw Trails Industrial Park 161-kV Switching Station, depending on final design, site soil conditions, and negotiations with landowners.

TVA would clear vegetation, remove topsoil, and grade both sites in accordance with TVA's *Site Clearing and Grading Specifications* (TVA 2019c). Equipment used during clearing would include chainsaws, skidders, bulldozers, tractors, and/or low ground-pressure feller-bunchers. While the Diffee site is open pasture, marketable timber would be salvaged where feasible at the Chickasaw Trails location; 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. In some instances, vegetation may be windrowed along the edge of the project site to serve as sediment barriers. Implementation of *TVA ROW Clearing Specifications*, *Environmental Quality Protection Specifications for Transmission Line Construction*, *Transmission Construction Guidelines Near Streams*, (TVA 2019c) and *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities* (TVA 2017a) provide further guidance for clearing and construction activities.

The proposed switching station sites would be leveled through a cut and fill process to help achieve final design grade. The areas of the site that are too high (sloped) would be "cut" down to a level elevation, and other areas that are too low require "fill" to raise the elevation. Any additional fill required would be obtained from an approved/permitted borrow area. Once the substation site has been graded, excess soil (i.e., "spoil") would be removed in preparation for foundations. Temporary spoil storage is proposed to be located onsite. Silt fences and site drainage structures would be installed during construction. Total disturbance, including grading and onsite spoil storage, would be approximately four acres at the Diffee 161-kV Switching Station and 4.7 acres at Chickasaw Trails Industrial Park 161-kV Switching Station locations.

Both switching station yards would be covered with crushed stone and enclosed with chain link fencing. New permanent gravel roads would be constructed to both switching stations; approximately 718 feet of new road off of Diffee Road at the Diffee 161-kV Switching Station location, and 304 feet off of Gateway Global Drive at the Chickasaw Trails Industrial Park. A potable water well and septic system would be installed at the Diffee 161-kV Switching Station location while municipal water and sewer is already available onsite at the Chickasaw Trails 161-kV Switching Station site. Major equipment to be installed at each location includes circuit breakers, transformers, disconnect switches, associated protective and communication equipment, and a switch house. The circuit breakers installed would utilize sulfur hexafluoride as the electrical insulator and would contain no oil.

Following clearing, grading, and construction, disturbed areas on the properties (excluding area within the finished switching station fences) would be restored to approximate pre-construction conditions, to the extent practicable, utilizing appropriate seed mixtures as described in TVA's BMP guidance (TVA 2017a). Erosion controls would remain in place for



each phase until that portion of the project is stabilized in accordance with the TN and MS General Stormwater Permits.

As described in TVA's *Substation Lighting Guidelines* (TVA 2019c), lights at the end of each of the proposed switching station locations would be fully shielded or would have internal low-glare optics, such that no light is emitted from the fixtures at angles above the horizontal plane. TVA's *Environmental Quality Protection Procedures for Transmission Substation or Communications Construction* (TVA 2019c) would be utilized during the construction of the substation.

### **2.2.2 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<sup>2</sup>.

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

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<sup>2</sup> 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.

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<sup>3</sup>.

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 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.

### **2.2.3 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 environmental resources such as stream crossings. 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.

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<sup>3</sup> 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.

However, in ephemeral<sup>4</sup> 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 constructed temporary access roads to previous conditions.

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).

#### **2.2.4 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 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.

#### **2.2.5 Structures and Conductors**

Most of the proposed 18.5-mile TL would utilize single steel-pole structures. Tower structures would be needed near the Wolf River Crossing and double steel-pole structures would be needed to facilitate clearance where the TL is proposed to cross under the existing 500-kV TL. Examples of these structure types are shown in Figure 2-1. The 2.5-mile rebuild of the Cordova-Holly Springs 161-kV TL would utilize double-circuit steel poles as depicted in Figure 2-2 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.

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<sup>4</sup> Ephemeral streams are also known as wet-weather conveyances or streams that run only following sufficient amounts of rainfall.



**Figure 2-1. Typical Single and Double Steel-Pole Structures**



**Figure 2-2. Typical River Crossing Tower Structure and Double-Circuit Steel-Pole**

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 porcelain 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 imbedded 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.

### **2.2.6 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.

### **2.2.7 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). This list may change over time as new herbicides are developed or new information on presently becomes available.

### **2.3 Structure Replacement**

TVA would rebuild approximately 2.5 miles of the de-energized Cordova-Holly Springs 161-KV TL as double-circuit on existing 100-foot-wide ROW. Steel towers make up the majority of the TL with a few wooden poles at the terminus. After retired, 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 and switching stations 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.
- Locate potential switching station locations.
- 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 Chickasaw Trails Industrial Park; and allow a reasonable area for multiple candidate corridors to be identified in multiple alignments.

The study area was determined primarily by the geographic boundaries of highways, existing power system assets, and river features (see Figure 1-1). The northern project boundary was primarily defined by Highway 57 and the existing TVA Cordova-Holly Springs, Tap to Rossville 161-kV TL, extending slightly north of the Moscow, TN. This boundary allowed potential routes to be developed west of the city of Moscow, south of the Wolf River, and away from densely developed residential areas south of the city of Rossville, TN. The southern boundary was defined to include the southernmost section of the Cordova-Holly Springs 161-kV rebuild, at the intersection of the Cordova-Holly Springs 161-kV TL at the Tap to Miller 161-kV TL, State Highway 302, and the west side of the Clear Creek 100-year floodplain. The eastern boundary was constrained to contain all land that could house a reasonable route alternative to the east of the town of Moscow. The western boundary connected the southern and northern boundary, with a buffer area to the west of a location within the Chickasaw Trails Industrial Park that would be suitable for a switching station site.

### 2.4.2 Description of the Study Area

The study area encompasses approximately 83 square miles and includes the towns of Moscow, TN in Fayette County to the north east and the community of Cayce, MS in Marshall County to the south west (see Figure 1-1). The tap location for the proposed TL is in Moscow, TN. The town of Moscow is surrounded on the north side by the North Fork of the Wolf River, and southwest by the Wolf River, and extensive areas of associated wetlands. Dense residential development in the town of Moscow is located to the west and south of the tap location with a combination of open land and forested area to the east.

In general, the study area is a mix of flat and rolling terrain, with farmland, open fields, forest and commercial timberland, including high numbers of streams and associated floodplains.

Residential development is predominantly concentrated along public roadways. The 3,600 acre Chickasaw Trails Industrial Park located in the western side of the study area and north of the community of Cayce, MS and intersected by Highway 72 is currently under development with several large spec buildings, industrial tenants, and a large Norfolk Southern Rail Yard.

### 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, photo-interpreted land use/land cover data, and Fayette and DeSoto and Marshall Counties 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, natural areas, and archaeological and historical resources).

Additionally, TVA utilized State/Local, 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. 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.

Data were analyzed 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.

The aerial photography, GIS-based map, and other maps and drawings were supplemented by reconnaissance throughout the study area by TVA personnel.

### 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 Location of Potential Switching Station Locations

Using information gathered during the system studies and data development phases, potential sites between the source TL (Cordova-Hickory Valley 161-kV TL) and the existing Chickasaw Trails Industrial Park were evaluated that could be utilized as locations for the proposed switching stations. Potential switching station locations must meet engineering requirements such as proximity to existing TLs for looping/termination, grading and geotechnical feasibility, and permanent access to the site. Additional considerations included are environmental impacts, current and future land use impacts of new switching station locations and TL routes to the switching stations.

The preferred location for the Diffiee 161-kV Switching Station was determined to be southwest of, and adjacent to, existing ROW for the Cordova-Hickory Valley 161-kV TL and the Cordova-Hickory Valley, Tap to Moscow 161-kV TL. The project scope included looping in the Cordova-Hickory Valley TL in to the east and west side of the switching station, and terminating the Tap to Moscow TL into the east side of the switching station. The property proposed to be purchased was accessible along existing ROW, just off of Diffiee Road. Limited clearing would be required as the area is predominantly open pasture and is without sensitive environmental features like watercourses, wetlands, and floodplains. The

surrounding property at this location also provided flexibility for potential future TLs into the switching station. Property owner interaction at the open house and field visits was positive with no major concerns regarding the proposed switching station location.

The preferred location for the Chickasaw Trails Industrial Park 161-kV Switching Station was selected to be within the Chickasaw Industrial Park property boundary within close proximity to the Cordova-Holly Springs 161-kV TL and the Cordova-Olive Branch 161-kV TL. The project scope included looping the Cordova-Olive Branch and the Holly Springs–Miller 161-kV TLs into the switching station. As such, the location for the switching station was proposed in the middle of an open field on the southeast corner of Cayce and East Wingo Road/Gateway Global Drive. The proximity to existing roads and TLs allowed for reduced impacts from new ROW acquisition. While the proposed location was predominantly within open field, some wooded area would be required to be cleared. Due to the current setting within the larger Industrial Park boundary, utilizing the site for a proposed switching station would be consistent with the overall planned land use for the area.

#### **2.4.6 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.

The straight-line distance between the identified power sources and the proposed Chickasaw Trails Industrial Park 161-kV Switching Station, is approximately 17.6 miles. Tapping the power source north of the North Fork of the Wolf River was not feasible for a variety of reasons including the increased electrical line exposure from the tap point to the Moscow 161-kV Substation, greater impacts to wetlands, and inability to locate switch structures outside of the floodplain. Additionally, pivot irrigation in a cultivated field adjacent to the Wolf River constrained potential TL route options. The switching station is proposed for location due southwest from the proposed tap point; as such, route options proceeding in a westward direction were investigated.

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).

#### **2.4.7 Potential Transmission Line Corridors**

As a result of the constraints mentioned in the previous section, 8 alternative TL routes were developed, consisting of a combination of 19 constituent segments (see Figure 1-3 and Table 2-1).

**Table 2-1. Alternative Route Corridors with Constituent Segments**

Route #	Route Segments
1	1.2.4.6.10.15.19
2	1.2.4.6.10.16.18.19
3	1.2.4.6.9.12.17.18.19
4	1.2.4.7.12.17.18.19
5	1.2.5.8.13.14.17.18.19
6	1.2.5.8.11.14.17.18.19
7	1.3.8.13.14.17.18.19
8	1.3.8.11.14.17.18.19

## 2.5 Identification of the Preferred Transmission Line Route

Three general corridors were generated that resulted in a “northern,” “middle” and “southern” alignment within the study area. Every alternative route included Segment 1 at the beginning of the route, and Segment 19 at the end. Segment 1, provided the only feasible option around the town of Moscow, TN, proceeding due east through a corridor of open land/farmland. Segment 1 avoided residential property and minimized impacts on farmland by following property lines, existing utility lines and the edge of wooded areas. Segment 19 was the last segment along the route and the entry point into the 3,600 acre Chickasaw Trails Industrial Park. Segment 19 constraints included both existing and planned industrial development, housing, as well as stream and wetland resources.

Every route combination also included either Segment 2 or 3 as they provided two separate, parallel crossing locations of the Wolf River. The Wolf River and its associated floodplain represented an unavoidable feature that resulted in engineering and constructability, social, and environmental challenges to the project. The FEMA floodplain and floodway data was used to develop routing options for Segment 2 and 3 that resulted in the narrowest floodplain crossings possible and complete avoidance of impacts to the floodway. PI<sup>5</sup> (angle structures) locations were strategically located such that they were outside of the floodplain and NWI-wetland areas. Research was performed during the alternative route development process to ensure parcels which were part of the Wolf River Conservancy or State-protected areas were avoided, or impacts would be minimized.

After the Wolf River crossing, Segment 2 continued through open fields and forested land, spanning Yager Drive, before intersecting with Segment 4 and Segment 5. Route options continuing from Segment 4 that created a “northern” corridor included Segments 6, 10, 15 and 16. Route options continuing from Segment 4 that created a “middle corridor” included Segments 7, 12, 17 and 18. Segments 9 and 16 acted as connectors between the “northern” and “middle” route.

Upon crossing the Wolf River, Segment 3 proceeded due south, passing through a Bermuda hay field behind residential properties and then continued southwest to the intersection of Segment 5 (a southern “connector” between Segments 2 and 3, routed primarily along property lines). From this intersection, Segment 8 continued southwest to

<sup>5</sup> The point of intersection at which two straight transmission line sections intersect to form an angle.

meet Segments 11 and 13. Segment 11 proceeded west, and north of segment 13, and crossed the Benton-Cordova 500-kV TL before turning back south to meet Segment 14. Segment 13 continued due west along parcel lines and Sand Rd before adjoining Segment 14. Segment 14 continued west before meeting Segments 17 and 18. This series of connecting Segments effectively created a “southern” corridor.

Segments 12, 15 and 16 all were affected by potential expansion of the Industrial Park and or Economic Development plans, which was discovered at the Open House. Impacts to Segment 16 included a proposed Norfolk Southern Rail line crossing the route in two locations.

Alternative Route 4, made up of route segments 1, 2, 4, 7, 12, 17, 18, and 19 resulted in the top rankings in the analysis. Route 4 ranked most favorable in environmental criteria with the fewest number of forested acres impacted (both natural and plantation) and no sinkholes, sensitive stream crossings, cemeteries or caves identified within 100 feet of the TL. Route 4 also had significantly fewer minor stream crossings than half of all other routes. Impacts to forested wetlands surrounding the Wolf River were similar across all routes, with between five and six acres of impact. Over one-third of the alternative routes had higher acres of impacts to non-forested wetlands than Route 4. Finally, based on desktop review there were no archeological sites shown Route 4.

Alternative Route 4 was just behind Routes 2 and 3 (which were effectively tied) in favorable ranking within the social criteria. Route 4 was comprised of the lowest number of ROW acres at 206.98, compared to Route 5 which had the highest number of ROW acres at 229.99. Route 4 tied for the second fewest number of dwellings within 300 feet of the ROW. Public comments received for the eight alternative routes were fairly even, with the most negative comments being twelve, and the least being nine. The preferred route received eleven negative comments and one positive comment.

In consideration of the engineering criteria, Route 4 was the shortest, most direct route, and had the second fewest number of property parcels impacted of all other routes. It also tied for the fewest number of PIs, which results in lower overall construction costs. In contrast to these positive engineering factors, Route 4 was the only route to impact an existing irrigation system. This impact was accounted for in the analysis, however, a low weight was applied due to the ability for TVA to route around the system thus minimizing impacts within the same parcel. Route 4 was tied with Route 3 for highest impacts to planned commercial or industrial development primarily due to potential development planned surrounding portions of segment 12. These impacts were later able to be minimized through discussions with the property owner and subsequent adjustments resulting in more favorable engineering and social criteria ranking.

After considerable analysis, Alternative Route 4 was announced as the agency’s preferred TL route in November 2017. Following this announcement, several adjustments were considered as a result of field surveys and additional public comment. These modifications are described below and reflected in Figure 1-4.

### **2.5.1 Chickasaw Trails Industrial Park 161-kV Switching Station Location Change**

At the open house, the stakeholders involved with the Chickasaw Trails Industrial Park expressed plans for a training center facing west, towards Cayce Rd. That location conflicted with the proposed Chickasaw Trails Switching Station location. As such, the

proposed switching station location was shifted east. Further movement of the switching station to the north was carried out to avoid impacts to a potential rail lead track and rail spur. The shift in the switching station location resulted in minor modifications to the proposed TL loop liens into the switching station.

### 2.5.2 Transmission Line Changes

- The original location of PI 2 was adjusted to preserve the owner's ability to develop the southern area of property with frontage on Old Somerville Avenue NW.
- PI 4 was shifted approximately 130 feet north at the request of the property owner in order to prevent bisecting the property and impacting future home site.
- PI 8 and 9 were added to facilitate a property owner's request to shift the TL centerline approximately 300 feet to parallel the eastern property line. PI 10 was adjusted to follow existing tree-line. Owners reasoning for changes included concern for future development potential.
- PI 12, 13 were added in order to shift the TL route along the edge of property owner's proposed lot alignments along Yager Drive. PI 14 was added to avoid a valuable hardwood forest, and more closely parallel the southern property line.
- PI 15A-16 was adjusted to the south to avoid bisecting a field. This change allowed for different but more favorable alignments as well as line length reductions on the next four parcels to the west to new PI 16.
- Adjusted line route to more closely follow the eastern and southern property lines at owner request which resulted in the addition of PI 17 and 18. This change allowed TVA to cross under the existing 500-kV TL without requiring a costly tower extension.
- PI 19 was added to facilitate a required adjustment to the route on the adjacent parcel to the west to avoid an irrigation system.
- PI 20 was added to avoid bisecting a Bermuda hay field and a straight line irrigation system which moved north and south through the field.
- PI 22 was shifted to the west to locate associated guy wires closer to edge of field
- The addition of PI 23 allowed for the proposed centerline to impact only the southeast corner of the parcel, rather than bisecting the parcel as originally proposed.
- At the request of an owner, the route was moved to parallel the eastern and southern property lines so as to limit impacts to industrial development of the parcel. This change required the addition of PI 24, 25 and 26 and impacted two separate owners. Both owners were in agreement with the changes.
- At the Highway 72 crossing, two 90 degree PIs 26 and 27 were added to route the line due south along west side of North Red Banks Road and along the south side of Lee Creek to minimize impact to the Highway 72 road frontage available for future development at request of property owner on North side of Highway 72.
- PI 28 was adjusted a length of approximately 800 feet to add buffer between the TL and a nearby cemetery.

- Minor change to PI 29 location was required due to adjustments on the parcels to the east and west resulting in shifting the centerline was approximately 150 feet south.
- PI 30 was shifted approximately 150 feet to the south to preserve areas associated with an extant homeplace. Upon agreement between the affected owner and neighbor to the south, PI 31 was added in the southeast corner of the property, and PI 32 on the neighbor to the south. This change shared ROW between the two properties.
- PI 33 was shifted to the west approximately 300 feet to avoid a planned road in the Industrial park to connect Hwy 72 with Hwy 302.
- PI 34 and 35 were moved to accommodate a property owner’s request to shift the line closer to eastern property line and as close as possible to Gateway Global/Wingo Rd.
- PI 35A was added to facilitate a shift to the east of the Tap location for Cordova-Olive Branch Loop into Chickasaw Trails industrial Park 161-kV Switching Station. Adding 35A allowed for adequate clearance between the two circuits.
- PI 37 was shifted 15 feet to the west to minimize impacts of the switching station on the adjacent wetland area to the east of the Station.
- After the open house, initial field survey, and visit to the site by the project team, river crossing towers were determined to be the preferred option to facilitate the TL crossing of the Wolf River and its associated wetland area. Utilizing towers allowed for structure placement outside of the wetland and floodplain area entirely. A route adjustment to the first PI (11) on the west side of the Wolf River was required to support design of the western tower structure. PI 11 was required to be shifted 590 feet “ahead” (PI 11A). Due to the height of the tower structure, the nearest location identified by TL Design in which the PI could be placed was 590 feet. A PI was then added (11B) to merge back in with the original as- surveyed route alignment. The span between the two tower structures would be approximately 3,300 feet in length. Between the two towers, the ROW would be expanded to 200-feet-wide for a distance along the TL route of about 2,200 feet.

## 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 2-2. 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.

Resource Area	Impacts From Implementing the No Action Alternative	Impacts From Implementing the Action Alternative
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 and substation expansion would have a minor, temporary effect on most local vegetation. An insignificant direct long-term effect on approximately 121 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 substation expansion site would be displaced. Because there are sufficient adjacent local habitats, any effects to wildlife are expected to be temporary and insignificant.
Endangered and Threatened Species	No effects to endangered or threatened species or any designated critical habitats are anticipated.	Tree clearing would remove approximately 48.91 acres of potentially suitable summer roosting habitat for the federally endangered Indiana bat 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 biological assessment for bats (Appendix B).
Floodplains	No changes in local floodplains and their functions are affected.	With the implementation of standard mitigation measures, no significant impact on floodplains would occur.

Resource Area	Impacts From Implementing the No Action Alternative	Impacts From Implementing the Action Alternative
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 37.44 acres of wetland are located within the proposed ROW, of which 26.27 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.	There would be a positive impact from continued reliability of service that would benefit the area and help maintain its economic stability and growth. 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 and MS SHPO and federally-recognized Indian Tribes on all the proposed undertakings. The TN and MS 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.
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. Minor temporary impacts to Ames Plantation during installation of OPGW.



## 2.7 Identification of Mitigation Measures

TVA employs standard practices when constructing, operating, and maintaining switching stations, 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).
- To minimize adverse impacts on natural and beneficial floodplain values, the following standard mitigation measures would be implemented:
  - BMPs would be used during construction activities
  - Construction would adhere to the TVA subclass review criteria for TL location in floodplains
  - For the access roads in the North Fork Wolf River floodway, (1) any fill, gravel or other access road 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
  - On the Diffie-Chickasaw TL, any road improvements would be done in such a manner that upstream flood elevations would not be increased by more than 1.0 foot

- Pesticide/herbicide use as part of construction or maintenance activities would comply with the TDEC and MDEQ 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 Northcentral Electric 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).

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.

- To compensate for the impacted 26.27 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.
- TVA project staff would contact Ames Plantation to inform them of the project and to avoid any impacts to scheduled recreational or educational activities.
- On the Diffie-Chickasaw TL, road construction or improvements would be done in such a manner that upstream flood elevations would not be increased by more than 1.0 foot.

## **2.8 The Preferred Alternative**

The Action Alternative — TVA Provides a New Power Supply to the Fayette County, TN and DeSoto and Marshall Counties, MS 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 4. This approximate 18.5-mile route is comprised of alternative route segments 1, 2, 4, 7, 12, 17, 18, and 19.

## 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 18.5-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<sup>6</sup> (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

The project area is located in the Coastal Plain Physiographic Province and is underlain by the lower most unit of the MS embayment aquifer system. In central MS, the geologic units of the Coastal Plain include deposits of Paleocene and Eocene sedimentary marine rocks. In the project region, the lower Claiborne and Wilcox Groups consist of thick sand bed layers with intervening clay layer which act as confining units for important regional aquifers. One of these regional aquifers, the Meridian-upper Wilcox aquifer, marks the upper part of the Wilcox Group and defines the Meridian Sand Member of the Tallahatta Formation. The lower part of the Wilcox Group and the uppermost part of the underlying Midway Group are also delineated by thick sand beds which comprise the important regional aquifer, the lower Wilcox regional aquifer (Taylor and Arthur 1989). Due to the absence of carbonate rock strata, the area is not prone to the development of karstic features.

Recharge for these aquifers primarily occurs as precipitation falling directly on surface outcrops of the aquifer units. Predominantly, water flows westward from the topographically higher northern and eastern sides of the region. The discharge zone corresponds with an area subject to large groundwater withdrawals underlying the MS River Valley alluvial aquifer. In 1995, fresh groundwater withdrawals from the MS embayment aquifer system were estimated to be 433 million gallons per day. Public supply use accounted for about 52 percent of the total water withdrawn from the aquifer system, or about 224 million gallons per day (Renken 1998). Information provided by the USEPA indicates groundwater is the

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<sup>6</sup> The United States is divided and subdivided 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.

primary source of water supply in the project area (USEPA 2014). While there are private wells located in the general area, public water is available water to the public in project area. The source for this system is from wells which withdraw from the Lower Wilcox and Meridian Upper Wilcox aquifer.

### **3.2 Surface Water**

The proposed project spans from Fayette County, TN to DeSoto and Marshall Counties, MS. This project area drains within the North Fork Wolf River (0801021001), Indian Creek-Wolf River (0801021002), Grays Creek-Wolf River (0801021003), Nonconnah Creek (0801021101), Upper Coldwater River (0803020401), and Camp Creek-Coldwater River (0803020403) watersheds.

A total of 123 aquatic features including: 8 perennial streams, 30 intermittent streams, 85 wet-weather conveyances (WWC)/ephemeral streams and 5 ponds were observed during on-site field studies in 2019. Precipitation in the general area of the proposed project averages about 57 inches per year. The average annual air temperature is 59-60 degrees Fahrenheit (U.S. Climate Data 2019). Stream flow varies with rainfall and averages about 19.41 inches of runoff per year, i.e., approximately 1.43 cubic feet per second, per square mile of drainage area (USGS 2008).

The federal CWA requires all states to identify all waters where required pollution controls are not sufficient to attain or maintain applicable water quality standards and to establish priorities for the development of limits based on the severity of the pollution and the sensitivity of the established uses of those waters. States are required to submit reports to the USEPA. The 303(d) list refers to the list of impaired and threatened streams and water bodies identified by the state. No resources in the project area in MS are currently listed on the 303(d) list of impaired streams (MDEQ 2018). However, in TN Unnamed Tributaries of Wolf Creek are listed for sedimentation/siltation due to construction storm water discharges, Escherichia Coli (E. Coli), due to grazing in riparian or shoreline zones, and alterations in stream-side or littoral vegetative covers due to non-irrigated crop production. Teague Branch is listed as impaired for physical substrate habitat alterations and E. coli due to grazing in riparian or shoreline zones. Stout Creek is listed as impaired for physical substrate habitat alterations due to channelization. Additionally, Grissum Creek is listed as impaired due to dissolved oxygen and E.coli grazing in riparian or shoreline zones and for physical substrate habitat alterations due to channelization (TDEC 2018). Please see Table 3-1 (MDEQ 2012) and 3-2 (TDEC 2013) for stream designations. In addition to the below designations, portions of the Wolf River and unnamed Tributaries of the Wolfe River have been designated as Exceptional TN Waters.

**Table 3-1. Uses for Streams in the Vicinity of the Proposed Moscow Miller Projects (Mississippi)**

Stream	Use Classification <sup>1</sup>				
	FW	REC	PWS	SH	ES
Coldwater River <sup>2</sup>	X	X			
Tributaries of Coldwater River	X				
Nonconnah Creek and Tributaries	X				
Lee Creek	X				
Opossum Creek	X				

<sup>1</sup> Codes: FW = Fish and Wildlife; REC = Recreation; PWS = Public Water Supply; SH = Shellfish Harvesting; ES = Ephemeral Stream

<sup>2</sup> Not part of the project area, just shown for river network path

**Table 3-2. Uses for Streams in the Vicinity of the Proposed Moscow Miller Projects (Tennessee)**

Stream	Use Classification <sup>3</sup>						
	NAV	DOM	IWS	FAL	REC	LWW	IRR
<b><u>Wolf River<sup>4</sup></u></b>	X		X	X	X	X	X
Unnamed Tributaries of Wolf River				X	X	X	X
Grissum Creek and Tributaries							
Stout Creek and Tributaries				X	X	X	X
Teague Branch and Tributaries				X	X	X	X
Golden Creek and Tributaries				X	X	X	X
Hargis Creek and Tributaries				X	X	X	X

<sup>3</sup> 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

<sup>4</sup> Not in project area, shown for flow network.

### 3.3 Aquatic Animals

#### 3.3.1 Aquatic Ecology

A total of 123 aquatic features including 8 perennial streams, 30 intermittent streams, 85 WWC/ephemeral streams and 5 ponds 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 3-3). 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 3-3. Riparian Condition of Streams Located Along Moscow-Miller Phase A, B, C, & D Transmission Line Route and Associated Access Roads**

Riparian Condition	# Perennial Streams	# Intermittent Streams	Total
Forested	6	22	28
Partially forested	-	2	2
Non-forested	2	6	8
<b>Total</b>	<b>8</b>	<b>30</b>	<b>38</b>

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 ESA provides broad protection for species of fishes, wildlife, and plants that are listed as threatened or endangered in the United States or elsewhere. The ESA outlines procedures for federal agencies to follow when taking actions that may jeopardize federally listed species or designated critical habitat. The policy of Congress is that federal agencies must seek to conserve endangered and threatened species and use their authorities in furtherance of the Act's purposes.

The State of TN and MS provide protection for species considered threatened, endangered, or deemed in need of management within their state other than those federally listed under the ESA.

A review of the TVA Regional Natural Heritage database for records of listed aquatic animal species indicated one state-listed fish (northern madtom) and no federally protected aquatic species are known to occur within the North Fork Wolf River (0801021001), Indian Creek-Wolf River (0801021002), Grays Creek- Wolf River (0801021003), Nonconnah Creek (0801021101), Upper Coldwater River (0803020401), and Camp Creek-Coldwater River (0803020403) watersheds. A query of the USFWS IPaC online database indicated the likely occurrence of the federally protected pallid Sturgeon and fat pocketbook within Fayette County, TN and DeSoto and Marshall Counties, MS.

### **3.4 Vegetation**

#### **3.4.1 Terrestrial Ecology (Plants)**

The proposed upgrades to the TVA transmission system would occur in the Loess Plains Level IV ecoregion (Chapman et al. 2004). This ecoregion extends from Kentucky (KY) through TN and MS into southeastern Louisiana and is characterized by thick loess, which is comprised of loosely compacted windblown sediment. Upland oak/hickory-loblolly/shortleaf pine forest as well as bottomland hardwood forests of mainly oak, water tupelo, and bald cypress are the dominant natural vegetation types in the portion of the ecoregion where the proposed transmission upgrades would be located. Currently, agricultural fields dominate the ecoregion with upland deciduous forest and forested wetlands occurring sporadically across the landscape.

Field surveys were conducted at various times from March 2018 through March 2019 to document plant communities, infestations of invasive plants, and to search for possible threatened and endangered plant species in all areas where work would occur. All areas within the project footprint capable of supporting natural plant communities or plant species of conservation concern were visited during the survey. 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 throughout the project area are common and well represented throughout the region. Vegetation is characterized by two main types: herbaceous (64 percent) and forest (36 percent).

Herbaceous vegetation is characterized by 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 existing TL ROW, but cropland, hayfields, recent clear-cuts, and heavily manipulated 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 annual blue grass, Bermuda grass, broomsedge, common carpetgrass, dallisgrass, gray goldenrod, Japanese clover, Japanese honeysuckle, Japanese stiltgrass, Johnson grass, hairy bitter cress, hairy buttercup, hairy white oldfield aster, henbit, Indian goose grass, Italian rye grass, little bluestem, marsh bristle grass, maypops, mouse-ear chickweed, oriental ladythumb, partridge pea, purpletop tridens, sawtooth blackberry,

sericea lespedeza, silver plume grass, smooth brome, southern crabgrass, spiny amaranth, tall fescue, tall goldenrod, velvet panicum, Virginia plantain, wild garlic, and yellow bristle grass. Areas of emergent wetlands are also present in the project area. See the wetland section 3.7 for species indicative of those areas.

Evergreen forest, which occurs on about 4.5 percent of proposed project area, has low species diversity and is dominated by plantation-grown loblolly pine. Many of these stands were planted and canopy trees are approximately the same size, are regularly harvested to produce wood products, and bear little resemblance to native plant communities found in the region. Other evergreen forest stands are the result of land use. In these areas, loblolly pine was the first tree species to colonize the site after disturbance. While these stands were not planted, they are often similar in structure and species composition to their managed counterparts.

Deciduous forest, where deciduous trees account for more than 75 percent of total canopy cover, is the most common type of forest and occupies about 29.5 percent of the entire proposed project. Deciduous forests are dominated by a variety of tree species including American elm, black cherry, black gum, cherrybark oak, green ash, mockernut hickory, pignut hickory, post oak, red maple, southern red oak, swamp chestnut oak, sweetgum, sycamore, tulip poplar, water oak, white oak, and willow oak. The understory consists of American beautyberry, Chinese privet, flowering dogwood, hophornbeam, pawpaw, red buckeye, and winged elm. Herbaceous plants and woody vines observed included Christmas fern, cypress panic grass, Japanese honeysuckle, Japanese stiltgrass, jumpseed, longleaf woodoats, muscadine, poison ivy, roundleaf greenbrier, trumpet creeper, and Virginia creeper. Most deciduous forests in the project area have trees that average between 6 and 18 inches diameter at breast height. Large forested wetlands were found in several locations of the proposed ROW. Forested wetlands are described in detail in section 3.7.

Mixed evergreen-deciduous forest, defined as stands where both evergreen and deciduous species contribute between 25 to 75 percent of total canopy cover, occurs on about 2 percent of the proposed project area. In general, these forest types are similar to the deciduous forests described above, but contain a greater percentage of loblolly pine, and to a lesser extent, Eastern red cedar and shortleaf pine.

EO 13112 directs 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 federal agencies to continue coordinate prevention and control efforts related to invasive species. This order directs federal agencies to consider human and environmental health, climate change, technological innovation, and other emerging priorities into efforts to address invasive species.

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 et al. 2010). No federal-noxious weeds were observed, but many non-native invasive plant species were observed throughout the project area. Invasive species present across significant portions of the landscape include bahiagrass, Callery pear, Chinese privet, Japanese clover, Japanese honeysuckle, Japanese stiltgrass, Johnson



grass, kudzu, mimosa, multiflora rose, paper mulberry, sericea lespedeza, tall fescue, wild garlic, and yellow bristle grass. During field surveys, invasive plants were prevalent in sections of both forest and herbaceous vegetation types.

### 3.4.2 Threatened and Endangered Species (Plants)

Review of the TVA Regional Natural Heritage database indicated that two state-listed and no federally listed plant species have been previously reported within a five-mile vicinity of the project area (Table 3-4). One federally listed plant species has been previously reported from Marshall County, MS; no federally listed plants are known from Desoto County, MS or Fayette County, TN. No federally or state-listed plants were observed in the proposed project area. No designated critical habitat for plants occurs in the project area.

**Table 3-4. Plant Species of Conservation Concern Previously Reported from Within Five Miles of Proposed Project Footprint**

Common Name	Scientific Name	Federal Status <sup>2</sup>	MS State Status <sup>2</sup>	TN State Status <sup>2</sup>	State Rank <sup>3</sup>
<b>PLANTS</b>					
White Trout-lily	<i>Erythronium albidum</i>	–	SLNS	–	S2
Whorled Sunflower	<i>Helianthus verticillatus</i>	E	-	-	-
Small Flowered Beardtongue	<i>Penstemon tubiflorus</i>	–	–	SPCO	S1

<sup>1</sup> Source: TVA Regional Natural Heritage database, queried June 2019

<sup>2</sup> Status Codes: E = Endangered; SPCO = Listed as Special Concern in TN; SLNS = MS State Listed, no status assigned

<sup>3</sup> State Ranks: S1 = Critically Imperiled; S2 = Imperiled;

## 3.5 Wildlife

### 3.5.1 Terrestrial Ecology (Animals)

Habitat assessments for terrestrial animal species were conducted in the field in March 2018 for the proposed Diffiee 161-kV Switching Station in Moscow, TN and Chickasaw Trails Industrial Park Switching Station in Olive Branch, MS. Habitat assessments were conducted in October 2018 for the 2.5 mile Cordova-Holly Springs 161-kV rebuild and on October 9-10, 2018 for the proposed 18.5-mile Diffiee-Chickasaw Trails 161-kV TL and access roads (ARs). The approximately 5.9 miles of OPGW addition and 4.4 miles of OPGW replacement did not require field review for terrestrial animal species after review of maps and aerial photos. The total footprint reviewed for all phases was approximately 337.76 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 121.42 acres of forested habitat exist within the project footprint and would be cleared and maintained as early successional habitat. Approximately 48.91 acres of forested habitat within the ROW and switching station footprints is suitable bat habitat and would be cleared and maintained as early successional

habitat. Each of the varying community types offers suitable habitat for species common to the region, both seasonally and year-round.

Forest types present within the project footprint include deciduous, evergreen, and mixed deciduous-evergreen and occupy approximately 121.42 acres or 36 percent of the habitat within the project footprint. Evergreen forests occupy approximately 14.7 acres (4.5 percent) of the project footprint. Common evergreen species observed during field survey included loblolly pine and eastern red cedar. These forests provide habitat for common terrestrial wildlife. Tufted titmouse, Carolina chickadee, yellow-bellied sapsucker, cedar waxwing, and downy woodpecker 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 forests in the project footprint include upland and bottomland hardwood types. Deciduous forests occupy approximately 99.11 acres or 29.5 percent of the project footprint and mixed forests occupy approximately 7.6 acres or 2 percent. Upland deciduous forests within the project footprint contain a mixture of canopy species that include: white oak, blackjack oak, 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 red-eyed vireo, northern flicker, pileated woodpecker, eastern screech-owl, yellow-breasted chat, red-bellied woodpecker, red-tailed 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, silver-haired bat, and tricolored bat. Eastern chipmunk, eastern woodrat, gray fox, and woodland vole 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; Scott and Redmond 2008). In forests with aquatic features, amphibians likely found in the area include eastern newt, spotted salamander, green treefrog, gray treefrog, and bird-voiced treefrog (Bailey et al. 2006; Petranka 1998).

Both emergent and forested wetlands (bottomland hardwood) were recorded within the project footprint. Sweetgum, sycamore, red maple, river birch, tulip poplar, cherrybark oak, water oak, willow oak, and black willow are common in this habitat type. Such habitat provides resources for birds including great blue heron, great egret, Canada goose, red-shouldered hawk, northern harrier, red-winged blackbird, barred owl, wood duck, northern parula, and swamp sparrow (National Geographic 2002; Sibley 2003). American beaver, southeastern shrew, golden mouse, muskrat, and mink are common mammals in emergent wetland and aquatic communities (Kays and Wilson 2002; Whitaker 1996). Eastern painted turtle, 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; Scott and Redmond 2008). Amphibians typical of this region found in and around emergent wetlands and open streams include American bullfrog, southern cricket frog, green frog, and southern two-lined salamander (Bailey et al. 2006; Petranka 1998).

Pastures, agricultural fields, and other early successional habitats comprise approximately 216.33 acres or 64.0 percent of the project footprint. Common inhabitants of this type of habitat include killdeer, brown-headed cowbird, brown thrasher, American goldfinch, indigo bunting, eastern bluebird, palm warbler, and eastern meadowlark (National Geographic 2002; Sibley 2003). Bobcat, coyote, eastern cottontail, hispid cotton rat, 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 speckled kingsnake are also known to occur in this habitat type (Bailey et al. 2006; Conant and Collins 1998; Dorcas and Gibbons 2005; Scott and Redmond 2008). Pollinators such as gulf fritillary and painted lady 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, Carolina chickadee, eastern phoebe, 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, eastern fence lizard, and brown snake (Conant and Collins 1998; Dorcas and Gibbons 2005; Scott and Redmond 2008).

Phased reviews of the TVA Regional Natural Heritage database were performed from December 2017 through February 2019 and indicated no recorded caves within three miles of the project area. No caves were identified during field review in March 2018, October 2018, or July 2019. No other unique or important terrestrial habitats were identified within the project area. Further, no aggregations of migratory birds or wading bird colonies have been documented within three miles of the project area and none were observed during field surveys.

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

The 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. The ESA requires federal agencies to consult with the USFWS when proposed actions may affect endangered or threatened species or Designated Critical Habitat.

Reviews of literature and the TVA Regional Natural Heritage database from December 2017 through February 2019 found no records of state-listed or federally listed species within three miles of the project area. One federally endangered species (interior least tern) is known from Desoto County, MS. The federally endangered Indiana bat and federally threatened northern long-eared bat and wood stork are thought by USFWS to have the potential to occur within the project footprint, though no records are known to date (Table 3-5).

**Table 3-5. Federally Listed Terrestrial Animal Species Reported From Fayette County TN and Desoto and Marshall Counties, MS and Other Species of Conservation Concern Documented Within Three Miles of TVA’s Proposed Moscow-Miller 161-kV Transmission Line**

Common Name	Scientific Name	Federal Status	State Status <sup>2</sup> (Rank <sup>3</sup> )
Interior Least Tern <sup>4</sup>	<i>Sterna antillarum athalassos</i>	LE	TN:E(S2S3B), MS:LE(S2B)
Wood Stork <sup>5</sup>	<i>Mycteria americana</i>	LT	TN:-(-), MS:LE(S2N)
Indiana bat <sup>6</sup>	<i>Myotis sodalis</i>	LE	TN:E(S1), MS:LE(S1B)
Northern long-eared bat <sup>5,6</sup>	<i>Myotis septentrionalis</i>	LT	TN:T(S1S2), MS:-(-SH)

<sup>1</sup> Source: TVA Regional Natural Heritage database, extracted 12/15/2017-2/4/2019 and USFWS Information for Planning and Conservation (<https://ecos.fws.gov/ipac/>), accessed 12/15/2017-2/4/2019.

<sup>2</sup> Status Codes: E or LE = Listed Endangered; T or LT = Listed Threatened.

<sup>3</sup> State Rank: S1 = Critically Imperiled; S2 = Imperiled; S3 = Rare and Uncommon; SH = Historical Occurrence; S#B = rank of breeding population; S#N = rank of non-breeding population.

<sup>4</sup> Federally endangered species with known records from Desoto County, MS.

<sup>5</sup> Federally threatened species with the potential to occur in Desoto and Marshall Counties MS, though no records are known to date.

<sup>6</sup> Federally listed species with the potential to occur in Fayette County, TN, though no records are known to date.

Interior Least Tern are associated with rivers and reservoirs with open, sparsely vegetated sand and gravel beaches, sandbars, islands and salt flats. This species is highly adapted to nesting in disturbed areas, using ash disposal areas, gravel pits and reservoir shorelines. They forage in the shallow waters of lakes, ponds and rivers near nest sites. Nesting records of Interior least tern are known from two locations on bars and islands in the MS River in Desoto County, MS.

Wood storks are highly colonial and require wetland habitat for nesting and foraging. They form large rookeries in upper parts of cypress trees, mangroves, or dead hardwoods over swamps, on islands, and along streams and shallow lakes (Natureserve 2016). Wood storks feed on small fish, crayfish, reptiles, and amphibians in shallow fresh waterbodies and wetlands (Turcotte and Watts 1999). The wood stork breeds in Florida, Georgia, South Carolina, and from Mexico to Argentina (Natureserve 2016). Vagrant individuals are believed to occur statewide in MS. No known records exist for Marshall and Desoto Counties. Ponds, streams, wetlands and other suitable foraging habitat for wood stork were observed within the project footprint.

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 although the species range is thought to include Fayette County, TN. No caves have been documented within three miles of the project area. 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.

The northern long-eared bat predominantly overwinters in large hibernacula such as caves, abandoned mines, and cave-like structures. During the fall and spring they utilize entrances of caves and the surrounding forested areas for swarming and staging. In the summer, northern long-eared bats roost individually or in colonies beneath exfoliating bark or in crevices of both live and dead trees (typically greater than 3 inches in diameter). Roost selection by northern long-eared 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). There are no known northern long-eared bat records within 5 miles or within Fayette, Desoto, and Marshall Counties. No caves have been documented within three miles of the project. One culvert was examined during field surveys but contained no evidence of bat use. No additional winter habitat was found within the project area. Foraging habitat exists throughout the proposed project area in forest fragments, along 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 2014, 2015, 2018). Field surveys resulted in the identification of 85 suitable roost trees scattered throughout the 48.91 acres of suitable forested habitat within the combined SS and ROW footprints. Habitat quality ranged from moderate to high, based on the presence of trees with exfoliating bark (i.e., 30 snags, 21 shagbark hickories, 15 black willows, 5 white oaks), and 14 hollow or crevice trees 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 subjected to periodic flooding. The area subject to a one-percent chance of flooding in any given year is normally called the 100-year floodplain. It is necessary to evaluate development in the 100-year floodplain to ensure that the project is consistent with the requirements of EO 11988. The proposed project would cross floodplain areas associated with streams (see section 4.7) in Fayette County, TN and DeSoto and Marshall Counties, MS.

### 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 March, August, October 2018, and March 2019 to delineate wetland areas potentially affected by the proposed Action Alternative. The review footprint included the proposed Diffie Switching Station and new loop line easement, Chickasaw Trails Switching Station and loop line easements, 9 miles of OPGW installation on the Diffie-Chickasaw Trails and Miller-Olive Branch TLs, and 18.5 miles of newly proposed TL ROW to accommodate Moscow-Miller 161-kV TL corridor.

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 TN Rapid Assessment Method (TRAM 2018) 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 stormwater 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 Fayette County, TN to DeSoto and Marshall Counties, MS. Approximately 11 miles of the project footprint consists of existing ROW, which spans low stature vegetation maintained by current land use practices or cyclical ROW maintenance. The remainder consists of two proposed substation sites and a newly proposed 17 miles of TL ROW route. The entire project area is located across the North Fork-Wolf River, Indian River-Wolf River, Greys Creek-Wolf River, Nonconnah Creek, and Camp Creek-Coldwater River watersheds (10-HUC). The project footprint for the Action Alternative was field surveyed to identify actual wetland extent and quality. Forty-two wetland areas, totaling 37.44 acres, were identified within the proposed project footprint (Appendix D). The combination of land-use practices and landscape position dictates the wetland habitat type, wetland functional capacity, and wetland value. These wetlands consisted of emergent, scrub-shrub (sapling dominated), and forested wetland habitat of varying levels of condition, thus providing a range of wetland function and value to the surrounding landscape (Table 3-6 and 3-7). The delineated wetlands were

generally identified in association with smaller to medium sized drainage features and larger floodplain bottoms. Table 3-6 and 3-7 identifies the wetland acreage and wetland types by watershed within the project footprint.

**Table 3-6. Acreage of Low, Moderate, and Exceptional Resource Value Wetlands by Watershed Within the Action Alternative Footprint**

Watershed (10-HUC)	NWI Estimated Total Wetland Acres in Watershed*	Delineated Wetland Acreage in Project Area			
		Low Value	Moderate Value	Exceptional Resource Value	TOTAL
North Fork-Wolf River (0801021001)	7,900	0.56	7.03	0	<b>7.59</b>
Indian River-Wolf River (0801021002)	18,200	0.16	3.73	12.02	<b>15.91</b>
Grays Creek-Wolf River (0801021003)	21,900	0.71	0.20	0	<b>0.91</b>
Nonconnah Creek (0801021101)	3,200	1.57	10.73	0	<b>12.30</b>
Camp Creek-Coldwater River (0803020403)	2,700	0.71	0.02	0	<b>0.73</b>
<b>TOTAL</b>	<b>53,900</b>	<b>3.71</b>	<b>21.71</b>	<b>12.02</b>	<b>37.44</b>

\*National Wetland Inventory (USFWS 1982)

**Table 3-7. Acreage of Wetland Habitat Type by Watershed Within the Action Alternative Footprint**

Watershed (10-HUC)	NWI Estimated Total Wetland Acres in Watershed	Delineated Total Wetland Acreage in Proposed Project			
		Emergent	Scrub-Shrub	Forested	TOTAL
North Fork-Wolf River (0801021001)	7,900	4.31	0.99	2.29	<b>7.59</b>
Indian River-Wolf River (0801021002)	18,200	3.82	0	12.09	<b>15.91</b>
Grays Creek-Wolf River (0801021003)	21,900	0.08	0.35	0.48	<b>0.91</b>

Watershed (10-HUC)	NWI Estimated Total Wetland Acres in Watershed	Delineated Total Wetland Acreage in Proposed Project			
		Emergent	Scrub- Shrub	Foreste d	TOTAL
Nonconnah Creek (0801021101)	3,200	1.78	0.54	9.98	<b>12.30</b>
Camp Creek- Coldwater River (803020403)	2,700	0.73	0	0	<b>0.73</b>
<b>TOTAL</b>	<b>53,900</b>	<b>10.72</b>	<b>1.88</b>	<b>24.84</b>	<b>37.44</b>

Emergent wetland area within the project footprint totaled 10.72 acres across 27 delineated wetland areas (Table 3-8). Emergent wetlands are generally devoid of woody vegetation with predominant cover by non-woody species across areas periodically saturated and/or inundated. The emergent wetland habitat encountered within the project footprint comprised 0.8 percent of the total estimated emergent wetland habitat within the project watersheds (Table 3-8). Emergent wetlands are a relatively small component of the wetland area and general landscape in this vicinity, likely due to the lack of maintenance needed to sustain low stature vegetation in areas otherwise prone to recruitment of woody species.

**Table 3-8. Acreage of Low, Moderate, and Exceptional Resource Value Emergent Wetlands by Watershed Within the Action Alternative Footprint Area**

Watershed (10-HUC)	NWI Estimated Emergent Wetland Acres in Watershed	Delineated Emergent Wetland Acreage in Proposed Project Area			
		Low Value	Moderate Value	Exceptional Resource Value	TOTA L
North Fork-Wolf River (0801021001)	200	0.54	3.77	0	<b>4.31</b>
Indian River-Wolf River (0801021002)	520	0.09	3.73	0	<b>3.82</b>
Grays Creek-Wolf River (0801021003)	530	0.08	0	0	<b>0.08</b>
Nonconnah Creek (0801021101)	70	1.03	0.75	0	<b>1.78</b>



Watershed (10-HUC)	NWI Estimated Emergent Wetland Acres in Watershed	Delineated Emergent Wetland Acreage in Proposed Project Area			
		Low Value	Moderate Value	Exceptional Resource Value	TOTA L
Camp Creek- Coldwater River (803020403)	50	0.71	0.02	0	<b>0.73</b>
<b>TOTAL</b>	<b>1370</b>	<b>2.45</b>	<b>8.27</b>	<b>0</b>	<b>10.72</b>

Emergent wetlands in this general vicinity are often found where land-use practices deter growth of woody species. This was evident for all the identified emergent wetland areas within the project footprint. The proposed substation site contains W001-A, a mowed wetland swale along a crop field, and W003-A, a portion of a mowed wetland field. W002-A (north and south) are located within a regularly mowed highway easement. TVA’s ROW vegetation management program targets eradication of woody vegetation through herbicide application and other methods within TVA’s existing ROWs comprising the project footprint. This has resulted in the emergent wetland habitat type found in W003-A and W004-A on the tap points for loop lines into the proposed Chickasaw Trails substation site, W001-B through W007-B on the Diffie-Chickasaw Trails TL (L5420), W001-HS-C and W002-HS-C on the Holly Springs-Cordova TL (L5864), and W001-D through W006-D on the Miller-Olive Branch TL (L5937). Other forms of emergent wetland habitat were encountered within the route proposed for new TL construction. These consisted of pasture wetlands actively grazed by cattle in W003-MM-C, W006-MM-C, and W0012-MM-C. W008-MM-C comprised an area with historical disturbance resulting in large gullies that exhibit persistent emergent wetland vegetation. W016-MM-C currently exhibits emergent wetland habitat due to a road cut through an otherwise bottomland forested wetland, where the road bed is not elevated or graveled and the clearing has resulted in the presence of emergent wetland. Historical clearing and along the margins of forested wetlands and ongoing maintenance of emergent wetland habitat in those locations was evident in W0018-MM-C and W019-MM-C. All of these wetland areas contained indicators of wetland hydrology influencing soil physiology such that coloration indicative of wetland conditions was evident in the soil profile. Typical wetland grasses, rushes, and forbs dominated these habitats. This included broomsedge, spikerush, rivercane, buttonweed, goldenrod, panic grasses, and pathrushes (USACE 2018). Condition and functional capacity of these wetlands ranged from low to moderate in quality, largely due to or dependent on size, landscape position, hydrologic influence, and degree of impacts evident (e.g. grazing, farming, woody vegetation control, soil compaction, mowing, etc.) (Table 3-10; TRAM 2018).

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 1.88 acre across five delineated wetland areas within the project footprint (Table 3-9, and Table 3-11). The scrub-shrub wetland habitat encountered comprised 0.1 percent of the total estimated scrub-shrub wetland habitat across the project watersheds (Table 3-11). Scrub-shrub wetland habitat represents a greater component of the wetland area and general landscape

in this vicinity than emergent wetland habitat type, likely due to recruitment and growth of woody species in previously maintained emergent wetland habitats.

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

Watershed (10-HUC)	NWI Estimated Scrub-Shrub Wetland Acres in Watershed	Delineated Scrub-Shrub Wetland Acreage in Proposed Project Area			
		Low Value	Moderate Value	Exceptional Resource Value	TOTA L
North Fork-Wolf River (0801021001)	140	0	0.99	0	<b>0.99</b>
Indian River-Wolf River (0801020102)	1,400	0	0	0	<b>0</b>
Grays Creek-Wolf River (0801021003)	820	0.35	0	0	<b>0.35</b>
Nonconnah Creek (0801021101)	150	0.10	0.44	0	<b>0.54</b>
Camp Creek- Coldwater River (803020403)	80	0	0	0	<b>0</b>
<b>TOTAL</b>	<b>2,590</b>	<b>0.45</b>	<b>1.43</b>	<b>0</b>	<b>1.88</b>

This habitat type within the project footprint is comprised of young saplings in early successional forest (scrubby). W001-A, W002-MM-C, W010-MM-C, and W021-MM-C appeared to have been historically cleared, but left fallow such that saplings comprising early successional forest habitat were present. W014-MM-C was dominated by previous understory saplings which remained after the large trees had recently been removed. Due to their landscape position, size, disturbance regime, hydrologic influence, these wetlands were assessed as providing low to moderate wetland value within the surrounding landscape (TRAM 2018). All delineated scrub-shrub wetland areas exhibited wetland hydrology indicators and hydric soil coloration within the soil profile. Hydrophytic saplings, such as sweetgum, black willow, and American elm, were dominant across these wetlands (USACE 2018).

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). 24.84 acres of forested wetland were delineated across 11

wetland areas within the proposed Chickasaw Trails switching station site and TL ROW corridors (Table 3-9 and Table 3-12) located in three of the four affected watersheds. The forested wetland habitat encountered comprised 0.04 percent of the total estimated forested wetland area across the project watersheds (Table 3-12). Due to landscape position, 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 exceptional. Of the total forested wetland acreage, 12.02 acres within the Wolf River floodplain complex were assessed as exceptional resource value, providing superior function to the surrounding landscape. Moderate quality forested wetland totaled 12.45 acres, providing adequate and healthy function and value. The remaining 0.37 acre was assessed as having low value, offering less than desirable wetland function (Table 3.-12).

**Table 3-10. 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			TOTAL
		Low Value	Moderate Value	Exceptional Resource Value	
North Fork-Wolf River (0801020101)	7,560	0.02	2.27	0	<b>2.29</b>
Indian River-Wolf River (0801020102)	16,280	0.07	0	12.02	<b>12.09</b>
Grays Creek-Wolf River (0801021003)	20,550	0.28	0.20	0	<b>0.48</b>
Nonconnah Creek (0801021101)	2,980	0	9.98	0	<b>9.98</b>
Camp Creek- Coldwater River (803020403)	2,570	0	<b>0</b>	<b>0</b>	<b>0</b>
<b>TOTAL</b>	<b>49,940</b>	<b>0.37</b>	<b>12.45</b>	<b>12.02</b>	<b>24.84</b>

The North Fork-Wolf River watershed contains forested wetlands W001-MM-C and W004-MM-C within the proposed new ROW corridor for the Moscow-Miller 161-kV TL. Of an estimated total 7,560 forested wetland acres, the proposed ROW corridor through this watershed contains 2.29 acres, or less than 0.1 percent (Table 3-12). W001-MM-C consists of a 2.27 acre portion of the North Fork Wolf River floodplain wetland complex. This wetland scored as moderate value due to its large size, beneficial landscape position, and good quality wildlife habitat coupled against a lack of adequate buffer, presence of young opportunistic tree species trees indications of recent clearing, and extensive presence of

invasive species (TRAM 2018). W004-MM-C comprises 0.02 acre of a forested wetland depression entirely located within the proposed ROW route, surrounded by a cleared fallow field. Due to the small size and lack of wildlife habitat or hydrologic influence, this scored as providing low value to the surrounding landscape. Wetland hydrology indicators, such as drainage patterns, crayfish burrows, and geomorphic position were exhibited within these forested wetlands. These hydrology parameters influenced the soil profile, and hydric soil coloration was evident. Hydrophytic forested vegetation was dominated by green ash, willow oak, river birch, red maple, sweetgum, or black willow (USACE 2018).

The Indian Creek-Wolf River watershed contains forested wetlands W005-MM-C and W007-MM-C within the proposed new ROW corridor for the Moscow-Miller 161-kV TL. Of an estimated 16,280 total forested wetland acres, the proposed ROW corridor through this watershed contains 12.09 acres, or less than 0.1 percent (Table 3-12). W005-MM-C consists of a 0.07 acre basin on the ROW, extending south of the ROW to a drainage feature. This wetland was heavily impacted by cattle in a pasture, inundated and saturated, dominated by a single species stand of sweetgum, and exhibiting hydric soil coloration. Due to ongoing disturbances and small size, W005-MM-C wetland scored as low wetland value to the surrounding landscape (TRAM 2018). W007-MM-C consists of a 12.02 acre portion of the Wolf River floodplain wetland complex where the proposed ROW crosses this bottomland habitat. This wetland scored as exceptional resource value due to its large size, beneficial landscape position, good quality wildlife habitat, relatively intact and adequate buffers, and lack of disturbance indicators (TRAM 2018). Portions of the Wolf River bottomland north and south of the proposed wetland crossing are protected either through designated natural areas or as a TN Exceptional Water reach. Wetland hydrology indicators, such as inundation, saturation, high water table, drainage patterns, drift deposits, crayfish burrows, geomorphic position, and moss trim lines were exhibited within this wetland. These hydrology parameters influenced the soil profile, and hydric soil coloration was evident. Hydrophytic forested vegetation was dominant and included American elm, water tupelo, and red maple, with cypress, willow oak, river birch, sweetgum and sycamore present as well. The understory was dominated by Nepalese browntop, an invasive grass, as well as native wetland ferns, including sensitive fern and netted chain fern (USACE 2018).

The Grays Creek-Wolf River watershed contains the largest estimated forested wetland cover, with over 20,000 acres, of all the watersheds crossed by the project footprint. However, this watershed only contains a small section of the newly proposed TL route, and the least acreage of affected forested wetland. W009-MM-C, W011-MM-C, and W013-MM-C comprise the forested wetland habitat in this watershed, totaling 0.48 acre, which is less than 0.01 percent of the Grays Creek-Wolf River watershed's overall estimated forested wetland cover (Table 3-12). W009-MM-C comprised 0.25 acre of floodplain forested acre associated with an unnamed tributary of Teague Creek. W011-MM-C consists of forested wetland associated with a drainage swale, receiving hydrology from an upstream pond, and draining into a defined channel outside the ROW. Both these wetlands were assessed at low value due to size, lack of hydrologic influence or wildlife use, and presence of invasive species (TRAM 2018). W013-MM-C is located at the upper reaches of a wide valley, feeding an unnamed tributary to Grissum Creek. These forested wetlands features all exhibited hydrologic indicators which have resulted in hydric soil coloration. Forested hydrophytic vegetation across these communities was dominated sweetgum, sycamore, red maple, or river birch (USACE 2018).

The Nonconnah Creek watershed contains an estimated 2,980 acres of forested wetland area. 9.98 acres of forest across four delineated wetlands were identified within this watershed at the proposed Chickasaw Trails switching station site, along the TL loop line into the site, or within Moscow-Miller TL corridor. These consisted of W003-A, W015-MM-C, W017-MM-C, W020-MM-C, comprising 0.03 percent of this watershed's estimated total forested wetland area (Table 3-12). These delineated wetland areas all comprise portions of the floodplain wetland complex associated with the upper reaches of an unnamed tributary to the Nonconnah Creek. They are separated either as the project footprint crosses this floodplain area at different locations or by emergent wetland habitat, and upland berms. This forested wetland bottom exhibited moderate value due to its healthy size, hydrologic influence, and relative lack of substrate and habitat disturbance paired against limited buffer widths, intense industrial and row cropping land use in the vicinity, and presence of invasive species (TRAM 2018). These forested wetlands exhibited hydrologic indicators such as drift deposits, drainage patterns, surface water, high water table, and saturated soils, which have resulted in hydric soil coloration. This wetland bottom was dominated by cherrybark oak, willow oak, and sweetgum, all of which are hydrophytic tree species (USACE 2018).

### **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 includes portions of Fayette, Marshall, and DeSoto counties in southwestern TN and northern MS, and is comprised of flat to moderately rolling terrain. The landscape is largely dominated by developed suburban and rural features including agricultural fields, fencerows, roadways, existing utility corridors, and scattered residences. The Miller-Olive Branch and Diffee-Moscow OPGW additions would be added along existing 161-kV TLs that predominantly cross forested and agricultural land, as well as a number of residential properties near the cities of Olive Branch and Moscow. Similarly, the Cordova-Holly Springs double-circuit rebuild would be constructed along an existing, currently de-energized TL passing through agricultural and rural residential properties.

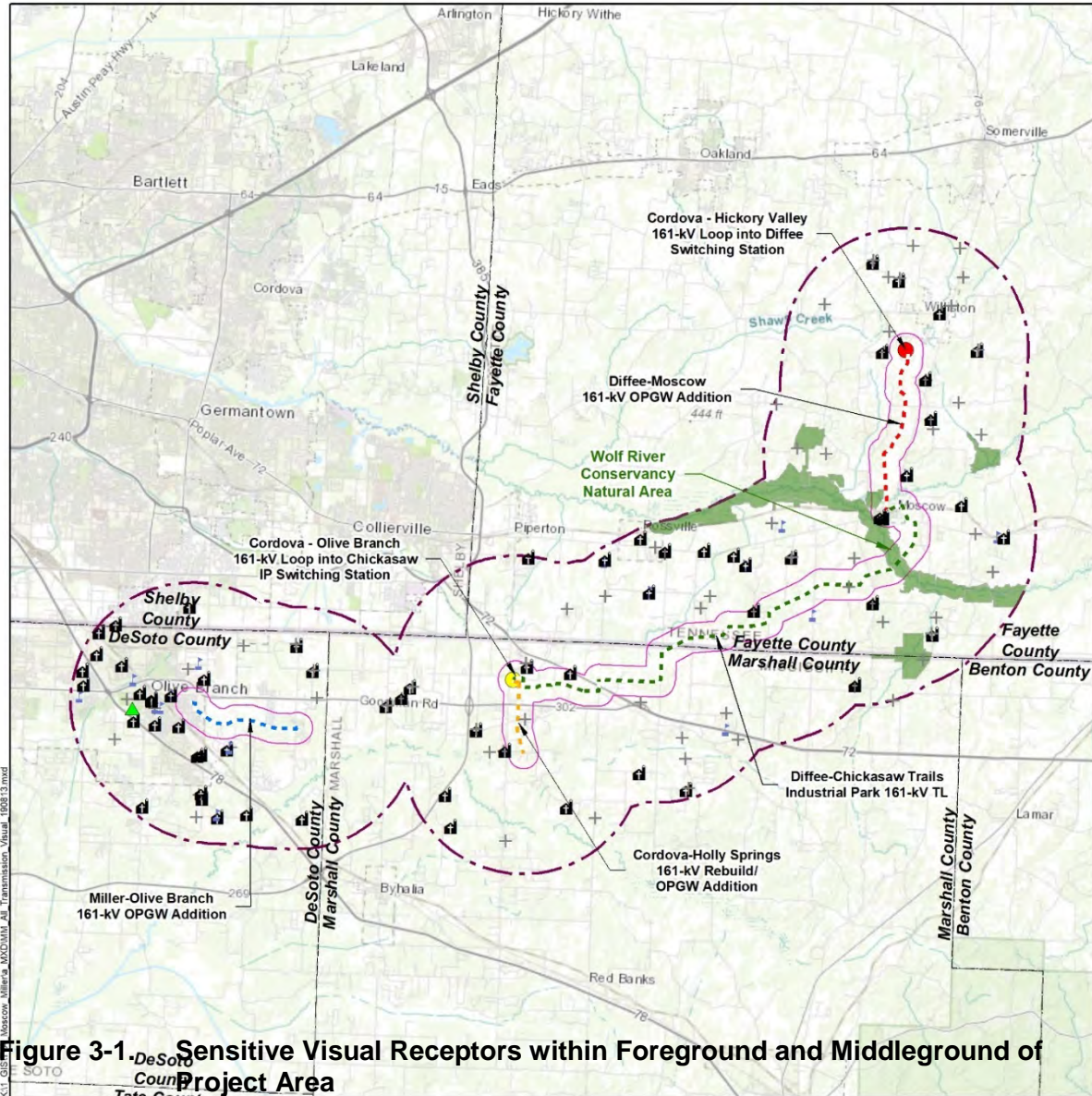
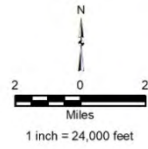
The proposed Diffee Switching Station would be constructed at the intersection of two existing TVA high-voltage TLs (the Cordova-Hickory Valley 161-kV TL and the Tap to Moscow 161-kV TL). The viewshed of the proposed switching station includes TLs, pasture lands, rural residential properties, and forested areas in the foreground. There are also several existing TLs located in the vicinity of the proposed Chickasaw Trails Industrial Park Switching Station, with a mixture of industrial, agricultural, and undeveloped forested properties in the foreground.

The proposed 18.5-mile Diffee-Chickasaw Trails Industrial Park 161-kV TL would primarily extend through pastures, agricultural fields, and forested areas. While residential properties were avoided to the extent possible, some rural residences are located within the foreground of the proposed TL as well. There are several existing TVA high voltage TLs present in the project area, including the Benton-Cordova 500-kV TL that would cross the new TL segment near its center, just north of the TN-MS state line. The proposed TL would be visible from one U.S. highway, two state highways, and various local roads along the route. The highest visibility would likely occur across U.S. Highway 72 and TN State Route (SR) 57 due to heavier volumes of traffic and the location of the proposed TL across and adjacent to these roads.

The viewshed of certain facilities, such as churches, schools, and outdoor recreation sites, can be vulnerable to visual modifications in the surrounding landscape. As shown in Figure 3-1, there are a number of churches, cemeteries, schools, and parks/natural areas within a four-mile radius of the proposed TL. The majority of these facilities occur within the middleground of the proposed project actions, at distances between 0.5 and 4 miles. Five churches and four cemeteries occur within the foreground of the project area. One cemetery is located approximately 0.25 mile east of the Cordova-Holly Springs rebuild, while the remaining facilities are dispersed along the corridor of the proposed Diffee-Chickasaw Trails Industrial Park TL. The closest facility to the proposed TL, Parr Cemetery, is a historic cemetery located in a wooded area approximately 400 feet south of the proposed TL. The remaining churches and cemeteries are located 0.2 miles or more from the proposed TL. In addition, the TL route would cross the Wolf River and adjacent riparian corridor, which are part of a natural area overseen by the Wolf River Conservancy.

The composition and patterns of vegetation are the prominent features of the landscape within the project area. Vegetation consists of a variety of deciduous and evergreen trees and agricultural fields. Scenic attractiveness of the project area is considered common due to the ordinary or common visual quality in the foreground, middleground, and background (Table 3-11). The forms, colors, and textures in the project area are normally seen throughout the characteristic landscape and, therefore, it is not considered to have distinctive visual quality. In the foreground and middleground, the scenic integrity is considered moderate due to the slight human alteration including agricultural and residential uses. However, in the background these alterations are not substantive enough to dominate the view of the landscape. 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.

**TVA** Moscow-Miller Power System Improvement



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

**Legend**

- |          |                                 |   |   |
|----------|---------------------------------|---|---|
| School   | Natural Areas                   | Chickasaw Trails IP 161kV Switching Station | <b>Alignments</b>                                   |
| Church   | 0.5-Mile Buffer of Project Area | Diffee 161kV Switching Station              | Diffee-Moscow 161-kV OPGW Addition                  |
| Cemetery | 4-Mile Buffer of Project Area   |   | Diffee-Chickasaw Trails Industrial Park 161-kV TL   |
| Park     |                                 |   | Miller-Olive Branch 161-kV Rebuild/ OPGW Addition   |
|          |                                 |   | Cordova-Holly Springs 161-kV Rebuild/ OPGW Addition |



**Table 3-11. Visual Assessment Ratings for Project Area**

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

**3.8.2 Noise and Odors**

Water Valley Municipal Airport is located in close proximity to the proposed TL route. Also, some traffic noise is generated along SR 57, SR 76, and SR 302, US 72, and from the towns of Moscow and Cayce, 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**

The proposed 18.5-mile Diffie-Chickasaw Trails Industrial Park 161-kV TL segment would extend through southern Fayette County, TN and northern Marshall County, MS. Related project actions, including new switching stations, a TL rebuild, and OPGW additions would also take place within these counties, as well as in northeastern DeSoto County, MS. Given the nature of the proposed actions, the project area for socioeconomic analysis is defined as the eight census block groups encompassing the proposed project actions. As the project area spans Fayette, DeSoto, and Marshall, counties in TN and MS, these three counties and two states are included as appropriate secondary geographic areas of reference. Comparisons at multiple spatial scales provide a more detailed characterization of populations that may be affected by the proposed actions, including any environmental justice populations (e.g., minority and low-income). Demographic and economic characteristics of populations within the project area were assessed using the 2013-2017 American Community Survey 5-year estimates provided by the U.S. Census Bureau (USCB) (USCB 2019a).

**3.9.1 Demographic and Socioeconomic Conditions**

Demographic characteristics of the project area and of the secondary reference geographies are summarized in Table 3-12. The project area has a resident population of 17,261 and is predominantly characterized by low-density residential development. It includes portions of the cities of Williston and Moscow, TN and Olive Branch, MS, as well as the unincorporated communities of Mt. Pleasant and Cayce, MS. The surrounding counties range in population size from rural Marshall County (35,981 residents) to DeSoto County (173,267 residents), which contains more densely populated areas associated with suburbs of the city of Memphis. Since 2010, the population within the block groups that make up the project area has increased by 5.4 percent, slightly higher than the increases experienced by Fayette County and the state of TN (2.4 and 4.0 percent, respectively).

**Table 3-12. Demographic and Socioeconomic Characteristics of Project Area and Secondary Reference Geographies**

	<b>Project Area (Block Groups Encompassing Proposed Actions)</b>	<b>Fayette County, TN</b>	<b>DeSoto County, MS</b>	<b>Marshall County, MS</b>	<b>State of TN</b>	<b>State of MS</b>
<b>Population<sup>1,2</sup></b>						
Population, 2017 estimate	17,261	39,336	173,267	35,981	6,597,381	2,986,220
Population, 2010	16,369	38,413	161,252	37,144	6,346,105	2,967,297
Percent Change 2010-2017	5.4 percent	2.4 percent	7.5 percent	-3.1 percent	4.0 percent	0.6 percent
Persons under 18 years, 2017 estimate	23.5 percent	20.5 percent	26.4 percent	21.9 percent	22.7 percent	24.3 percent
Persons 65 years and over, 2017 estimate	13.1 percent	19.3 percent	12.1 percent	15.7 percent	15.4 percent	14.6 percent
<b>Racial Characteristics<sup>1</sup></b>						
Not Hispanic or Latino						
White alone, 2017 (a)	59.7 percent	68.3 percent	66.6 percent	47.7 percent	74.3 percent	57.0 percent
Black or African American, 2017 (a)	35.4 percent	27.7 percent	25.3 percent	47.6 percent	16.7 percent	37.5 percent
American Indian and Alaska Native, 2017 (a)	0.4 percent	0.3 percent	0.1 percent	0.1 percent	0.2 percent	0.4 percent
Asian, 2017 (a)	0.1 percent	0.7 percent	1.2 percent	0.1 percent	1.7 percent	1.0 percent
Native Hawaiian and Other Pacific Islander, 2017 (a)	0.0 percent	0.0 percent	0.0 percent	0.0 percent	0.1 percent	0.0 percent

	<b>Project Area (Block Groups Encompassing Proposed Actions)</b>	<b>Fayette County, TN</b>	<b>DeSoto County, MS</b>	<b>Marshall County, MS</b>	<b>State of TN</b>	<b>State of MS</b>
Some Other Race alone, 2017 (a)	0.0 percent	0.0 percent	0.1 percent	0.0 percent	0.1 percent	0.1 percent
Two or More Races, 2017	0.2 percent	0.5 percent	1.8 percent	0.9 percent	1.9 percent	1.1 percent
Hispanic or Latino, 2017	4.3 percent	2.5 percent	4.8 percent	3.5 percent	5.2 percent	3.0 percent
<b>Housing and Income<sup>1</sup></b>						
Housing units, 2017	6,629	16,576	65,118	15,318	2,903,199	1,308,259
Median household income, 2013-2017	\$ 59,087	\$ 57,919	\$ 62,595	\$ 41,134	\$ 48,708	\$ 42,009
Persons below poverty level, 2013-2017	13.3 percent	14.4 percent	9.8 percent	17.8 percent	16.7 percent	21.5 percent
Persons below low-income threshold, 2013-2017 (b)	30.2 percent	31.3 percent	26.4 percent	41.6 percent	37.3 percent	44.0 percent
(a) Includes persons reporting only one race.						
(b) Low-income threshold is defined as two times the poverty level						
Sources: <sup>1</sup> USCB 2019a; <sup>2</sup> USCB 2011						

During this same period, the population of DeSoto County grew by 7.5 percent, while the population of Marshall County decreased by 3.1 percent and the state of MS essentially remained the same (with an increase of less than 1 percent).

Approximately 60 percent of the project area population is white. The largest minority group in the project area is Black or African American, representing 35.4 percent of the population, followed by Hispanic or Latino with 4.3 percent, and small numbers who are American Indian and Alaska Native, Asian, and persons who identified as two or more races (less than 1 percent each). Minority populations in the project area are generally comparable to those of the surrounding counties, which have total minority populations ranging from 31.7 to 52.3 percent (Table 3-12).

The average median household income in the block groups that make up the project area is \$59,087, which is consistent with the median household income reported for Fayette County (\$57,919) and DeSoto County (\$62,595) and is notably higher than Marshall County and the states of TN and MS (ranging from \$41,134 to \$48,708) (Table 3-12). Correspondingly, the percentage of the project area population below the poverty level is 13.3 percent, similar to DeSoto County (9.8 percent) and Fayette County (14.4 percent), while the percentage of persons below the poverty level is higher in Marshall County and the states of TN and MS (16.7 to 21.5 percent).

### **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. When applicable, the study area for the evaluation of impacts to community services is the service area of various providers; otherwise, a secondary study area identified for the purposes of a socioeconomic analysis may be defined. In this case, a 5-mile radius was utilized along the entirety of the project area to identify facilities and emergency services that could be potentially impacted by proposed project activities or emergency incidents along the length of the TL.

Community facilities and services available within a 5-mile radius of the proposed project area include schools, churches, cemeteries, health care facilities, police and emergency services, and an airport. Many of these facilities are concentrated in and around Olive Branch, MS, in the westernmost portion of the project area where the population density is greatest. While there are no facilities located in close proximity (within 0.5 mile) of the proposed Diffie Switching Station, there is one church and one cemetery located within 0.5 mile of the proposed Chickasaw Trails Industrial Park Switching Station. Both the Church and cemetery are also located within 0.5 mile of the new 18.5-mile Diffie-Chickasaw Trails Industrial Park TL segment, as are four additional churches, two additional cemeteries, and the Moscow District of the Fayette County Fire Department.

### **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 (USEPA 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:

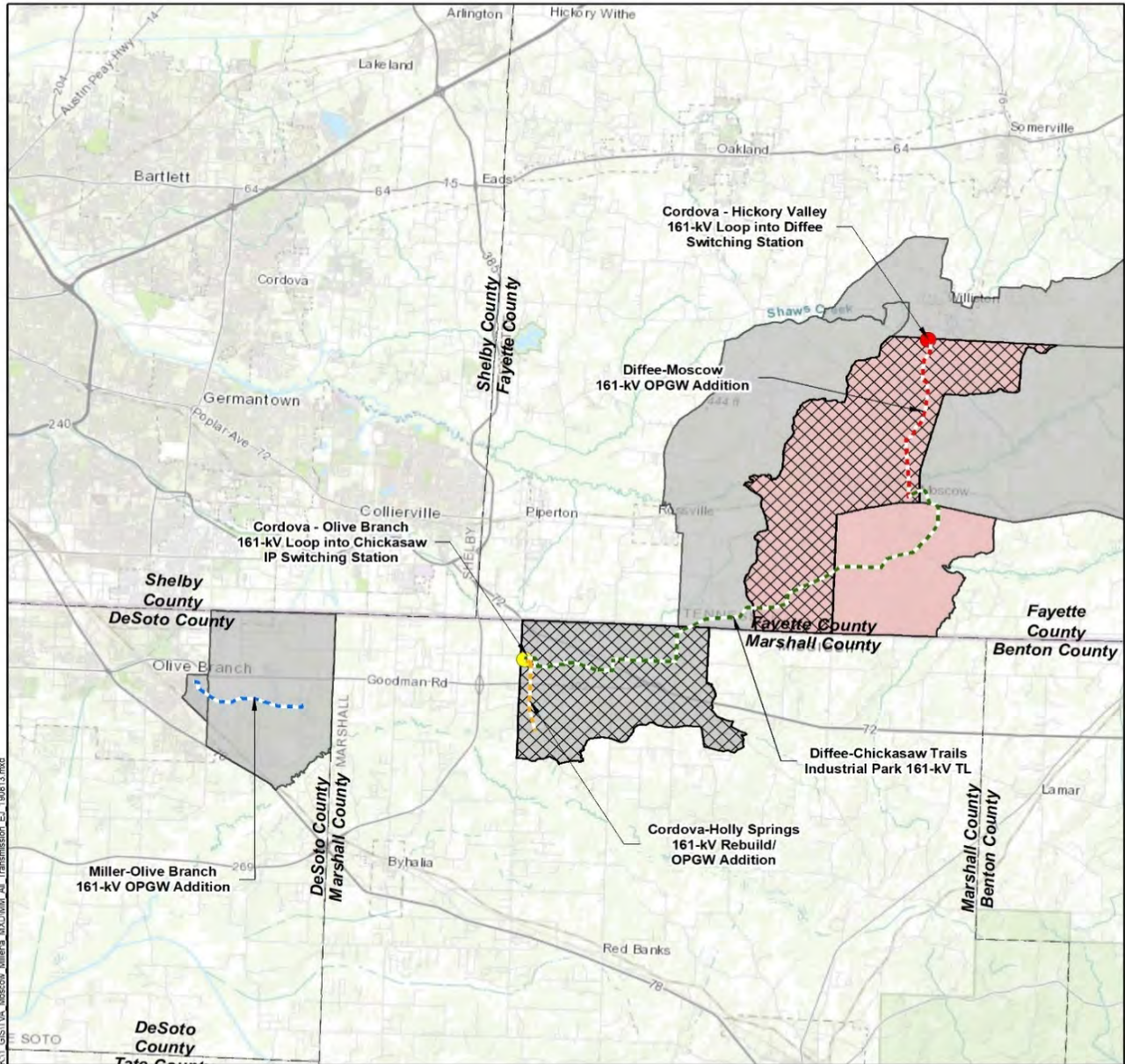
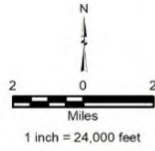
- The minority population of the impacted area exceeds 50 percent of the total population.
- The ratio of minority population is meaningfully greater (i.e., greater than or equal to 20 percent) than the minority population percentage in the general population or other appropriate unit of geographic analysis (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 2018 USCB Poverty Threshold for an individual is an annual income of \$13,064, and for a family of four it is an annual household income of \$25,900 (USCB 2019b). 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 USEPA 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 (USEPA 2017). According to USEPA, 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 (Center 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 USEPA's EJSCREEN tool, the project area consists of a mixture of communities that meet the criteria for consideration as minority and/or low-income populations and those that do not. A more detailed evaluation was completed using the 2013-2017 American Community Survey data to identify specific block groups within the project area that exceed environmental justice thresholds. Figure 3-2 identifies the block groups that meet the specified criteria as environmental justice minority populations or low-income populations.

**TVA** Moscow-Miller Power System Improvement



**Legend**

- Low Income Block Group
- Minority Block Group
- Project Area Block Group

- Chickasaw Trails IP161kV Switching Station
- Diffee 161kV Switching Station

**Alignments**

- Diffee-Moscow 161-kV OPGW Addition
- Diffee-Chickasaw Trails Industrial Park 161-kV TL
- Miller-Olive Branch 161-kV OPGW Addition
- Cordova-Holly Springs 161-kV Rebuild/ OPGW Addition

**Figure 3-2. Environmental Justice Populations Within the Project Area**

Total minority populations (i.e., all non-white and Hispanic or Latino racial groups combined) comprise approximately 26 percent of the population of TN and 43 percent of the population of MS. In the three counties where project activities are proposed, total minority populations range from 31.7 to 52.3 percent of the population. Approximately 40.3 percent of people living within the project area are minorities, with percentages for individual block groups ranging from 22.6 to 51.9 percent of the population. Two of the selected block groups have minority populations that either exceed 50 percent of the total population or significantly exceed the minority percentage of one or more of the reference geographies. Figure 3-2 identifies these block groups determined to meet the criterion for consideration as minority population groups subject to environmental justice considerations.

The percentages of the population of TN and MS living below the low-income threshold are 37.3 percent and 44.0 percent, respectively. Of the three counties considered, Marshall County has the highest percentage of low-income individuals (41.6 percent), followed by Fayette County (31.3 percent), and DeSoto County (26.4 percent). Approximately 30.2 percent of people living within the project area are considered low-income, with percentages for individual block groups ranging from 19.5 to 54.0 percent of the population. Two of the selected block groups have low-income populations that either exceed 50 percent of the total population or significantly exceed the low-income percentage of one or more of the reference geographies. Figure 3-2 identifies these block groups determined to meet the criterion for consideration as low-income population groups subject to environmental justice considerations.

### 3.10 Cultural Resources

The TVA has been inhabited more or less continuously by humans for more than 13,000 years. This period began with small, highly mobile groups of people using large spear points and knives, who at least occasionally hunted large extinct mammals. Thousands of years of cultural change and adaptation were marked by the development of large stone tools for processing nuts and shellfish during the Archaic Period (10,000-3,000 years ago), followed by the adoption of pottery and the first beginnings of plant cultivation in the Woodland Period (3,000-1100 years ago), and the rise of large towns during the Mississippian period beginning ca. AD 900. Generally speaking, large habitation sites are found on levees or terraces along rivers and tributaries, while specialized campsites tend to be found on older alluvial terraces and in the uplands where resources were gathered. Prehistoric camps and villages were only occasionally located on upland areas more than 1,000 feet from permanent water sources, so these areas tend to have low probability for archaeological remains.

Beginning with the first European contact during the Soto Expedition, the native population declined rapidly, political networks between native groups and European colonists arose. Native peoples devised new settlement and subsistence strategies and formed alliances with British and French colonists. At that time of early European settlement, Chickasaw settlements encompassed portions of southwestern KY, western TN, northwestern Alabama, and northeastern MS. Early Chickasaw settlements have been identified throughout these areas.

The three counties within the current project area share a long history beginning with their early settlement with the cessation of Chickasaw lands through multiple treaties and forced removal. In the intervening years, prior to the Civil War, the economy in these counties was largely based on subsistence agriculture and larger monoculture farms of crops such as

corn, cotton, rice, tobacco, sheep, cattle, horses, and hogs. Railroads, especially the LaGrange and Memphis Railroad, played a key role in the growth of these economies. The counties within the project area were not subject to any major battles during the Civil War, however, some skirmishes did occur. The site of one site skirmish was located on the Memphis & Charleston railway bridge spanning the Wolf River just west of Moscow (outside the project area) as Union troops, including U.S. Colored Troops of the 2nd West TN Infantry, heavily guarded the federal interest of the railroad (Rosenwinkel et al. 2018).

Following the Civil War, the counties faced economic hardship and in some areas a decrease in populations. The early twentieth century, played in part by road infrastructure projects, saw population growth and diversification of the economy beyond agricultural. During the Civil Rights Area, in some locations within the counties, African American tenant farmers were forcibly evicted for attempting to register to vote. “Tent cities” were erected to house the newly homeless. One such tent city was located along Highway 57 near the town of Moscow (Rosenwinkel et al. 2018). These areas were occupied until 1963 when inhabitants either moved elsewhere or received housing in newly constructed homes for the purpose of resettlement. Today the economy of the region is still largely based in agricultural.

Cultural resources, including archaeological and historic architectural resources, are protected under various federal laws, including: the Archaeological Resources Protection Act, the Native American Graves Protection and Repatriation Act, and the NHPA. Section 106 of the NHPA requires federal agencies to consult with the respective SHPO and other consulting parties including federally recognized Indian tribes that have an interest in the area when proposed federal actions could affect these resources.

With regards to cultural resources the APE is taken as the affected environment for purposes of this EA. The APE is defined at 36 CFR §800.16(d) (a section of the federal regulations implementing Section 106 of the National Historic Preservation Act) as “the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist.” TVA determined APE to be the project area including 18.5 mile proposed TL ROW, which includes some 100-foot wide ROW and associated access roads; the footprint the two purposed switching stations and any associated infrastructure (approximately 7 acres), and the footprint of all ground disturbance associated with the proposed OPGW replacement and rebuild. TVA determined the APE for visual effects to be areas within a one-half mile radius surrounding the centerline of the proposed new TL and switching stations, where new construction or vegetation clearing could be within view of a historic resource.

TVA contracted with Tennessee Valley Archaeological Research to conduct a Phase I cultural resources survey of the APE (de Gregory et al. 2018; Rosenwinkel et al. 2018 and 2019). Subsequent to the surveys, TVA proposed slight changes in design. A Phase I cultural resources survey was conducted in those areas that were not previously subjected to an archaeological survey (de Gregory et al. 2019).

### **3.10.1 Archaeological Resources**

Two previously recorded sites 40FY229 (the location of a Federal Army encampment during the Civil War) and 22MR707 (a historic house site) were located within the APE. Sixteen sites (40FY490, 40FY491, 40FY492, 40FY493, 40FY494, 40FY495, 40FY587, 40FY588, 22MR707, 22MR734, 22MR735, 22MR736, 22MR737, 22MR738, 22DS848 and



22DS849) were identified as a result of the surveys. The majority of the sites represented low density historic or prehistoric artifact scatters.

### **3.10.2 Architectural Resources**

Two previously recorded architectural resources (FY-46 and FY-47) were identified within the viewshed of the proposed new transmission line. FY-46 has been significantly altered, and TVA finds the site ineligible for National Register of Historic Places (NRHP) inclusion due to lack of integrity. FY-47, the Wheeler-Burnette House, was previously determined by the THC staff as ineligible for NRHP listing and is no longer extant. The survey resulted in the identification of 114 newly recorded architectural resources in TN and 13 in MS. The majority of the historic architectural resources are located within the town of Moscow. A portion of the Memphis and Charleston Railroad is also located within the viewshed.

### **3.11 Recreation**

There are no developed parks or outdoor recreation areas adjacent to or within this TL right of way. However, some informal dispersed outdoor recreation activity such as walking for pleasure or wildlife observation may occur within the ROW corridor.

### **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 (5 mi radius).

Phase A of the Moscow-Miller TL project includes portions of Fayette County, TN and Marshall County, MS. There is one natural area within 4.9 miles of the project; Steeplechase Park in Cordova, TN is a 28.15 acre park consisting of 2 lakes, .65-miles of greenbelt trail, and a playground. Phase B of the Moscow-Miller TL project includes portions of Shelby, Fayette, and Hardeman counties in TN. Twenty-seven natural areas occur within 5 miles of Phase B of the project (Table 3-13). No natural areas occur within 5 miles of Phase C of the project. Phase D of the project is sited within DeSoto County, MS. There are no natural areas crossed by the TL for this portion of the project. There is a private conservation easement located 3.7 miles south of the project. The Wolf River Conservancy holds a 21.4 acre conservation easement 4.3 miles north of the project.

**Table 3-13. Natural Areas Occur within 5 Miles of Phase B**

Site	Distance from Project	Comments	Managing Entity	Acres	County
Ames Plantation	0	Agricultural research facility; hunt club; habitat restoration	Hobart Ames Foundation	18,400	Multiple
Moscow Wetland	0.09	Wetland & WMA	Tennessee Wildlife Resources Agency	173.1	Fayette (TN)
North Fork Conservation Easement – Wolf River Conservancy	0.09	Wetland conservation easement	Wolf River Conservancy	171.8	Fayette (TN)
Herb Parsons State Fishing Lake and Wildlife Observation Area	0.36	Recreation lake and wildlife observation area	Tennessee Department of Environment & Conservation	364.4	Fayette (TN)
Wolf River Macrosite	0.38	High quality ecological community >3000 acres	None	13,834.9	Multiple
Middlecoff Conservation Easement	0.86	Conservation easement	State of Tennessee	436.3	Fayette (TN)
Ames Plantation Woods Registered State Natural Area	1.35	Registered state natural area; uncommon upland forest habitat	Hobart Ames Foundation	34.1	Fayette (TN)
McNeill Conservation Easement	2.22	Conservation easement	State of Tennessee	96.6	Fayette (TN)
Poole Road Wetland – Wolf River	2.42	Wetland & WMA	Tennessee Wildlife Resources Area	163.7	Fayette (TN)
Zadie E. Kuehl Park	2.51	Arboretum and playground	City of Lakeland, Tennessee	3	Shelby (TN)
Cordova Park and Arboretum	2.64	Arboretum and public park	City of Cordova, Tennessee	48	Shelby (TN)
Hays Crossing Wetland	2.66	Wetland & WMA	Tennessee Wildlife Resources Agency	725.4	
Wolf River Easement	2.68	Wetland conservation easement	The Nature Conservancy	399.8	Fayette (TN)

Moscow-Miller Power System Improvements

Site	Distance from Project	Comments	Managing Entity	Acres	County
Wolfe Conservation Easement	2.88	Wetland conservation easement	Wolf River Conservancy	523.9	Fayette (TN)
Peterson Lake Nature Center	3.11	Arboretum & nature center	City of Collierville, Tennessee	112.7	Shelby (TN)
SMW Dev. Conservation Easement	3.23	Wetland conservation easement	Wolf River Conservancy	30.8	Shelby (TN)
Kelsey Conservation Easement	3.37	Wetland conservation easement	Wolf River Conservancy	181.9	Shelby (TN)
Wolf River WMA	3.51	Wetland & WMA	Tennessee Wildlife Resources Agency	112.8	Shelby (TN)
Wolf River WMA – Briggs Tract	3.53	Wetland & WMA	Tennessee Wildlife Resources Agency	725.4	Fayette (TN)
Ghost River Designated State Natural Area	3.68	State natural area; pristine forested wetlands	Tennessee Division of Natural Areas	2,084.1	Fayette (TN)
Conservation Easement	3.72	Wetland conservation easement	Ducks Unlimited	322.6	Shelby (TN)
Shelby Farms Forest Public Recreation Area	3.75	Urban park and wildlife preserve	Shelby Farms Park Conservancy	4,513.7	Shelby (TN)
Piperton Wetland Complex – Wolf River	3.76	Wetland & WMA	Tennessee Wildlife Resources Agency	1,217.8	Multiple
Wolf River WMA	3.76	Wetland & WMA	Tennessee Wildlife Resources Agency	6,118.7	Multiple
Shaw Creek Bottoms	3.91	Wetland & WMA	Tennessee Wildlife Resources Agency	1,673.4	Multiple
Conservation Easement	4.09	Wetland conservation easement	Ducks Unlimited	844.2	Multiple
Beasley Creek Stream Mitigation Site	4.41	Stream restoration/mitigation site	Tennessee Stream Mitigation Program	11.5	Fayette (TN)

## 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 or substation to improve the existing power supply in an area of northern MS and Southern 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 the power service area of northern MS 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 facilities and substation 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, the project would be implemented as proposed. The TL work could potentially have some impact to groundwater resources in the area. However, with implementation of standard BMPs, these impacts would be minor.

#### 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. Impacts associated with the relocation or diversion of a stream could include the previously mentioned sedimentation, soil erosion, alteration of habitat, which can lead to adverse

impacts to aquatic life and vegetation. 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. Coverage under the small or large construction storm water general permit would be required in MS if the project disturbs more than 1 acre (small) or more than 5 acres (large). In TN any impact over an acre trigger the requirement for coverage under the NPDES General Construction Storm Water Permit. These permits also require the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). This SWPPP would identify specific BMPs to address construction-related activities that would be adopted to minimize storm water impacts. Additionally, BMPs (TVA 2017a) would be used to avoid contamination of surface water in the project area. Additionally a USACE Section 404 and State 401 Water Quality Certification and in TN an Aquatic Resource Alteration Permit (ARAP) would be required for stream crossings/impacts. Due to the fact that the project activities would be within some areas of sediment impairment or exceptional TN waters, additional requirements would be required (see subpart 1.3 and 5.4 of the TDEC General Construction Storm Water Permit for details), such as additional vegetated buffer zones, different SWPPP sign off requirements, and additional design storm requirements. Additionally, BMPs (TVA 2017a) would be used to avoid contamination of surface water in the project area. See the Aquatics section for buffer zone sizes and additional stream crossing details.

TVA routinely includes precautions in the design, construction, and maintenance of its transmission 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, however in this case mitigation would likely be required due to stream impacts. Temporary stream crossings and other construction and maintenance activities would comply with appropriate state permit requirements and TVA requirements (TVA 2017a). ROW maintenance would employ manual and low-impact methods wherever possible. Proper implementation of these controls and mitigative measures is expected to result in only minor temporary impacts to surface waters. No cumulative impacts are anticipated.

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. Permanent facilities for the Chickasaw Trails industrial Park 161-kV Switching Station would be connected to the local sewer as described in Section 2.2.1. This sewer system may require permitting from local or state authorizes/regulators and installation from certified personnel. The Diffie 161-kV Switching Station restroom facility installation would include a septic system and drainage field lines. This septic system may require permits from the local authority or health department and installation by certified personnel.

### 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.

### 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 and MDEQ 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. No cumulative impacts are anticipated.

## 4.5 Aquatic Animals

### 4.5.1 Aquatic Ecology

Under the Action Alternative, TVA would construct the 2 proposed substations (Phase A), add OPGW on 6 miles of L5217 (Phase B), rebuild 2.5 miles of L584 (Phase C1), construct 17 miles of new TL, associated ARs, and ROW (Phase C2) and add OPGW to 4 miles of L3937 (Phase D).

Aquatic ecology would be affected by the proposed construction of the proposed TL. Impacts would either occur directly by the alteration of habitat conditions within the stream or indirectly due to modification of the riparian zone and potentially from 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 effects resulting from construction and maintenance include alteration of stream banks and stream bottoms by heavy equipment. 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 fish and mussel species (Brim Box and Mossa 1999; Sutherland et al. 2002).

Watercourses that convey only surface water during storm events (such as WWC/ephemeral streams) and that could be affected by the proposed TL route would be protected by standard BMPs (TVA 2017a). These BMPs are designed in part to minimize disturbance of riparian areas and subsequent erosion and sedimentation that can be carried to streams. TVA also provides additional categories of protection to watercourses 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. The type of watercourse, primary use of the water resource, topography, or other physical barriers, determines the width of the SMZs (TVA 2017a).

Applicable State 401/ARAP and USACE 404 Permits would be obtained for any stream alterations located within the project area and the terms and conditions of these permits would be followed in addition to guidelines outlined in TVA's BMPs (TVA 2017a).

Implementation of BMPs during construction, operation, and maintenance activities would reduce potential impacts to the greatest extent possible. Therefore, impacts would be minor and insignificant.

#### **4.5.2 Aquatic Threatened and Endangered Species**

No federally protected aquatic species are known to occur within any of the potentially affected watersheds. A query of the USFWS IPaC online database for Fayette County, TN and DeSoto and Marshall Counties, MS indicated the potential occurrence of the federally protected fat pocketbook and pallid sturgeon. However, no suitable habitat for either species was observed within streams intersected by the proposed TL. Therefore, no impacts to the fat pocketbook and pallid sturgeon would occur. Furthermore, ground disturbance would be minimized and all work done in accordance to BMPs, as outlined in TVA 2017a. These BMPs are designed in part to minimize disturbance of riparian areas and subsequent erosion and sedimentation that can be carried to streams. The state-listed northern madtom is deemed in need of management by the state of TN and known to occur within the potentially affected watersheds. However, with proper implementation of BMPs, impacts to the state-listed northern madtom would be minor and insignificant.

### **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 construction of the proposed TL and switching stations and upgrades would be long-term in duration, but insignificant. Adoption of this alternative would require clearing of approximately 121 acres of forest. Virtually all forest in the project area has been previously cleared and the plant communities found there are common and well represented throughout the region. As of 2017, there were well over 770,000 acres of forest land in DeSoto and Marshall Counties, MS and the surrounding MS counties. As of 2015, there were well over 500,000 acres of land in Fayette County, TN and the surrounding TN counties (USDA 2019). Cumulatively, project-related effects to forest resources would be negligible when compared to the total amount of forest land occurring in the region. Also, project-related work would temporarily affect herbaceous plant communities, but these areas would likely recover to their pre-project condition in less than one year.

#### **4.6.2 Endangered, Threatened, and Rare Species (Plants)**

Adoption of the Action Alternative would have no effect on federally listed plant species because no federally listed plant species occur in the project area. Also, no populations of state-listed species were observed during field surveys of the project area. Therefore, no direct, indirect, or cumulative impacts on endangered and threatened species and their critical habitats are anticipated as a result of implementing the Action Alternative.

### **4.7 Wildlife**

#### **4.7.1 Terrestrial Ecology (Animals)**

Under the Action Alternative, TVA would construct the 2 proposed substations (Phase A), add OPGW on 6 miles of L5217 (Phase B), rebuild 2.5 miles of L584 (Phase C1), construct 17 miles of new TL, associated ARs, and ROW (Phase C2) and add OPGW to 4 miles of

L3937 (Phase D). TVA would clear some or all of the 216.33 acres of early-successional, herbaceous habitat (pastures, cultivated fields, residential areas) and 121.42 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 reestablish territories, potentially resulting in added stress or energy use to these individuals. In the event that surrounding areas are already overpopulated, further stress to wildlife populations could occur to those individuals presently utilizing these areas, as well as those attempting to relocate. 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. 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.

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

Under the Action Alternative, TVA would construct the 2 proposed substations (Phase A), add OPGW on 6 miles of L5217 (Phase B), rebuild 2.5 miles of L584 (Phase C1), construct 17 miles of new TL, associated ARs, and ROW (Phase C2) and add OPGW to 4 miles of L3937 (Phase D). TVA would clear some or all of the 216.33 acres of early-successional, herbaceous habitat (pastures, cultivated fields, residential areas) and 121.42 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.

No federal or state-listed terrestrial animal species were documented within three miles of the project footprint. However, four federally listed terrestrial animal species were assessed based on county occurrence records or the potential for species to occur in the project area. The federally endangered interior least tern was assessed based on documented presence within Desoto County, MS. No interior least terns were observed during field surveys in March, and October 2018. The project footprint also lacks suitable tern nesting and foraging habitat. All county records are associated with the MS River. Interior least tern would not be impacted by the proposed project activities.

The federally threatened wood stork was assessed based on the potential to occur throughout Mississippi. Wood storks do not breed in Mississippi, however, vagrant individuals are believed to occur statewide. No wood storks were observed during field surveys in March, and October 2018. The project footprint contains suitable wood stork foraging and roosting habitat in forested wetlands, streams, and a pond. The proposed project may clear potential roosting habitat and increase foraging habitat. Similar habitat is abundant in the project area. With BMPs (TVA 2017a) in place, water quality and hydrology would not be affected. Wood storks are not likely to be impacted by the proposed actions.

The federally endangered Indiana bat was assessed based on the potential to occur throughout TN and the federally threatened northern long-eared bat was assessed based on potential to occur throughout all of the counties in the proposed project area. Both Indiana and northern long-eared bats hibernate in caves, mines, tunnels, or similar underground structures. No caves have been recorded within 3 miles of the project footprint. Foraging habitat for both species exists throughout the proposed project area in forest fragments and over streams, ponds, and wetlands. Standard BMPs (TVA 2017a) would be implemented during construction to minimize potential impacts to foraging habitat as described and in accordance with TVA's Programmatic Agreement (PA) Consultation on Bats on routine actions (TVA 2017c). 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 were performed on March 21<sup>st</sup> 2018 at the two switching station locations and on October 9<sup>th</sup>-11<sup>th</sup> 2018 & July 25<sup>th</sup>, 2019 at the site of the proposed rebuild and new 18.5 mile 161-kV TL and ROW. During these surveys, 85 suitable roost trees were identified along the proposed ROW and within the switching station sites. Suitability was determined based on the high number of snags, black willow, shagbark hickory, and other trees with exfoliating bark or cavities and their proximity to water sources. A total of 48.91 acres of suitable summer roosting habitat for Indiana and northern long-eared bat would be removed for the proposed ROW and is subject to "take". A number of activities associated with the proposed project were addressed in TVA's PA with the U.S. Fish and Wildlife Service on routine actions and federally listed bats in accordance with ESA Section 7(a) (2) (TVA 2017c). For those activities with potential to affect bats, TVA

committed to implementing specific conservation measures. These activities and associated conservation measures are identified on page 5 of the TVA Bat Strategy Project Screening Forms (Appendix B) from Phases A, B, C1, C2, and D of the project 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.

Under the Action Alternative, the proposed Diffie and Chickasaw Trails substations, Miller-Olive Branch OPGW installation, structure replacement along approximately four miles of TVA TL, additional ground wires, and rebuilding of the Holly Springs-Chickasaw Trails TL, and access roads would be constructed. Based on Fayette County, TN, Flood Insurance Rate Maps (FIRMs), the proposed Diffie substation and loop into the substation would be located outside floodplains, which would be consistent with EO 11988. Based on Marshall County, MS, FIRMs, the proposed Chickasaw Trails substation and the loop into the substation would be located outside floodplains, which would be consistent with EO 11988. Based on DeSoto County, MS, FIRMs, no access roads to the Miller-Olive Branch TL would cross FEMA-mapped floodplains. The proposed substations and the floodplains are shown in Figures 4-1 and 4-2.

The Miller-Holly Springs TL to be rebuilt and the Miller-Olive Branch TL to receive OPGW are located outside 100-year floodplains, which is consistent with EO 11988.

## Proposed Chickasaw Trails Substation



### Legend

	Cordova_OliveBranch_Loop	<b>Zone Type</b>		1% Annual Chance Flood Hazard
	HollySprings_Miller_Loop		Regulatory Floodway	
	HollySprings_Miller_NEW		Special Floodway	
	Chickasaw_SS		Area of Undetermined Flood Hazard	
<b>Flood Hazard Boundaries</b>			0.2% Annual Chance Flood Hazard	
	Other Boundaries		Future Conditions 1% Annual Chance Flood Hazard	
<b>Line Type</b>			Area with Reduced Risk Due to Levee	
	Limit Lines			
	SFHA / Flood Zone Boundary			

### Flood Hazard Zones

Figure 4-1. Proposed Chickasaw Trails Substation and Floodplain Layer (The existing transmission line is depicted as a brown line)

# Proposed Diffie Substation



### Legend

Diffie\_Moscow\_OPGW

Diffie substation

### Flood Hazard Zones

#### Zone Type

- 1% Annual Chance Flood Hazard
- Regulatory Floodway
- Special Floodway
- Area of Undetermined Flood Hazard
- 0.2% Annual Chance Flood Hazard
- Future Conditions 1% Annual Chance Flood Hazard
- Area with Reduced Risk Due to Levee



**Figure 4-2. Proposed Diffie Substation and Floodplain Layer (the existing transmission line is depicted as a brown line)**

Portions of the proposed Diffie-Chickasaw TL, the existing Moscow-Diffie TL to receive OPGW, and some of the associated access roads cross the 100-year floodplains of Grissom Creek, Stout Creek, Golden Creek, Teague Branch, the Wolf River, the North Fork Wolf River, and various unnamed tributaries. Consistent with EO 11988, overhead TLs and related support structures are considered to be repetitive actions in the 100-year floodplain (TVA 1981). 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. The conducting wires of the TL would be located well above the 100-year elevation.

On the Diffie-Chickasaw TL, portions of the access roads to Structures 4, 25, 40, 41, 42, 58, 60, 74, 75, and 87 would be located within 100-year floodplains. Consistent with EO 11988, roads are considered to be repetitive actions in the 100-year floodplain. To minimize adverse impacts, any road construction or improvements would be done in such a manner that upstream flood elevations would not be increased by more than 1.0 foot.

Fayette County, TN, participates in the National Flood Insurance Program (NFIP), and any development must be consistent with its floodplain ordinance. As shown in Figure 4-3, portions of the access roads to Structure 732, 733, and 737 on the Moscow-Diffie TL would be located within the 100-year floodplain, as well as the floodway of the North Fork Wolf River. The structures would receive side guys, which would be located well above the 100-year "with floodway" flood elevation, which would comply with the NFIP. To prevent an obstruction in the floodway: (1) any fill, gravel or other access road 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. Therefore, the access roads would comply with the NFIP.

TL construction in the floodplain would be consistent with EO 11988 provided the TVA subclass review criteria for TL location in floodplains are followed. To minimize adverse impacts, the following mitigation measures would be implemented:

- BMPs would be used during construction activities
- Construction would adhere to the TVA subclass review criteria for TL location in floodplains
- For the access roads in the North Fork Wolf River floodway, (1) any fill, gravel or other access road 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.
- On the Diffie-Chickasaw TL, any road improvements would be done in such a manner that upstream flood elevations would not be increased by more than 1.0 foot

Based upon implementation of the above mitigation measures, the proposed Moscow-Miller TL project would have no significant impact on floodplains and their natural and beneficial values.

# Roads in Floodway on Moscow-Diffie Transmission Line

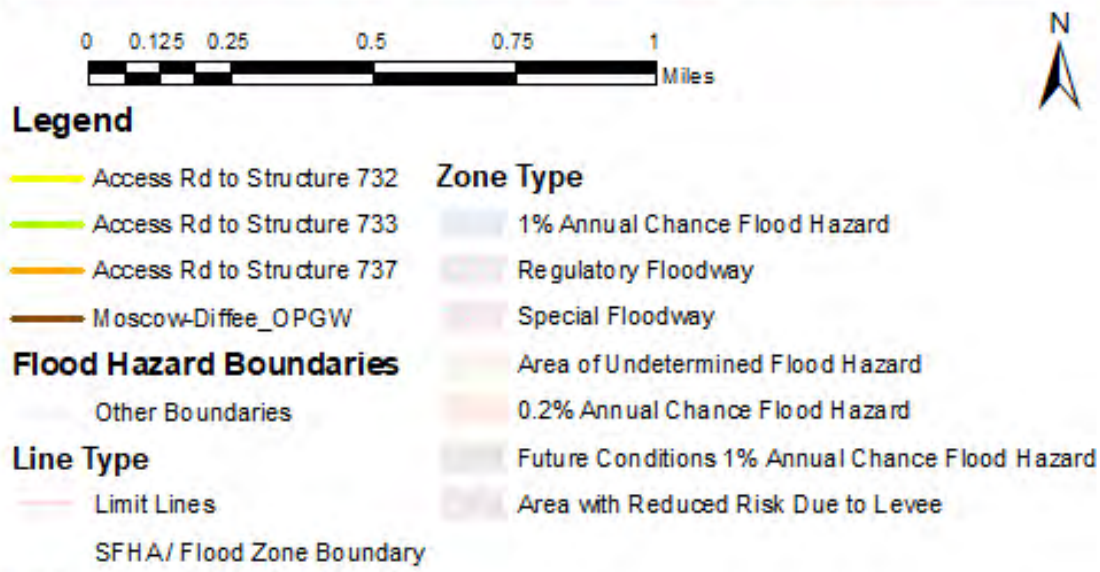
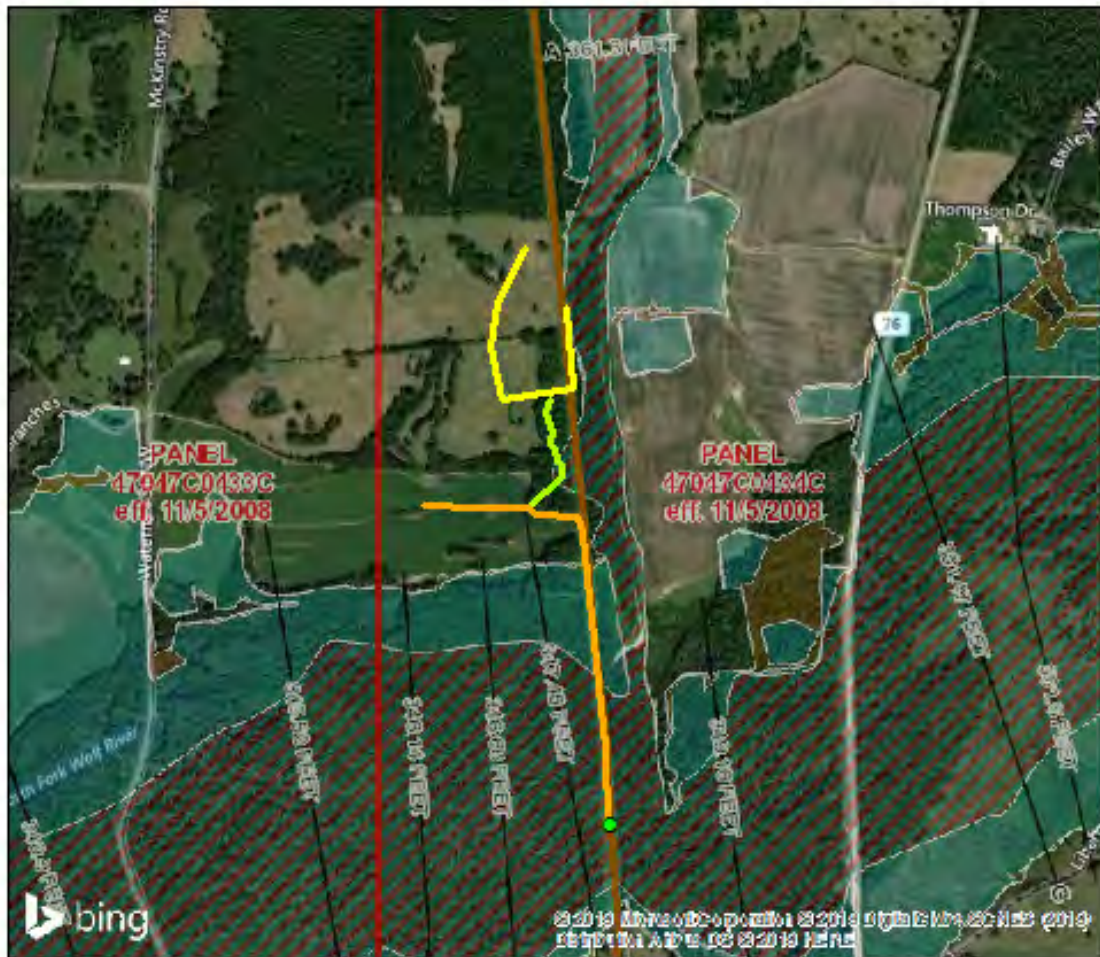


Figure 4-3. Access Roads in the North Fork Wolf River Floodway

#### 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 USACE through a Nationwide, Regional, or Individual Permit. This project is located in the Memphis District USACE. CWA Section 401 mandates state water quality certification for projects requiring USACE approval. In TN, TDEC certifies CWA Section 404 permits and impacts to intrastate wetland resources through a general or individual aquatic resources alteration permit. In TN, 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 TN Water Quality Control Act (§69-3-108, 0400-40-07). TDEC's permit process ensures compliance with TNs anti-degradation policy as well (§69-3-108, 0400-40-04). TNs jurisdiction would apply to regulated activities affecting W001-B through W007-B and W001-MM-C through W012-MM-C, including W007-MM-C comprising the exceptional resource value wetland complex identified within the project footprint across the Wolf River. MDEQ is responsible for certifying CWA Section 404 permits are compliant with state water quality regulations. MSs jurisdiction would apply to regulated activities affecting W001-A through W004-A, W001-HS-C and W002-HS-C, W013-MM-C through W0021-MM-C, and W001-D through W006-D. 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 avoiding mapped wetland resources is described in Section 2.7.

Under the Action Alternative, the proposed switching stations and TLs would be constructed, fiber installation on existing lines would take place, TL rebuild and upgrades would occur, and associated access roads would be used. Of the total of 37.44 acres of wetland within the project footprint, 26.27 acres would be permanently altered by the proposed activities (Appendix D). As described in Section 1.1, the switching stations sites would be cleared and built, and adequate clearance between tall vegetation and TL conductors would require trees within the proposed ROWs be cleared. Switching station construction would require site grading establish a level and suitable contour. 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.

Wetlands on existing TVA TL ROWs are maintained as emergent/low growing habitat through TVA's ROW management practices to ensure adequate conductor clearance. W001-B through W007-B and W001-D through W006-D are emergent wetlands located on existing ROWs proposed for overhead fiber optic cable installation. W001-HS-MM and W002-HS-MM are emergent wetlands located on the existing TL proposed for rebuild. Access across most of these wetlands would be necessary to accommodate the proposed activities. W002-HS-MM, W001-D, W002-D, and W005-D, can be entirely circumnavigated by heavy equipment due to their location within the ROW, and thus completely avoided.

The Chickasaw Trails switching station is situated within the parcel to avoid wetlands to the extent practicable. However, 0.11 acre disturbance in W001-A would be necessary to regrade and reshape the contours at the toe of the slope created for the switching station pad. This impact would occur within the Nonconnah Creek watershed (10-HUC), nestled in the larger Horn Lake-Nonconnah Creek sub-basin (8-HUC). Wetland acreage comprising W001-A located outside the disturbance footprint would remain intact. Direct impacts to W002(s)-A and the portions of W003-A within the switching station parcel would be avoided during switching station construction. No wetlands were identified at the proposed Diffie switching station site, therefore no direct wetland impacts are anticipated as a result of switching station construction in that location.

The proposed new Moscow-Miller TL ROW and loop line ROWs into the Chickasaw Trails switching station contain a total of 1.65 acre emergent wetland, 1.78 acre scrub-shrub wetland, and 24.84 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 saplings and trees comprising scrub-shrub and forested wetland areas within the proposed ROWs would be cleared and permanently converted to emergent/meadow like wetland for the perpetuity of the TLs' 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.

Wetland fill associated with the proposed switching station construction and structure placement results in total loss of wetland function within the impact footprint and is subject to USACE/MDEQ/TDEC jurisdiction, per the directives of the CWA. Likewise, forested wetland conversion to accommodate structure locations and spans is considered a secondary impact under section 404b of the CWA. The proposed project requires 0.11 acre of wetland fill associated with switching station construction, 0.0042 acre wetland fill associated with structure placements in wetlands, and 26.16 acres forested wetland clearing to accommodate conductor spans. Because the necessary wetland fill results in the associated secondary impact of forested wetland clearing, the conversion of forested wetland 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 (USEPA 1990). The CWA authorizes regulatory oversight for these impacts. The USACE and states exert this oversight through an established permit process that ensures maintenance of the physical, biological, and chemical integrity of the nation's 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. This included a field assessment for options crossing the Wolf River floodplain, the wetland complex of exceptional resource value. The initial consideration of a 100-foot-wide ROW across this wetland floodplain would have resulted in wetland fill associated with structure placement across the wetland, but minimized forested wetland clearing and associated loss of wetland function by 5.05 acres less than currently proposed. This option proved unfeasible, however, due to construction limitations and associated costs for structure placement inside this saturated and inundated environment. Instead, the Action Alternative involves two structures outside the Wolf River wetland floodplain, no structures or associated wetland fill inside the wetland floodplain, but an additional 5.05 acres of forested wetland conversion in an expanded 200-foot-wide ROW necessary to ensure safe conductor clearance for anticipated sway within this span. Therefore, although this portion of the Action Alternative increases wetland impacts to the exceptional resource value wetland area within the Wolf River floodplain, TVA has determined that there are no practicable alternatives to construction in such wetlands given construction limitations and the cost and difficulty of maintaining long-term maintenance associated with the alternatives.

Wetland habitat located in areas proposed for heavy equipment travel could experience minor and temporary impacts during TL construction, fiber optic overhead ground wire installation, 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 2017a). 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/MDEQ 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 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 larger affected basins. Compensatory mitigation would be purchased through an approved wetland mitigation bank to ensure no more than minimal impacts to the aquatic environment result and the objectives of the CWA and federal no net loss of wetlands 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 four watersheds, within two larger sub-basins. 14.86 acres of proposed forested wetland clearing would occur across three of these watersheds, which feed the Wolf River. This includes forested wetland conversion of 12.02 acres within the Wolf River floodplain, an area assessed as exceptional resource value. 9.98 acres of forested wetland conversion would take place within the Nonconnah Creek watershed, comprising about 0.3 percent of

mapped forested wetland within this watershed, and 0.1 percent within the Horn Lake sub-basin (Table 4-1).

**Table 4-1. Percent Forested Wetland Loss or Conversion by Watershed Within the Proposed New ROW Corridors**

<b>Sub-Basin (8-HUC) and Nested Watersheds (10-HUC)</b>	<b>Estimated* percent Wooded Wetland Cover</b>	<b>Estimated* percent Wooded Wetland Conversion</b>
Wolf River (08010210)	8.4 percent	0.022 percent
North Fork-Wolf River (08010210)	9.6 percent	0.030 percent
Indian Creek-Wolf River (08010210)	16.4 percent	0.038 percent
Grays Creek-Wolf River (08010210)	8.9 percent	0.002 percent
Horn Lake-Nonconnah Creek (08010211)	5.4 percent	0.103 percent
Nonconnah Creek (08010211)	2.7 percent	0.313 percent

\*Based on National Wetland Inventory (USFWS 1982)

Studies have shown that sub-basins the size of the Wolf River and Horn Lake, should contain 3 to 7 percent total wetland cover to provide sufficient flood control and water quality benefits for the surrounding landscape (Mitsch and Gosselink 2000). This percentage does not distinguish between wetland habitat types. Regardless, the percent of forested wetland conversion proposed would not appreciably reduce the estimated existing forested wetland extent within either sub-basin. In addition, forested wetland conversion does not constitute total wetland loss. The functions and values associated with a forest's water storage, uptake, assimilation, filtration, and transpiration of storm water runoff would be provided at the reduced level facilitated by lower stature vegetation. Similarly, general trends in wetland impacts resulting from development within the watershed would be subject to CWA, USACE, and MDEQ/TDEC mandates, and these regulatory requirements are in place to ensure wetland impacts cause cumulative loss. Therefore, the proposed wetland impacts would be minimal on a cumulative scale due to the avoidance, minimization, mitigation, and compliance measures in place. In compliance and accordance with the CWA, EO11990, the federal no-net-loss of wetlands policy, and the directives of USACE and MDEQ/TDEC ensuring no more than minimal adverse effects on the aquatic environment, the Action Alternative's impacts to wetlands would be insignificant.

## **4.10 Aesthetic 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.

### **4.10.1 Visual Resources**

Under the Action Alternative, construction, operation, and maintenance of the proposed TL and associated project components have the potential to impact visual resources. Transmission structures tend to be the most visible element of the electric transmission system, while the permanent removal of woody vegetation within the new TL ROW also creates a visible corridor. The addition of lines on or near existing structures or ROW increases compatibility with the landscape and minimizes visual impacts. Therefore, where the proposed project involves the addition of OPGW on existing structures or a rebuild in an existing TL ROW, changes in the viewshed would be negligible and overall aesthetics would remain consistent with current conditions. There may be some minor visual discord in these areas during the construction period due to an increase in personnel and equipment and the use of laydown areas and access roads. However, these minor visual obtrusions would be temporary until the ROW and laydown areas have been restored through implementation of TVA standard BMPs (TVA 2017a). Sensitive visual receptors located along these portions of the project area would experience some minor visual discord during construction, but there would be no change in the aesthetics once that phase is complete.

The proposed Diffee Switching Station would be visible from several residential properties. However, there are no other sensitive visual receptors in the foreground, and views from the residences would be at least somewhat obscured by vegetated buffers. Additionally, the presence of existing high-voltage TLs increases the visual compatibility of a switching station and prevents significant changes to the viewshed. Similarly, the proposed Chickasaw Trails Industrial Park Switching Station would be constructed in an industrial area with existing TLs. While there is a church and associated cemetery located within 0.5 mile, the proposed switching station would not be visible from these resources due to the presence of dense vegetation.

The proposed Diffee-Chickasaw Trails Industrial Park 161-kV TL would be visible in the foreground by motorists where the TL would cross U.S. Highway 72, TN SRs 57 and 76, and a number of local roads. However, observers would be transient motorists who would only be exposed to these features for short periods of time. Additionally, along much of the new TL segment, the view of the corridor would be limited by the natural density of the tree growth near the TL alignments. The dominant shapes and colors in the landscape include green and brown from the vegetation and vertical lines of trees and existing transmission structures against the horizon. The proposed TL would add a small number of discordantly contrasting elements and colors to the existing landscape, which would be greatest in the foreground to passing motorists, although color and features would be less noticeable in the middleground and background.

Sensitive visual receptors in the foreground of the proposed Diffie-Chickasaw Trails Industrial Park 161-kV TL include the Wolf River Conservancy natural area, five churches, and three cemeteries. The proposed TL would cross the Wolf River in an undeveloped, densely wooded area. As river access points are located several miles upstream and downstream of the TL crossing, recreational users paddling this section of the river may experience visual discord at the location of the crossing due to the altered tree canopy and views of the TL and structures. However, these visual effects would be limited to a short segment of the river due to the presence of dense vegetation. Similarly, vegetation would block the view of the new TL from the majority of the churches and cemeteries in the foreground. Even the closest facility, Parr Cemetery, would have minimal visual impacts due to the separation from the TL corridor by dense, mature forest. Additionally, views of the TL from two of the churches within 0.5 mile, located in Moscow, would be obstructed by several blocks of residential and commercial development. For facilities located at further distances, in the middleground, 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 TLs and associated structures already in place within the project area currently contribute some minor visual discord with the landscape. These elements contribute to the landscape's ability to absorb negative visual change. Additionally, vegetative areas maintained adjacent to the TL would provide screening in the foreground and middleground, allowing the landscape to absorb the minor visual changes associated with the proposed project. 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. In the foreground, the scenic attractiveness would remain common; however, the scenic integrity along the new TL segment and in the vicinity of the new switching stations would be reduced to low (Table 4-2). The forms, colors, and textures of the landscape that make up the scenic attractiveness would be affected by the construction of the TL, but it would still remain common or ordinary. Impacts to scenic integrity are anticipated to be greatest in the foreground for motorists on the nearby roads and for adjacent landowners, though these are minimized through vegetated buffers and visual compatibility with existing TLs. There would be no change in the ratings for the middleground and background. Based on the criteria used for this analysis, the scenic value class for the affected environment after the proposed modifications would remain classified as good, and therefore, impacts would be minor.

**Table 4-2. Visual Assessment Ratings for Project Area Resulting from Action Alternative**

View Distance	Resulting Landscape	
	Scenic Attractiveness	Scenic Integrity
<b>Foreground</b>	Common	Low
<b>Middleground</b>	Common	Moderate
<b>Background</b>	Common	Moderate

#### **4.10.2 Noise and Odors**

During construction of the proposed TL and switching stations, 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 construction activities would occur over approximately two years and would entail the use of mobile crews comprised predominantly of TVA staff. Due to the linear nature of the project, the construction workforce would be transient as work progresses along the TLs. Similarly, in the long term, there would be work crews present in the project area for occasional ROW maintenance and vegetation management. In both cases, there would be no notable effects on local demographics due to the 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 224 acres of easements, across 40 parcels, from private landowners in order to construct the proposed Diffee-Chickasaw Trails Industrial Park 161-kV TL. Those easements would give TVA the right to locate, operate, and maintain the TL across the property owner's land (see Section 2.2.1.). In certain cases, such as the acquisition of property for the proposed switching stations, TVA would be required to acquire ownership of a property. In either case, current landowners would be compensated for the value of such rights or properties. While beneficial, 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 growing load within the Chickasaw Trails Industrial Park in Olive Branch, MS and increase the power reliability in Fayette County, TN and in DeSoto and Marshall counties, MS. Currently, the lack of electrical capacity within the Chickasaw Trails Industrial Park has limited new industrial opportunities within the area. Therefore, the increased capacity provided under the Action Alternative would support additional economic development opportunities and could result in long-term indirect economic benefits to the area.

Property values potentially could be indirectly affected for those parcels intersected by or adjacent to the new TL ROW or switching stations. However, the vast majority of the new construction would take place in forested, agricultural, or industrial areas; residential properties have been avoided to the greatest extent possible. As most homes in the area

are located a significant distance from the proposed route and/or are separated from the TL by a vegetated buffer, any 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 new switching stations and TL segment would not result in the displacement of any community facilities nor impede access to the facilities. Similarly, the TL rebuild and OPGW additions along existing TL ROWs would not impact operation of or access to any community 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 related project actions would not result in notable impacts to local demographics, increased demands for services such as schools, churches, and healthcare facilities are not anticipated. However, in the event of an emergency at a switching station or along the TL corridor, local law enforcement, fire, and/or EMS response would likely be required. Due to the rural nature of much of the project area, emergency services in the immediate vicinity are limited. While some nearby cities including Williston, Moscow, and Cayce, have local or volunteer fire departments, most emergency services would likely come from the Olive Branch area or from other Memphis suburbs to the west. However, as the need for emergency services at the switching stations or along the TL is 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**

Block groups encompassing the Diffie-Moscow OPGW addition, Cordova-Holly Springs rebuild and OPGW addition, Diffie and Chickasaw Trails Industrial Park switching stations, and portions of the new Diffie-Chickasaw Trails Industrial Park 161-kV TL were determined to meet the criteria for consideration as minority and/or low-income population groups subject to environmental justice considerations (Figure 3-2). Impacts to environmental justice populations located along the double-circuit rebuild and OPGW replacement routes would be minimal, as these modifications would take place along existing TL ROWs, and construction activities at any one point along the route would be short-term. Following construction, any impacts to environmental justice populations associated with the operation and maintenance of the TLs would be similar to those experienced under current conditions.

Impacts to environmental justice populations along the new TL segment and adjacent to switching stations could include increased noise and fugitive dust during ROW clearing and construction, as well as potential changes in property value and limitations on future land use in the immediate vicinity of the ROW easement. While impacts associated with the proposed TL and switching stations would primarily be borne by minority and/or low-income populations subject to environmental justice consideration, construction activities would be temporary and would typically have minimal impact on area residents due to the distance between residences and the proposed ROW. Longer-term impacts have been minimized through community and landowner involvement in the selection of the proposed TL route and switching station locations. Therefore, implementation of the Action Alternative would have a minor impact on environmental justice populations.

#### **4.12 Cultural Resources**

TVA, determined in consultation, that the portions (40FY490, 40FY491, 40FY492, 40FY493, 40FY494, 40FY495, 40FY588, 22MR734, 22MR735, 22MR736, 22MR737, 22MR738, 22DS848 and 22DS849) within the APE are ineligible for the NRHP based on lack of integrity and research potential. Site 40FY587 is a buried Woodland artifact scatter located on an eroding bluff. No excavation is purposed within the site boundaries. Potential ground disturbance within this area would be minimal and confined to possibly traversing the site with equipment to access other portions within the TL ROW. Due to the depth of the deposits and the minimal depth of disturbance, TVA finds that site 40FY587 would not be affected by the proposed action.

For the 127 newly recorded historic structures, TVA determined, in consultation, that none of the individual houses/buildings are eligible for NRHP listing due to lack of architectural distinction and inability to associate these resources to historic person(s) or event(s). In regards to the town of Moscow within the APE as a NRHP eligible district, the majority of the structures have undergone significant modifications and/or are in a state of disrepair. Therefore, few of the buildings retained the integrity required to contribute to a district. TVA finds the Memphis and Charleston Railroad as eligible for NRHP listing under Criteria A. The surrounding viewshed has already been altered by the construction of modern highways, roads, and residential developments while much of the associated infrastructure such as the Moscow Railroad depot is no longer extant.

The TN and MS SHPO concurred with TVA's finding of no effect (Appendix A, letters dated 5-25-2018, 6-18-2018, 10-22-2018, 1-2-2019, 5-17-2019, 5-21-2019, 7-11-2019). TVA also consulted with federally recognized Indian tribes regarding historic properties within the proposed project's APE that may be of religious and cultural significance and are eligible for the NRHP and received no disagreement with TVA's eligibility determinations and findings of effect.

#### **4.13 Recreation**

Under the action alternative, the project would be implemented as proposed. The TL work could have some impact on any informal dispersed recreation use that may occur within the project area but any impacts would be short term and minor.

#### **4.14 Managed and Natural Areas**

In Phase A, one natural area (Steeplechase Park) occurs within 4.9 miles of the proposed project. This is of sufficient distance such that there would be no impacts to this area. In Phase B, the existing TL L5217 crosses Ames Plantation from structures 270-302, a distance of approximately 6.9 miles. Impacts to this area would be associated with retrofitting the line with OPGW. Access to the line would be confined to designated access roads, and the use of standard BMPs would minimize impacts to the existing TL ROW. TVA project staff would contact Ames Plantation to inform them of the project and to avoid any impacts to scheduled recreational or educational activities. Access roads 9-12 are located adjacent to the TWRA Moscow Wetland site. No direct impacts to this area would occur as the roads are located less than 250 feet from the boundary of the wetland. Standard BMPs would be sufficient to prevent indirect impacts such as sedimentation etc. Remaining natural areas are located at a distance sufficient to eliminate any direct or indirect impacts associated with Phase B of the project. There would be no impacts to natural areas

associated with Phase C of the project as there are no natural areas located within 5 miles of the project area. There would be no impacts to natural areas associated with Phase D of the project as there are no natural areas located within the project area. Two conservation easements are located more than 3 miles from the project area, a sufficient distance to eliminate direct or indirect impacts to these areas.

#### **4.15 Post-construction Effects**

Transmission lines, 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 Fayette County, TN and DeSoto and Marshall Counties, MS 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. There would be minor temporary impacts to Ames Plantation during installation of OPGW on L5217; these impacts would be mitigated to an insignificant level via the use of BMPs and via scheduling work such to eliminate any impacts to planned activities at Ames Plantation.

#### **4.17 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.

#### **4.18 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.

#### **4.19 Irreversible and Irrecoverable 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. Irrecoverable 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

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

#### **6.3 State Agencies**

Mississippi Department of Environmental Quality  
Mississippi Department of Transportation  
Mississippi State Historic Preservation Office  
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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## CHAPTER 7

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## **Appendix A – Correspondence**

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**From:** [Ezell, Patricia Bernard](#)  
**To:** [Harle, Michaelyn S](#); [Angst, Michael G](#); [Shuler, Marianne M](#); [McCampbell, Amy Boardman](#)  
**Subject:** FW: TVA, Moscow-Miller Transmission Line Project, Fayette County, Tennessee and De Soto and Marshall Counties, Mississippi  
**Date:** Tuesday, June 12, 2018 1:06:42 PM  
**Attachments:** [image001.png](#)

Please provide requested information. Thanks.--Pat

**From:** Elizabeth Toombs <elizabeth-toombs@cherokee.org>  
**Sent:** Friday, June 01, 2018 2:59 PM  
**To:** Ezzell, Patricia Bernard <pbezzell@tva.gov>  
**Subject:** RE: TVA, Moscow-Miller Transmission Line Project, Fayette County, Tennessee and De Soto and Marshall Counties, Mississippi

**TVA External Message. Please use caution when opening.**

Many thanks for the review request, Pat. Are there shapefiles available for this project given linear nature and length of the project. Any additional information would be greatly appreciated. Please let me know if there are any questions or concerns about this request.

Wado,

Elizabeth Toombs, Tribal Historic Preservation Officer  
 Cherokee Nation  
 Tribal Historic Preservation Office  
 PO Box 948  
 Tahlequah, OK 74465-0948  
 918.453.5389

**From:** Ezzell, Patricia Bernard [<mailto:pbezzell@tva.gov>]  
**Sent:** Monday, May 7, 2018 2:00 PM  
**To:** 'ethompson@astribe.com' <[ethompson@astribe.com](mailto:ethompson@astribe.com)>; [celestine.bryant@actribe.org](mailto:celestine.bryant@actribe.org); Elizabeth Toombs <[elizabeth-toombs@cherokee.org](mailto:elizabeth-toombs@cherokee.org)>; [HPO@chickasaw.net](mailto:HPO@chickasaw.net); Ian Thompson <[ithompson@choctawnation.com](mailto:ithompson@choctawnation.com)>; 'Llangley@coushatta.org' <[Llangley@coushatta.org](mailto:Llangley@coushatta.org)>; [hollymaustin94@gmail.com](mailto:hollymaustin94@gmail.com); [BBarnes@estoo.net](mailto:BBarnes@estoo.net); [ashively@jenachoctaw.org](mailto:ashively@jenachoctaw.org); [dc13.dc4@gmail.com](mailto:dc13.dc4@gmail.com); 'Carleton, Ken' <[KCarleton@choctaw.org](mailto:KCarleton@choctaw.org)>; 'section106@mcn-nsn.gov' <[section106@mcn-nsn.gov](mailto:section106@mcn-nsn.gov)>; Tonya Tipton ([tonya@shawnee-tribe.com](mailto:tonya@shawnee-tribe.com)) <[tonya@shawnee-tribe.com](mailto:tonya@shawnee-tribe.com)>; 'THPO' <[thpo@ttown.org](mailto:thpo@ttown.org)>; Sheila Bird ([sbird@ukb-nsn.gov](mailto:sbird@ukb-nsn.gov)) <[sbird@ukb-nsn.gov](mailto:sbird@ukb-nsn.gov)>  
**Cc:** Stephen Yerka <[syerka@nc-chokeee.com](mailto:syerka@nc-chokeee.com)> ([syerka@nc-chokeee.com](mailto:syerka@nc-chokeee.com)) <[syerka@nc-chokeee.com](mailto:syerka@nc-chokeee.com)>; 'Russell Townsend' <[RussellT@nc-chokeee.com](mailto:RussellT@nc-chokeee.com)>; 'Jonas John' <[jonasj@coushattatribela.org](mailto:jonasj@coushattatribela.org)>; [David.Cook@kialegeetribe.net](mailto:David.Cook@kialegeetribe.net); Karen Pritchett <[kpritchett@ukb-nsn.gov](mailto:kpritchett@ukb-nsn.gov)>; Rachel Perash ([RPerash@ukb-nsn.gov](mailto:RPerash@ukb-nsn.gov)) <[RPerash@ukb-nsn.gov](mailto:RPerash@ukb-nsn.gov)>  
**Subject:** <EXTERNAL> TVA, Moscow-Miller Transmission Line Project, Fayette County, Tennessee and De Soto and Marshall Counties, Mississippi

\*\*\*\*\*  
**WARNING STAMP, MICROSOFT WORD ATTACHMENT:**  
**IF YOU DO NOT KNOW THE SENDER OR WERE NOT EXPECTING THIS EMAIL, DO NOT OPEN**  
**ANY EMAIL ATTACHMENTS AND DELETE THIS MESSAGE.**  
**Thank you: Cherokee Nation Information Technology Department**  
\*\*\*\*\*

Good Afternoon,

By this email message, TVA is transmitting the attached letter regarding TVA's proposal to build an approximately 17-mile long by 100 foot wide Right of Way (ROW) of single-circuit transmission line (TL) and two switching stations. The proposed Moscow-Miller Transmission Line would begin at TVA's Hickory Valley-Cordova Tap to Moscow line and extend southwest to the new Chickasaw Trail IP Switching Station. The new Chickasaw Trail IP Switching Station would be located on the corner of Cayce and East Wingo Roads in Byhalia, Mississippi. The new Diffee Switching Station would be located on Diffee Road in Moscow, Tennessee. Construction of the TL also includes a yet unknown number of new access roads. TVA has identified this preferred route for a transmission line that would provide power for growing load and increase power reliability for these Counties.

The Scope-of-Work, the draft Programmatic Agreement, and a map is attached along with the project letter.

As always, please let us know if you have any questions. Also, please let us know if you would like to participate in the PA and please provide any comments on the proposed undertaking no later than June 6, 2018.

Thank you.

Sincerely,

Pat

**Pat Bernard Ezzell**  
Senior Program Manager and Federal Preservation Officer  
Community Relations

Tennessee Valley Authority  
400 W. Summit Hill Drive  
Knoxville, TN 37902

(865) 632-6461 (w)  
(865) 806-0370 (m)  
[pbezzell@tva.gov](mailto:pbezzell@tva.gov)





**Office of the Chief**

Bill John Baker  
*Principal Chief*  
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S. Joe Crittenden  
*Deputy Principal Chief*  
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June 22, 2018

Patricia Ezzell  
Tennessee Valley Authority  
400 W Summit Hill Drive  
Knoxville, TN 37902

Re: Moscow Miller Transmission Line Project, Phase A.

Ms. Patricia Ezzell:

The Cherokee Nation (Nation) is in receipt of your correspondence about **Moscow Miller Transmission Line Project, Phase A**, and appreciates the opportunity to provide comment upon this project.

The Nation maintains databases and records of cultural, historic, and pre-historic resources in this area. Our Historic Preservation Office reviewed this project, cross referenced the project’s legal description against our information, and found no instances where this project intersects or adjoins such resources. Thus, the Nation does not foresee this project imparting impacts to Cherokee cultural resources at this time.

However, the Nation requests that the Tennessee Valley Authority (TVA) halt all project activities immediately and re-contact our Offices for further consultation if items of cultural significance are discovered during the course of this project.

Additionally, the Nation requests that TVA conduct appropriate inquiries with other pertinent Tribal and Historic Preservation Offices regarding historic and prehistoric resources not included in the Nation’s databases or records.

If you require additional information or have any questions, please contact me at your convenience. Thank you for your time and attention to this matter.

Wado,

Elizabeth Toombs, Tribal Historic Preservation Officer  
Cherokee Nation Tribal Historic Preservation Office  
elizabeth-toombs@cherokee.org  
918.453.5389



## Moscow-Miller Power System Improvements

**From:** [Ezell, Patricia Bernard](#)  
**To:** [Harle, Michaelyn S](#); [Shuler, Marianne M](#); [McCampbell, Amy Boardman](#)  
**Subject:** FW: TVA, Moscow-Miller Transmission Line Project, Fayette County, Tennessee and De Soto and Marshall Counties, Mississippi  
**Date:** Wednesday, June 13, 2018 9:34:33 AM  
**Attachments:** [image001.png](#)

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Cherokee Nation.

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**From:** Elizabeth Toombs <[elizabeth-toombs@cherokee.org](mailto:elizabeth-toombs@cherokee.org)>  
**Sent:** Monday, June 11, 2018 3:48 PM  
**To:** Ezzell, Patricia Bernard <[pbezzell@tva.gov](mailto:pbezzell@tva.gov)>  
**Cc:** Shuler, Marianne M <[mmshuler@tva.gov](mailto:mmshuler@tva.gov)>  
**Subject:** FW: TVA, Moscow-Miller Transmission Line Project, Fayette County, Tennessee and De Soto and Marshall Counties, Mississippi

**TVA External Message. Please use caution when opening.**

Good Afternoon, Pat:

This proposed project is outside the Cherokee Nation's Area of Interest. Thus, this Office defers to federally recognized Tribes that have a cultural and historic connection to this landbase. As such, the Nation does not plan on joining the PA at this time. Many thanks for your time and understanding.

Wado,

Elizabeth Toombs, Tribal Historic Preservation Officer  
Cherokee Nation  
Tribal Historic Preservation Office  
PO Box 948  
Tahlequah, OK 74465-0948  
918.453.5389

---

**From:** Shuler, Marianne M [<mailto:mmshuler@tva.gov>]  
**Sent:** Thursday, June 7, 2018 11:06 AM  
**To:** Elizabeth Toombs <[elizabeth-toombs@cherokee.org](mailto:elizabeth-toombs@cherokee.org)>  
**Cc:** Ezzell, Patricia Bernard <[pbezzell@tva.gov](mailto:pbezzell@tva.gov)>  
**Subject:** <EXTERNAL> RE: TVA, Moscow-Miller Transmission Line Project, Fayette County, Tennessee and De Soto and Marshall Counties, Mississippi

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DO NOT OPEN ANY EMAIL ATTACHMENTS AND DELETE THIS MESSAGE.  
Thank you: The Cherokee Nation - Information Technology Department  
\*\*\*\*\*

Hey Elizabeth

Please see the attached shapefiles for the project also a township and range map. Let me know if this helps.

Thanks

Marianne

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**From:** Elizabeth Toombs <[elizabeth-toombs@cherokee.org](mailto:elizabeth-toombs@cherokee.org)>

**Sent:** Friday, June 01, 2018 3:24 PM

**To:** Shuler, Marianne M <[mmshuler@tva.gov](mailto:mmshuler@tva.gov)>

**Subject:** FW: TVA, Moscow-Miller Transmission Line Project, Fayette County, Tennessee and De Soto and Marshall Counties, Mississippi

**TVA External Message. Please use caution when opening.**

Good Afternoon, Marianne:

I'm forwarding this email along to you per Pat's out-of-office notice. I have one more email to forward along to your attention as well. Please let me know if there are any questions or concerns.

Wado,

Elizabeth Toombs, Tribal Historic Preservation Officer  
Cherokee Nation  
Tribal Historic Preservation Office  
PO Box 948  
Tahlequah, OK 74465-0948  
918.453.5389

---

**From:** Elizabeth Toombs

**Sent:** Friday, June 1, 2018 1:59 PM

**To:** 'Ezell, Patricia Bernard'

**Subject:** RE: TVA, Moscow-Miller Transmission Line Project, Fayette County, Tennessee and De Soto and Marshall Counties, Mississippi

Many thanks for the review request, Pat. Are there shapefiles available for this project given linear nature and length of the project. Any additional information would be greatly appreciated. Please let me know if there are any questions or concerns about this request.

Wado,

Elizabeth Toombs, Tribal Historic Preservation Officer  
Cherokee Nation  
Tribal Historic Preservation Office  
PO Box 948

## Moscow-Miller Power System Improvements

Tahlequah, OK 74465-0948  
918.453.5389

---

**From:** Ezzell, Patricia Bernard [<mailto:pbezzell@tva.gov>]  
**Sent:** Monday, May 7, 2018 2:00 PM  
**To:** 'ethompson@astribe.com' <[ethompson@astribe.com](mailto:ethompson@astribe.com)>; [celestine.bryant@actribe.org](mailto:celestine.bryant@actribe.org); Elizabeth Toombs <[elizabeth-toombs@cherokee.org](mailto:elizabeth-toombs@cherokee.org)>; [HPO@chickasaw.net](mailto:HPO@chickasaw.net); Ian Thompson <[ithompson@choctawnation.com](mailto:ithompson@choctawnation.com)>; 'Llangley@coushatta.org' <[Llangley@coushatta.org](mailto:Llangley@coushatta.org)>; [hollymaustin94@gmail.com](mailto:hollymaustin94@gmail.com); [BBarnes@estoo.net](mailto:BBarnes@estoo.net); [ashively@jenachoctaw.org](mailto:ashively@jenachoctaw.org); [dc13.dc4@gmail.com](mailto:dc13.dc4@gmail.com); 'Carleton, Ken' <[KCarleton@choctaw.org](mailto:KCarleton@choctaw.org)>; 'section106@mcn-nsn.gov' <[section106@mcn-nsn.gov](mailto:section106@mcn-nsn.gov)>; Tonya Tipton ([tonya@shawnee-tribe.com](mailto:tonya@shawnee-tribe.com)) <[tonya@shawnee-tribe.com](mailto:tonya@shawnee-tribe.com)>; 'THPO' <[thpo@tttwn.org](mailto:thpo@tttwn.org)>; Sheila Bird ([sbird@ukb-nsn.gov](mailto:sbird@ukb-nsn.gov)) <[sbird@ukb-nsn.gov](mailto:sbird@ukb-nsn.gov)>  
**Cc:** Stephen Yerka <[syerka@nc-cherokee.com](mailto:syerka@nc-cherokee.com)> ([syerka@nc-cherokee.com](mailto:syerka@nc-cherokee.com)) <[syerka@nc-cherokee.com](mailto:syerka@nc-cherokee.com)>; 'Russell Townsend' <[RussellT@nc-cherokee.com](mailto:RussellT@nc-cherokee.com)>; 'Jonas John' <[jonasj@coushattatribela.org](mailto:jonasj@coushattatribela.org)>; [David.Cook@kialegeetribe.net](mailto:David.Cook@kialegeetribe.net); Karen Pritchett <[kpritchett@ukb-nsn.gov](mailto:kpritchett@ukb-nsn.gov)>; Rachel Perash ([RPerash@ukb-nsn.gov](mailto:RPerash@ukb-nsn.gov)) <[RPerash@ukb-nsn.gov](mailto:RPerash@ukb-nsn.gov)>  
**Subject:** TVA, Moscow-Miller Transmission Line Project, Fayette County, Tennessee and De Soto and Marshall Counties, Mississippi

\*\*\*\*\*  
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IF YOU DO NOT KNOW THE SENDER OR WERE NOT EXPECTING THIS EMAIL, DO NOT OPEN ANY EMAIL ATTACHMENTS AND DELETE THIS MESSAGE.  
Thank you: Cherokee Nation Information Technology Department  
\*\*\*\*\*

Good Afternoon,

By this email message, TVA is transmitting the attached letter regarding TVA's proposal to build an approximately 17-mile long by 100 foot wide Right of Way (ROW) of single-circuit transmission line (TL) and two switching stations. The proposed Moscow-Miller Transmission Line would begin at TVA's Hickory Valley-Cordova Tap to Moscow line and extend southwest to the new Chickasaw Trail IP Switching Station. The new Chickasaw Trail IP Switching Station would be located on the corner of Cayce and East Wingo Roads in Byhalia, Mississippi. The new Diffee Switching Station would be located on Diffee Road in Moscow, Tennessee. Construction of the TL also includes a yet unknown number of new access roads. TVA has identified this preferred route for a transmission line that would provide power for growing load and increase power reliability for these Counties.

The Scope-of-Work, the draft Programmatic Agreement, and a map is attached along with the project letter.

As always, please let us know if you have any questions. Also, please let us know if you would like to participate in the PA and please provide any comments on the proposed undertaking no later than June 6, 2018.

Thank you.

Sincerely,

Pat

**Pat Bernard Ezell**

Senior Program Manager and Federal Preservation Officer  
Community Relations

Tennessee Valley Authority  
400 W. Summit Hill Drive  
Knoxville, TN 37902

(865) 632-6461 (w)

(865) 806-0370 (m)

[pbezzell@tva.gov](mailto:pbezzell@tva.gov)



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## Moscow-Miller Power System Improvements

**From:** [Ezell, Patricia Bernard](#)  
**To:** [Harle, Michaelyn S](#); [Shuler, Marianne M](#); [McCampbell, Amy Boardman](#); [Angst, Michael G](#)  
**Subject:** FW: TVA, Moscow-Miller Transmission Line Project, Fayette County, Tennessee and De Soto and Marshall Counties, Mississippi  
**Date:** Tuesday, June 12, 2018 12:59:37 PM  
**Attachments:** [image001.png](#)

---

From Choctaw Nation—please provide requested info.--pat

---

**From:** Ian Thompson <[ithompson@choctawnation.com](mailto:ithompson@choctawnation.com)>  
**Sent:** Thursday, May 31, 2018 3:55 PM  
**To:** Ezzell, Patricia Bernard <[pbezzell@tva.gov](mailto:pbezzell@tva.gov)>  
**Subject:** RE: TVA, Moscow-Miller Transmission Line Project, Fayette County, Tennessee and De Soto and Marshall Counties, Mississippi

**TVA External Message. Please use caution when opening.**

The Choctaw Nation of Oklahoma thanks TVA for consultation about the above-referenced undertaking. While some of this line is located outside of our area of historic interest, it appears other portions may be located within a Choctaw Trail of Tears corridor. Please provide our office with the latitude and longitude coordinates for the beginning and ending points of Miller-Olive Branch segment as well as the Desoto and Alcoa metering stations so that our office can tell for certain which portion(s) of this undertaking lie within our area of interest.

Thank you,

**Ian Thompson** PhD, RPA  
Tribal Historic Preservation Officer,  
Senior Director  
Historic Preservation Dept,  
Wheelock Academy,  
Tuskahoma Capitol Museum.  
Choctaw Nation of Oklahoma  
PO Drawer 1210  
Durant, OK 74701  
1-800-522-6170 ext. 2216  
[www.choctawnationculture.com](http://www.choctawnationculture.com)

---

**From:** Ezzell, Patricia Bernard [<mailto:pbezzell@tva.gov>]  
**Sent:** Monday, May 07, 2018 2:00 PM  
**To:** 'ethompson@astribe.com' <[ethompson@astribe.com](mailto:ethompson@astribe.com)>; [celestine.bryant@actribe.org](mailto:celestine.bryant@actribe.org); [elizabeth-toombs@cherokee.org](mailto:elizabeth-toombs@cherokee.org); [HPO@chickasaw.net](mailto:HPO@chickasaw.net); Ian Thompson <[ithompson@choctawnation.com](mailto:ithompson@choctawnation.com)>; 'Llanglely@coushatta.org' <[Llanglely@coushatta.org](mailto:Llanglely@coushatta.org)>; [hollymaustin94@gmail.com](mailto:hollymaustin94@gmail.com); [BBarnes@estoo.net](mailto:BBarnes@estoo.net); [ashively@jenachoctaw.org](mailto:ashively@jenachoctaw.org); [dc13.dc4@gmail.com](mailto:dc13.dc4@gmail.com); 'Carleton, Ken' <[KCarleton@choctaw.org](mailto:KCarleton@choctaw.org)>; 'section106@mcn-nsn.gov' <[section106@mcn-nsn.gov](mailto:section106@mcn-nsn.gov)>; Tonya Tipton ([tonya@shawnee-tribe.com](mailto:tonya@shawnee-tribe.com)) <[tonya@shawnee-tribe.com](mailto:tonya@shawnee-tribe.com)>; 'THPO' <[thpo@tttown.org](mailto:thpo@tttown.org)>; Sheila Bird ([sbird@ukb-nsn.gov](mailto:sbird@ukb-nsn.gov)) <[sbird@ukb-nsn.gov](mailto:sbird@ukb-nsn.gov)>

**Cc:** Stephen Yerka <[syerka@nc-choke.com](mailto:syerka@nc-choke.com)> ([syerka@nc-choke.com](mailto:syerka@nc-choke.com)) <[syerka@nc-choke.com](mailto:syerka@nc-choke.com)>; 'Russell Townsend' <[RussellT@nc-choke.com](mailto:RussellT@nc-choke.com)>; 'Jonas John' <[jonasj@coushattatribela.org](mailto:jonasj@coushattatribela.org)>; [David.Cook@kialegetribe.net](mailto:David.Cook@kialegetribe.net); Karen Pritchett <[kpritchett@ukb-nsn.gov](mailto:kpritchett@ukb-nsn.gov)>; Rachel Perash ([RPerash@ukb-nsn.gov](mailto:RPerash@ukb-nsn.gov)) <[RPerash@ukb-nsn.gov](mailto:RPerash@ukb-nsn.gov)>

**Subject:** TVA, Moscow-Miller Transmission Line Project, Fayette County, Tennessee and De Soto and Marshall Counties, Mississippi

---

Halito!

\*\*\*WARNING: External email. Please verify sender before opening attachments or clicking on links.\*\*\*

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Good Afternoon,

By this email message, TVA is transmitting the attached letter regarding TVA's proposal to build an approximately 17-mile long by 100 foot wide Right of Way (ROW) of single-circuit transmission line (TL) and two switching stations. The proposed Moscow-Miller Transmission Line would begin at TVA's Hickory Valley-Cordova Tap to Moscow line and extend southwest to the new Chickasaw Trail IP Switching Station. The new Chickasaw Trail IP Switching Station would be located on the corner of Cayce and East Wingo Roads in Byhalia, Mississippi. The new Diffe Switching Station would be located on Diffe Road in Moscow, Tennessee. Construction of the TL also includes a yet unknown number of new access roads. TVA has identified this preferred route for a transmission line that would provide power for growing load and increase power reliability for these Counties.

The Scope-of-Work, the draft Programmatic Agreement, and a map is attached along with the project letter.

As always, please let us know if you have any questions. Also, please let us know if you would like to participate in the PA and please provide any comments on the proposed undertaking no later than June 6, 2018.

Thank you.

Sincerely,

Pat

**Pat Bernard Ezzell**  
Senior Program Manager and Federal Preservation Officer  
Community Relations

Tennessee Valley Authority  
400 W. Summit Hill Drive  
Knoxville, TN 37902

(865) 632-6461 (w)  
(865) 806-0370 (m)  
[pbezzell@tva.gov](mailto:pbezzell@tva.gov)



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This message is intended only for the use of the individual or entity to which it is addressed and may contain information that is privileged, confidential and exempt from disclosure. If you have received this message in error, you are hereby notified that we do not consent to any reading, dissemination, distribution or copying of this message. If you have received this communication in error, please notify the sender immediately and destroy the transmitted information. Please note that any view or opinions presented in this email are solely those of the author and do not necessarily represent those of the Choctaw Nation.

**From:** [Shuler, Marianne M](#)  
**To:** [McCampbell, Amy Boardman](#); [Harle, Michaelyn S](#)  
**Subject:** FW: TVA-MoscowMillerPhaseB-FayetteCoTN-Desoto&MarshallCoMS-Tribal-17Oct18  
**Date:** Tuesday, November 13, 2018 8:28:07 AM  
**Attachments:** [image010.png](#)  
[image011.png](#)  
[image012.png](#)  
[image013.png](#)  
[image014.png](#)  
[image015.png](#)  
[image016.png](#)  
[image017.png](#)

---

**From:** [tonya@shawnee-tribe.com](mailto:tonya@shawnee-tribe.com) <[tonya@shawnee-tribe.com](mailto:tonya@shawnee-tribe.com)>  
**Sent:** Saturday, November 10, 2018 2:44 PM  
**To:** Shuler, Marianne M <[mmshuler@tva.gov](mailto:mmshuler@tva.gov)>  
**Subject:** RE: TVA-MoscowMillerPhaseB-FayetteCoTN-Desoto&MarshallCoMS-Tribal-17Oct18

**TVA External Message. Please use caution when opening.**

This letter is in response to the above referenced project.

The Shawnee Tribe's Tribal Historic Preservation Department concurs that no known historic properties will be negatively impacted by this project.

We have no issues or concerns at this time, but in the event that archaeological materials are encountered during construction, use, or maintenance of this location, please re-notify us at that time as we would like to resume immediate consultation under such a circumstance.

If you have any questions, you may contact me via email at [tonya@shawnee-tribe.com](mailto:tonya@shawnee-tribe.com)

Thank you for giving us the opportunity to comment on this project.

Sincerely,

Tonya Tipton  
Shawnee Tribe-THPO



29 S Highway 69A  
Miami, OK 74354  
Phone:(918)542-2441  
Fax: (918)542-2922  
[tonya@shawnee-tribe.com](mailto:tonya@shawnee-tribe.com)



## Moscow-Miller Power System Improvements

---

**From:** Shuler, Marianne M <[mmshuler@tva.gov](mailto:mmshuler@tva.gov)>  
**Sent:** Wednesday, October 17, 2018 1:21 PM  
**To:** [106NAGPRA@astribe.com](mailto:106NAGPRA@astribe.com); Elizabeth Toombs <[elizabeth-toombs@cherokee.org](mailto:elizabeth-toombs@cherokee.org)>; 'Ian Thompson ([ithompson@choctawnation.com](mailto:ithompson@choctawnation.com))' <[ithompson@choctawnation.com](mailto:ithompson@choctawnation.com)>; 'BBarnes@estoo.net' <[BBarnes@estoo.net](mailto:BBarnes@estoo.net)>; 'ashively@jenachoctaw.org' <[ashively@jenachoctaw.org](mailto:ashively@jenachoctaw.org)>; 'HPO@chickasaw.net' <[HPO@chickasaw.net](mailto:HPO@chickasaw.net)>; 'Llangley@coushatta.org' <[Llangley@coushatta.org](mailto:Llangley@coushatta.org)>; 'dc13.dc4@gmail.com' <[dc13.dc4@gmail.com](mailto:dc13.dc4@gmail.com)>; 'kcarleton@choctaw.org' <[kcarleton@choctaw.org](mailto:kcarleton@choctaw.org)>; 'section106@mcn-nsn.gov' <[section106@mcn-nsn.gov](mailto:section106@mcn-nsn.gov)>; 'Tonya Tipton ([tonya@shawnee-tribe.com](mailto:tonya@shawnee-tribe.com))' <[tonya@shawnee-tribe.com](mailto:tonya@shawnee-tribe.com)>; THPO <[thpo@ttown.org](mailto:thpo@ttown.org)>; 'Sheila Bird ([sbird@ukb-nsn.gov](mailto:sbird@ukb-nsn.gov))' <[sbird@ukb-nsn.gov](mailto:sbird@ukb-nsn.gov)>  
**Cc:** Corain Lowe <[CLowe@mcn-nsn.gov](mailto:CLowe@mcn-nsn.gov)>; [cwolfe@ukb-nsn.gov](mailto:cwolfe@ukb-nsn.gov)  
**Subject:** TVA-MoscowMillerPhaseB-FayetteCoTN-Desoto&MarshallCoMS-Tribal-17Oct18

Good Afternoon

By this email I am sending the attached letter regarding TVA's proposal to install approximately 5.9 miles of optical ground wire on the existing Hickory Valley-Cordova Tap to Moscow transmission line in Fayette County, Tennessee and Desoto and Marshall Counties, Mississippi.

Please let me know by November 16<sup>th</sup> if you have any questions or comments on the proposed undertaking.

Thanks  
Marianne

**Marianne Shuler**  
Senior Specialist, Archaeologist & Tribal Liaison  
Cultural Compliance

Tennessee Valley Authority  
400 W. Summit Hill Drive  
Knoxville, TN 37902

865-632-2464 (w)  
[mmshuler@tva.gov](mailto:mmshuler@tva.gov)



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**From:** [Ezell, Patricia Bernard](#)  
**To:** [Angst, Michael G](#); [Harle, Michaelyn S](#); [Shuler, Marianne M](#); [McCampbell, Amy Boardman](#)  
**Subject:** FW: TVA, Moscow-Miller Transmission Line Project, Fayette County, Tennessee and De Soto and Marshall Counties, Mississippi  
**Date:** Tuesday, May 08, 2018 7:10:55 PM  
**Attachments:** [image002.png](#)

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Comments from Shawnee Tribe

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**From:** [tonya@shawnee-tribe.com](mailto:tonya@shawnee-tribe.com) [mailto:[tonya@shawnee-tribe.com](mailto:tonya@shawnee-tribe.com)]  
**Sent:** Tuesday, May 08, 2018 1:29 PM  
**To:** Ezell, Patricia Bernard  
**Subject:** RE: TVA, Moscow-Miller Transmission Line Project, Fayette County, Tennessee and De Soto and Marshall Counties, Mississippi

**TVA External Message. Please use caution when opening.**

This letter is in response to the above referenced project.

The Shawnee Tribe's Tribal Historic Preservation Department concurs that no known historic properties will be negatively impacted by this project.

We have no issues or concerns at this time, but in the event that archaeological materials are encountered during construction, use, or maintenance of this location, please re-notify us at that time as we would like to resume immediate consultation under such a circumstance.

If you have any questions, you may contact me via email at [tonya@shawnee-tribe.com](mailto:tonya@shawnee-tribe.com)

Thank you for giving us the opportunity to comment on this project.

Sincerely,  
Tonya Tipton  
Shawnee Tribe



---

**From:** Ezell, Patricia Bernard <[pbezzell@tva.gov](mailto:pbezzell@tva.gov)>  
**Sent:** Monday, May 7, 2018 2:00 PM  
**To:** 'ethompson@astribe.com' <[ethompson@astribe.com](mailto:ethompson@astribe.com)>; [celestine.bryant@actribe.org](mailto:celestine.bryant@actribe.org); [elizabeth-toombs@cherokee.org](mailto:elizabeth-toombs@cherokee.org); [HPO@chickasaw.net](mailto:HPO@chickasaw.net); Ian Thompson <[ithompson@choctawnation.com](mailto:ithompson@choctawnation.com)>; 'Llangley@coushatta.org' <[Llangley@coushatta.org](mailto:Llangley@coushatta.org)>; [hollymaustin94@gmail.com](mailto:hollymaustin94@gmail.com); [BBarnes@estoo.net](mailto:BBarnes@estoo.net); [ashively@jenachoctaw.org](mailto:ashively@jenachoctaw.org); [dc13.dc4@gmail.com](mailto:dc13.dc4@gmail.com); 'Carleton, Ken'

## Moscow-Miller Power System Improvements

<KCarleton@choctaw.org>; 'section106@mcn-nsn.gov' <section106@mcn-nsn.gov>; Tonya Tipton (tonya@shawnee-tribe.com) <tonya@shawnee-tribe.com>; 'THPO' <thpo@tttown.org>; Sheila Bird (sbird@ukb-nsn.gov) <sbird@ukb-nsn.gov>

**Cc:** Stephen Yerka <syerka@nc-chokeee.com> (syerka@nc-chokeee.com) <syerka@nc-chokeee.com>; 'Russell Townsend' <RussellT@nc-chokeee.com>; 'Jonas John' <jonasj@coushattatribela.org>; David.Cook@kialegeetribe.net; Karen Pritchett <kpritchett@ukb-nsn.gov>; Rachel Perash (RPerash@ukb-nsn.gov) <RPerash@ukb-nsn.gov>

**Subject:** TVA, Moscow-Miller Transmission Line Project, Fayette County, Tennessee and De Soto and Marshall Counties, Mississippi

Good Afternoon,

By this email message, TVA is transmitting the attached letter regarding TVA's proposal to build an approximately 17-mile long by 100 foot wide Right of Way (ROW) of single-circuit transmission line (TL) and two switching stations. The proposed Moscow-Miller Transmission Line would begin at TVA's Hickory Valley-Cordova Tap to Moscow line and extend southwest to the new Chickasaw Trail IP Switching Station. The new Chickasaw Trail IP Switching Station would be located on the corner of Cayce and East Wingo Roads in Byhalia, Mississippi. The new Diffee Switching Station would be located on Diffee Road in Moscow, Tennessee. Construction of the TL also includes a yet unknown number of new access roads. TVA has identified this preferred route for a transmission line that would provide power for growing load and increase power reliability for these Counties.

The Scope-of-Work, the draft Programmatic Agreement, and a map is attached along with the project letter.

As always, please let us know if you have any questions. Also, please let us know if you would like to participate in the PA and please provide any comments on the proposed undertaking no later than June 6, 2018.

Thank you.

Sincerely,

Pat

**Pat Bernard Ezzell**  
Senior Program Manager and Federal Preservation Officer  
Community Relations

Tennessee Valley Authority  
400 W. Summit Hill Drive  
Knoxville, TN 37902

(865) 632-6461 (w)  
(865) 806-0370 (m)  
[pbezzell@tva.gov](mailto:pbezzell@tva.gov)



**THLOPTHLOCCO TRIBAL TOWN**

*Tribal Historic Preservation Office*

*Terry Clouthier, Tribal Historic Preservation Officer*

P.O. Box 188  
Okemah, OK 74859  
(918) 560-6113  
[thpo@tttown.org](mailto:thpo@tttown.org)

November 15, 2018

THPO File Number: 2018-405

Marianne Shuler  
Senior Specialist, Archaeologist and Tribal Liaison  
Cultural Compliance  
Tennessee Valley Authority  
400 W. Summit Hill Drive  
Knoxville, TN 37902

**RE: TENNESSEE VALLEY AUTHORITY (TVA), PHASE B, MOSCOW-MILLER TRANSMISSION LINE PROJECT FAYETTE COUNTY, TENNESSEE AND DESOTO AND MARSHALL COUNTIES, MISSISSIPPI**

Dear Ms. Shuler,

Thank you for contacting the Thlopthlocco Tribal Town Tribal Historic Preservation Office (THPO) requesting comments regarding the undertaking to install approximately 5.9 miles of optical ground wire on the existing Hickory Valley - Cordova Tap to Moscow in Tennessee and rebuild approximately 2.6 miles on the existing Cordova - Holly Springs TL in Mississippi. Our office has reviewed the documents provided and offers the following comments.

Based upon a review of the document and consulting our records we are unaware of any culturally significant sites within the APE. Should any human remains or cultural resources be inadvertently discovered, please cease all work and contact our THPO at [thpo@tttown.org](mailto:thpo@tttown.org) immediately.

The THPO agrees that site 40FY587 is potentially eligible for the National Register and that the portion of 40FY588 within the APE lacks information potential beyond presence or absence of artifacts. However, portions of 40FY587 were not tested outside of the APE therefore its eligibility to the National Register should remain undetermined.

The THPO agrees with the findings and recommendations within the report and concurs with any No Adverse Effect determination for this undertaking.

Please feel free to contact the THPO at [thpo@tttown.org](mailto:thpo@tttown.org) if you have any questions.

Please refer to THPO file number 2018-405 in all correspondence for this undertaking.

Sincerely,

Terry Clouthier  
Thlopthlocco Tribal Town  
Tribal Historic Preservation Officer



Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, TN 37902

May 8, 2018

Mr. Jim Woodrick  
Division Director  
Mississippi Department of Archives and History  
Historic Preservation Division  
200 North Street  
Jackson, Mississippi 39201

Dear Mr. Woodrick:

TENNESSEE VALLEY AUTHORITY (TVA), MOSCOW-MILLER TRANSMISSION LINE PROJECT, FAYETTE COUNTY, TENNESSEE and DE SOTO AND MARSHALL COUNTIES, MISSISSIPPI

TVA proposes to build an approximately 17-mile long by 100 foot wide Right of Way (ROW) of single-circuit transmission line (TL) and two switching stations. The proposed Moscow-Miller Transmission Line would begin at TVA's Hickory Valley-Cordova Tap to Moscow line and extend southwest to the new Chickasaw Trail IP Switching Station. The new Chickasaw Trail IP Switching Station would be located on the corner of Cayce and East Wingo Roads in Byhalia, Mississippi. The new Diffee Switching Station would be located on Diffee Road in Moscow, Tennessee. Construction of the TL also includes a yet unknown number of new access roads.

TVA has identified this preferred route for a transmission line that would provide power for growing load and increase power reliability for these Counties. The preferred route for a new transmission line was selected from several options. TVA considers this action (the "Moscow Miller Transmission Line Project") meets the definition of "undertaking" at 36 CFR § 800.16(y). In addition, two existing TLs will have approximately 10 miles of Optical Ground Wire (OPGW) replaced and another existing TL will require approximately 3 miles of rebuild. The methodology of OPGW replacement (e.g., aerial or on-ground) has yet to be determined. TVA determined that the area of potential effects (APE) for direct effects to be the 17 mile proposed TL ROW, which includes some 100-foot wide ROW and yet unknown miles of associated access roads; the footprint of the two proposed switching stations and any associated infrastructure (approximately 7 acres), and the footprint of all ground disturbance associated with the proposed OPGW replacement and rebuild. TVA determined the APE for visual effects to be areas within a one-half mile radius surrounding the centerline of the proposed new TL and switching station, where new construction or vegetation clearing could be within view of a historic architectural resource.

Due to scale and complexity of the project the project will be completed in "phases" (Figure enclosed). Per our recent phone conversation, TVA considers the undertaking a "complex

Mr. Jim Woodrick  
Page 2  
May 8, 2018

undertaking as defined 36 CFR § 800.14(b)(3) and is electing to fulfill our obligations under Section 106 through execution and implementation of this Programmatic Agreement (PA).

Please find the draft programmatic agreement in hardcopy and digital form (in an editable Microsoft Word format) enclosed for your review and comment.

Please send all edits and comments by email to [mharle@tva.gov](mailto:mharle@tva.gov). If you have any questions, please contact Michaelyn Harle by email or by phone, (865) 632-2248.

Sincerely,



Edward W. Wells on Behalf of Clinton E. Jones  
Manager  
Cultural Compliance

MSH:ABM  
Enclosures

INTERNAL COPIES ONLY, NOT TO BE INCLUDED WITH OUTGOING LETTER:

A. Michelle Cagley, KFP 1T-KST  
Marty M. Gamble, WT 11C-K  
Michaelyn S. Harle, WT 11D-K  
Susan R. Jacks, WT 11C-K  
M. Susan Smelley, BR 4A-C  
Emily P. Willard, MR 4G-C  
ECM, WT CA-K



Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, TN 37902

May 2, 2018

Mr. E. Patrick McIntyre, Jr.  
Executive Director  
Tennessee Historical Commission  
2941 Lebanon Road  
Nashville, Tennessee 37243-0442

Dear Mr. McIntyre:

TENNESSEE VALLEY AUTHORITY (TVA), MOSCOW-MILLER TRANSMISSION LINE PROJECT, FAYETTE COUNTY, TENNESSEE and DE SOTO AND MARSH AL COUNTIES, MISSISSIPPI

TVA proposes to build an approximately 17-mile long by 100 foot wide Right of Way (ROW) of single-circuit transmission line (TL) and two switching stations. The proposed Moscow-Miller Transmission Line would begin at TVA's Hickory Valley-Cordova Tap to Moscow line and extend southwest to the new Chickasaw Trail IP Switching Station. The new Chickasaw Trail IP Switching Station would be located on the corner of Cayce and East Wingo Roads in Byhalia, Mississippi. The new Diffee Switching Station would be located on Diffee Road in Moscow, Tennessee. Construction of the TL also includes a yet unknown number of new access roads.

TVA has identified this preferred route for a transmission line that would provide power for growing load and increase power reliability for these Counties. The preferred route for a new transmission line was selected from several options. TVA considers this action (the "Moscow Miller Transmission Line Project") meets the definition of "undertaking" at 36 CFR § 800.16(y). In addition, two existing TLs will have approximately 10 miles of Optical Ground Wire (OPGW) replaced and another existing TL will require approximately 3 miles of rebuild. The methodology of OPGW replacement (e.g., aerial or on-ground) has yet to be determined. TVA determined that the area of potential effects (APE) for direct effects to be the 17 mile proposed TL ROW, which includes some 100-foot wide ROW and yet unknown miles of associated access roads; the footprint of the two purposed switching stations and any associated infrastructure (approximately 7 acres), and the footprint of all ground disturbance associated with the proposed OPGW replacement and rebuild. TVA determined the APE for visual effects to be areas within a one-half mile radius surrounding the centerline of the proposed new TL and switching station, where new construction or vegetation clearing could be within view of a historic architectural resource.

Due to scale and complexity of the project the project will be completed in "phases" (Figure enclosed). Per our recent phone conversation, TVA considers the undertaking a "complex undertaking as defined 36 CFR § 800.14(b)(3) and is electing to fulfill our obligations under Section 106 through execution and implementation of this Programmatic Agreement (PA).

Mr. E. Patrick McIntyre, Jr.  
Page 2  
May 2, 2018

Please find the draft programmatic agreement in hardcopy and digital form (in an editable Microsoft Word format) enclosed for your review and comment.

Please send all edits and comments by email to [mharle@tva.gov](mailto:mharle@tva.gov). If you have any questions, please contact Michaelyn Harle by email or by phone, (865) 632-2248.

Sincerely,



Edward W. Wells on Behalf of Clinton E. Jones  
Manager  
Cultural Compliance

MSH:ABM  
Enclosures  
cc (Enclosures):

Ms. Jennifer Barnett  
Tennessee Division of Archaeology  
1216 Foster Avenue, Cole Bldg. #3  
Nashville, Tennessee 37210

INTERNAL COPIES ONLY, NOT TO BE INCLUDED WITH OUTGOING LETTER:

A. Michelle Cagley, KFP 1T-KST  
Marty M. Gamble, WT 11C-K  
Michaelyn S. Harle, WT 11D-K  
Susan R. Jacks, WT 11C-K  
M. Susan Smelley, BR 4A-C  
Emily P. Willard, MR 4G-C  
ECM, WT CA-K





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

October 22, 2018

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

RE: TVA / Tennessee Valley Authority, Moscow-Miller Transmission Line Project, Phase B,  
Fayette County, TN

Dear Mr. Jones:

In response to your request, we have reviewed the archaeological report of investigations 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 site 40FY587 is potentially eligible for inclusion in the National Register of Historic Places and that the currently investigated portion of 40FY588 is not eligible. We further concur that, given the avoidance measures included in your correspondence, no 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 Barnett (615) 687-4780.

Your cooperation is appreciated.

Sincerely,

A handwritten signature in cursive script that reads "E. Patrick McIntyre, Jr.".

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

EPM/jmb

MISSISSIPPI DEPARTMENT of ARCHIVES AND HISTORY



HISTORIC PRESERVATION DIVISION  
P. O. BOX 571  
Jackson, MS 39205-0571  
Phone 601-576-6940 Fax 601-576-6955  
Website: [mdah.ms.gov](http://mdah.ms.gov)

January 2, 2019

Dr. Michaelyn Harle  
Tennessee Valley Authority  
400 West Summit Hill Drive  
Knoxville, Tennessee 37902

RE: A Phase I Cultural Resources Survey for the Tennessee Valley Authority's Planned Moscow-Miller Transmission Line Project, Phase B, Final, (TVA) MDAH Project Log #12-063-18 (10-117-18), Report #18-0328, Desoto and Marshall Counties

Dear Dr. Harle:

We have reviewed the August, 2018, survey report, by J. Rocco de Gregory, Principal Investigator, with Tennessee Valley Archaeological Research, received on December 17, 2018, for the above referenced undertaking, pursuant to our responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR Part 800. After reviewing the information provided, we concur that no cultural resources eligible for listing in the National Register of Historic Places in Mississippi are likely to be affected. Therefore, we have no reservations with the project.

While we have no objection with the proposed undertaking, please be aware that according to the above referenced regulations appropriate tribal authorities must also be afforded the opportunity to comment if the project is a Federal undertaking. We will be happy to provide a list of *Native American Tribes With Cultural Interests in Mississippi* upon request.

There remains the possibility that unrecorded cultural resources may be encountered during the project. Should this occur, we would appreciate your contacting this office immediately in order that we may offer appropriate comments under 36 CFR 800.13.

Please provide a copy of this letter to Mr. de Gregory. If you need further information, please let me know.

Sincerely,

A handwritten signature in black ink that reads "Hal Bell". The signature is written in a cursive, flowing style.

Hal Bell  
Review and Compliance Officer

FOR: Katie Blount  
State Historic Preservation Officer



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

May 25, 2018

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

RE: TVA / Tennessee Valley Authority, Moscow-Miller Transmission Line Project,  
Fayette County, TN

Dear Mr. Jones:

At your request, our office has reviewed the above-referenced draft programmatic agreement for the above-reference complex undertaking. This review is a requirement of Section 106 of the National Historic Preservation Act for compliance by the participating federal agency or applicants for federal assistance. Procedures for implementing Section 106 of the Act are codified at 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739).

We have provided our editorial requests and comments separately via email.

Upon receipt of the revised agreement document, we will continue our review of this undertaking and the proposed phased compliance process detailed in the document expeditiously as possible. Until such time as this office has rendered a final comment on this project, your Section 106 obligation under federal law has not been met. Please inform this office if this project is not funded, licensed, permitted, or is canceled by the federal agency. Questions and comments may be directed to Jennifer M. Barnett (615) 687-4780.

Your cooperation is appreciated.

Sincerely,

A handwritten signature in black ink, appearing to read 'E. Patrick McIntyre, Jr.', is written over a light blue horizontal line.

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

EPM/jmb

MISSISSIPPI DEPARTMENT *of* ARCHIVES AND HISTORY



HISTORIC PRESERVATION DIVISION  
P. O. BOX 571  
Jackson, MS 39205-0571  
Phone 601-576-6940 Fax 601-576-6955  
Website: mdah.ms.gov

June 18, 2018

Dr. Michaelyn Harle  
Tennessee Valley Archaeological  
400 West Summit Hill Drive  
Knoxville, Tennessee 37902

RE: Phase I Cultural Resources Survey for the TVA's Planned Moscow-Miller Transmission Line Project, (TVA) MDAH Project Log #05-135-18, Report #18-0141, Desoto and Marshall Counties

Dear Dr. Harle:

We have reviewed the April, 2018, survey report, by J. Rocco de Gregory, Principal Investigator, with Tennessee Valley Archaeological Research, received on May 24, 2018, for the above referenced undertaking, pursuant to our responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR Part 800. After reviewing the information provided, we concur that no cultural resources eligible for listing in the National Register of Historic Places are likely to be affected. Therefore, we have no reservations with the project.

While we have no objection with the proposed undertaking, please be aware that according to the above referenced regulations appropriate tribal authorities must also be afforded the opportunity to comment if the project is a Federal undertaking. We will be happy to provide a list of *Native American Tribes With Cultural Interests in Mississippi* upon request.

There remains the possibility that unrecorded cultural resources may be encountered during the project. Should this occur, we would appreciate your contacting this office immediately in order that we may offer appropriate comments under 36 CFR 800.13.

If you need further information, please let me know.

Sincerely,

Hal Bell  
Review and Compliance Officer

FOR: Katie Blount  
State Historic Preservation Officer



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

May 17, 2019

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

RE: TVA / Tennessee Valley Authority, Phase C and D, Moscow Miller Transmission Line Project, , Fayette County, TN

Dear Mr. Jones:

We have reviewed the documents you submitted regarding your proposed undertaking. Our review of and comment on your proposed undertaking are among the requirements of Section 106 of the National Historic Preservation Act. You have submitted documents that are insufficient for us to complete our review. To continue the Tennessee State Historic Preservation Office review of this undertaking, please provide us with the following information:

1. A map that shows the location of the tent city outside of Moscow. Your report mentions it, but it is unclear if parts of it remain and if it is within the APE. If it still remains and is within the APE, please provide information and photographs about the tent city.
2. Additional photographs of IS-FY-19, the ca. 1930 Sinclair gas station.

Upon receipt of this additional documentation, we will continue our review of this undertaking as quickly as possible. Please be advised that until this office has provided you a final written comment on this undertaking, you have not met your Section 106 obligation under federal law. Questions and comments may be directed to Casey Lee (615 253-3163). We appreciate your cooperation.

Sincerely,

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

EPM/cjl

MISSISSIPPI DEPARTMENT *of* ARCHIVES AND HISTORY



HISTORIC PRESERVATION DIVISION  
P. O. BOX 571  
Jackson, MS 39205-0571  
Phone 601-576-6940 Fax 601-576-6955  
Website: mdah.ms.gov

May 21, 2019

Mr. Clinton E. Jones  
Tennessee Valley Archaeological  
400 West Summit Hill Drive  
Knoxville, Tennessee 37902

RE: A Phase I Cultural Resources Survey for the Tennessee Valley Authority's Planned  
Moscow-Miller Transmission Line Project, Phases C and D, (TVA)  
MDAH Project Log #05-032-19, Report #19-0123, Desoto and Marshall Counties

Dear Mr. Jones:

We have reviewed the April, 2019, survey report, by J. Rocco de Gregory, Principal Investigator, with Tennessee Valley Archaeological Research, received on May 9, 2019, for the above referenced undertaking, pursuant to our responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR Part 800. After reviewing the information provided, we concur that revisited site 22MR707, sites 22DS734-738 and 22DS848-849 are ineligible for listing in the National Register of Historic Places and that no cultural resources eligible for listing in the NRHP are likely to be affected. Therefore, we have no reservations with the project.

While we have no objection with the proposed undertaking, please be aware that according to the above referenced regulations appropriate tribal authorities must also be afforded the opportunity to comment if the project is a Federal undertaking. We will be happy to provide a list of *Native American Tribes With Cultural Interests in Mississippi* upon request.

There remains the possibility that unrecorded cultural resources may be encountered during the project. Should this occur, we would appreciate your contacting this office immediately in order that we may offer appropriate comments under 36 CFR 800.13.

Please provide Mr. de Gregory with a copy of this letter. If you need further information, please let me know.

Sincerely,

Hal Bell  
Review and Compliance Officer

FOR: Katie Blount  
State Historic Preservation Officer



**TENNESSEE HISTORICAL COMMISSION**  
STATE HISTORIC PRESERVATION OFFICE  
2341 LEBANON PIKE  
NASHVILLE, TENNESSEE 37243-0442  
OFFICE: (615) 632-1550  
[www.tnhistoricalcommission.org](http://www.tnhistoricalcommission.org)

October 22, 2018

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

RE: TVA / Tennessee Valley Authority, Moscow-Miller Transmission Line Project, Phase B,  
Fayette County, TN

Dear Mr. Jones:

In response to your request, we have reviewed the archaeological report of investigations 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 site 40FY587 is potentially eligible for inclusion in the National Register of Historic Places and that the currently investigated portion of 40FY588 is not eligible. We further concur that, given the avoidance measures included in your correspondence, no 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 Barnett (615) 687-4780.

Your cooperation is appreciated.

Sincerely,

A handwritten signature in cursive script that reads "E. Patrick McIntyre, Jr.".

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

EPM/jmb



TENNESSEE HISTORICAL COMMISSION  
STATE HISTORIC PRESERVATION OFFICE  
2541 LEBANON P K E  
NASHVILLE, TENNESSEE 37243-0442  
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July 11, 2019

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

RE: TVA / Tennessee Valley Authority, Moscow-Miller Transmission Line Project, Phase E,  
Fayette County, TN

Dear Mr. Jones:

In response to your request, we have reviewed the cultural resources survey report 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 no historic properties 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 Barnett (615) 687-1780.

Your cooperation is appreciated.

Sincerely,

A handwritten signature in cursive script that reads "E. Patrick McIntyre, Jr." followed by a small mark.

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

EPM/jmb



MISSISSIPPI DEPARTMENT OF CULTURAL RESOURCES



HISTORY PRESERVATION DIVISION  
PO BOX 511  
Jackson, MS 39205-0511  
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Website: [mdah.ms.gov](http://mdah.ms.gov)

October 29, 2018

Mr. Clinton E. Jones  
Tennessee Valley Authority  
400 West Summit Hill Drive  
Knoxville, Tennessee 37902

RE: A Phase I Cultural Resources Survey for the Tennessee Valley Authority's Planned Moscow-Miller Transmission Line Project, (TVA) MDAH Project Log #10-117-18. Report #18-0290, Desoto and Marshall Counties.

Dear Mr. Jones:

We have reviewed the August, 2018, cultural resources survey, by J. Rocco de Gregory, Principal Investigator, with Tennessee Valley Archaeological Research, received on October 23, 2018, for the above referenced project in accordance with our responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR Part 800. After review, we concur that no historic properties or resources eligible for listing in the National Register of Historic Places in Mississippi are likely to be affected by the proposed project. However, before we can approve the survey, we need to know the amount of acreage in Mississippi that was surveyed for the project. Please send a revised copy of the report with the updated information. We look forward to receiving the information so that we may complete our comments.

Please provide a copy of this letter to Mr. de Gregory. If you need further information, please let us know.

Sincerely,

A handwritten signature in black ink that reads "Hal Bell". The signature is written in a cursive style.

Hal Bell  
Review and Compliance Officer

FOR: Katie Blount  
State Historic Preservation Officer

**Appendix B – Bat Strategy Project Screening Form**

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Appendix B – Bat Strategy Project Screening Form

**Project Review Form - TVA Bat Strategy (12/2018)**

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.<sup>1</sup>

**Project Name:** Moscow Miller Phase A - Project No. 417277 **Date:** May 2, 2019  
**Contact(s):** Emily Willard **CEC#:** **Project ID:** 417277  
**Project Location (City, County, State):** Fayette Co, TN (Diffie), and Marshall Co, MS (Chickasaw Trails)

**Project Description:**

Phase A of the Moscow Miller Project included the review of 2 switching station locations. Diffie 161-kV Sunstation and Chickasaw Trails 161-kV Substation. No clearing will be required at the Diffie location. Tree clearing is required within the Chickasaw Trails 161-kV substation as depicted on the site map provided in the BCC folder.

**SECTION 1: PROJECT INFORMATION - ACTION AND ACTIVITIES**

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

- |   |  |
|---|--|
| <input type="checkbox"/> 1 Manage Biological Resources for Biodiversity and Public Use on TVA Reservoir Lands | <input type="checkbox"/> 6 Maintain Existing Electric Transmission Assets                  |
| <input type="checkbox"/> 2 Protect Cultural Resources on TVA-Retained Land                                    | <input type="checkbox"/> 7 Convey Property associated with Electric Transmission           |
| <input type="checkbox"/> 3 Manage Land Use and Disposal of TVA-Retained Land                                  | <input checked="" type="checkbox"/> 8 Expand or Construct New Electric Transmission Assets |
| <input type="checkbox"/> 4 Manage Permitting under Section 26a of the TVA Act                                 | <input type="checkbox"/> 9 Promote Economic Development                                    |
| <input type="checkbox"/> 5 Operate, Maintain, Retire, Expand, Construct Power Plants                          | <input type="checkbox"/> 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.		
<input type="checkbox"/> 1. Loans and/or grant awards	<input type="checkbox"/> 8. Sale of TVA property	<input type="checkbox"/> 19. Site-specific enhancements in streams and reservoirs for aquatic animals
<input checked="" type="checkbox"/> 2. Purchase of property	<input type="checkbox"/> 9. Lease of TVA property	<input type="checkbox"/> 20. Nesting platforms
<input type="checkbox"/> 3. Purchase of equipment for industrial facilities	<input type="checkbox"/> 10. Deed modification associated with TVA rights or TVA property	<input type="checkbox"/> 41. Minor water-based structures (this does not include boat docks, boat slips or piers)
<input type="checkbox"/> 4. Environmental education	<input type="checkbox"/> 11. Abandonment of TVA retained rights	<input type="checkbox"/> 42. Internal renovation or internal expansion of an existing facility
<input type="checkbox"/> 5. Transfer of ROW easement and/or ROW equipment	<input type="checkbox"/> 12. Sufferance agreement	<input type="checkbox"/> 43. Replacement or removal of TL poles
<input type="checkbox"/> 6. Property and/or equipment transfer	<input type="checkbox"/> 13. Engineering or environmental planning or studies	<input checked="" type="checkbox"/> 44. Conductor and overhead ground wire installation and replacement
<input type="checkbox"/> 7. Easement on TVA property	<input type="checkbox"/> 14. Harbor limits	<input type="checkbox"/> 49. Non-navigable houseboats

Project Review Form - TVA Bat Strategy (12/2018)

**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.**

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

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

Appendix B – Bat Strategy Project Screening Form

Project Review Form - TVA Bat Strategy (12/2018)

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, bridge, other structure (potential bat roost)?  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	<input type="checkbox"/> Oct 15 - Nov 14	<input type="checkbox"/> Nov 15 - Mar 31	<input type="checkbox"/> Apr 1 - May 31, Aug 1 - Oct 14	<input type="checkbox"/> Jun 1 - Jul 31
VA	<input type="checkbox"/> Sep 16 - Nov 15	<input type="checkbox"/> Nov 16 - Apr 14	<input type="checkbox"/> Apr 15 - May 31, Aug 1 - Sept 15	<input type="checkbox"/> Jun 1 - Jul 31
AL	<input type="checkbox"/> Oct 15 - Nov 14	<input type="checkbox"/> Nov 15 - Mar 15	<input type="checkbox"/> Mar 16 - May 31, Aug 1 - Oct 14	<input type="checkbox"/> Jun 1 - Jul 31
NC	<input type="checkbox"/> Oct 15 - Nov 14	<input type="checkbox"/> Nov 15 - Apr 15	<input type="checkbox"/> Apr 16 - May 31, Aug 1 - Oct 14	<input type="checkbox"/> Jun 1 - Jul 31
MS	<input type="checkbox"/> Oct 1 - Nov 14	<input type="checkbox"/> Nov 15 - Apr 14	<input type="checkbox"/> Apr 15 - May 31, Aug 1 - Sept 30	<input type="checkbox"/> Jun 1 - Jul 31

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

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

STATE	SWARMING	WINTER	NON-WINTER	PUP
GA, KY, TN	<input type="checkbox"/> Oct 15 - Nov 14	<input type="checkbox"/> Nov 15 - Mar 31	<input type="checkbox"/> Apr 1 - May 31, Aug 1 - Oct 14	<input type="checkbox"/> Jun 1 - Jul 31
VA	<input type="checkbox"/> Sep 16 - Nov 15	<input type="checkbox"/> Nov 16 - Apr 14	<input type="checkbox"/> Apr 15 - May 31, Aug 1 - Sept 15	<input type="checkbox"/> Jun 1 - Jul 31
AL	<input type="checkbox"/> Oct 15 - Nov 14	<input type="checkbox"/> Nov 15 - Mar 15	<input type="checkbox"/> Mar 16 - May 31, Aug 1 - Oct 14	<input type="checkbox"/> Jun 1 - Jul 31
NC	<input type="checkbox"/> Oct 15 - Nov 14	<input type="checkbox"/> Nov 15 - Apr 15	<input type="checkbox"/> Apr 16 - May 31, Aug 1 - Oct 14	<input type="checkbox"/> Jun 1 - Jul 31
MS	<input checked="" type="checkbox"/> Oct 1 - Nov 14	<input type="checkbox"/> Nov 15 - Apr 14	<input checked="" type="checkbox"/> Apr 15 - May 31, Aug 1 - Sept 30	<input checked="" type="checkbox"/> Jun 1 - Jul 31

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

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 (If NO and includes Table 3 activities, submit project / relevant information [e.g., maps] for review by Terrestrial Zoologist.)

Info below completed by:	<input type="checkbox"/> Heritage Reviewer (name)	<input type="text"/>	Date	<input type="text"/>
	<input type="checkbox"/> OSAR Reviewer (name)	<input type="text"/>	Date	<input type="text"/>
	<input checked="" type="checkbox"/> Terrestrial Zoologist (name)	Jesse Troxler	Date	Jul 22, 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 10 miles\*  Within the County
- Caves:  None within 3 mi  Within 3 miles but > 0.5 mi  Within 0.5 mi but > 0.25 mi\*  Within 0.25 mi but > 200 feet\*  Within 200 feet\*

Bat Habitat Inspection Sheet completed?  NO  YES

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

Project Review Form - TVA Bat Strategy (12/2018)

**STEP 6) If reviewed by Heritage/OSAR reviewer, does records review trigger need for additional review by Terrestrial Zoologist (noted by \* in Step 5)?**

- NO (Go to Step 13)
  YES (Submit for Terrestrial Zoology review)
  YES, however, based on Heritage Data review guidelines (or discussion with Terrestrial Zoology), project does not need to be submitted to Terrestrial Zoology for review. (Go to Step 13)

**Notes (additional information from field review or explanation of no impact):**

2.59 acres of suitable wetland bat habitat at Chickasaw Trails SS. Snags & suitable black willows present. No trees at Diffie SS-pasture.

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

**STEP 7) Project will involve:**

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

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

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

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

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

TVA Action	Total 20-year	Winter	Volant Season	Non-Volant Season
8 Expand or Construct New Electric Transmission Assets	11,757	7,025.04	2,356.39	2,375.83

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

**SECTION 3: REQUIRED CONSERVATION MEASURES**

**STEP 13a) If answer to STEP 3 is NO, (Project Lead or OSAR/Heritage Reviewer) is to review Conservation Measures in Table 4 and ensure these selected Conservation Measures are relevant to project. If not manually override and uncheck.** **Go to Step 14**

**STEP 13b) If answer to STEP 3 is YES, and answer to STEP 6 is NO, OSAR/Heritage Reviewer is to review Conservation Measures in Table 4 that and ensure these selected Conservation Measures are relevant to project. If not manually override and uncheck.** **Go to Step 14**

**STEP 13c) If answer to STEP 3 is YES, and answer to STEP 6 is YES, Terrestrial Zoologist is to review Conservation Measures in Table 4 and ensure these selected Conservation Measures are relevant to project. If not manually override and uncheck.** **Go to Step 15**

Appendix B – Bat Strategy Project Screening Form

Project Review Form - TVA Bat Strategy (12/2018)

**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: Jesse Troxler

Check if applies to Project	Activities Subject to Conservation Measure	Conservation Measure Description
<input type="checkbox"/>	15, 16, 17, 18, 22, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 45, 47, 48, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 90, 91, 92, 93, 94, 95, 96	<b>NV1</b> - 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.
<input type="checkbox"/>	33, 34	<b>TR1*</b> - 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.
<input type="checkbox"/>	33, 34	<b>TR4*</b> - 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.
<input type="checkbox"/>	33, 34	<b>TR9</b> - 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.



Project Review Form - TVA Bat Strategy (12/2018)

Check if applies to Project	Activities Subject to Conservation Measure	Conservation Measure Description
<input checked="" type="checkbox"/>	16, 17, 18, 21, 22, 24, 25, 26, 27, 28, 29, 31, 32, 33, 34, 35, 36, 37, 38, 39, 48, 50, 51, 56, 61, 62, 63, 64, 65, 67, 69, 84, 89	<p><b>SSPC1 (Transmission only)</b> - 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:</p> <ul style="list-style-type: none"> <li>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:                         <ul style="list-style-type: none"> <li>• Plan clearing, grading, and construction to minimize area and duration of soil exposure.</li> <li>• Maintain existing vegetation wherever and whenever possible.</li> <li>• Minimize disturbance of natural contours and drains.</li> <li>• As much as practicable, operate on dry soils when they are least susceptible to structural damage and erosion.</li> <li>• 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.</li> <li>• Divert runoff away from disturbed areas.</li> <li>• Provide for dispersal of surface flow that carries sediment into undisturbed surface zones with high infiltration capacity and ground cover conditions.</li> <li>• Prepare drainage ways and outlets to handle concentrated/increased runoff.</li> <li>• Minimize length and steepness of slopes. Interrupt long slopes frequently.</li> <li>• Keep runoff velocities low and/or check flows.</li> <li>• Trap sediment on-site.</li> <li>• Inspect/maintain control measures regularly &amp; after significant rain.</li> <li>• Re-vegetate and mulch disturbed areas as soon as practical.</li> </ul> </li> <li>o Specific guidelines regarding sensitive resources and buffer zones:                         <ul style="list-style-type: none"> <li>• Extra precaution (wider buffers) within SMZs is taken to protect stream banks and water quality for streams, springs, sinkholes, and surrounding habitat.</li> <li>• 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.</li> <li>• 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).</li> </ul> </li> </ul>
<input checked="" type="checkbox"/>	16, 17, 18, 21, 22, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 48, 50, 51, 52, 53, 54, 55, 58, 59, 60, 61, 62, 63, 64, 65, 67, 70, 71, 73, 76, 77, 78, 80, 81, 82, 83, 86, 87, 88, 89, 90	<p><b>SSPC2</b> - 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.</p>
<input checked="" type="checkbox"/>	16, 26, 36, 37, 38, 39, 48, 50, 52, 59, 60, 62, 66, 67, 69, 72, 75, 77, 78, 79, 86	<p><b>L1</b> - Direct temporary lighting away from suitable habitat during the active season.</p>
<input checked="" type="checkbox"/>	16, 26, 36, 37, 38, 39, 48, 50, 52, 59, 60, 62, 66, 67, 69, 72, 75, 77, 78, 79, 86	<p><b>L2</b> - Evaluate the use of outdoor lighting during the active season and seek to minimize light pollution when installing new or replacing existing permanent lights by angling lights downward or via other light minimization measures (e.g., dimming, directed lighting, motion-sensitive lighting).</p>

<sup>1</sup>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).

Appendix B – Bat Strategy Project Screening Form

Project Review Form - TVA Bat Strategy (12/2018)

**STEP 14)** Save completed form in project environmental documentation (e.g., CEC, Appendix to EA) AND send a copy of form to [batstrategy@tva.gov](mailto:batstrategy@tva.gov). Submission of this form indicates that Project Lead/Applicant:

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

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

**STEP 15) For Use by Terrestrial Zoologist if Project and Form are Submitted for Review**

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

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

Finalize and Print to Noneditable PDF. Changes to form cannot be made after this button is selected.

**Project Screening Form - TVA Bat Strategy (04/26/2018)**

*This form is to assist in determining alignment of proposed projects and any required measures to comply with TVA's ESA Section 7 programmatic consultation for routine actions and federally-listed bats<sup>1</sup>*

**Project Name:** Moscow Miller Phase B Installation of OPGW on L35217 **Date:** 8/8/18  
**Contact(s):** Emily Willard **CEC#:** NA - it is an E **RLR#:** \_\_\_\_\_ **Project ID:** 417277

**Project Description:** Installation of OPGW on L5217. No tree clearing of trees per Siting Access contractor - there may be light

**STEP 1) Select Appropriate TVA Action (or check here  if none of the Actions below are applicable):**

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

**STEP 2) Select all activities from Tables 1 and 2 (Column 1 only) included in proposed project. If you have an activity that is not listed below, describe here):** \_\_\_\_\_

**Table 1. Activities (CHECK ALL THAT APPLY) with No Effect on Federally Listed Bats. If none, check here:**

#	ACTIVITY	#	ACTIVITY
<input type="checkbox"/> 1	Loans and/or grant awards	<input type="checkbox"/> 12	Sufferance agreement
<input type="checkbox"/> 2	Purchase of property	<input type="checkbox"/> 13	Engineering or environmental planning or studies
<input type="checkbox"/> 3	Purchase of equipment for industrial facilities	<input type="checkbox"/> 14	Harbor limits
<input type="checkbox"/> 4	Environmental education	<input type="checkbox"/> 19	Site-specific enhancements in streams and reservoirs for aquatic animals
<input type="checkbox"/> 5	Transfer of ROW easement or ROW equipment	<input type="checkbox"/> 20	Nesting platforms
<input type="checkbox"/> 6	Property and/or equipment transfer	<input type="checkbox"/> 41	Minor water-based structures
<input type="checkbox"/> 7	Easement on TVA property	<input type="checkbox"/> 42	Internal renovation or internal expansion of existing facility
<input type="checkbox"/> 8	Sale of TVA property	<input type="checkbox"/> 43	Replacement or removal of TL poles, or cutting of poles to 4-6 ft above ground
<input type="checkbox"/> 9	Lease of TVA property	<input checked="" type="checkbox"/> 44	Conductor and OHGW installation and replacement
<input type="checkbox"/> 10	Deed modification of TVA rights or TVA property	<input type="checkbox"/> 49	Non-navigable houseboats
<input type="checkbox"/> 11	Abandonment of TVA retained rights		

**Table 2. Activities (CHECK ALL THAT APPLY) and Associated Conservation Measures. If none, check here:**

#	ACTIVITY	CONSERVATION MEASURES	TZ SME Review Needed
<input checked="" type="checkbox"/> 15	Windshield or ground surveys for archaeological resources	<input checked="" type="checkbox"/> a. NV1 <input type="checkbox"/> b. HP2	<input type="checkbox"/> c. HP1
<input type="checkbox"/> 16	Drilling	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3 <input type="checkbox"/> g. L1, L2	<input type="checkbox"/> a NV3, NV4 / <input type="checkbox"/> a1. NV2
<input checked="" type="checkbox"/> 17	Mechanical vegetation removal; does <u>not</u> include removal of trees or tree branches ≥ 3" in diameter.	<input checked="" type="checkbox"/> a. NV1 <input checked="" type="checkbox"/> f. SSPC1, SSPC2, SSPC3, SSPC5	<input type="checkbox"/> f. SSPC4, SSPC7
<input checked="" type="checkbox"/> 18	Erosion control – minor	<input checked="" type="checkbox"/> a. NV1 <input checked="" type="checkbox"/> f. SPCC1, SSPC2, SSPC3, SSPC5	None
<input type="checkbox"/> 21	Herbicide use	<input type="checkbox"/> d. SSPC1, SSPC2, SSPC3, SSPC5	<input type="checkbox"/> d. SSPC6, SSPC7
<input type="checkbox"/> 22	Grubbing	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3, SSPC5	<input type="checkbox"/> f. SSPC4
<input type="checkbox"/> 23	Prescribed burns, burn piles, or	<input type="checkbox"/> c. SHF1, SHF4, SHF5	<input type="checkbox"/> c. SHF2, SHF3, SHF6, SHF7,

Appendix B – Bat Strategy Project Screening Form

#	ACTIVITY	CONSERVATION MEASURES	TZ SME Review Needed
	brush piles		SHF8, SHF9
<input type="checkbox"/>	24 Tree planting	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3, SSPC5	None
<input type="checkbox"/>	25 Maintenance, improvement or construction of pedestrian or vehicular access corridors	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3, SSPC5	<input type="checkbox"/> a1. NV2 <input type="checkbox"/> f. SSPC7
<input type="checkbox"/>	26 Maintenance or construction of access control measures	<input type="checkbox"/> a. NV1 <input type="checkbox"/> b. HP2 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3, SSPC5 <input type="checkbox"/> g. L1, L2	<input type="checkbox"/> a NV3, NV4 / <input type="checkbox"/> a1. NV2 <input type="checkbox"/> b HP1 <input type="checkbox"/> f. SSPC7
<input type="checkbox"/>	27 Restoration of sites following human use and abuse	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3	<input type="checkbox"/> f. SSPC7
<input type="checkbox"/>	28 Removal of debris (e.g., dump sites, hazardous material, unauthorized structures)	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3	<input type="checkbox"/> f. SSPC7
<input type="checkbox"/>	29 Acquisition and use of fill/borrow material	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3	<input type="checkbox"/> f. SSPC7
<input type="checkbox"/>	30 Dredging and excavation; recessed harbor areas	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3, SSPC5	None
<input checked="" type="checkbox"/>	31 Stream/wetland crossings	<input checked="" type="checkbox"/> a. NV1 <input checked="" type="checkbox"/> f. SSPC1, SSPC2, SSPC3, SSPC5	<input type="checkbox"/> f. SSPC7
<input type="checkbox"/>	32 Clean-up following storm damage	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3	<input type="checkbox"/> f. SSPC4, SSPC7
<input checked="" type="checkbox"/>	33 Removal of hazardous trees or tree branches	<input checked="" type="checkbox"/> a. NV1 <input checked="" type="checkbox"/> d. TR7, TR8 <input checked="" type="checkbox"/> f. SSPC1, SSPC2, SSPC3, SSPC5	<input type="checkbox"/> d. TR1, TR2, TR3, TR4, TR5, TR6, TR9, <input type="checkbox"/> f. SSPC4, SSPC7
<input type="checkbox"/>	34 Mechanical vegetation removal, includes trees or tree branches three inches or greater in diameter	<input type="checkbox"/> a. NV1 <input type="checkbox"/> d. TR7, TR8 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3, SSPC5	<input type="checkbox"/> d. TR1, TR2, TR3, TR4, TR5, TR6, TR9, <input type="checkbox"/> f. SSPC4, SSPC7
<input type="checkbox"/>	35 Stabilization (major erosion control)	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3, SSPC5	<input type="checkbox"/> f. SSPC4, SSPC7
<input type="checkbox"/>	36 Grading	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3, SSPC5 <input type="checkbox"/> g. L1, L2	<input type="checkbox"/> f. SSPC4, SSPC7
<input type="checkbox"/>	37 Installation of soil improvements	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3 <input type="checkbox"/> g. L1, L2	<input type="checkbox"/> a1. NV2 <input type="checkbox"/> f. SSPC7
<input type="checkbox"/>	38 Drainage installations (including for ponds)	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3 <input type="checkbox"/> g. L1, L2	<input type="checkbox"/> f. SSPC7
<input type="checkbox"/>	39 Berm development	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3, <input type="checkbox"/> g. L1, L2	None
<input type="checkbox"/>	40 Closed loop heat exchangers (heat pumps)	<input type="checkbox"/> f. SSPC5	None
<input type="checkbox"/>	45 Stream monitoring equipment-placement, use	<input type="checkbox"/> a. NV1	None
<input type="checkbox"/>	46 Floating boat slips within approved harbor limits	<input type="checkbox"/> f. SSPC5	None
<input type="checkbox"/>	47 Conduit installation	<input type="checkbox"/> a. NV1	<input type="checkbox"/> a1. NV2
<input type="checkbox"/>	48 Laydown areas	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3, <input type="checkbox"/> g. L1, L2	None
<input type="checkbox"/>	50 Minor land-based structures	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3, SSPC5 <input type="checkbox"/> g. L1, L2	None
<input type="checkbox"/>	51 Signage installation	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3, SSPC5	None
<input type="checkbox"/>	52 Floating buildings	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3, SSPC5 <input type="checkbox"/> g. L1, L2	<input type="checkbox"/> a1. NV2
<input type="checkbox"/>	53 Mooring buoys or posts	<input type="checkbox"/> a. NV1	

Moscow-Miller Power System Improvements

#	ACTIVITY	CONSERVATION MEASURES	TZ SME Review Needed
		<input type="checkbox"/> f. SSPC2, SSPC3, SSPC5	None
<input type="checkbox"/> 54	Maintenance of water control structures (dewatering units, spillways, levees)	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3, SSPC5	<input type="checkbox"/> f. SSPC6, SSPC7
<input type="checkbox"/> 55	Solar panels	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3, SSPC5	<input type="checkbox"/> f. SSPC7
<input type="checkbox"/> 56	Culverts	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC3, SSPC5	None
<input type="checkbox"/> 57	Water intake - non-industrial	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC3, SSPC5	None
<input type="checkbox"/> 58	Wastewater outfalls	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3, SSPC5	None
<input type="checkbox"/> 59	Marine fueling facilities	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3, SSPC5 <input type="checkbox"/> g. L1, L2	None
<input type="checkbox"/> 60	Commercial water-use facilities (e.g., marinas)	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC5 <input type="checkbox"/> g. L1, L2	None
<input type="checkbox"/> 61	Septic fields	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3, SSPC5	None
<input type="checkbox"/> 62	Blasting	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3, <input type="checkbox"/> g. L1, L2	<input type="checkbox"/> a. NV3, NV4 / <input type="checkbox"/> a1. NV2
<input type="checkbox"/> 63	Foundation installation	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3	<input type="checkbox"/> a1. NV2
<input type="checkbox"/> 64	Installation of steel structure, overhead bus, equipment, etc.	<input type="checkbox"/> a. NV1 <input type="checkbox"/> g. SSPC1, SSPC2, SSPC3	<input type="checkbox"/> a1. NV2
<input type="checkbox"/> 65	Pole and/or tower installation and/or extension	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3	<input type="checkbox"/> a1. NV2
<input type="checkbox"/> 66	Private, residential docks, piers, boathouses	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC5 <input type="checkbox"/> g. L1, L2	None
<input type="checkbox"/> 67	Siting of temporary office trailers	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3, SSPC5 <input type="checkbox"/> g. L1, L2	None
<input type="checkbox"/> 68	Financing for speculative building construction	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC5	None
<input type="checkbox"/> 69	Renovation of existing structures	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC3, SSPC5 <input type="checkbox"/> g. L1, L2	<input type="checkbox"/> e. AR1, AR2, AR4, AR5
<input type="checkbox"/> 70	Lock maintenance and construction	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3, SSPC5	<input type="checkbox"/> a1. NV2
<input type="checkbox"/> 71	Concrete dam modification	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3	<input type="checkbox"/> a1. NV2
<input type="checkbox"/> 72	Ferry landings/service operations	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC5 <input type="checkbox"/> g. L1, L2	None
<input type="checkbox"/> 73	Boat launching ramps	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC5	<input type="checkbox"/> a1. NV2
<input type="checkbox"/> 74	Recreational vehicle campsites	<input type="checkbox"/> a. NV1 <input type="checkbox"/> g. SPCC5	None
<input type="checkbox"/> 75	Utility lines/light poles	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SPCC5 <input type="checkbox"/> g. L1, L2	None
<input type="checkbox"/> 76	Concrete sidewalk	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3, SSPC5	None
<input type="checkbox"/> 77	Construction or expansion of land-based buildings	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3, SSPC5 <input type="checkbox"/> g. L1, L2	<input type="checkbox"/> e. AR1, AR2, AR5
<input type="checkbox"/> 78	Wastewater treatment plants	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC5 <input type="checkbox"/> g. L1, L2	<input type="checkbox"/> a1. NV2
<input type="checkbox"/> 79	Swimming pools and associated	<input type="checkbox"/> a. NV1	

Appendix B – Bat Strategy Project Screening Form

#	ACTIVITY	CONSERVATION MEASURES	TZ SME Review Needed
	equipment	<input type="checkbox"/> f. SSPC5 <input type="checkbox"/> g. L1, L2	None
<input type="checkbox"/> 80	Barge fleeting areas	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3, SSPC5	<input type="checkbox"/> a1. NV2
<input type="checkbox"/> 81	Water intakes - Industrial	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3, SSPC5	None
<input type="checkbox"/> 82	Construction of dam/weirs/ Levees	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SPCC2, SPCC3, SPCC5	<input type="checkbox"/> a1. NV2
<input type="checkbox"/> 83	Submarine pipeline, directional boring operations	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3, SSPC5	<input type="checkbox"/> a1. NV2
<input type="checkbox"/> 84	On-site/off-site public utility relocation or construction or extension	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC3, SSPC5	None
<input type="checkbox"/> 85	Playground equipment - land-based	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC5	None
<input type="checkbox"/> 86	Landfill construction	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3 <input type="checkbox"/> g. L1, L2	<input type="checkbox"/> a1. NV2
<input type="checkbox"/> 87	Aboveground storage tanks	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3, SSPC5	None
<input type="checkbox"/> 88	Underground storage tanks (USTs)	<input type="checkbox"/> a. NV1 <input type="checkbox"/> g. SSPC2, SSPC3, SSPC5	None
<input type="checkbox"/> 89	Structure demolition	<input type="checkbox"/> f. SSPC1, SSPC2, SSPC3	<input type="checkbox"/> e. AR1, AR2, AR4, AR5
<input type="checkbox"/> 90	Pond closure	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3	None
<input type="checkbox"/> 91	Bridge replacement	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC3, SSPC5	<input type="checkbox"/> a1. NV2 <input type="checkbox"/> e. AR1, AR2, AR3, AR5,
<input type="checkbox"/> 92	Return of remains to former burial sites	<input type="checkbox"/> a. NV1 <input type="checkbox"/> h. HP2	<input type="checkbox"/> h. HP1
<input type="checkbox"/> 93	Standard license	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC5	None
<input type="checkbox"/> 94	Special use license	<input type="checkbox"/> a. NV1	None
<input type="checkbox"/> 95	Recreation license	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC5	None
<input type="checkbox"/> 96	Land use permit	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC5	None

**STEP 3)** Are all project activities limited to Table 1? If **YES**, **STOP HERE**. No Bat Strategy Conservation Measures required. Include this form in environmental documentation (e.g., attach to CEC) and send to [batstrategy@tva.gov](mailto:batstrategy@tva.gov). If **NO**, proceed to Step 4.....  **YES**  **NO**

**STEP 4)** Check **ALL** relevant characteristics below. If **none** apply, **STOP HERE** and check . No Bat Strategy Conservation Measures required. Include form in environmental documentation and send to [batstrategy@tva.gov](mailto:batstrategy@tva.gov)

- a.** Project may occur outside, involves human presence, or use of equipment that **generates noise or vibration** (e.g., drilling, blasting, loud machinery).
  - a1.** Project involves continuous noise (i.e., ≥ 24 hrs) that is >75 decibels measured on A scale (e.g., loud machinery).
- b.** Project may involve **human entry into/survey of a potential bat roost** (cave, bridge, other structure).
- c.** Project may involve **fire** (e.g., prescribed fire, burn piles) or **preparation of fire breaks** within 0.25 mi of trees, caves, or water sources. If prescribed burn, estimated acreage: \_\_\_\_\_
- d.** Project may involve **tree removal**. Tree removal may need to occur **outside of winter**:.....  **YES**  **NO**  
 Estimated number of trees or acres to be removed: 0.0 \_\_\_\_\_  acres  trees  
 If warranted, project has flexibility for bat surveys (May 15-Aug 15):.....  **MAYBE**  **YES**  **NO**
- e.** Project may involve **alteration or removal of bridges or other human structures**.
- f.** Project may involve land use activities involving **ground disturbance or use of chemicals or fuels** near water sources, wetlands, sinkholes, caves, or exposed limestone/karst.
- g.** Project may involve use of **artificial lighting** at night.

**STEP 5)** Please contact Holly LeGrand or other Bat Strategy support staff for assistance if needed. For those Activities selected in Table 2: select all Conservation Measures with letters (e.g., a-g) that correspond to characteristics selected in Step 4. If this results in selection of Conservation Measures in the last column of Table 2, a review by a terrestrial zoologist is required. Based on selection of Conservation Measures, does project require review by a terrestrial zoologist? If **YES**, STOP HERE and submit form as part of environmental review request; if **NO**, skip to STEP 16..... ■ **YES** □ **NO**

**Terrestrial Zoologist SME Verification (Steps 6-11 will be completed by a terrestrial zoologist if warranted):**

**STEP 6)** Project is within range of:  Gray bat  VA Big-eared bat  Indiana bat  Northern long-eared bat

**STEP 7a)** Project includes the following:

- Removal/burning of suitable trees within 0.5 mile (0.8 km) of P1-P2 Indiana bat hibernacula or 0.25 mile (0.4 km) of P3-P4 Indiana bat hibernacula or any northern long-eared bat hibernacula.
- Removal/burning of suitable trees within 10 miles of documented Indiana bat hibernacula or within 5 miles of northern long-eared bat hibernacula.
- Removal/burning of suitable trees greater than 10 miles from documented Indiana bat hibernacula or greater than 5 miles from documented northern long-eared bat hibernacula.
- Removal/burning of trees within 150 feet of a documented Indiana bat or northern long-eared bat maternity roost tree.
- Removal/burning of suitable trees within 2.5 miles of Indiana bat roost trees or within 5 miles of Indiana bat capture sites.
- Removal/burning of suitable trees greater than 2.5 miles from Indiana bat roost trees or greater than 5 miles from Indiana bat capture sites.
- Removal/burning of documented Indiana bat or northern long-eared bat roost tree, if still suitable.

**STEP 7b)** Amount of SUITABLE tree/acreage removal or burned (may be different than total amount of removal): 0.0 □ acres □ trees

**STEP 8)** Select anticipated date range of burning/tree removal in table below:

STATE	SWARMING	WINTER	NON-WINTER	PUP
GA, KY, TN	<input type="checkbox"/> Oct 15 - Nov 14	<input type="checkbox"/> Nov 15 - Mar 31	<input type="checkbox"/> Apr 1 - May 31, Aug 1 - Oct 14	<input type="checkbox"/> Jun 1 - Jul 31
VA	<input type="checkbox"/> Sep 16 - Nov 15	<input type="checkbox"/> Nov 16 - Apr 14	<input type="checkbox"/> Apr 15 - Sep 15	<input type="checkbox"/> Jun 1 - Jul 31
AL	<input type="checkbox"/> Oct 15 - Nov 14	<input type="checkbox"/> Nov 15 - Mar 15	<input type="checkbox"/> Mar 16 - May 31, Aug 1 - Oct 14	<input type="checkbox"/> Jun 1 - Jul 31
NC	<input type="checkbox"/> Oct 15 - Nov 14	<input type="checkbox"/> Nov 15 - Apr 15	<input type="checkbox"/> Apr 16 - May 31, Aug 1 - Oct 14	<input type="checkbox"/> Jun 1 - Jul 31
MS	<input type="checkbox"/> Oct 1 - Nov 14	<input type="checkbox"/> Nov 15 - Apr 14	<input type="checkbox"/> Apr 15 - Sep 30	<input type="checkbox"/> Jun 1 - Jul 31

**STEP 9)** Presence/absence surveys (visual, mist net, acoustic) were/will be conducted: □ **YES** ■ **NO** □ **TBD**

**STEP 10)** Result of presence/absence surveys (if conducted), on \_\_\_\_\_ (date): □ **NEGATIVE** □ **POSITIVE** ■ **N/A** NOTES: Not within range of gray bat-this is a bug in the form.

**STEP 11)** □ Conservation measures have been verified (and modified, if necessary) in Table 2. NOTES: No tree clearing will occur on phase B per this form and ESCS.

**Bat Strategy Compliance Verification (Steps 12-15 will be completed by SME/Bat Strategy Support staff):**

**STEP 12)** Project □ **WILL** ■ **WILL NOT** require use of Incidental Take in the amount of \_\_\_\_\_ □ acres or □ trees, proposed to be used during the □ **VOLANT** □ **NON-VOLANT** bat season (or ■ **N/A**).

**STEP 13)** Available Incidental Take as of \_\_\_\_\_ for \_\_\_\_\_ (Action):

TVA Action	Total 20-year acreage	Winter Burning/Removal	Volant Season Burning/Removal	Non-Volant Season Burning/Removal

**STEP 14)** Amount contributed to TVA's Bat Conservation Fund upon activity completion: \_\_\_\_\_ or ■ **N/A**

**STEP 15)** Project Effects Determinations: **Gray Bat:** □ NE □ NLAA □ N/A; **Virginia Big-eared Bat:** □ NE □ NLAA □ N/A; **Northern Long-eared Bat:** □ NE □ NLAA □ LAA □ N/A

NOTES: \_\_\_\_\_

**TVA's ESA Section 7 Bat Strategy Conservation Measures Required for:**

**STEP 16)** Based on completion of Step 5, select the appropriate Conservation Measures listed in the table below (this will be completed/verified by a Terrestrial Zoologist if a Terrestrial Zoologist review is required) and review the following bullets. Save this form in project environmental documentation AND send a copy of form to [batstrategy@tva.gov](mailto:batstrategy@tva.gov). Submission of this form is an indication that the Project Lead Emily Willard (name) is (or will be made) aware of the requirements below.

- Implementation of conservation measures identified below is required to comply with TVA's programmatic Endangered Species Act bat consultation.
- Confirmation of completion (e.g., report from contractor, time stamped photos pre and post completion) for Conservation Measures below with an \* (as well as any additional confirmation noted here by Terrestrial Zoologist: Jesse Troxler) will be provided to TVA's Bat Strategy Compliance Officer ([batstrategy@tva.gov](mailto:batstrategy@tva.gov)) following completion of activit (ies).
- TVA may conduct post-project monitoring to determine if conservation measures were effective in minimizing or avoiding impacts to federally listed bats.

**STEP 17)** For projects that require use of Take and/or contribution to TVA's Bat Conservation Fund, please acknowledge the following statement:

Project Lead/Contact acknowledges that proposed project will result in use of \_\_\_\_\_  acres/ trees in Incidental Take and will require \_\_\_\_\_ contribution to TVA's Conservation Fund upon completion of activity.

	Conservation Measure Acronym	Conservation Measure Description
<input checked="" type="checkbox"/>	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.
<input type="checkbox"/>	NV2	Drilling, blasting, or any other activity that involves continuous noise (i.e., longer than 24 hours) disturbances greater than 75 decibels measured on the A scale (e.g., loud machinery) within a 0.5 mile radius of documented winter and/or summer roosts (caves, trees, unconventional roosts) will be conducted when bats are absent from roost sites.
<input type="checkbox"/>	NV3	Drilling or blasting within a 0.5 mile radius of documented cave (or unconventional) roosts will be conducted in a manner that will not compromise the structural integrity or alter the karst hydrology of the roost site.
<input type="checkbox"/>	NV4	Drilling or blasting within 0.5 miles of a documented roost site (cave, tree, unconventional roost) that needs to occur when bats are present will first involve development of project-specific avoidance or minimization measures in coordination with the USFWS.
<input type="checkbox"/>	HP1	Site-specific cases in which potential impact of human presence is heightened (e.g., conducting environmental or cultural surveys within a roost site) will be closely coordinated with staff bat biologists to avoid or minimize impacts below any potential adverse effect. Any take from these activities would be covered by TVA's Section 10 permit.
<input type="checkbox"/>	HP2	Entry into roosts known to be occupied by federally listed bats will be communicated to the USFWS when impacts to bats may occur if not otherwise communicated (i.e., via annual monitoring reports per TVA's Section 10 permit). Any take from these activities would be covered by TVA's section 10 permit.
<input type="checkbox"/>	SHF1	Fire breaks will be used to define and limit burn scope.
<input type="checkbox"/>	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.
<input type="checkbox"/>	SHF3	Acreage will be divided into smaller units to keep amount of smoke at any one



		time or location to a minimum and reduce risk for smoke to enter caves.
<input type="checkbox"/>	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.
<input type="checkbox"/>	SHF5	Fire breaks will be plowed immediately prior to burning, will be plowed as shallow as possible, and will be kept to minimum to minimize sediment.
<input type="checkbox"/>	SHF6	Tractor-constructed fire lines will be established greater than 200 feet from cave entrances. Existing logging roads and skid trails will be used where feasible to minimize ground disturbance and generation of loose sediment.
<input type="checkbox"/>	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.
<input type="checkbox"/>	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.
<input type="checkbox"/>	SHF9	A 0.25 mile buffer of undisturbed forest will be maintained around documented or known gray bat maternity and hibernation colony sites, documented or known Virginia big-eared bat maternity, bachelor, or winter colony sites, Indiana bat hibernation sites, and northern long-eared bat hibernation sites. Prohibited activities within this buffer include cutting of overstory vegetation, construction of roads, trails or wildlife openings, and prescribed burning. Exceptions may be made for maintenance of existing roads and existing ROW, or where it is determined that the activity is compatible with species conservation and recovery (e.g., removal of invasive species).
<input type="checkbox"/>	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.
<input type="checkbox"/>	TR2	Removal of suitable summer roosting habitat within 0.5 mile of Priority 1/Priority 2 Indiana bat hibernacula, or 0.25 mile of Priority 3/Priority 4 Indiana bat hibernacula or any northern long-eared bat hibernacula will be prohibited, regardless of season, with very few exceptions (e.g., vegetation maintenance of TL ROW immediately adjacent to a known cave).
<input type="checkbox"/>	TR3*	Removal of suitable summer roosting habitat within documented bat habitat (i.e., within 10 miles of documented Indiana bat hibernacula, within five miles of documented northern long-eared bat hibernacula, within 2.5 miles of documented Indiana bat summer roost trees, within five miles of Indiana bat capture sites, within one mile of documented northern long-eared bat summer roost trees, within three miles of northern long-eared bat capture sites) will be tracked, documented, and included in annual reporting. Project will therefore communicate completion of tree removal to appropriate TVA staff.
<input type="checkbox"/>	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.
<input type="checkbox"/>	TR5	Removal of any trees within 150 feet of a documented Indiana bat or northern long-eared bat maternity summer roost tree during non-winter season, range-wide pup season or swarming season (if site is within known swarming habitat), will first require a site-specific review and assessment. If pups are present in trees to be removed (determined either by mist netting and assessment of adult females, or by visual assessment of trees following evening emergence counts),

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		TVA will coordinate with the USFWS to determine how to minimize impacts to pups to the extent possible. May include establishment of artificial roosts before removal of roost tree(s).
<input type="checkbox"/>	TR6	Removal of a documented Indiana bat or northern long-eared bat roost tree that is still suitable and that needs to occur during non-winter season, range-wide pup season, or swarming season (if site is within known swarming habitat) will first require a site-specific review and assessment. If pups are present in trees to be removed (determined either by mist netting and assessment of adult females, or by visual assessment of trees following evening emergence counts), TVA will coordinate with USFWS to determine how to minimize impacts to pups to the extent possible. This may include establishment of artificial roosts before removal of roost tree(s).
<input type="checkbox"/>	TR7	Tree removal within 100 feet of <b>existing transmission ROWs</b> will be limited to hazard trees. On or adjacent to TLs, a hazard tree is a tree that is tall enough to fall within an unsafe distance of TLs under maximum sag and blowout conditions and/or are also dead, diseased, dying, and/or leaning. Hazard tree removal includes removal of trees that 1) currently are tall enough to threaten the integrity of operation and maintenance of a TL or 2) have the ability in the future to threaten the integrity of operation and maintenance of a TL.
<input type="checkbox"/>	TR8	Requests for removal of hazard trees on or adjacent to <b>TVA reservoir land</b> will be inspected by staff knowledgeable in identifying hazard trees per International Society of Arboriculture and TVA's checklist for hazard trees. Approval will be limited to trees with a defined target.
<input type="checkbox"/>	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 continuing to carry out TVA's broad mission and responsibilities.
<input type="checkbox"/>	AR1	Projects that involve structural modification or demolition of buildings, bridges, and potentially suitable box culverts, will require assessment to determine if structure has characteristics that make it a potentially suitable unconventional bat roost. If so a survey to determine if bats may be present will be conducted. Structural assessment will include: <ul style="list-style-type: none"> <li>○ Visual check that includes an exhaustive internal/external inspection of building to look for evidence of bats (e.g., bat droppings, roost entrance/exit holes); this can be done at any time of year, preferably when bats are active.</li> <li>○ Where accessible and health and safety considerations allow, a survey of roof space for evidence of bats (e.g., droppings, scratch marks, staining, sightings), noting relevant characteristics of internal features that provide potential access points and roosting opportunities. Suitable characteristic may include: gaps between tiles and roof lining, access points via eaves, gaps between timbers or around mortise joints, gaps around top and gable end walls, gaps within roof walling or around tops of chimney breasts, and clean ridge beams.</li> <li>○ Features with high-medium likelihood of harboring bats but cannot be checked visually include soffits, cavity walls, space between roof covering and roof lining.</li> <li>○ Applies to box culverts that are at least 5 feet (1.5 meters) tall and with one or more of the following characteristics. Suitable culverts for bat day roosts have the following characteristics: <ul style="list-style-type: none"> <li>▪ Location in relatively warm areas</li> </ul> </li> </ul>

		<ul style="list-style-type: none"> <li>▪ Between 5-10 feet (1.5-3 meters) tall and 300 ft (100 m) or more long</li> <li>▪ Openings protected from high winds</li> <li>▪ Not susceptible to flooding</li> <li>▪ Inner areas relatively dark with roughened walls or ceilings</li> <li>▪ Crevices, imperfections, or swallow nests</li> <li>○ Bridge survey protocols will be adapted from the Programmatic Biological Opinion for the Federal Highway Administration (Appendix D of USFWS 2016c, which includes a Bridge Structure Assessment Guidance and a Bridge Structure Assessment Form).</li> <li>○ Bat surveys usually are NOT needed in the following circumstances:             <ul style="list-style-type: none"> <li>▪ Domestic garages /sheds with no enclosed roof space (with no ceiling)</li> <li>▪ Modern flat-roofed buildings</li> <li>▪ Metal framed and roofed buildings</li> <li>▪ Buildings where roof space is regularly used (e.g., attic space converted to living space, living space open to rafters) or where all roof space is lit from skylights or windows. Large/tall roof spaces may be dark enough at apex to provide roost space.</li> </ul> </li> </ul>
<input type="checkbox"/>	AR2	Additional bat P/A surveys (e.g., emergence counts) conducted if warranted (i.e., when AR1 indicates that bats may be present).
<input type="checkbox"/>	AR3	Bridge survey protocols will be implemented, either by permittee (e.g., state DOT biologists) or qualified personnel. If a bridge is determined to be in use as an unconventional roost, subsequent protocols will be implemented.
<input type="checkbox"/>	AR4	Removal of buildings with suitable roost characteristics within six miles of known or presumed occupied roosts for Virginia big-eared bat would occur between Nov 16 and Mar 31. Buildings may be removed other times of the year once a bat biologist evaluates a buildings' potential to serve as roosting habitat and determines that this species is not present and/or is not using structure(s).
<input type="checkbox"/>	AR5	If evidence of bat use warrants seasonal modification or removal, TVA will carry out or recommend (i.e., to applicants) seasonal modification or removal. Risk to human safety, however, should take priority. For project-specific cases in which project is unable to accommodate seasonal modification or removal, and federally listed bat species are present, TVA will carry out or recommend consultation with the USFWS to determine the best approach in the context of the project-specific circumstance. This may include establishment of artificial roosts before demolition of structures with bats present.
<input checked="" type="checkbox"/>	SSPC1	<p><b>Transmission actions and activities</b> 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:</p> <ul style="list-style-type: none"> <li>○ BMPs to 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:             <ul style="list-style-type: none"> <li>▪ Plan clearing, grading, and construction to minimize area and duration of soil exposure.</li> <li>▪ Maintain existing vegetation wherever and whenever possible.</li> <li>▪ Minimize disturbance of natural contours and drains.</li> <li>▪ As much as practicable, operate on dry soils when they are least susceptible to structural damage and erosion.</li> <li>▪ Limit vehicular and equipment traffic in disturbed areas.</li> <li>▪ Keep equipment paths dispersed or designate single traffic flow</li> </ul> </li> </ul>

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		<p>paths with appropriate road BMPs to manage runoff.</p> <ul style="list-style-type: none"> <li>▪ Divert runoff away from disturbed areas.</li> <li>▪ Provide for dispersal of surface flow that carries sediment into undisturbed surface zones with high infiltration capacity and ground cover conditions.</li> <li>▪ Prepare drainage ways and outlets to handle concentrated/increased runoff.</li> <li>▪ Minimize length and steepness of slopes. Interrupt long slopes frequently.</li> <li>▪ Keep runoff velocities low and/or check flows.</li> <li>▪ Trap sediment on-site.</li> <li>▪ Inspect/maintain control measures regularly and after significant rain.</li> <li>▪ Re-vegetate and mulch disturbed areas as soon as practical.</li> </ul> <ul style="list-style-type: none"> <li>○ Application of herbicide is in compliance with USEPA, state water quality standards, and state permits. Areas in which covered species are known to occur on existing transmission line ROW are depicted on referenced, applicable spreadsheets and include guidelines to follow for impact minimization or avoidance. During pre-job briefings, the ROW Forester will review location of resources with contractors and provide guidelines and expectations from TVA's BMP Manual (Appendix O). Herbicides labeled for aquatic use are utilized in and around wetlands, streams, and SMZs. Unless specifically labeled for aquatic use, measures are taken to keep herbicides from reaching streams whether by direct application or through runoff or flooding by surface water. Hand application of certain herbicides labeled for use within SMZs is used only selectively.</li> <li>○ Specific guidelines regarding sensitive resources and buffer zones: <ul style="list-style-type: none"> <li>▪ Extra precaution (wider buffers) within SMZs is taken to protect stream banks and water quality for streams, springs, sinkholes, and surrounding habitat.</li> <li>▪ 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.</li> <li>▪ Standard requirements exist to avoid adverse impacts to caves, protected animals, and unique and important habitat (e.g., protective buffers around caves, restricted herbicide use, seasonal clearing of suitable habitat).</li> </ul> </li> </ul>
<input checked="" type="checkbox"/>	SSPC2	<p>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.</p>
<input type="checkbox"/>	SSPC3	<p><b>Power Plant actions and activities</b> will continue to implement standard environmental practices. These include:</p> <ul style="list-style-type: none"> <li>○ Best Management Practices (BMPs) in accordance with regulations:</li> </ul>

		<ul style="list-style-type: none"> <li>▪ Ensure proper disposal of waste, ex: used rags, used oil, empty containers, general trash, dependent on plant policy</li> <li>▪ Maintain every site with well-equipped spill response kits, included in some heavy equipment</li> <li>▪ Conduct Quarterly Internal Environmental Field Assessments at each sight</li> <li>▪ Every project must have an approved work package that contains an environmental checklist that is approved by sight Environmental Health &amp; Safety consultant.</li> <li>▪ When refueling, vehicle is positioned as close to pump as possible to prevent drips, and overfilling of tank. Hose and nozzle are held in a vertical position to prevent spillage</li> <li>○ Construction Site Protection Methods             <ul style="list-style-type: none"> <li>▪ Sediment basin for runoff - used to trap sediments and temporarily detain runoff on larger construction sites</li> <li>▪ Storm drain protection device</li> <li>▪ Check dam to help slow down silt flow</li> <li>▪ Silt fencing to reduce sediment movement</li> </ul> </li> <li>○ Storm Water Pollution Prevention (SWPP) Pollution Control Strategies             <ul style="list-style-type: none"> <li>▪ Minimize storm water contact with disturbed soils at the construction site</li> <li>▪ Protect disturbed soil areas from erosion</li> <li>▪ Minimize sediment in storm water before discharge</li> <li>▪ Prevent storm water contact with other pollutants</li> <li>▪ Construction sites also may be required to have a storm water permit, depending on size of land disturbance ( &gt;1 acre )</li> </ul> </li> <li>○ Every site has a Spill Prevention and Control Countermeasures (SPCC) Plan and requires training. Several hundred pieces of equipment often managed at the same time on power generation properties. Goal is to minimize fuel and chemical use</li> </ul>
<input type="checkbox"/>	SSPC4	Woody vegetation burn piles associated with <b>transmission construction</b> 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.
<input type="checkbox"/>	SSPC5	<b>Section 26a</b> permits and contracts associated with <b>solar projects, economic development projects</b> or land use projects include standards and conditions that include standard BMPs for sediment and contaminants as well as measures to avoid or minimize impacts to sensitive species or other resources consistent with applicable laws and Executive Orders.
<input type="checkbox"/>	SSPC6	Herbicide use will be avoided within 200 ft of portals associated with caves, cave collapse areas, mines and sinkholes that are capable of supporting cave-associated species. Herbicides are not applied to surface water or wetlands unless specifically labeled for aquatic use. Filter and buffer strips will conform at least to federal and state regulations and any label requirements.
<input type="checkbox"/>	SSPC7	Clearing of vegetation within a 200-ft radius of documented caves will be limited to that conducted by hand or small machinery clearing only (e.g., chainsaws, bush-hog, mowers). This will protect potential recharge areas of cave streams and other karst features that are connected hydrologically to caves.
<input type="checkbox"/>	L1	Direct temporary lighting away from suitable habitat during the active season.
<input type="checkbox"/>	L2	Evaluate the use of outdoor lighting during the active season and seek to minimize light pollution when installing new or replacing existing permanent lights by angling lights downward or via other light minimization measures (e.g., dimming, directed lighting, motion-sensitive lighting).

<sup>1</sup>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).

**Project Screening Form - TVA Bat Strategy (04/26/2018)**

This form is to assist in determining alignment of proposed projects and any required measures to comply with TVA's ESA Section 7 programmatic consultation for routine actions and federally-listed bats<sup>1</sup>

**Project Name:** Cordova-Holly Springs (L5864) 161kV TL Rebuild :Work Order 31PZE Phase C1 (Par **Date:** 8/24/18  
**Contact(s):** Emily Willard **CEC#:** NA - EA **RLR#:** **Project ID:** 417277

**Project Description:** Rebuild of 2.5 miles of existing Cordova-Holly Springs (L5864) 161-kV TL . Existing ROW will be used  
 Some light clearing/tree-trimming may be needed for access

**STEP 1) Select Appropriate TVA Action (or check here  if none of the Actions below are applicable):**

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

**STEP 2) Select all activities from Tables 1 and 2 (Column 1 only) included in proposed project. If you have an activity that is not listed below, describe here):** \_\_\_\_\_

**Table 1. Activities (CHECK ALL THAT APPLY) with No Effect on Federally Listed Bats. If none, check here:**

#	ACTIVITY	#	ACTIVITY
<input type="checkbox"/> 1	Loans and/or grant awards	<input type="checkbox"/> 12	Sufferance agreement
<input type="checkbox"/> 2	Purchase of property	<input type="checkbox"/> 13	Engineering or environmental planning or studies
<input type="checkbox"/> 3	Purchase of equipment for industrial facilities	<input type="checkbox"/> 14	Harbor limits
<input type="checkbox"/> 4	Environmental education	<input type="checkbox"/> 19	Site-specific enhancements in streams and reservoirs for aquatic animals
<input type="checkbox"/> 5	Transfer of ROW easement or ROW equipment	<input type="checkbox"/> 20	Nesting platforms
<input type="checkbox"/> 6	Property and/or equipment transfer	<input type="checkbox"/> 41	Minor water-based structures
<input type="checkbox"/> 7	Easement on TVA property	<input type="checkbox"/> 42	Internal renovation or internal expansion of existing facility
<input type="checkbox"/> 8	Sale of TVA property	<input checked="" type="checkbox"/> 43	Replacement or removal of TL poles, or cutting of poles to 4-6 ft above ground
<input type="checkbox"/> 9	Lease of TVA property	<input checked="" type="checkbox"/> 44	Conductor and OHGW installation and replacement
<input type="checkbox"/> 10	Deed modification of TVA rights or TVA property	<input type="checkbox"/> 49	Non-navigable houseboats
<input type="checkbox"/> 11	Abandonment of TVA retained rights		

**Table 2. Activities (CHECK ALL THAT APPLY) and Associated Conservation Measures. If none, check here:**

#	ACTIVITY	CONSERVATION MEASURES	TZ SME Review Needed
<input checked="" type="checkbox"/> 15	Windshield or ground surveys for archaeological resources	<input checked="" type="checkbox"/> a. NV1 <input type="checkbox"/> b. HP2	<input type="checkbox"/> c. HP1
<input type="checkbox"/> 16	Drilling	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3 <input type="checkbox"/> g. L1, L2	<input type="checkbox"/> a NV3, NV4 / <input type="checkbox"/> a1. NV2
<input checked="" type="checkbox"/> 17	Mechanical vegetation removal; does not include removal of trees or tree branches ≥ 3" in diameter.	<input checked="" type="checkbox"/> a. NV1 <input checked="" type="checkbox"/> f. SSPC1, SSPC2, SSPC3, SSPC5	<input type="checkbox"/> f. SSPC4, SSPC7
<input checked="" type="checkbox"/> 18	Erosion control – minor	<input checked="" type="checkbox"/> a. NV1 <input checked="" type="checkbox"/> f. SPCC1, SSPC2, SSPC3, SSPC5	None
<input type="checkbox"/> 21	Herbicide use	<input type="checkbox"/> d. SSPC1, SSPC2, SSPC3, SSPC5 <input type="checkbox"/> a. NV1	<input type="checkbox"/> d. SSPC6, SSPC7
<input type="checkbox"/> 22	Grubbing	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3, SSPC5	<input type="checkbox"/> f. SSPC4
<input type="checkbox"/> 23	Prescribed burns, burn piles, or	<input type="checkbox"/> c. SHF1, SHF4, SHF5	<input type="checkbox"/> c. SHF2, SHF3, SHF6, SHF7,

Moscow-Miller Power System Improvements

#	ACTIVITY	CONSERVATION MEASURES	TZ SME Review Needed
	brush piles		SHF8, SHF9
<input type="checkbox"/>	24 Tree planting	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3, SSPC5	None
<input checked="" type="checkbox"/>	25 Maintenance, improvement or construction of pedestrian or vehicular access corridors	<input checked="" type="checkbox"/> a. NV1 <input checked="" type="checkbox"/> f. SSPC1, SSPC2, SSPC3, SSPC5	<input type="checkbox"/> a1. NV2 <input type="checkbox"/> f. SSPC7
<input type="checkbox"/>	26 Maintenance or construction of access control measures	<input type="checkbox"/> a. NV1 <input type="checkbox"/> b. HP2 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3, SSPC5 <input type="checkbox"/> g. L1, L2	<input type="checkbox"/> a NV3, NV4 / <input type="checkbox"/> a1. NV2 <input type="checkbox"/> b HP1 <input type="checkbox"/> f. SSPC7
<input type="checkbox"/>	27 Restoration of sites following human use and abuse	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3	<input type="checkbox"/> f. SSPC7
<input type="checkbox"/>	28 Removal of debris (e.g., dump sites, hazardous material, unauthorized structures)	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3	<input type="checkbox"/> f. SSPC7
<input type="checkbox"/>	29 Acquisition and use of fill/borrow material	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3	<input type="checkbox"/> f. SSPC7
<input type="checkbox"/>	30 Dredging and excavation; recessed harbor areas	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3, SSPC5	None
<input checked="" type="checkbox"/>	31 Stream/wetland crossings	<input checked="" type="checkbox"/> a. NV1 <input checked="" type="checkbox"/> f. SSPC1, SSPC2, SSPC3, SSPC5	<input type="checkbox"/> f. SSPC7
<input type="checkbox"/>	32 Clean-up following storm damage	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3	<input type="checkbox"/> f. SSPC4, SSPC7
<input checked="" type="checkbox"/>	33 Removal of hazardous trees or tree branches	<input checked="" type="checkbox"/> a. NV1 <input checked="" type="checkbox"/> d. TR7, TR8 <input checked="" type="checkbox"/> f. SSPC1, SSPC2, SSPC3, SSPC5	<input type="checkbox"/> d. TR1, TR2, TR3, TR4, TR5, TR6, TR9, <input type="checkbox"/> f. SSPC4, SSPC7
<input type="checkbox"/>	34 Mechanical vegetation removal, includes trees or tree branches three inches or greater in diameter	<input type="checkbox"/> a. NV1 <input type="checkbox"/> d. TR7, TR8 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3, SSPC5	<input type="checkbox"/> d. TR1, TR2, TR3, TR4, TR5, TR6, TR9, <input type="checkbox"/> f. SSPC4, SSPC7
<input type="checkbox"/>	35 Stabilization (major erosion control)	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3, SSPC5	<input type="checkbox"/> f. SSPC4, SSPC7
<input type="checkbox"/>	36 Grading	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3, SSPC5 <input type="checkbox"/> g. L1, L2	<input type="checkbox"/> f. SSPC4, SSPC7
<input type="checkbox"/>	37 Installation of soil improvements	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3 <input type="checkbox"/> g. L1, L2	<input type="checkbox"/> a1. NV2 <input type="checkbox"/> f. SSPC7
<input type="checkbox"/>	38 Drainage installations (including for ponds)	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3 <input type="checkbox"/> g. L1, L2	<input type="checkbox"/> f. SSPC7
<input type="checkbox"/>	39 Berm development	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3, <input type="checkbox"/> g. L1, L2	None
<input type="checkbox"/>	40 Closed loop heat exchangers (heat pumps)	<input type="checkbox"/> f. SSPC5	None
<input type="checkbox"/>	45 Stream monitoring equipment-placement, use	<input type="checkbox"/> a. NV1	None
<input type="checkbox"/>	46 Floating boat slips within approved harbor limits	<input type="checkbox"/> f. SSPC5	None
<input type="checkbox"/>	47 Conduit installation	<input type="checkbox"/> a. NV1	<input type="checkbox"/> a1. NV2
<input type="checkbox"/>	48 Laydown areas	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3, <input type="checkbox"/> g. L1, L2	None
<input type="checkbox"/>	50 Minor land-based structures	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3, SSPC5 <input type="checkbox"/> g. L1, L2	None
<input type="checkbox"/>	51 Signage installation	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3, SSPC5	None
<input type="checkbox"/>	52 Floating buildings	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3, SSPC5 <input type="checkbox"/> g. L1, L2	<input type="checkbox"/> a1. NV2
<input type="checkbox"/>	53 Mooring buoys or posts	<input type="checkbox"/> a. NV1	

Appendix B – Bat Strategy Project Screening Form

#	ACTIVITY	CONSERVATION MEASURES	TZ SME Review Needed
		<input type="checkbox"/> f. SSPC2, SSPC3, SSPC5	None
<input type="checkbox"/> 54	Maintenance of water control structures (dewatering units, spillways, levees)	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3, SSPC5	<input type="checkbox"/> f. SSPC6, SSPC7
<input type="checkbox"/> 55	Solar panels	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3, SSPC5	<input type="checkbox"/> f. SSPC7
<input type="checkbox"/> 56	Culverts	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC3, SSPC5	None
<input type="checkbox"/> 57	Water intake - non-industrial	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC3, SSPC5	None
<input type="checkbox"/> 58	Wastewater outfalls	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3, SSPC5	None
<input type="checkbox"/> 59	Marine fueling facilities	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3, SSPC5 <input type="checkbox"/> g. L1, L2	None
<input type="checkbox"/> 60	Commercial water-use facilities (e.g., marinas)	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC5 <input type="checkbox"/> g. L1, L2	None
<input type="checkbox"/> 61	Septic fields	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3, SSPC5	None
<input type="checkbox"/> 62	Blasting	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3, <input type="checkbox"/> g. L1, L2	<input type="checkbox"/> a. NV3, NV4 / <input type="checkbox"/> a1. NV2
<input type="checkbox"/> 63	Foundation installation	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3	<input type="checkbox"/> a1. NV2
<input type="checkbox"/> 64	Installation of steel structure, overhead bus, equipment, etc.	<input type="checkbox"/> a. NV1 <input type="checkbox"/> g. SSPC1, SSPC2, SSPC3	<input type="checkbox"/> a1. NV2
<input checked="" type="checkbox"/> 65	Pole and/or tower installation and/or extension	<input checked="" type="checkbox"/> a. NV1 <input checked="" type="checkbox"/> f. SSPC1, SSPC2, SSPC3	<input type="checkbox"/> a1. NV2
<input type="checkbox"/> 66	Private, residential docks, piers, boathouses	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SPCC5 <input type="checkbox"/> g. L1, L2	None
<input type="checkbox"/> 67	Siting of temporary office trailers	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3, SSPC5 <input type="checkbox"/> g. L1, L2	None
<input type="checkbox"/> 68	Financing for speculative building construction	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC5	None
<input type="checkbox"/> 69	Renovation of existing structures	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC3, SSPC5 <input type="checkbox"/> g. L1, L2	<input type="checkbox"/> e. AR1, AR2, AR4, AR5
<input type="checkbox"/> 70	Lock maintenance and construction	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3, SSPC5	<input type="checkbox"/> a1. NV2
<input type="checkbox"/> 71	Concrete dam modification	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3	<input type="checkbox"/> a1. NV2
<input type="checkbox"/> 72	Ferry landings/service operations	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC5 <input type="checkbox"/> g. L1, L2	None
<input type="checkbox"/> 73	Boat launching ramps	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC5	<input type="checkbox"/> a1. NV2
<input type="checkbox"/> 74	Recreational vehicle campsites	<input type="checkbox"/> a. NV1 <input type="checkbox"/> g. SPCC5	None
<input type="checkbox"/> 75	Utility lines/light poles	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SPCC5 <input type="checkbox"/> g. L1, L2	None
<input type="checkbox"/> 76	Concrete sidewalk	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3, SSPC5	None
<input type="checkbox"/> 77	Construction or expansion of land-based buildings	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3, SSPC5 <input type="checkbox"/> g. L1, L2	<input type="checkbox"/> e. AR1, AR2, AR5
<input type="checkbox"/> 78	Wastewater treatment plants	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC5 <input type="checkbox"/> g. L1, L2	<input type="checkbox"/> a1. NV2
<input type="checkbox"/> 79	Swimming pools and associated	<input type="checkbox"/> a. NV1	



Moscow-Miller Power System Improvements

#	ACTIVITY	CONSERVATION MEASURES	TZ SME Review Needed
	equipment	<input type="checkbox"/> f. SSPC5 <input type="checkbox"/> g. L1, L2	None
<input type="checkbox"/> 80	Barge floating areas	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3, SSPC5	<input type="checkbox"/> a1. NV2
<input type="checkbox"/> 81	Water intakes - Industrial	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3, SSPC5	None
<input type="checkbox"/> 82	Construction of dam/weirs/ Levees	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SPCC2, SPCC3, SPCC5	<input type="checkbox"/> a1. NV2
<input type="checkbox"/> 83	Submarine pipeline, directional boring operations	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3, SSPC5	<input type="checkbox"/> a1. NV2
<input type="checkbox"/> 84	On-site/off-site public utility relocation or construction or extension	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC3, SSPC5	None
<input type="checkbox"/> 85	Playground equipment - land-based	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC5	None
<input type="checkbox"/> 86	Landfill construction	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3 <input type="checkbox"/> g. L1, L2	<input type="checkbox"/> a1. NV2
<input type="checkbox"/> 87	Aboveground storage tanks	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3, SSPC5	None
<input type="checkbox"/> 88	Underground storage tanks (USTs)	<input type="checkbox"/> a. NV1 <input type="checkbox"/> g. SSPC2, SSPC3, SSPC5	None
<input type="checkbox"/> 89	Structure demolition	<input type="checkbox"/> f. SSPC1, SSPC2, SSPC3	<input type="checkbox"/> e. AR1, AR2, AR4, AR5
<input type="checkbox"/> 90	Pond closure	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3	None
<input type="checkbox"/> 91	Bridge replacement	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC3, SSPC5	<input type="checkbox"/> a1. NV2 <input type="checkbox"/> e. AR1, AR2, AR3, AR5,
<input type="checkbox"/> 92	Return of remains to former burial sites	<input type="checkbox"/> a. NV1 <input type="checkbox"/> h. HP2	<input type="checkbox"/> h. HP1
<input type="checkbox"/> 93	Standard license	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC5	None
<input type="checkbox"/> 94	Special use license	<input type="checkbox"/> a. NV1	None
<input type="checkbox"/> 95	Recreation license	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC5	None
<input type="checkbox"/> 96	Land use permit	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC5	None

**STEP 3)** Are all project activities limited to Table 1? If **YES**, **STOP HERE**. No Bat Strategy Conservation Measures required. Include this form in environmental documentation (e.g., attach to CEC) and send to [batstrategy@tva.gov](mailto:batstrategy@tva.gov). If **NO**, proceed to Step 4.....  YES  **NO**

**STEP 4)** Check **ALL** relevant characteristics below. If **none** apply, **STOP HERE** and check . No Bat Strategy Conservation Measures required. Include form in environmental documentation and send to [batstrategy@tva.gov](mailto:batstrategy@tva.gov)

- a.** Project may occur outside, involves human presence, or use of equipment that **generates noise or vibration** (e.g., drilling, blasting, loud machinery).
  - a1.** Project involves continuous noise (i.e., ≥ 24 hrs) that is >75 decibels measured on A scale (e.g., loud machinery).
- b.** Project may involve **human entry into/survey of a potential bat roost** (cave, bridge, other structure).
- c.** Project may involve **fire** (e.g., prescribed fire, burn piles) or **preparation of fire breaks** within 0.25 mi of trees, caves, or water sources. If prescribed burn, estimated acreage: \_\_\_\_\_
- d.** Project may involve **tree removal**. Tree removal may need to occur **outside of winter**:.....  **YES**  **NO**  
 Estimated number of trees or acres to be removed: TBD \_\_\_\_\_  acres  trees  
 If warranted, project has flexibility for bat surveys (May 15-Aug 15):.....  **MAYBE**  **YES**  **NO**
- e.** Project may involve **alteration or removal of bridges or other human structures**.
- f.** Project may involve land use activities involving **ground disturbance or use of chemicals or fuels** near water sources, wetlands, sinkholes, caves, or exposed limestone/karst.
- g.** Project may involve use of **artificial lighting** at night.

**STEP 5)** Please contact Holly LeGrand or other Bat Strategy support staff for assistance if needed. For those Activities selected in Table 2: select all Conservation Measures with letters (e.g., a-g) that correspond to characteristics selected in Step 4. If this results in selection of Conservation Measures in the last column of Table 2, a review by a terrestrial zoologist is required. Based on selection of Conservation Measures, does project require review by a terrestrial zoologist? If **YES**, **STOP HERE** and submit form as part of environmental review request; if **NO**, skip to **STEP 16**..... ■ **YES** □ **NO**

**Terrestrial Zoologist SME Verification (Steps 6-11 will be completed by a terrestrial zoologist if warranted):**  
**STEP 6)** Project is within range of:  Gray bat  VA Big-eared bat  Indiana bat  Northern long-eared bat

**STEP 7a)** Project includes the following:

- Removal/burning of suitable trees within 0.5 mile (0.8 km) of P1-P2 Indiana bat hibernacula or 0.25 mile (0.4 km) of P3-P4 Indiana bat hibernacula or any northern long-eared bat hibernacula.
- Removal/burning of suitable trees within 10 miles of documented Indiana bat hibernacula or within 5 miles of northern long-eared bat hibernacula.
- Removal/burning of suitable trees greater than 10 miles from documented Indiana bat hibernacula or greater than 5 miles from documented northern long-eared bat hibernacula.
- Removal/burning of trees within 150 feet of a documented Indiana bat or northern long-eared bat maternity roost tree.
- Removal/burning of suitable trees within 2.5 miles of Indiana bat roost trees or within 5 miles of Indiana bat capture sites.
- Removal/burning of suitable trees greater than 2.5 miles from Indiana bat roost trees or greater than 5 miles from Indiana bat capture sites.
- Removal/burning of documented Indiana bat or northern long-eared bat roost tree, if still suitable.

**STEP 7b)** Amount of SUITABLE tree/acreage removal or burned (may be different than total amount of removal): 0.0 ■ acres □ trees

**STEP 8)** Select anticipated date range of burning/tree removal in table below:

STATE	SWARMING	WINTER	NON-WINTER	PUP
GA, KY, TN	<input type="checkbox"/> Oct 15 - Nov 14	<input type="checkbox"/> Nov 15 - Mar 31	<input type="checkbox"/> Apr 1 - May 31, Aug 1 - Oct 14	<input type="checkbox"/> Jun 1 - Jul 31
VA	<input type="checkbox"/> Sep 16 - Nov 15	<input type="checkbox"/> Nov 16 - Apr 14	<input type="checkbox"/> Apr 15 - Sep 15	<input type="checkbox"/> Jun 1 - Jul 31
AL	<input type="checkbox"/> Oct 15 - Nov 14	<input type="checkbox"/> Nov 15 - Mar 15	<input type="checkbox"/> Mar 16 - May 31, Aug 1 - Oct 14	<input type="checkbox"/> Jun 1 - Jul 31
NC	<input type="checkbox"/> Oct 15 - Nov 14	<input type="checkbox"/> Nov 15 - Apr 15	<input type="checkbox"/> Apr 16 - May 31, Aug 1 - Oct 14	<input type="checkbox"/> Jun 1 - Jul 31
MS	<input type="checkbox"/> Oct 1 - Nov 14	<input type="checkbox"/> Nov 15 - Apr 14	<input type="checkbox"/> Apr 15 - Sep 30	<input type="checkbox"/> Jun 1 - Jul 31

**STEP 9)** Presence/absence surveys (visual, mist net, acoustic) were/will be conducted: □ **YES** ■ **NO** □ **TBD**

**STEP 10)** Result of presence/absence surveys (if conducted), on \_\_\_\_\_ (date): □ **NEGATIVE** □ **POSITIVE** ■ **N/A** *NOTES:* \_\_\_\_\_

**STEP 11)** □ Conservation measures have been verified (and modified, if necessary) in Table 2. *NOTES:* No suitable habitat was present on phase C1 - Cordova-Holly Springs rebuild. Field survey performed 10/11/18.

**Bat Strategy Compliance Verification (Steps 12-15 will be completed by SME/Bat Strategy Support staff):**

**STEP 12)** Project □ **WILL** ■ **WILL NOT** require use of Incidental Take in the amount of \_\_\_\_\_ □ acres or □ trees, proposed to be used during the □ **VOLANT** □ **NON-VOLANT** bat season (or ■ **N/A**).

**STEP 13)** Available Incidental Take as of \_\_\_\_\_ for \_\_\_\_\_ (Action):

TVA Action	Total 20-year acreage	Winter Burning/Removal	Volant Season Burning/Removal	Non-Volant Season Burning/Removal

**STEP 14)** Amount contributed to TVA's Bat Conservation Fund upon activity completion: \_\_\_\_\_ or ■ **N/A**

**STEP 15)** Project Effects Determinations: **Gray Bat:** NE NLAA N/A; **Virginia Big-eared Bat:** NE NLAA N/A  
**Northern Long-eared Bat:** NE NLAA LAA N/A; **Indiana Bat:** NE NLAA LAA N/A

**NOTES:** Not within the range of gray bat-this is a bug in the form. No suitable roosting trees present.

**TVA's ESA Section 7 Bat Strategy Conservation Measures Required for:**

**STEP 16)** Based on completion of Step 5, select the appropriate Conservation Measures listed in the table below (this will be completed/verified by a Terrestrial Zoologist if a Terrestrial Zoologist review is required) and review the following bullets. Save this form in project environmental documentation AND send a copy of form to [batstrategy@tva.gov](mailto:batstrategy@tva.gov). Submission of this form is an indication that the Project Lead Emily Willard (name) is (or will be made) aware of the requirements below.

- Implementation of conservation measures identified below is required to comply with TVA's programmatic Endangered Species Act bat consultation.
- Confirmation of completion (e.g., report from contractor, time stamped photos pre and post completion) for Conservation Measures below with an \* (as well as any additional confirmation noted here by Terrestrial Zoologist: Jesse Troxler) will be provided to TVA's Bat Strategy Compliance Officer ([batstrategy@tva.gov](mailto:batstrategy@tva.gov)) following completion of activit (ies).
- TVA may conduct post-project monitoring to determine if conservation measures were effective in minimizing or avoiding impacts to federally listed bats.

**STEP 17)** For projects that require use of Take and/or contribution to TVA's Bat Conservation Fund, please acknowledge the following statement:

Project Lead/Contact acknowledges that proposed project will result in use of \_\_\_\_\_  acres/ trees in Incidental Take and will require \_\_\_\_\_ contribution to TVA's Conservation Fund upon completion of activity.

	<b>Conservation Measure Acronym</b>	<b>Conservation Measure Description</b>
<input checked="" type="checkbox"/>	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.
<input type="checkbox"/>	NV2	Drilling, blasting, or any other activity that involves continuous noise (i.e., longer than 24 hours) disturbances greater than 75 decibels measured on the A scale (e.g., loud machinery) within a 0.5 mile radius of documented winter and/or summer roosts (caves, trees, unconventional roosts) will be conducted when bats are absent from roost sites.
<input type="checkbox"/>	NV3	Drilling or blasting within a 0.5 mile radius of documented cave (or unconventional) roosts will be conducted in a manner that will not compromise the structural integrity or alter the karst hydrology of the roost site.
<input type="checkbox"/>	NV4	Drilling or blasting within 0.5 miles of a documented roost site (cave, tree, unconventional roost) that needs to occur when bats are present will first involve development of project-specific avoidance or minimization measures in coordination with the USFWS.
<input type="checkbox"/>	HP1	Site-specific cases in which potential impact of human presence is heightened (e.g., conducting environmental or cultural surveys within a roost site) will be closely coordinated with staff bat biologists to avoid or minimize impacts below any potential adverse effect. Any take from these activities would be covered by TVA's Section 10 permit.
<input type="checkbox"/>	HP2	Entry into roosts known to be occupied by federally listed bats will be communicated to the USFWS when impacts to bats may occur if not otherwise communicated (i.e., via annual monitoring reports per TVA's Section 10 permit). Any take from these activities would be covered by TVA's section 10 permit.
<input type="checkbox"/>	SHF1	Fire breaks will be used to define and limit burn scope.
<input type="checkbox"/>	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.
<input type="checkbox"/>	SHF3	Acreage will be divided into smaller units to keep amount of smoke at any one

Appendix B – Bat Strategy Project Screening Form

		time or location to a minimum and reduce risk for smoke to enter caves.
<input type="checkbox"/>	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.
<input type="checkbox"/>	SHF5	Fire breaks will be plowed immediately prior to burning, will be plowed as shallow as possible, and will be kept to minimum to minimize sediment.
<input type="checkbox"/>	SHF6	Tractor-constructed fire lines will be established greater than 200 feet from cave entrances. Existing logging roads and skid trails will be used where feasible to minimize ground disturbance and generation of loose sediment.
<input type="checkbox"/>	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.
<input type="checkbox"/>	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.
<input type="checkbox"/>	SHF9	A 0.25 mile buffer of undisturbed forest will be maintained around documented or known gray bat maternity and hibernation colony sites, documented or known Virginia big-eared bat maternity, bachelor, or winter colony sites, Indiana bat hibernation sites, and northern long-eared bat hibernation sites. Prohibited activities within this buffer include cutting of overstory vegetation, construction of roads, trails or wildlife openings, and prescribed burning. Exceptions may be made for maintenance of existing roads and existing ROW, or where it is determined that the activity is compatible with species conservation and recovery (e.g., removal of invasive species).
<input type="checkbox"/>	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.
<input type="checkbox"/>	TR2	Removal of suitable summer roosting habitat within 0.5 mile of Priority 1/Priority 2 Indiana bat hibernacula, or 0.25 mile of Priority 3/Priority 4 Indiana bat hibernacula or any northern long-eared bat hibernacula will be prohibited, regardless of season, with very few exceptions (e.g., vegetation maintenance of TL ROW immediately adjacent to a known cave).
<input type="checkbox"/>	TR3*	Removal of suitable summer roosting habitat within documented bat habitat (i.e., within 10 miles of documented Indiana bat hibernacula, within five miles of documented northern long-eared bat hibernacula, within 2.5 miles of documented Indiana bat summer roost trees, within five miles of Indiana bat capture sites, within one mile of documented northern long-eared bat summer roost trees, within three miles of northern long-eared bat capture sites) will be tracked, documented, and included in annual reporting. Project will therefore communicate completion of tree removal to appropriate TVA staff.
<input type="checkbox"/>	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.
<input type="checkbox"/>	TR5	Removal of any trees within 150 feet of a documented Indiana bat or northern long-eared bat maternity summer roost tree during non-winter season, range-wide pup season or swarming season (if site is within known swarming habitat), will first require a site-specific review and assessment. If pups are present in trees to be removed (determined either by mist netting and assessment of adult females, or by visual assessment of trees following evening emergence counts),

		TVA will coordinate with the USFWS to determine how to minimize impacts to pups to the extent possible. May include establishment of artificial roosts before removal of roost tree(s).
<input type="checkbox"/>	TR6	Removal of a documented Indiana bat or northern long-eared bat roost tree that is still suitable and that needs to occur during non-winter season, range-wide pup season, or swarming season (if site is within known swarming habitat) will first require a site-specific review and assessment. If pups are present in trees to be removed (determined either by mist netting and assessment of adult females, or by visual assessment of trees following evening emergence counts), TVA will coordinate with USFWS to determine how to minimize impacts to pups to the extent possible. This may include establishment of artificial roosts before removal of roost tree(s).
<input type="checkbox"/>	TR7	Tree removal within 100 feet of <b>existing transmission ROWs</b> will be limited to hazard trees. On or adjacent to TLs, a hazard tree is a tree that is tall enough to fall within an unsafe distance of TLs under maximum sag and blowout conditions and/or are also dead, diseased, dying, and/or leaning. Hazard tree removal includes removal of trees that 1) currently are tall enough to threaten the integrity of operation and maintenance of a TL or 2) have the ability in the future to threaten the integrity of operation and maintenance of a TL.
<input type="checkbox"/>	TR8	Requests for removal of hazard trees on or adjacent to <b>TVA reservoir land</b> will be inspected by staff knowledgeable in identifying hazard trees per International Society of Arboriculture and TVA's checklist for hazard trees. Approval will be limited to trees with a defined target.
<input type="checkbox"/>	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 continuing to carry out TVA's broad mission and responsibilities.
<input type="checkbox"/>	AR1	Projects that involve structural modification or demolition of buildings, bridges, and potentially suitable box culverts, will require assessment to determine if structure has characteristics that make it a potentially suitable unconventional bat roost. If so a survey to determine if bats may be present will be conducted. Structural assessment will include: <ul style="list-style-type: none"> <li>○ Visual check that includes an exhaustive internal/external inspection of building to look for evidence of bats (e.g., bat droppings, roost entrance/exit holes); this can be done at any time of year, preferably when bats are active.</li> <li>○ Where accessible and health and safety considerations allow, a survey of roof space for evidence of bats (e.g., droppings, scratch marks, staining, sightings), noting relevant characteristics of internal features that provide potential access points and roosting opportunities. Suitable characteristic may include: gaps between tiles and roof lining, access points via eaves, gaps between timbers or around mortise joints, gaps around top and gable end walls, gaps within roof walling or around tops of chimney breasts, and clean ridge beams.</li> <li>○ Features with high-medium likelihood of harboring bats but cannot be checked visually include soffits, cavity walls, space between roof covering and roof lining.</li> <li>○ Applies to box culverts that are at least 5 feet (1.5 meters) tall and with one or more of the following characteristics. Suitable culverts for bat day roosts have the following characteristics: <ul style="list-style-type: none"> <li>▪ Location in relatively warm areas</li> </ul> </li> </ul>

Appendix B – Bat Strategy Project Screening Form

		<ul style="list-style-type: none"> <li>▪ Between 5-10 feet (1.5-3 meters) tall and 300 ft (100 m) or more long</li> <li>▪ Openings protected from high winds</li> <li>▪ Not susceptible to flooding</li> <li>▪ Inner areas relatively dark with roughened walls or ceilings</li> <li>▪ Crevices, imperfections, or swallow nests</li> <li>○ Bridge survey protocols will be adapted from the Programmatic Biological Opinion for the Federal Highway Administration (Appendix D of USFWS 2016c, which includes a Bridge Structure Assessment Guidance and a Bridge Structure Assessment Form).</li> <li>○ Bat surveys usually are NOT needed in the following circumstances:             <ul style="list-style-type: none"> <li>▪ Domestic garages /sheds with no enclosed roof space (with no ceiling)</li> <li>▪ Modern flat-roofed buildings</li> <li>▪ Metal framed and roofed buildings</li> <li>▪ Buildings where roof space is regularly used (e.g., attic space converted to living space, living space open to rafters) or where all roof space is lit from skylights or windows. Large/tall roof spaces may be dark enough at apex to provide roost space.</li> </ul> </li> </ul>
<input type="checkbox"/>	AR2	Additional bat P/A surveys (e.g., emergence counts) conducted if warranted (i.e., when AR1 indicates that bats may be present).
<input type="checkbox"/>	AR3	Bridge survey protocols will be implemented, either by permittee (e.g., state DOT biologists) or qualified personnel. If a bridge is determined to be in use as an unconventional roost, subsequent protocols will be implemented.
<input type="checkbox"/>	AR4	Removal of buildings with suitable roost characteristics within six miles of known or presumed occupied roosts for Virginia big-eared bat would occur between Nov 16 and Mar 31. Buildings may be removed other times of the year once a bat biologist evaluates a buildings' potential to serve as roosting habitat and determines that this species is not present and/or is not using structure(s).
<input type="checkbox"/>	AR5	If evidence of bat use warrants seasonal modification or removal, TVA will carry out or recommend (i.e., to applicants) seasonal modification or removal. Risk to human safety, however, should take priority. For project-specific cases in which project is unable to accommodate seasonal modification or removal, and federally listed bat species are present, TVA will carry out or recommend consultation with the USFWS to determine the best approach in the context of the project-specific circumstance. This may include establishment of artificial roosts before demolition of structures with bats present.
<input checked="" type="checkbox"/>	SSPC1	<p><b>Transmission actions and activities</b> 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:</p> <ul style="list-style-type: none"> <li>○ BMPs to 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:             <ul style="list-style-type: none"> <li>▪ Plan clearing, grading, and construction to minimize area and duration of soil exposure.</li> <li>▪ Maintain existing vegetation wherever and whenever possible.</li> <li>▪ Minimize disturbance of natural contours and drains.</li> <li>▪ As much as practicable, operate on dry soils when they are least susceptible to structural damage and erosion.</li> <li>▪ Limit vehicular and equipment traffic in disturbed areas.</li> <li>▪ Keep equipment paths dispersed or designate single traffic flow</li> </ul> </li> </ul>

		<p>paths with appropriate road BMPs to manage runoff.</p> <ul style="list-style-type: none"> <li>▪ Divert runoff away from disturbed areas.</li> <li>▪ Provide for dispersal of surface flow that carries sediment into undisturbed surface zones with high infiltration capacity and ground cover conditions.</li> <li>▪ Prepare drainage ways and outlets to handle concentrated/increased runoff.</li> <li>▪ Minimize length and steepness of slopes. Interrupt long slopes frequently.</li> <li>▪ Keep runoff velocities low and/or check flows.</li> <li>▪ Trap sediment on-site.</li> <li>▪ Inspect/maintain control measures regularly and after significant rain.</li> <li>▪ Re-vegetate and mulch disturbed areas as soon as practical.</li> </ul> <ul style="list-style-type: none"> <li>○ Application of herbicide is in compliance with USEPA, state water quality standards, and state permits. Areas in which covered species are known to occur on existing transmission line ROW are depicted on referenced, applicable spreadsheets and include guidelines to follow for impact minimization or avoidance. During pre-job briefings, the ROW Forester will review location of resources with contractors and provide guidelines and expectations from TVA's BMP Manual (Appendix O). Herbicides labeled for aquatic use are utilized in and around wetlands, streams, and SMZs. Unless specifically labeled for aquatic use, measures are taken to keep herbicides from reaching streams whether by direct application or through runoff or flooding by surface water. Hand application of certain herbicides labeled for use within SMZs is used only selectively.</li> <li>○ Specific guidelines regarding sensitive resources and buffer zones: <ul style="list-style-type: none"> <li>▪ Extra precaution (wider buffers) within SMZs is taken to protect stream banks and water quality for streams, springs, sinkholes, and surrounding habitat.</li> <li>▪ 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.</li> <li>▪ Standard requirements exist to avoid adverse impacts to caves, protected animals, and unique and important habitat (e.g., protective buffers around caves, restricted herbicide use, seasonal clearing of suitable habitat).</li> </ul> </li> </ul>
<input checked="" type="checkbox"/>	SSPC2	<p>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.</p>
<input type="checkbox"/>	SSPC3	<p><b>Power Plant actions and activities</b> will continue to implement standard environmental practices. These include:</p> <ul style="list-style-type: none"> <li>○ Best Management Practices (BMPs) in accordance with regulations:</li> </ul>

Appendix B – Bat Strategy Project Screening Form

		<ul style="list-style-type: none"> <li>▪ Ensure proper disposal of waste, ex: used rags, used oil, empty containers, general trash, dependent on plant policy</li> <li>▪ Maintain every site with well-equipped spill response kits, included in some heavy equipment</li> <li>▪ Conduct Quarterly Internal Environmental Field Assessments at each sight</li> <li>▪ Every project must have an approved work package that contains an environmental checklist that is approved by sight Environmental Health &amp; Safety consultant.</li> <li>▪ When refueling, vehicle is positioned as close to pump as possible to prevent drips, and overfilling of tank. Hose and nozzle are held in a vertical position to prevent spillage</li> <li>○ Construction Site Protection Methods             <ul style="list-style-type: none"> <li>▪ Sediment basin for runoff - used to trap sediments and temporarily detain runoff on larger construction sites</li> <li>▪ Storm drain protection device</li> <li>▪ Check dam to help slow down silt flow</li> <li>▪ Silt fencing to reduce sediment movement</li> </ul> </li> <li>○ Storm Water Pollution Prevention (SWPP) Pollution Control Strategies             <ul style="list-style-type: none"> <li>▪ Minimize storm water contact with disturbed soils at the construction site</li> <li>▪ Protect disturbed soil areas from erosion</li> <li>▪ Minimize sediment in storm water before discharge</li> <li>▪ Prevent storm water contact with other pollutants</li> <li>▪ Construction sites also may be required to have a storm water permit, depending on size of land disturbance ( &gt;1 acre )</li> </ul> </li> <li>○ Every site has a Spill Prevention and Control Countermeasures (SPCC) Plan and requires training. Several hundred pieces of equipment often managed at the same time on power generation properties. Goal is to minimize fuel and chemical use</li> </ul>
<input type="checkbox"/>	SSPC4	Woody vegetation burn piles associated with <b>transmission construction</b> 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.
<input type="checkbox"/>	SSPC5	<b>Section 26a</b> permits and contracts associated with <b>solar projects, economic development projects</b> or land use projects include standards and conditions that include standard BMPs for sediment and contaminants as well as measures to avoid or minimize impacts to sensitive species or other resources consistent with applicable laws and Executive Orders.
<input type="checkbox"/>	SSPC6	Herbicide use will be avoided within 200 ft of portals associated with caves, cave collapse areas, mines and sinkholes that are capable of supporting cave-associated species. Herbicides are not applied to surface water or wetlands unless specifically labeled for aquatic use. Filter and buffer strips will conform at least to federal and state regulations and any label requirements.
<input type="checkbox"/>	SSPC7	Clearing of vegetation within a 200-ft radius of documented caves will be limited to that conducted by hand or small machinery clearing only (e.g., chainsaws, bush-hog, mowers). This will protect potential recharge areas of cave streams and other karst features that are connected hydrologically to caves.
<input type="checkbox"/>	L1	Direct temporary lighting away from suitable habitat during the active season.
<input type="checkbox"/>	L2	Evaluate the use of outdoor lighting during the active season and seek to minimize light pollution when installing new or replacing existing permanent lights by angling lights downward or via other light minimization measures (e.g., dimming, directed lighting, motion-sensitive lighting).

<sup>1</sup>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).



**Project Screening Form - TVA Bat Strategy (04/26/2018)**

This form is to assist in determining alignment of proposed projects and any required measures to comply with TVA's ESA Section 7 programmatic consultation for routine actions and federally-listed bats<sup>1</sup>

**Project Name:** Moscow Miller 161-KV TL :Work Order 645BP Phase C2 (Part of Moscow Miller EA) **Date:** 8/31/18  
**Contact(s):** Emily Willard **CEC#:** NA - it is EA **RLR#:** **Project ID:** 417277

**Project Description:** TVA proposes to build approximately 17 miles of new 161-kV TL centered on 100' ROW. The entire ROW will be cleared of shrubs and trees to facilitate construction. Clearing window currently scheduled for 10/22/19-3/23/20

**STEP 1) Select Appropriate TVA Action (or check here  if none of the Actions below are applicable):**

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

**STEP 2) Select all activities from Tables 1 and 2 (Column 1 only) included in proposed project. If you have an activity that is not listed below, describe here):** \_\_\_\_\_

**Table 1. Activities (CHECK ALL THAT APPLY) with No Effect on Federally Listed Bats. If none, check here:**

#	ACTIVITY	#	ACTIVITY
<input type="checkbox"/> 1	Loans and/or grant awards	<input type="checkbox"/> 12	Sufferance agreement
<input type="checkbox"/> 2	Purchase of property	<input type="checkbox"/> 13	Engineering or environmental planning or studies
<input type="checkbox"/> 3	Purchase of equipment for industrial facilities	<input type="checkbox"/> 14	Harbor limits
<input type="checkbox"/> 4	Environmental education	<input type="checkbox"/> 19	Site-specific enhancements in streams and reservoirs for aquatic animals
<input type="checkbox"/> 5	Transfer of ROW easement or ROW equipment	<input type="checkbox"/> 20	Nesting platforms
<input type="checkbox"/> 6	Property and/or equipment transfer	<input type="checkbox"/> 41	Minor water-based structures
<input type="checkbox"/> 7	Easement on TVA property	<input type="checkbox"/> 42	Internal renovation or internal expansion of existing facility
<input type="checkbox"/> 8	Sale of TVA property	<input type="checkbox"/> 43	Replacement or removal of TL poles, or cutting of poles to 4-6 ft above ground
<input type="checkbox"/> 9	Lease of TVA property	<input checked="" type="checkbox"/> 44	Conductor and OHGW installation and replacement
<input type="checkbox"/> 10	Deed modification of TVA rights or TVA property	<input type="checkbox"/> 49	Non-navigable houseboats
<input type="checkbox"/> 11	Abandonment of TVA retained rights		

**Table 2. Activities (CHECK ALL THAT APPLY) and Associated Conservation Measures. If none, check here:**

#	ACTIVITY	CONSERVATION MEASURES	TZ SME Review Needed
<input checked="" type="checkbox"/> 15	Windshield or ground surveys for archaeological resources	<input checked="" type="checkbox"/> a. NV1 <input type="checkbox"/> b. HP2	<input type="checkbox"/> c. HP1 <input type="checkbox"/> a NV3, NV4 / <input type="checkbox"/> a1. NV2
<input type="checkbox"/> 16	Drilling	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3 <input type="checkbox"/> g. L1, L2	
<input type="checkbox"/> 17	Mechanical vegetation removal; does not include removal of trees or tree branches ≥ 3" in diameter.	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3, SSPC5	<input type="checkbox"/> f. SSPC4, SSPC7
<input checked="" type="checkbox"/> 18	Erosion control – minor	<input checked="" type="checkbox"/> a. NV1 <input checked="" type="checkbox"/> f. SPCC1, SSPC2, SSPC3, SSPC5	None
<input type="checkbox"/> 21	Herbicide use	<input type="checkbox"/> d. SSPC1, SSPC2, SSPC3, SSPC5 <input type="checkbox"/> a. NV1	<input type="checkbox"/> d. SSPC6, SSPC7
<input type="checkbox"/> 22	Grubbing	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3, SSPC5	<input type="checkbox"/> f. SSPC4
<input type="checkbox"/> 23	Prescribed burns, burn piles, or	<input type="checkbox"/> c. SHF1, SHF4, SHF5	<input type="checkbox"/> c. SHF2, SHF3, SHF6, SHF7,

Appendix B – Bat Strategy Project Screening Form

#	ACTIVITY	CONSERVATION MEASURES	TZ SME Review Needed
	brush piles		SHF8, SHF9
<input type="checkbox"/>	24 Tree planting	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3, SSPC5	None
<input checked="" type="checkbox"/>	25 Maintenance, improvement or construction of pedestrian or vehicular access corridors	<input checked="" type="checkbox"/> a. NV1 <input checked="" type="checkbox"/> f. SSPC1, SSPC2, SSPC3, SSPC5	<input type="checkbox"/> a1. NV2 <input type="checkbox"/> f. SSPC7
<input type="checkbox"/>	26 Maintenance or construction of access control measures	<input type="checkbox"/> a. NV1 <input type="checkbox"/> b. HP2 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3, SSPC5 <input type="checkbox"/> g. L1, L2	<input type="checkbox"/> a NV3, NV4 / <input type="checkbox"/> a1. NV2 <input type="checkbox"/> b HP1 <input type="checkbox"/> f. SSPC7
<input type="checkbox"/>	27 Restoration of sites following human use and abuse	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3	<input type="checkbox"/> f. SSPC7
<input type="checkbox"/>	28 Removal of debris (e.g., dump sites, hazardous material, unauthorized structures)	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3	<input type="checkbox"/> f. SSPC7
<input type="checkbox"/>	29 Acquisition and use of fill/borrow material	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3	<input type="checkbox"/> f. SSPC7
<input type="checkbox"/>	30 Dredging and excavation; recessed harbor areas	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3, SSPC5	None
<input checked="" type="checkbox"/>	31 Stream/wetland crossings	<input checked="" type="checkbox"/> a. NV1 <input checked="" type="checkbox"/> f. SSPC1, SSPC2, SSPC3, SSPC5	<input type="checkbox"/> f. SSPC7
<input type="checkbox"/>	32 Clean-up following storm damage	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3	<input type="checkbox"/> f. SSPC4, SSPC7
<input checked="" type="checkbox"/>	33 Removal of hazardous trees or tree branches	<input checked="" type="checkbox"/> a. NV1 <input checked="" type="checkbox"/> d. TR7, TR8 <input checked="" type="checkbox"/> f. SSPC1, SSPC2, SSPC3, SSPC5	<input checked="" type="checkbox"/> d. TR1, TR2, TR3, TR4, TR5, TR6, TR9, <input type="checkbox"/> f. SSPC4, SSPC7
<input checked="" type="checkbox"/>	34 Mechanical vegetation removal, includes trees or tree branches three inches or greater in diameter	<input checked="" type="checkbox"/> a. NV1 <input checked="" type="checkbox"/> d. TR7, TR8 <input checked="" type="checkbox"/> f. SSPC1, SSPC2, SSPC3, SSPC5	<input checked="" type="checkbox"/> d. TR1, TR2, TR3, TR4, TR5, TR6, TR9, <input type="checkbox"/> f. SSPC4, SSPC7
<input type="checkbox"/>	35 Stabilization (major erosion control)	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3, SSPC5	<input type="checkbox"/> f. SSPC4, SSPC7
<input checked="" type="checkbox"/>	36 Grading	<input checked="" type="checkbox"/> a. NV1 <input checked="" type="checkbox"/> f. SSPC1, SSPC2, SSPC3, SSPC5 <input type="checkbox"/> g. L1, L2	<input type="checkbox"/> f. SSPC4, SSPC7
<input type="checkbox"/>	37 Installation of soil improvements	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3 <input type="checkbox"/> g. L1, L2	<input type="checkbox"/> a1. NV2 <input type="checkbox"/> f. SSPC7
<input type="checkbox"/>	38 Drainage installations (including for ponds)	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3 <input type="checkbox"/> g. L1, L2	<input type="checkbox"/> f. SSPC7
<input type="checkbox"/>	39 Berm development	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3, <input type="checkbox"/> g. L1, L2	None
<input type="checkbox"/>	40 Closed loop heat exchangers (heat pumps)	<input type="checkbox"/> f. SSPC5	None
<input type="checkbox"/>	45 Stream monitoring equipment-placement, use	<input type="checkbox"/> a. NV1	None
<input type="checkbox"/>	46 Floating boat slips within approved harbor limits	<input type="checkbox"/> f. SSPC5	None
<input type="checkbox"/>	47 Conduit installation	<input type="checkbox"/> a. NV1	<input type="checkbox"/> a1. NV2
<input type="checkbox"/>	48 Laydown areas	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3, <input type="checkbox"/> g. L1, L2	None
<input type="checkbox"/>	50 Minor land-based structures	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3, SSPC5 <input type="checkbox"/> g. L1, L2	None
<input type="checkbox"/>	51 Signage installation	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3, SSPC5	None
<input type="checkbox"/>	52 Floating buildings	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3, SSPC5 <input type="checkbox"/> g. L1, L2	<input type="checkbox"/> a1. NV2
<input type="checkbox"/>	53 Mooring buoys or posts	<input type="checkbox"/> a. NV1	

Moscow-Miller Power System Improvements

#	ACTIVITY	CONSERVATION MEASURES	TZ SME Review Needed
		<input type="checkbox"/> f. SSPC2, SSPC3, SSPC5	None
<input type="checkbox"/> 54	Maintenance of water control structures (dewatering units, spillways, levees)	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3, SSPC5	<input type="checkbox"/> f. SSPC6, SSPC7
<input type="checkbox"/> 55	Solar panels	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3, SSPC5	<input type="checkbox"/> f. SSPC7
<input type="checkbox"/> 56	Culverts	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC3, SSPC5	None
<input type="checkbox"/> 57	Water intake - non-industrial	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC3, SSPC5	None
<input type="checkbox"/> 58	Wastewater outfalls	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3, SSPC5	None
<input type="checkbox"/> 59	Marine fueling facilities	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3, SSPC5 <input type="checkbox"/> g. L1, L2	None
<input type="checkbox"/> 60	Commercial water-use facilities (e.g., marinas)	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC5 <input type="checkbox"/> g. L1, L2	None
<input type="checkbox"/> 61	Septic fields	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3, SSPC5	None
<input type="checkbox"/> 62	Blasting	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3, <input type="checkbox"/> g. L1, L2	<input type="checkbox"/> a NV3, NV4 / <input type="checkbox"/> a1. NV2
<input type="checkbox"/> 63	Foundation installation	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3	<input type="checkbox"/> a1. NV2
<input type="checkbox"/> 64	Installation of steel structure, overhead bus, equipment, etc.	<input type="checkbox"/> a. NV1 <input type="checkbox"/> g. SSPC1, SSPC2, SSPC3	<input type="checkbox"/> a1. NV2
<input checked="" type="checkbox"/> 65	Pole and/or tower installation and/or extension	<input checked="" type="checkbox"/> a. NV1 <input checked="" type="checkbox"/> f. SSPC1, SSPC2, SSPC3	<input type="checkbox"/> a1. NV2
<input type="checkbox"/> 66	Private, residential docks, piers, boathouses	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SPCC5 <input type="checkbox"/> g. L1, L2	None
<input type="checkbox"/> 67	Siting of temporary office trailers	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC2, SSPC3, SSPC5 <input type="checkbox"/> g. L1, L2	None
<input type="checkbox"/> 68	Financing for speculative building construction	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC5	None
<input type="checkbox"/> 69	Renovation of existing structures	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC3, SSPC5 <input type="checkbox"/> g. L1, L2	<input type="checkbox"/> e. AR1, AR2, AR4, AR5
<input type="checkbox"/> 70	Lock maintenance and construction	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3, SSPC5	<input type="checkbox"/> a1. NV2
<input type="checkbox"/> 71	Concrete dam modification	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3	<input type="checkbox"/> a1. NV2
<input type="checkbox"/> 72	Ferry landings/service operations	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC5 <input type="checkbox"/> g. L1, L2	None
<input type="checkbox"/> 73	Boat launching ramps	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC5	<input type="checkbox"/> a1. NV2
<input type="checkbox"/> 74	Recreational vehicle campsites	<input type="checkbox"/> a. NV1 <input type="checkbox"/> g. SPCC5	None
<input type="checkbox"/> 75	Utility lines/light poles	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SPCC5 <input type="checkbox"/> g. L1, L2	None
<input type="checkbox"/> 76	Concrete sidewalk	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3, SSPC5	None
<input type="checkbox"/> 77	Construction or expansion of land-based buildings	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3, SSPC5 <input type="checkbox"/> g. L1, L2	<input type="checkbox"/> e. AR1, AR2, AR5
<input type="checkbox"/> 78	Wastewater treatment plants	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC5 <input type="checkbox"/> g. L1, L2	<input type="checkbox"/> a1. NV2
<input type="checkbox"/> 79	Swimming pools and associated	<input type="checkbox"/> a. NV1	

Appendix B – Bat Strategy Project Screening Form

#	ACTIVITY	CONSERVATION MEASURES	TZ SME Review Needed
	equipment	<input type="checkbox"/> f. SSPC5 <input type="checkbox"/> g. L1, L2	None
<input type="checkbox"/> 80	Barge fleeting areas	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3, SSPC5	<input type="checkbox"/> a1. NV2
<input type="checkbox"/> 81	Water intakes - Industrial	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3, SSPC5	None
<input type="checkbox"/> 82	Construction of dam/weirs/ Levees	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SPCC2, SPCC3, SPCC5	<input type="checkbox"/> a1. NV2
<input type="checkbox"/> 83	Submarine pipeline, directional boring operations	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3, SSPC5	<input type="checkbox"/> a1. NV2
<input type="checkbox"/> 84	On-site/off-site public utility relocation or construction or extension	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC1, SSPC3, SSPC5	None
<input type="checkbox"/> 85	Playground equipment - land-based	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC5	None
<input type="checkbox"/> 86	Landfill construction	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3 <input type="checkbox"/> g. L1, L2	<input type="checkbox"/> a1. NV2
<input type="checkbox"/> 87	Aboveground storage tanks	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3, SSPC5	None
<input type="checkbox"/> 88	Underground storage tanks (USTs)	<input type="checkbox"/> a. NV1 <input type="checkbox"/> g. SSPC2, SSPC3, SSPC5	None
<input type="checkbox"/> 89	Structure demolition	<input type="checkbox"/> f. SSPC1, SSPC2, SSPC3	<input type="checkbox"/> e. AR1, AR2, AR4, AR5
<input type="checkbox"/> 90	Pond closure	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC2, SSPC3	None
<input type="checkbox"/> 91	Bridge replacement	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC3, SSPC5	<input type="checkbox"/> a1. NV2 <input type="checkbox"/> e. AR1, AR2, AR3, AR5,
<input type="checkbox"/> 92	Return of remains to former burial sites	<input type="checkbox"/> a. NV1 <input type="checkbox"/> h. HP2	<input type="checkbox"/> h. HP1
<input type="checkbox"/> 93	Standard license	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC5	None
<input type="checkbox"/> 94	Special use license	<input type="checkbox"/> a. NV1	None
<input type="checkbox"/> 95	Recreation license	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC5	None
<input type="checkbox"/> 96	Land use permit	<input type="checkbox"/> a. NV1 <input type="checkbox"/> f. SSPC5	None

**STEP 3)** Are all project activities limited to Table 1? If **YES**, **STOP HERE**. No Bat Strategy Conservation Measures required. Include this form in environmental documentation (e.g., attach to CEC) and send to [batstrategy@tva.gov](mailto:batstrategy@tva.gov). If **NO**, proceed to Step 4.....  **YES**  **NO**

**STEP 4)** Check **ALL** relevant characteristics below. If **none** apply, **STOP HERE** and check . No Bat Strategy Conservation Measures required. Include form in environmental documentation and send to [batstrategy@tva.gov](mailto:batstrategy@tva.gov)

- a.** Project may occur outside, involves human presence, or use of equipment that **generates noise or vibration** (e.g., drilling, blasting, loud machinery).
  - a1.** Project involves continuous noise (i.e., > 24 hrs) that is >75 decibels measured on A scale (e.g., loud machinery).
- b.** Project may involve **human entry into/survey of a potential bat roost** (cave, bridge, other structure).
- c.** Project may involve **fire** (e.g., **prescribed fire, burn piles**) or **preparation of fire breaks** within 0.25 mi of trees, caves, or water sources. If **prescribed burn**, estimated acreage: \_\_\_\_\_
- d.** Project may involve **tree removal**. Tree removal may need to occur **outside of winter**:.....  **YES**  **NO**  
 Estimated number of trees or acres to be removed: 121.42 \_\_\_\_\_  acres  trees  
 If warranted, project has flexibility for bat surveys (May 15-Aug 15):.....  **MAYBE**  **YES**  **NO**
- e.** Project may involve **alteration or removal of bridges or other human structures**.
- f.** Project may involve land use activities involving **ground disturbance or use of chemicals or fuels** near water sources, wetlands, sinkholes, caves, or exposed limestone/karst.
- g.** Project may involve use of **artificial lighting** at night.

**STEP 5)** Please contact Holly LeGrand or other Bat Strategy support staff for assistance if needed. For those Activities selected in Table 2: select all Conservation Measures with letters (e.g., a-g) that correspond to characteristics selected in Step 4. If this results in selection of Conservation Measures in the last column of Table 2, a review by a terrestrial zoologist is required. Based on selection of Conservation Measures, does project require review by a terrestrial zoologist? If **YES**, **STOP HERE** and submit form as part of environmental review request; if **NO**, skip to **STEP 16**..... ■ **YES** □ **NO**

**Terrestrial Zoologist SME Verification (Steps 6-11 will be completed by a terrestrial zoologist if warranted):**

**STEP 6)** Project is within range of:  Gray bat  VA Big-eared bat  Indiana bat  Northern long-eared bat

**STEP 7a)** Project includes the following:

- Removal/burning of suitable trees within 0.5 mile (0.8 km) of P1-P2 Indiana bat hibernacula or 0.25 mile (0.4 km) of P3-P4 Indiana bat hibernacula or any northern long-eared bat hibernacula.
- Removal/burning of suitable trees within 10 miles of documented Indiana bat hibernacula or within 5 miles of northern long-eared bat hibernacula.
- Removal/burning of suitable trees greater than 10 miles from documented Indiana bat hibernacula or greater than 5 miles from documented northern long-eared bat hibernacula.
- Removal/burning of trees within 150 feet of a documented Indiana bat or northern long-eared bat maternity roost tree.
- Removal/burning of suitable trees within 2.5 miles of Indiana bat roost trees or within 5 miles of Indiana bat capture sites.
- Removal/burning of suitable trees greater than 2.5 miles from Indiana bat roost trees or greater than 5 miles from Indiana bat capture sites.
- Removal/burning of documented Indiana bat or northern long-eared bat roost tree, if still suitable.

**STEP 7b)** Amount of SUITABLE tree/acreage removal or burned (may be different than total amount of removal): 48.91 ■ acres □ trees

**STEP 8)** Select anticipated date range of burning/tree removal in table below:

STATE	SWARMING	WINTER	NON-WINTER	PUP
GA, KY, TN	<input type="checkbox"/> Oct 15 - Nov 14	<input type="checkbox"/> Nov 15 - Mar 31	■ Apr 1 - May 31, Aug 1 - Oct 14	■ Jun 1 - Jul 31
VA	<input type="checkbox"/> Sep 16 - Nov 15	<input type="checkbox"/> Nov 16 - Apr 14	<input type="checkbox"/> Apr 15 - Sep 15	<input type="checkbox"/> Jun 1 - Jul 31
AL	<input type="checkbox"/> Oct 15 - Nov 14	<input type="checkbox"/> Nov 15 - Mar 15	<input type="checkbox"/> Mar 16 - May 31, Aug 1 - Oct 14	<input type="checkbox"/> Jun 1 - Jul 31
NC	<input type="checkbox"/> Oct 15 - Nov 14	<input type="checkbox"/> Nov 15 - Apr 15	<input type="checkbox"/> Apr 16 - May 31, Aug 1 - Oct 14	<input type="checkbox"/> Jun 1 - Jul 31
MS	<input type="checkbox"/> Oct 1 - Nov 14	<input type="checkbox"/> Nov 15 - Apr 14	■ Apr 15 - Sep 30	■ Jun 1 - Jul 31

**STEP 9)** Presence/absence surveys (visual, mist net, acoustic) were/will be conducted: □ **YES** ■ **NO** □ **TBD**

**STEP 10)** Result of presence/absence surveys (if conducted), on \_\_\_\_\_ (date): □ **NEGATIVE** □ **POSITIVE** ■ **N/A** NOTES: \_\_\_\_\_

**STEP 11)** ■ Conservation measures have been verified (and modified, if necessary) in Table 2. NOTES: \_\_\_\_\_

**Bat Strategy Compliance Verification (Steps 12-15 will be completed by SME/Bat Strategy Support staff):**

**STEP 12)** Project ■ **WILL** □ **WILL NOT** require use of Incidental Take in the amount of 48.91 ■ acres or □ trees, proposed to be used during the □ **VOLANT** ■ **NON-VOLANT** bat season (or □ **N/A**).

**STEP 13)** Available Incidental Take as of 8/5/19 for Action 8: Expand/Construct new TL Assets (Action):

TVA Action	Total 20-year acreage	Winter Burning/Removal	Volant Season Burning/Removal	Non-Volant Season Burning/Removal
8	11754.67	7025.04	2356.39	2373.24

**STEP 14)** Amount contributed to TVA's Bat Conservation Fund upon activity completion: \$36,682.50 or □ **N/A**

**STEP 15)** Project Effects Determinations: **Gray Bat:** NE NLAA N/A; **Virginia Big-eared Bat:** NE NLAA N/A; **Northern Long-eared Bat:** NE NLAA LAA N/A; **Indiana Bat:** NE NLAA LAA N/A

NOTES: Project is NOT within range of gray bat-this is a bug in the form.

**TVA's ESA Section 7 Bat Strategy Conservation Measures Required for:**

**STEP 16)** Based on completion of Step 5, select the appropriate Conservation Measures listed in the table below (this will be completed/verified by a Terrestrial Zoologist if a Terrestrial Zoologist review is required) and review the following bullets. Save this form in project environmental documentation AND send a copy of form to [batstrategy@tva.gov](mailto:batstrategy@tva.gov). Submission of this form is an indication that the Project Lead Emily Willard (name) is (or will be made) aware of the requirements below.

- Implementation of conservation measures identified below is required to comply with TVA's programmatic Endangered Species Act bat consultation.
- Confirmation of completion (e.g., report from contractor, time stamped photos pre and post completion) for Conservation Measures below with an \* (as well as any additional confirmation noted here by Terrestrial Zoologist: Jesse Troxler) will be provided to TVA's Bat Strategy Compliance Officer ([batstrategy@tva.gov](mailto:batstrategy@tva.gov)) following completion of activit (ies).
- TVA may conduct post-project monitoring to determine if conservation measures were effective in minimizing or avoiding impacts to federally listed bats.

**STEP 17)** For projects that require use of Take and/or contribution to TVA's Bat Conservation Fund, please acknowledge the following statement:

■ Project Lead/Contact acknowledges that proposed project will result in use of 48.91 ■ acres/□ trees in Incidental Take and will require \$36,682.50 contribution to TVA's Conservation Fund upon completion of activity.

	Conservation Measure Acronym	Conservation Measure Description
<input checked="" type="checkbox"/>	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.
<input type="checkbox"/>	NV2	Drilling, blasting, or any other activity that involves continuous noise (i.e., longer than 24 hours) disturbances greater than 75 decibels measured on the A scale (e.g., loud machinery) within a 0.5 mile radius of documented winter and/or summer roosts (caves, trees, unconventional roosts) will be conducted when bats are absent from roost sites.
<input type="checkbox"/>	NV3	Drilling or blasting within a 0.5 mile radius of documented cave (or unconventional) roosts will be conducted in a manner that will not compromise the structural integrity or alter the karst hydrology of the roost site.
<input type="checkbox"/>	NV4	Drilling or blasting within 0.5 miles of a documented roost site (cave, tree, unconventional roost) that needs to occur when bats are present will first involve development of project-specific avoidance or minimization measures in coordination with the USFWS.
<input type="checkbox"/>	HP1	Site-specific cases in which potential impact of human presence is heightened (e.g., conducting environmental or cultural surveys within a roost site) will be closely coordinated with staff bat biologists to avoid or minimize impacts below any potential adverse effect. Any take from these activities would be covered by TVA's Section 10 permit.
<input type="checkbox"/>	HP2	Entry into roosts known to be occupied by federally listed bats will be communicated to the USFWS when impacts to bats may occur if not otherwise communicated (i.e., via annual monitoring reports per TVA's Section 10 permit). Any take from these activities would be covered by TVA's section 10 permit.
<input type="checkbox"/>	SHF1	Fire breaks will be used to define and limit burn scope.
<input type="checkbox"/>	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.
<input type="checkbox"/>	SHF3	Acreage will be divided into smaller units to keep amount of smoke at any one

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		time or location to a minimum and reduce risk for smoke to enter caves.
<input type="checkbox"/>	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.
<input type="checkbox"/>	SHF5	Fire breaks will be plowed immediately prior to burning, will be plowed as shallow as possible, and will be kept to minimum to minimize sediment.
<input type="checkbox"/>	SHF6	Tractor-constructed fire lines will be established greater than 200 feet from cave entrances. Existing logging roads and skid trails will be used where feasible to minimize ground disturbance and generation of loose sediment.
<input type="checkbox"/>	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.
<input type="checkbox"/>	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.
<input type="checkbox"/>	SHF9	A 0.25 mile buffer of undisturbed forest will be maintained around documented or known gray bat maternity and hibernation colony sites, documented or known Virginia big-eared bat maternity, bachelor, or winter colony sites, Indiana bat hibernation sites, and northern long-eared bat hibernation sites. Prohibited activities within this buffer include cutting of overstory vegetation, construction of roads, trails or wildlife openings, and prescribed burning. Exceptions may be made for maintenance of existing roads and existing ROW, or where it is determined that the activity is compatible with species conservation and recovery (e.g., removal of invasive species).
<input checked="" type="checkbox"/>	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.
<input type="checkbox"/>	TR2	Removal of suitable summer roosting habitat within 0.5 mile of Priority 1/Priority 2 Indiana bat hibernacula, or 0.25 mile of Priority 3/Priority 4 Indiana bat hibernacula or any northern long-eared bat hibernacula will be prohibited, regardless of season, with very few exceptions (e.g., vegetation maintenance of TL ROW immediately adjacent to a known cave).
<input type="checkbox"/>	TR3*	Removal of suitable summer roosting habitat within documented bat habitat (i.e., within 10 miles of documented Indiana bat hibernacula, within five miles of documented northern long-eared bat hibernacula, within 2.5 miles of documented Indiana bat summer roost trees, within five miles of Indiana bat capture sites, within one mile of documented northern long-eared bat summer roost trees, within three miles of northern long-eared bat capture sites) will be tracked, documented, and included in annual reporting. Project will therefore communicate completion of tree removal to appropriate TVA staff.
<input checked="" type="checkbox"/>	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.
<input type="checkbox"/>	TR5	Removal of any trees within 150 feet of a documented Indiana bat or northern long-eared bat maternity summer roost tree during non-winter season, range-wide pup season or swarming season (if site is within known swarming habitat), will first require a site-specific review and assessment. If pups are present in trees to be removed (determined either by mist netting and assessment of adult females, or by visual assessment of trees following evening emergence counts),

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		TVA will coordinate with the USFWS to determine how to minimize impacts to pups to the extent possible. May include establishment of artificial roosts before removal of roost tree(s).
<input type="checkbox"/>	TR6	Removal of a documented Indiana bat or northern long-eared bat roost tree that is still suitable and that needs to occur during non-winter season, range-wide pup season, or swarming season (if site is within known swarming habitat) will first require a site-specific review and assessment. If pups are present in trees to be removed (determined either by mist netting and assessment of adult females, or by visual assessment of trees following evening emergence counts), TVA will coordinate with USFWS to determine how to minimize impacts to pups to the extent possible. This may include establishment of artificial roosts before removal of roost tree(s).
<input checked="" type="checkbox"/>	TR7	Tree removal within 100 feet of <b>existing transmission ROWs</b> will be limited to hazard trees. On or adjacent to TLs, a hazard tree is a tree that is tall enough to fall within an unsafe distance of TLs under maximum sag and blowout conditions and/or are also dead, diseased, dying, and/or leaning. Hazard tree removal includes removal of trees that 1) currently are tall enough to threaten the integrity of operation and maintenance of a TL or 2) have the ability in the future to threaten the integrity of operation and maintenance of a TL.
<input type="checkbox"/>	TR8	Requests for removal of hazard trees on or adjacent to <b>TVA reservoir land</b> will be inspected by staff knowledgeable in identifying hazard trees per International Society of Arboriculture and TVA's checklist for hazard trees. Approval will be limited to trees with a defined target.
<input checked="" type="checkbox"/>	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 continuing to carry out TVA's broad mission and responsibilities.
<input type="checkbox"/>	AR1	Projects that involve structural modification or demolition of buildings, bridges, and potentially suitable box culverts, will require assessment to determine if structure has characteristics that make it a potentially suitable unconventional bat roost. If so a survey to determine if bats may be present will be conducted. Structural assessment will include: <ul style="list-style-type: none"> <li>○ Visual check that includes an exhaustive internal/external inspection of building to look for evidence of bats (e.g., bat droppings, roost entrance/exit holes); this can be done at any time of year, preferably when bats are active.</li> <li>○ Where accessible and health and safety considerations allow, a survey of roof space for evidence of bats (e.g., droppings, scratch marks, staining, sightings), noting relevant characteristics of internal features that provide potential access points and roosting opportunities. Suitable characteristic may include: gaps between tiles and roof lining, access points via eaves, gaps between timbers or around mortise joints, gaps around top and gable end walls, gaps within roof walling or around tops of chimney breasts, and clean ridge beams.</li> <li>○ Features with high-medium likelihood of harboring bats but cannot be checked visually include soffits, cavity walls, space between roof covering and roof lining.</li> <li>○ Applies to box culverts that are at least 5 feet (1.5 meters) tall and with one or more of the following characteristics. Suitable culverts for bat day roosts have the following characteristics: <ul style="list-style-type: none"> <li>▪ Location in relatively warm areas</li> </ul> </li> </ul>



		<ul style="list-style-type: none"> <li>▪ Between 5-10 feet (1.5-3 meters) tall and 300 ft (100 m) or more long</li> <li>▪ Openings protected from high winds</li> <li>▪ Not susceptible to flooding</li> <li>▪ Inner areas relatively dark with roughened walls or ceilings</li> <li>▪ Crevices, imperfections, or swallow nests</li> <li>○ Bridge survey protocols will be adapted from the Programmatic Biological Opinion for the Federal Highway Administration (Appendix D of USFWS 2016c, which includes a Bridge Structure Assessment Guidance and a Bridge Structure Assessment Form).</li> <li>○ Bat surveys usually are NOT needed in the following circumstances:             <ul style="list-style-type: none"> <li>▪ Domestic garages /sheds with no enclosed roof space (with no ceiling)</li> <li>▪ Modern flat-roofed buildings</li> <li>▪ Metal framed and roofed buildings</li> <li>▪ Buildings where roof space is regularly used (e.g., attic space converted to living space, living space open to rafters) or where all roof space is lit from skylights or windows. Large/tall roof spaces may be dark enough at apex to provide roost space.</li> </ul> </li> </ul>
<input type="checkbox"/>	AR2	Additional bat P/A surveys (e.g., emergence counts) conducted if warranted (i.e., when AR1 indicates that bats may be present).
<input type="checkbox"/>	AR3	Bridge survey protocols will be implemented, either by permittee (e.g., state DOT biologists) or qualified personnel. If a bridge is determined to be in use as an unconventional roost, subsequent protocols will be implemented.
<input type="checkbox"/>	AR4	Removal of buildings with suitable roost characteristics within six miles of known or presumed occupied roosts for Virginia big-eared bat would occur between Nov 16 and Mar 31. Buildings may be removed other times of the year once a bat biologist evaluates a buildings' potential to serve as roosting habitat and determines that this species is not present and/or is not using structure(s).
<input type="checkbox"/>	AR5	If evidence of bat use warrants seasonal modification or removal, TVA will carry out or recommend (i.e., to applicants) seasonal modification or removal. Risk to human safety, however, should take priority. For project-specific cases in which project is unable to accommodate seasonal modification or removal, and federally listed bat species are present, TVA will carry out or recommend consultation with the USFWS to determine the best approach in the context of the project-specific circumstance. This may include establishment of artificial roosts before demolition of structures with bats present.
<input checked="" type="checkbox"/>	SSPC1	<p><b>Transmission actions and activities</b> 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:</p> <ul style="list-style-type: none"> <li>○ BMPs to 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:             <ul style="list-style-type: none"> <li>▪ Plan clearing, grading, and construction to minimize area and duration of soil exposure.</li> <li>▪ Maintain existing vegetation wherever and whenever possible.</li> <li>▪ Minimize disturbance of natural contours and drains.</li> <li>▪ As much as practicable, operate on dry soils when they are least susceptible to structural damage and erosion.</li> <li>▪ Limit vehicular and equipment traffic in disturbed areas.</li> <li>▪ Keep equipment paths dispersed or designate single traffic flow</li> </ul> </li> </ul>

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		<p>paths with appropriate road BMPs to manage runoff.</p> <ul style="list-style-type: none"> <li>▪ Divert runoff away from disturbed areas.</li> <li>▪ Provide for dispersal of surface flow that carries sediment into undisturbed surface zones with high infiltration capacity and ground cover conditions.</li> <li>▪ Prepare drainage ways and outlets to handle concentrated/increased runoff.</li> <li>▪ Minimize length and steepness of slopes. Interrupt long slopes frequently.</li> <li>▪ Keep runoff velocities low and/or check flows.</li> <li>▪ Trap sediment on-site.</li> <li>▪ Inspect/maintain control measures regularly and after significant rain.</li> <li>▪ Re-vegetate and mulch disturbed areas as soon as practical.</li> </ul> <ul style="list-style-type: none"> <li>○ Application of herbicide is in compliance with USEPA, state water quality standards, and state permits. Areas in which covered species are known to occur on existing transmission line ROW are depicted on referenced, applicable spreadsheets and include guidelines to follow for impact minimization or avoidance. During pre-job briefings, the ROW Forester will review location of resources with contractors and provide guidelines and expectations from TVA's BMP Manual (Appendix O). Herbicides labeled for aquatic use are utilized in and around wetlands, streams, and SMZs. Unless specifically labeled for aquatic use, measures are taken to keep herbicides from reaching streams whether by direct application or through runoff or flooding by surface water. Hand application of certain herbicides labeled for use within SMZs is used only selectively.</li> <li>○ Specific guidelines regarding sensitive resources and buffer zones: <ul style="list-style-type: none"> <li>▪ Extra precaution (wider buffers) within SMZs is taken to protect stream banks and water quality for streams, springs, sinkholes, and surrounding habitat.</li> <li>▪ 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.</li> <li>▪ Standard requirements exist to avoid adverse impacts to caves, protected animals, and unique and important habitat (e.g., protective buffers around caves, restricted herbicide use, seasonal clearing of suitable habitat).</li> </ul> </li> </ul>
<input checked="" type="checkbox"/>	SSPC2	<p>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.</p>
<input type="checkbox"/>	SSPC3	<p><b>Power Plant actions and activities</b> will continue to implement standard environmental practices. These include:</p> <ul style="list-style-type: none"> <li>○ Best Management Practices (BMPs) in accordance with regulations:</li> </ul>

		<ul style="list-style-type: none"> <li>▪ Ensure proper disposal of waste, ex: used rags, used oil, empty containers, general trash, dependent on plant policy</li> <li>▪ Maintain every site with well-equipped spill response kits, included in some heavy equipment</li> <li>▪ Conduct Quarterly Internal Environmental Field Assessments at each sight</li> <li>▪ Every project must have an approved work package that contains an environmental checklist that is approved by sight Environmental Health &amp; Safety consultant.</li> <li>▪ When refueling, vehicle is positioned as close to pump as possible to prevent drips, and overfilling of tank. Hose and nozzle are held in a vertical position to prevent spillage</li> <li>○ Construction Site Protection Methods             <ul style="list-style-type: none"> <li>▪ Sediment basin for runoff - used to trap sediments and temporarily detain runoff on larger construction sites</li> <li>▪ Storm drain protection device</li> <li>▪ Check dam to help slow down silt flow</li> <li>▪ Silt fencing to reduce sediment movement</li> </ul> </li> <li>○ Storm Water Pollution Prevention (SWPP) Pollution Control Strategies             <ul style="list-style-type: none"> <li>▪ Minimize storm water contact with disturbed soils at the construction site</li> <li>▪ Protect disturbed soil areas from erosion</li> <li>▪ Minimize sediment in storm water before discharge</li> <li>▪ Prevent storm water contact with other pollutants</li> <li>▪ Construction sites also may be required to have a storm water permit, depending on size of land disturbance ( &gt;1 acre )</li> </ul> </li> <li>○ Every site has a Spill Prevention and Control Countermeasures (SPCC) Plan and requires training. Several hundred pieces of equipment often managed at the same time on power generation properties. Goal is to minimize fuel and chemical use</li> </ul>
<input type="checkbox"/>	SSPC4	Woody vegetation burn piles associated with <b>transmission construction</b> 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.
<input type="checkbox"/>	SSPC5	<b>Section 26a</b> permits and contracts associated with <b>solar projects, economic development projects</b> or land use projects include standards and conditions that include standard BMPs for sediment and contaminants as well as measures to avoid or minimize impacts to sensitive species or other resources consistent with applicable laws and Executive Orders.
<input type="checkbox"/>	SSPC6	Herbicide use will be avoided within 200 ft of portals associated with caves, cave collapse areas, mines and sinkholes that are capable of supporting cave-associated species. Herbicides are not applied to surface water or wetlands unless specifically labeled for aquatic use. Filter and buffer strips will conform at least to federal and state regulations and any label requirements.
<input type="checkbox"/>	SSPC7	Clearing of vegetation within a 200-ft radius of documented caves will be limited to that conducted by hand or small machinery clearing only (e.g., chainsaws, bush-hog, mowers). This will protect potential recharge areas of cave streams and other karst features that are connected hydrologically to caves.
<input type="checkbox"/>	L1	Direct temporary lighting away from suitable habitat during the active season.
<input type="checkbox"/>	L2	Evaluate the use of outdoor lighting during the active season and seek to minimize light pollution when installing new or replacing existing permanent lights by angling lights downward or via other light minimization measures (e.g., dimming, directed lighting, motion-sensitive lighting).

<sup>1</sup>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).

Appendix B – Bat Strategy Project Screening Form

**Project Review Form - TVA Bat Strategy (12/2018)**

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.<sup>1</sup>

**Project Name:** Moscow Miller Phase D - Miller-Olive Branch OPGW installation (L3937) **Date:** Feb 13, 2019  
**Contact(s):** emily willard **CEC#:** \_\_\_\_\_ **Project ID:** 417277  
**Project Location (City, County, State):** Desoto County, Mississippi

**Project Description:**

This is the last phase of the overall Moscow Miller Project. This work will consist of the addition of 4 miles of OPGW. Several wood pole structures will be replaced with steel poles. See ESCS request 34274 for additional details. Access will be predominantly on-ROW with the off ROW portions coming off existing roads. No clearing needed.

**SECTION 1: PROJECT INFORMATION - ACTION AND ACTIVITIES**

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

- |   |  |
|---|--|
| <input type="checkbox"/> 1 Manage Biological Resources for Biodiversity and Public Use on TVA Reservoir Lands | <input type="checkbox"/> 6 Maintain Existing Electric Transmission Assets                  |
| <input type="checkbox"/> 2 Protect Cultural Resources on TVA-Retained Land                                    | <input type="checkbox"/> 7 Convey Property associated with Electric Transmission           |
| <input type="checkbox"/> 3 Manage Land Use and Disposal of TVA-Retained Land                                  | <input checked="" type="checkbox"/> 8 Expand or Construct New Electric Transmission Assets |
| <input type="checkbox"/> 4 Manage Permitting under Section 26a of the TVA Act                                 | <input type="checkbox"/> 9 Promote Economic Development                                    |
| <input type="checkbox"/> 5 Operate, Maintain, Retire, Expand, Construct Power Plants                          | <input type="checkbox"/> 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.		
<input type="checkbox"/> 1. Loans and/or grant awards	<input type="checkbox"/> 8. Sale of TVA property	<input type="checkbox"/> 19. Site-specific enhancements in streams and reservoirs for aquatic animals
<input type="checkbox"/> 2. Purchase of property	<input type="checkbox"/> 9. Lease of TVA property	<input type="checkbox"/> 20. Nesting platforms
<input type="checkbox"/> 3. Purchase of equipment for industrial facilities	<input type="checkbox"/> 10. Deed modification associated with TVA rights or TVA property	<input type="checkbox"/> 41. Minor water-based structures (this does not include boat docks, boat slips or piers)
<input type="checkbox"/> 4. Environmental education	<input type="checkbox"/> 11. Abandonment of TVA retained rights	<input type="checkbox"/> 42. Internal renovation or internal expansion of an existing facility
<input type="checkbox"/> 5. Transfer of ROW easement and/or ROW equipment	<input type="checkbox"/> 12. Sufferance agreement	<input checked="" type="checkbox"/> 43. Replacement or removal of TL poles
<input type="checkbox"/> 6. Property and/or equipment transfer	<input type="checkbox"/> 13. Engineering or environmental planning or studies	<input checked="" type="checkbox"/> 44. Conductor and overhead ground wire installation and replacement
<input type="checkbox"/> 7. Easement on TVA property	<input type="checkbox"/> 14. Harbor limits	<input type="checkbox"/> 49. Non-navigable houseboats

Project Review Form - TVA Bat Strategy (12/2018)

**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.**

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

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

Appendix B – Bat Strategy Project Screening Form

Project Review Form - TVA Bat Strategy (12/2018)

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, bridge, other structure (potential bat roost)?  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	<input type="checkbox"/> Oct 15 - Nov 14	<input type="checkbox"/> Nov 15 - Mar 31	<input type="checkbox"/> Apr 1 - May 31, Aug 1 - Oct 14	<input type="checkbox"/> Jun 1 - Jul 31
VA	<input type="checkbox"/> Sep 16 - Nov 15	<input type="checkbox"/> Nov 16 - Apr 14	<input type="checkbox"/> Apr 15 - May 31, Aug 1 - Sept 15	<input type="checkbox"/> Jun 1 - Jul 31
AL	<input type="checkbox"/> Oct 15 - Nov 14	<input type="checkbox"/> Nov 15 - Mar 15	<input type="checkbox"/> Mar 16 - May 31, Aug 1 - Oct 14	<input type="checkbox"/> Jun 1 - Jul 31
NC	<input type="checkbox"/> Oct 15 - Nov 14	<input type="checkbox"/> Nov 15 - Apr 15	<input type="checkbox"/> Apr 16 - May 31, Aug 1 - Oct 14	<input type="checkbox"/> Jun 1 - Jul 31
MS	<input type="checkbox"/> Oct 1 - Nov 14	<input type="checkbox"/> Nov 15 - Apr 14	<input type="checkbox"/> Apr 15 - May 31, Aug 1 - Sept 30	<input type="checkbox"/> Jun 1 - Jul 31

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

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

STATE	SWARMING	WINTER	NON-WINTER	PUP
GA, KY, TN	<input type="checkbox"/> Oct 15 - Nov 14	<input type="checkbox"/> Nov 15 - Mar 31	<input type="checkbox"/> Apr 1 - May 31, Aug 1 - Oct 14	<input type="checkbox"/> Jun 1 - Jul 31
VA	<input type="checkbox"/> Sep 16 - Nov 15	<input type="checkbox"/> Nov 16 - Apr 14	<input type="checkbox"/> Apr 15 - May 31, Aug 1 - Sept 15	<input type="checkbox"/> Jun 1 - Jul 31
AL	<input type="checkbox"/> Oct 15 - Nov 14	<input type="checkbox"/> Nov 15 - Mar 15	<input type="checkbox"/> Mar 16 - May 31, Aug 1 - Oct 14	<input type="checkbox"/> Jun 1 - Jul 31
NC	<input type="checkbox"/> Oct 15 - Nov 14	<input type="checkbox"/> Nov 15 - Apr 15	<input type="checkbox"/> Apr 16 - May 31, Aug 1 - Oct 14	<input type="checkbox"/> Jun 1 - Jul 31
MS	<input type="checkbox"/> Oct 1 - Nov 14	<input type="checkbox"/> Nov 15 - Apr 14	<input type="checkbox"/> Apr 15 - May 31, Aug 1 - Sept 30	<input type="checkbox"/> Jun 1 - Jul 31

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

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 (If NO and includes Table 3 activities, submit project / relevant information [e.g., maps] for review by Terrestrial Zoologist.)

Info below completed by:

<input type="checkbox"/> Heritage Reviewer	(name)	<input type="text"/>	Date	<input type="text"/>
<input type="checkbox"/> OSAR Reviewer	(name)	<input type="text"/>	Date	<input type="text"/>
<input type="checkbox"/> Terrestrial Zoologist	(name)	Jesse Troxler	Date	Jul 24, 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 10 miles\*  Within the County
- Caves:  None within 3 mi  Within 3 miles but > 0.5 mi  Within 0.5 mi but > 0.25 mi\*  Within 0.25 mi but > 200 feet\*  Within 200 feet\*

Bat Habitat Inspection Sheet completed?  NO  YES

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

Project Review Form - TVA Bat Strategy (12/2018)

**STEP 6) If reviewed by Heritage/OSAR reviewer, does records review trigger need for additional review by Terrestrial Zoologist (noted by \* in Step 5)?**

- NO (Go to Step 13)
  YES (Submit for Terrestrial Zoology review)
  YES, however, based on Heritage Data review guidelines (or discussion with Terrestrial Zoology), project does not need to be submitted to Terrestrial Zoology for review. (Go to Step 13)

Notes (additional information from field review or explanation of no impact):

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

**STEP 7) Project will involve:**

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

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

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

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

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

TVA Action	Total 20-year	Winter	Volant Season	Non-Volant Season
8 Expand or Construct New Electric Transmission Assets				

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

**SECTION 3: REQUIRED CONSERVATION MEASURES**

**STEP 13a) If answer to STEP 3 is NO, (Project Lead or OSAR/Heritage Reviewer) is to review Conservation Measures in Table 4 and ensure these selected Conservation Measures are relevant to project. If not manually override and uncheck.** **Go to Step 14**

**STEP 13b) If answer to STEP 3 is YES, and answer to STEP 6 is NO, OSAR/Heritage Reviewer is to review Conservation Measures in Table 4 that and ensure these selected Conservation Measures are relevant to project. If not manually override and uncheck.** **Go to Step 14**

**STEP 13c) If answer to STEP 3 is YES, and answer to STEP 6 is YES, Terrestrial Zoologist is to review Conservation Measures in Table 4 and ensure these selected Conservation Measures are relevant to project. If not manually override and uncheck.** **Go to Step 15**

Appendix B – Bat Strategy Project Screening Form

Project Review Form - TVA Bat Strategy (12/2018)

**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: Jesse Troxler

Check if applies to Project	Activities Subject to Conservation Measure	Conservation Measure Description
<input type="checkbox"/>	15, 16, 17, 18, 22, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 45, 47, 48, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 90, 91, 92, 93, 94, 95, 96	<b>NV1</b> - 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.
<input type="checkbox"/>	16, 17, 18, 21, 22, 24, 25, 26, 27, 28, 29, 31, 32, 33, 34, 35, 36, 37, 38, 39, 48, 50, 51, 56, 61, 62, 63, 64, 65, 67, 69, 84, 89	<p><b>SSPC1 (Transmission only)</b> - 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:</p> <ul style="list-style-type: none"> <li>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: <ul style="list-style-type: none"> <li>• Plan clearing, grading, and construction to minimize area and duration of soil exposure.</li> <li>• Maintain existing vegetation wherever and whenever possible.</li> <li>• Minimize disturbance of natural contours and drains.</li> <li>• As much as practicable, operate on dry soils when they are least susceptible to structural damage and erosion.</li> <li>• 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.</li> <li>• Divert runoff away from disturbed areas.</li> <li>• Provide for dispersal of surface flow that carries sediment into undisturbed surface zones with high infiltration capacity and ground cover conditions.</li> <li>• Prepare drainage ways and outlets to handle concentrated/increased runoff.</li> <li>• Minimize length and steepness of slopes. Interrupt long slopes frequently.</li> <li>• Keep runoff velocities low and/or check flows.</li> <li>• Trap sediment on-site.</li> <li>• Inspect/maintain control measures regularly &amp; after significant rain.</li> <li>• Re-vegetate and mulch disturbed areas as soon as practical.</li> </ul> </li> <li>o Specific guidelines regarding sensitive resources and buffer zones: <ul style="list-style-type: none"> <li>• Extra precaution (wider buffers) within SMZs is taken to protect stream banks and water quality for streams, springs, sinkholes, and surrounding habitat.</li> <li>• 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.</li> <li>• 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).</li> </ul> </li> </ul>

Project Review Form - TVA Bat Strategy (12/2018)

Check if applies to Project	Activities Subject to Conservation Measure	Conservation Measure Description
<input type="checkbox"/>	16, 17, 18, 21, 22, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 48, 50, 51, 52, 53, 54, 55, 58, 59, 60, 61, 62, 63, 64, 65, 67, 70, 71, 73, 76, 77, 78, 80, 81, 82, 83, 86, 87, 88, 89, 90	<b>SSPC2</b> - 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.

<sup>1</sup>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).



**Project Review Form - TVA Bat Strategy (12/2018)**

**STEP 14)** Save completed form in project environmental documentation (e.g., CEC, Appendix to EA) AND send a copy of form to [batstrategy@tva.gov](mailto:batstrategy@tva.gov). Submission of this form indicates that Project Lead/Applicant:

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

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

**STEP 15) For Use by Terrestrial Zoologist if Project and Form are Submitted for Review**

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

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

Finalize and Print to Noneditable PDF. Changes to form cannot be made after this button is selected.

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

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Appendix C – Stream Crossings

**Stream Crossings Along The Proposed Project**

Stream ID	Sequence ID	Stream Type	Streamside Management Zone Category	Stream Name	Field Notes	Cowardin Code	HGM Code	Latitude	Longitude
BWA03	001	Perennial	Category A (50 ft)	NA	7ft wide x 3ft deep channel. Slow moving/ standing water, runs across TL in middle of wetland	R4	Riverine	35.03893	-89.39264
AB63	002	Perennial	Category A (50 ft)	Wolf River	Fish present.	R4	Riverine	35.036900	-89.394804
AB10	003	Perennial	Category A (50 ft)	NA	Fish present. Parallels Wolf River.	R4	Riverine	35.036498	-89.395230
AB16	004	Intermittent	Category A (50 ft)	NA	Smaller channel (1' x 1') within larger channel (10' x 10'). DATOS (dry at time of survey). TDEC score 19.	R4	Riverine	35.021858	-89.445982
AB19	005	Intermittent	Category A (50 ft)	Teague Branch	DATOS. Wide sandy bottom stream with little to no veg in channel. TDEC score 26.5.	R4	Riverine	35.019701	-89.451065
AB25	006	Intermittent	Category A (50 ft)	Teague Branch	Likely a named stream. DATOS. TDEC score 23.	R4	Riverine	35.014917	-89.462350
AB30	007	Intermittent	Category A (50 ft)	Stout Creek	Stout Creek. TDEC score 22. DATOS.	R4	Riverine	35.005184	-89.486516
AB34	008	Intermittent	Category A (50 ft)	NA	TDEC score 18.5. I use best professional judgement to call this a stream. DATOS.	R4	Riverine	35.000312	-89.497522
AB35	009	Intermittent	Category A (50 ft)	NA	Very large gully, multiple channels. Some wetland plants present. 20' wide x 10' deep. Cattle skeletons and trash is abundant. TDEC score 20.5.	R4	Riverine	34.999597	-89.505349

Moscow-Miller Power System Improvements

Stream ID	Sequence ID	Stream Type	Streamside Management Zone Category	Stream Name	Field Notes	Cowardin Code	HGM Code	Latitude	Longitude
AB38	010	Intermittent	Category A (50 ft)	NA	TDEC score 20.5. Deep gully with some plants in channel. DATOS.	R4	Riverine	34.999592	-89.505950
BWA14	011	Intermittent	Category A (50 ft)	NA	10ft wide x 10ft deep channel with flowing water, deep erosion, rocky/sand substrate. Scored below the 19 TDEC threshold but was bumped up to 19 via BPJ	R4	Riverine	34.99208	-89.53319
AB43	012	Intermittent	Category A (50 ft)	NA	Completely incised through sandy soil to clay substrate. DATOS. TDEC score 19.	R4	Riverine	34.981890	-89.529295
AB45	013	Intermittent	Category A (50 ft)	NA	TDEC score 20. Tributary to Grissum Creek. Some water in pools. Large bed with sandy substrate, very few plants.	R4	Riverine	34.979119	-89.529361
AB46	014	Intermittent	Category A (50 ft)	NA	DATOS. TDEC score 23.	R4	Riverine	34.977780	-89.529569
AB50	015	Intermittent	Category A (50 ft)	NA	DATOS. TDEC score 21.	R4	Riverine	34.977230	-89.540712
AB51	016	Intermittent	Category A (50 ft)	NA	DATOS. TDEC score 20.	R4	Riverine	34.977244	-89.541520

Appendix C – Stream Crossings

Stream ID	Sequence ID	Stream Type	Streamside Management Zone Category	Stream Name	Field Notes	Cowardin Code	HGM Code	Latitude	Longitude
BWA19	017	Intermittent	Category A (50 ft)	Lee Creek	Dry at time of survey, high erosion, 25ft wide x 25 feet deep channel with sand substrates. Top of bank vegetated, access road runs down to bottom and back out top	R4	Riverine	34.97167	-89.57379
BWA27	018	Perennial	Category A (50 ft)	NA	10ft wide x 3ft deep channel with fish observed. Vegetated banks	R4	Riverine	34.97243	-89.60449
AB60	019	Perennial	Category A (50 ft)	Nonconnah Creek	Fish present. Multiple crossings with power line ROW.	R4	Riverine	34.973600	-89.609481
AB59	020	Intermittent	Category A (50 ft)	Lee Creek	Lee Creek. TDEC score 22.5. DATOS.	R4	Riverine	34.943688	-89.606261
BWA02A	P001	Other	Category A (50 ft)	NA	Pond	UB	Palustrine	35.05144	-89.38304
BWA04	P002	Other	Category A (50 ft)	NA	Pond	UB	Palustrine	35.03842	-89.39333
POND1	P003	Other	Category A (50 ft)	NA	Farm pond.	UB	Palustrine	35.02392	-89.44253
POND2	P004	Other	Category A (50 ft)	NA	Pond	UB	Palustrine	35.0172	-89.45691
POND3	P005	Other	Category A (50 ft)	NA	Farm pond.	UB	Palustrine	35.95416	-89.61188
AB56	AR004	Perennial	Category A (50 ft)	Nonconnah Creek	Fish present.	R6	Riverine	34.974714	-89.611906

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## **Appendix D – Detailed Wetland Descriptions**



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**Table D-1. Wetlands located within proposed Moscow-Miller Transmission Line Project and associated substations, rebuild lines, overhead ground wire installation areas, and access roads.**

Wetland Identifier	Wetland Type <sup>1</sup>	TRAM <sup>2</sup> Functional Capacity (Score)	Wetland Acreage in Footprint
Diffee Switching Station and New Cordova-Hickory Valley Loop Line Easement			
No wetlands			
Chickasaw Trails Switching Station Site			
W001-A	PEM/SS1E	Low (40)	0.48/0.10
W002(s)-A	PEM1E	Low (38)	0.03
W003-A	PEM/FO1E	Moderate (59)	0.09/0.46
Holly Springs - Miller (L5861) Loop into Chickasaw Switching Station			
W003-A	PEM/PFO1E	Moderate (59)	0.36/2.12
Cordova – Olive Branch (L5417) Loop into Chickasaw Switching Station			
W002(n)-A	PEM1E	Low (38)	0.02
W004-A	PEM1E	Low (31)	0.27
Diffee-Chickasaw Trails (L5420) OPGW Installation and Access Roads			
W001-B	PEM1E	Moderate (55)	0.42
W002-B	PEM1E	Moderate (50)	0.28
W003-B	PEM1E	Low (21)	0.12
W004-B	PEM1E	Low (33)	0.34
W005-B	PEM1E	Moderate (54)	1.83
W006-B	PEM1E	Moderate (50)	1.24
W007-B	PEM1E	Moderate (65)	3.73
Holly Springs – Cordova (L5864) Rebuild 2.5 miles			
W001-HS-C	PEM1E	Moderate (59)	Overlaps W003-A
W002-HS-C	PEM1E	Low (27)	0.03
Moscow-Miller (L5420) 161-kV New Transmission Line, 17 miles			
W001-MMC	PFO1E	Moderate (52)	2.27
W002-MM-C	PSS1E	Moderate (52)	0.99
W003-MM-C	PEM1E	Low (27)	0.08
W004-MM-C	PFO1E	Low (32)	0.02
W005-MM-C	PFO1E	Low (39)	0.07
W006-MM-C	PEM1E	Low (33)	0.04
W007-MM-C	PFO1E	Exceptional (83)	12.02
W008-MM-C	PEM1E	Low (30)	0.05

Moscow-Miller Power System Improvements

Wetland Identifier	Wetland Type <sup>1</sup>	TRAM <sup>2</sup> Functional Capacity (Score)	Wetland Acreage in Footprint
W009-MM-C	PFO1E	Low (43)	0.25
W010-MM-C	PSS1E	Low (31)	0.15
W011-MM-C	PFO1E	Low (40)	0.03
W012-MM-C	PEM1E	Low (38)	0.08
W013-MM-C	PFO1E	Moderate (47)	0.20
W014-MM-C	PSS1E	Low (29)	0.20
W015-MM-C	PFO1E	Moderate (58)	0.88
W016-MM-C	PEM1E	Moderate (45)	0.12
W017-MM-C	PFO1E	Moderate (59)	3.32
W018-MM-C	PEM1E	Low (39)	0.20
W019-MM-C	PEM1E	Moderate (56)	0.18
W020-MM-C	PFO1E	Moderate (56)	3.20
W021-MM-C	PSS1E	Low (37)	0.44
<b>Miller-Olive Branch (L5937) OPGW Installation and Access Roads</b>			
W001-D	PEM1E	Low (38)	0.05
W002-D	PEM1E	Low (32)	0.12
W003-D	PEM1E	Low (43)	0.42
W004-D	PEM1E	Low (42)	0.06
W005-D	PEM1E	Moderate (45)	0.02
W006-D	PEM1E	Low (43)	0.06
<b>TOTAL ACRES</b>			<b>37.44</b>

<sup>1</sup>Classification codes as defined in Cowardin et al. (1979): E = Seasonally flooded/saturated; EM1=Emergent, persistent vegetation; FO1=Forested, broadleaf deciduous vegetation; P=Palustrine; SS1=Scrub-shrub, broadleaf deciduous vegetation;

<sup>2</sup>TRAM = Tennessee Rapid Assessment Method that categorizes wetland quality by their functional capacity

**Table D2. Action Alternative Wetlands Impacts on the Moscow-Miller Transmission Line Project and associated substations, rebuild lines, overhead ground wire installation areas, and access roads.**

Wetland Identifier	Impact Type	Acreage Wetland Fill	Acreage Wooded Wetland Clearing	State
<b>Proposed Chickasaw Trails Switching Station Site</b>				
W001-A	Fill for Substation Construction	0.11	--	MS
<b>Proposed Holly Springs - Miller (L5861) Loop into Chickasaw Switching Station</b>				
W003-A	Fill & Clearing for TL Structures and Spans	0.001	2.12	MS
<b>Existing Diffee-Chickasaw Trails (L5420) TL Proposed for OPGW Installation and Access Roads</b>				
W001-B	Temporary for Access	--	--	TN
W002-B	Temporary for Access	--	--	TN
W003-B	Temporary for Access	--	--	TN
W004-B	Temporary for Access	--	--	TN
W005-B	Temporary for Access	--	--	TN
W006-B	Temporary for Access	--	--	TN
W007-B	Temporary for Access	--	--	TN
<b>Proposed Moscow-Miller (L5420) 161-kV New Transmission Line, 17 miles</b>				
W001-MM-C	Fill & Clearing for TL Structures and Spans	0.0006	2.27	TN
W002-MM-C	Fill & Clearing for TL Structures and Spans	0.0003	0.99	TN
W003-MM-C	Temporary for Access	--	--	TN
W004-MM-C	Clearing for TL Spans	--	0.02	TN
W005-MM-C	Clearing for TL Spans	--	0.07	TN
W006-MM-C	Temporary for Access	--	--	TN
W007-MM-C	Clearing for TL Spans	--	12.02	TN
W009-MM-C	Clearing for TL Spans	--	0.25	TN
W010-MM-C	Clearing for TL Spans	--	0.15	TN
W011-MM-C	Clearing for TL Spans	--	0.03	TN
W012-MM-C	Temporary for Access	--	--	TN
W013-MM-C	Clearing for TL Spans	--	0.20	MS
W014-MM-C	Clearing for TL Spans	--	0.20	MS
W015-MM-C	Fill & Clearing for TL Structures and Spans	0.0005	0.88	MS
W016-MM-C	Fill for Structure	0.0002	--	MS
W017-MM-C	Fill & Clearing for TL Structures and Spans	0.0007	3.32	MS
W018-MM-C	Temporary for Access	--	--	MS

Moscow-Miller Power System Improvements

Wetland Identifier	Impact Type	Acreage Wetland Fill	Acreage Wooded Wetland Clearing	State
W019-MM-C	Temporary for Access	--	--	MS
W020-MM-C	Fill & Clearing for TL Structures and Spans	0.0007	3.20	MS
W021-MM-C	Fill & Clearing for TL Structures and Spans	0.0002	0.44	MS
<b>Existing Miller-Olive Branch (L5937) Proposed for OPGW Installation and Access Roads</b>				
W003-D	Temporary for Access	--	--	MS
W004-D	Temporary for Access	--	--	MS
W006-D	Temporary for Access	--	--	MS
<b>TOTAL ACRES</b>		<b>0.1142 Acre</b>	<b>26.16 Acre</b>	

## **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**

Transmission lines 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 transmission line 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.