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RED HILLS-KOSCIUSKO 161-KV TRANSMISSION LINE

DRAFT ENVIRONMENTAL ASSESSMENT

Choctaw, Attala, and Winston Counties, Mississippi

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ACRONYMS, ABBREVIATIONS, AND GLOSSARY OF TERMS USED

acre	A unit measure of land area equal to 43,560 square feet
access road	A dirt, gravel, or paved road that is either temporary or permanent, and is used to access the right-of-way and transmission line structures for construction, maintenance, or decommissioning activities
APE	Area of potential effect
BMP	Best management practice or accepted construction practice designed to reduce environmental effects
bus	A conductor, which may be a solid bar or pipe, normally made of aluminum or copper, used to connect one or more circuits to a common interface. An example would be the bus used to connect a substation transformer to the outgoing circuits.
CAA	Clean Air Act
Central EPA	Central Electric Power Association
circuit	A section of conductors (three conductors per circuit) capable of carrying electricity to various points
conductors	Cables that carry electrical current
CWA	Clean Water Act
danger tree	A tree located outside the right-of-way that could pose a threat of grounding a line if allowed to fall near a transmission line or a structure
dbh	Diameter at breast height
DCH	Designated critical habitat
EA	Environmental Assessment
easement	A legal agreement that gives TVA the right to use property for a purpose such as a right-of-way for constructing and operating a transmission line
EMF	Electromagnetic field
endangered species	A species in danger of extinction throughout all or a significant part of its range
EO	Executive Order
ephemeral stream	Watercourses or ditches that only have water flowing after a rain event; also called a wet-weather conveyance
ESA	Endangered Species Act
extant	In existence; still existing; not destroyed or lost
feller-buncher	A piece of heavy equipment that grasps a tree while cutting it, which can then lift the tree and place it in a suitable location for disposal; this equipment is used to prevent trees from falling into sensitive areas, such as a wetland
FPPA	Farmland Protection Policy Act
GIS	Geographic Information System
groundwater	Water located beneath the ground surface in the soil pore spaces or in the pores and crevices of rock formations

guy	A cable connecting a structure to an anchor that helps support the structure
hydric soil	A soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop conditions of having no free oxygen available in the upper part
HUC	Hydrologic unit code
hydrophytic vegetation	Aquatic and wetland plants that have developed physiological adaptations allowing a greater tolerance to saturated soil conditions including with limited or absence of oxygen
I-	Interstate
IPaC	Information, planning, and assessment database (USFWS)
kV	Symbol for kilovolt (1 kV equals 1,000 volts)
load	That portion of the entire electric power in a network consumed within a given area; also synonymous with “demand” in a given area
LPC	Local power company
MDEQ	Mississippi Department of Environmental Quality
MDOT	Mississippi Department of Transportation
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MSA	Metropolitan Statistical Area
NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Corporation
NESC	National Electric Safety Code
NHPA	National Historic Preservation Act
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
outage	An interruption of the electric power supply to a user
PA	Programmatic Agreement
PI	Point of intersection at which two straight transmission line sections intersect to form an angle
riparian	Related to or located on the banks of a river or stream
ROW	Right-of-way, a corridor containing a transmission line
runoff	That portion of total precipitation that eventually enters a stream or river
SHPO	State Historic Preservation Officer
SMZ	Streamside management zone
SR	State Route
structure	A pole or tower that supports a transmission line
substation	A facility connected to a transmission line used to reduce voltage so

	that electric power may be delivered to a local power distributor or user
surface water	Water collecting on the ground or in a stream, river, lake, or wetland; it is naturally lost through evaporation and seepage into the groundwater
switch	A device used to complete or break an electrical connection
SWPPP	Storm Water pollution Prevention Plan
threatened species	A species likely to become endangered within the foreseeable future
TL	Transmission line
TVA	Tennessee Valley Authority
TVAR	Tennessee Valley Archaeological Research
TVARAM	TVA Rapid Assessment Method, a version of the Ohio Rapid Assessment Method for categorizing wetlands, designed specifically for the TVA region
US	U. S. highway
USACE	U. S. Army Corps of Engineers
USDA	U. S. Department of Agriculture
USEPA	U. S. Environmental Protection Agency
USFS	U. S. Forest Service
USFWS	U. S. Fish and Wildlife Service
USGS	U. S. Geological Survey
wetland	A marsh, swamp, or other area of land where the soil near the surface is saturated or covered with water, especially one that forms a habitat for wildlife
WHO	World Health Organization
WMA	Wildlife Management Area
WWC	Wet-weather conveyance (see ephemeral stream)

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CHAPTER 1

1.0 PURPOSE OF AND NEED FOR ACTION

1.1 Proposed Action – Improve Power Supply

Central Electric Power Association (Central EPA) plans to upgrade its existing Kosciusko 46-kilovolt (kV) Substation in Kosciusko, Mississippi, to a 161-kV substation. The Tennessee Valley Authority (TVA) proposes to supply electric power to this substation by constructing and operating approximately 43 miles of new 161-kV transmission line (TL) which would connect the planned substation to TVA's existing Red Hills 161-kV Substation in Ackerman, Mississippi (see Figure 1-1). The proposed project would require approximately 524 acres of right-of-way (ROW), including about 461 acres of new ROW and 63 acres of existing ROW. The new TL would be constructed using single and double steel-pole structures.

The ROW to be utilized for this project is as follows:

- Approximately 3.2 miles of new 100-foot-wide ROW from the Red Hills 161-kV Substation to existing structure 523 on the Red Hill-Sturgis No. 1 (Tap to Weir) 161-kV TL.

- Approximately 5.2 miles of existing 100-foot-wide TVA ROW between structures 523 and 572 on the Red Hill-Sturgis No. 1 (Tap to Weir) 161-kV TL.

- Approximately 34.8 miles of new 100-foot-wide ROW from the Weir 161-kV Substation to the upgraded Kosciusko 161-kV Substation.

Additionally, TVA would install a second bus with associated metering, communication, and protective equipment at its Red Hills 161-kV Substation and provide metering equipment for Central EPA to install at its upgraded Kosciusko 161-kV Substation. TVA would also install new fiber optic ground wire on the new TL to facilitate communications with the TVA network. The TVA map board displays would be updated to reflect this work. The proposed in-service date for this project is October 2018.

1.2 Need for the Proposed Action

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

Central EPA serves the area around the city of Kosciusko from its Kosciusko 46-kV Substation. Power is presently supplied to this substation by a 21.7-mile, single source 46-kV TL from TVA's Leake 161-kV Substation. This line was constructed in the 1960s and uses primarily wood pole structures that are nearing the end of their useful life, which

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

makes this line vulnerable to interruptions. Additionally, the length and age of this TL causes the voltage at the local power company's current Kosciusko 46-kV Substation to fall below acceptable TVA criteria when the power demand (or load) is at its peak.

To ensure that the Kosciusko area has continuous, reliable service, TVA needs to provide additional electric service to the area. The construction of a new TL to serve the Kosciusko 161-kV Substation would meet this need by addressing the voltage problems and improving reliability in Central EPA's service area, thereby allowing TVA to meet NERC reliability criteria. Additionally, the proposed project would allow TVA to ensure the area is provided a strong, affordable source of power for continued economic health and residential and commercial growth.

1.3 Decisions to be Made

The primary decision before TVA is whether to provide more reliable electric power to Central EPA's service area by constructing a new 161-kV TL. If the proposed TL is to be built, other secondary decisions are involved. These include the following considerations:

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

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

1.4 Related Environmental Reviews or Documentation

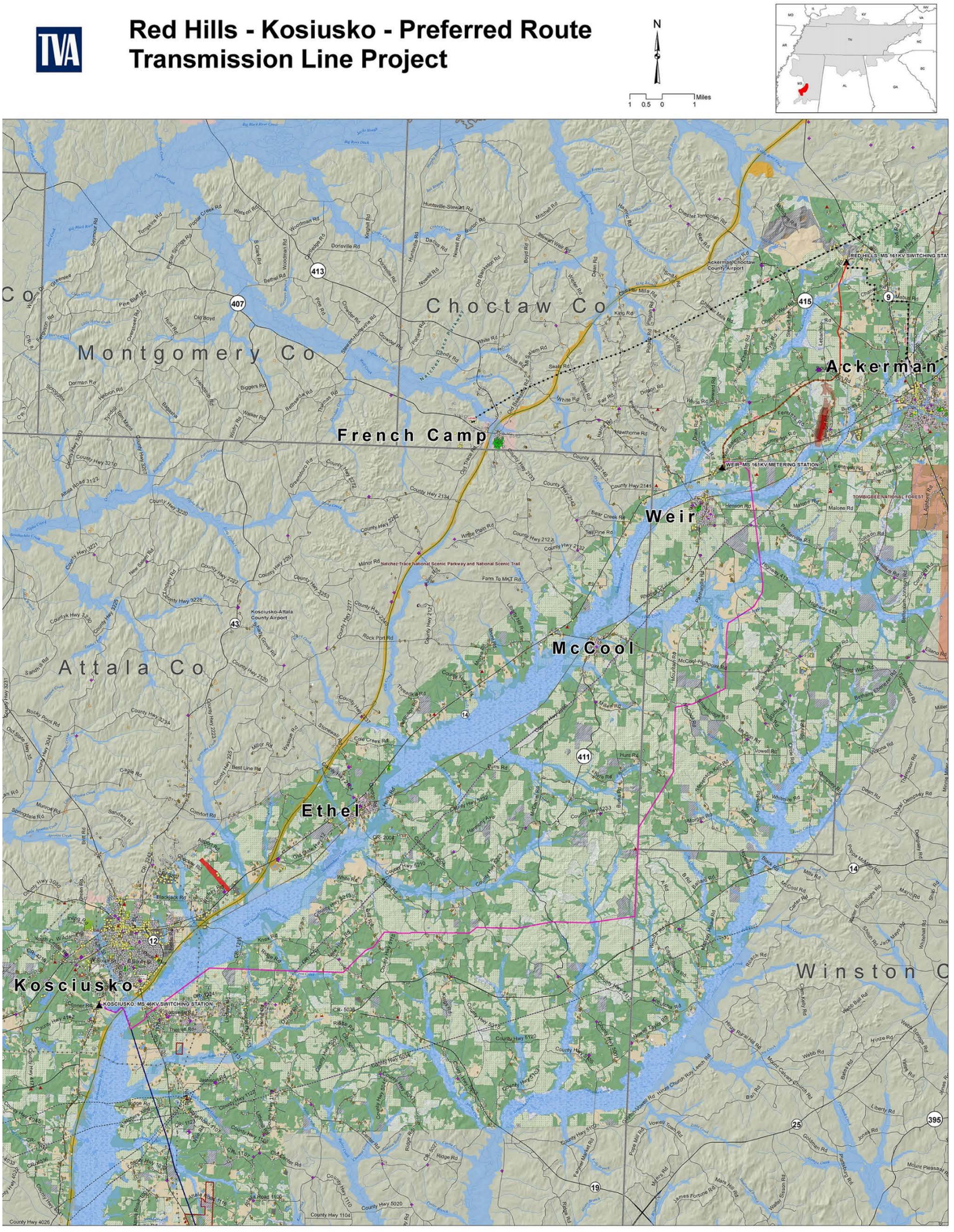
In 2015, TVA completed the Integrated Resource Plan (TVA 2015a) that provides a direction for how TVA will meet the long-term energy needs of the Tennessee Valley region. This document and the associated Supplemental Environmental Impact Statement evaluate scenarios that could unfold over the next 20 years. It discusses ways that TVA can meet future electricity demand economically while supporting TVA's equally important mandates for environmental stewardship and economic development across the valley. This report indicated that a diverse portfolio is the best way to deliver low-cost, reliable electricity. TVA released the accompanying Final Supplemental Environmental Impact Statement for TVA's Integrated Resource Plan in July 2015 (TVA 2015b) and its Record of Decision in October 2015 (80 FR 65282).

1.5 Scoping Process and Public Involvement

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

- Mississippi Band of Choctaw Indians
- Alabama-Coushatta Tribe of Texas
- Jena Band of Choctaw Indians
- Choctaw Nation of Oklahoma
- National Park Service (NPS) – Natchez Trace Parkway
- United States Army Corps of Engineers (USACE)
- United States Fish and Wildlife Service (USFWS)
- Mississippi State Historic Preservation Office (SHPO)

Figure 1-1 Proposed Red Hills–Kosciusko 161-kV Transmission Line



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TVA developed a public communication plan that included a website with information about the project, a map of the alternative routes, and numerous feedback mechanisms. Due to the large number of alternative routes and property owners potentially affected by the proposed project, TVA held two open houses in Ackerman and Kosciusko, Mississippi, on September 8 and 9, 2014, respectively. These were attended by a total of 174 people. Property owners potentially affected by, or near to, any of the route alternative segments and elected officials were invited to the open houses. TVA used local news outlets and notices placed in the local newspapers to notify other interested members of the public of the open houses.

At the open houses, TVA presented maps with a network of alternative TL routes, comprised of 41 different line segments, to the public for comment (see Figure 1-2).

The primary concern expressed by the public was the impact of the new line on residential development, marketable timber production, and farmland in the area. Owners also voiced concerns relative to health issues, property value, and impacts of the proposed line on visual quality, along with natural, historical, and cultural resources.

A 30-day public review and comment period was held following the open houses, 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. During the comment period, numerous landowners contacted TVA to express their concerns, most of which were similar to those voiced at the open houses.

At the conclusion of the comment period, TVA considered additional information and developed a preferred route. TVA announced the preferred route to the public in April 2015 (Figure 1-3). Letters were sent to affected property owners and elected officials, and information was provided to the public through TVA's website.

TVA's invitation to the NPS to be a cooperating agency on the proposed EA was formally accepted in September 2016 (Appendix A). The NPS may further address the effects of the proposal on NPS actions (permit) within their independent NEPA decision document.

As a result of information obtained following the announcement of the preferred route from both public and agency comments, as well as from environmental field surveys, TVA made additional route adjustments to the preferred TL route (Figure 1-1). These adjustments are described in Section 2.4.

TVA will make this draft EA available to the public and federal and state agencies for comment during a 14-day public review period. To solicit public input, the availability of the draft EA will be announced in regional and local newspapers. A news release will be issued to the media and posted to TVA's website. The document will be posted on TVA's website and hard copies will be made available by request. TVA will send letters to the agencies and federally recognized tribes listed above to notify them of the availability of the draft EA. Once the public and other agencies have reviewed and provided comments on this document, TVA will make revisions, if necessary, and issue a final EA.

1.6 Issues to be Addressed

TVA prepared this EA to comply with the National Environmental Policy Act (NEPA) and regulations promulgated by the Council of Environmental Quality and TVA to implement

NEPA (TVA 1983). The EA will investigate the construction, operation, and maintenance of a new TL as well as the purchase of ROW for this purpose, 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 and prime farmland
- 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 (Invasive Species), EO 13653 (Preparing the U. S. for the Impacts of Climate Change), and applicable laws including the Farmland Protection Policy Act (FPPA), the National Historic Preservation Act (NHPA), the Endangered Species Act (ESA), 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 not deemed necessary.

1.7 Necessary Federal Permits and Licenses

A permit would be required from the State of Mississippi and/or the local municipality for the discharge of construction site storm water associated with the construction of the TL. 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 it becomes necessary to burn trees and other combustible materials removed during construction of the proposed TL. 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 special use permit would be required to cross the Natchez Trace Parkway. A permit would be obtained from the Mississippi Department of Transportation for crossing state highways or federal interstates during TL construction.

Figure 1-2 Alternative Route Segments for the Proposed Red Hills–Kosciusko 161-kV Transmission Line in Attala, Choctaw and Winston Counties, Mississippi

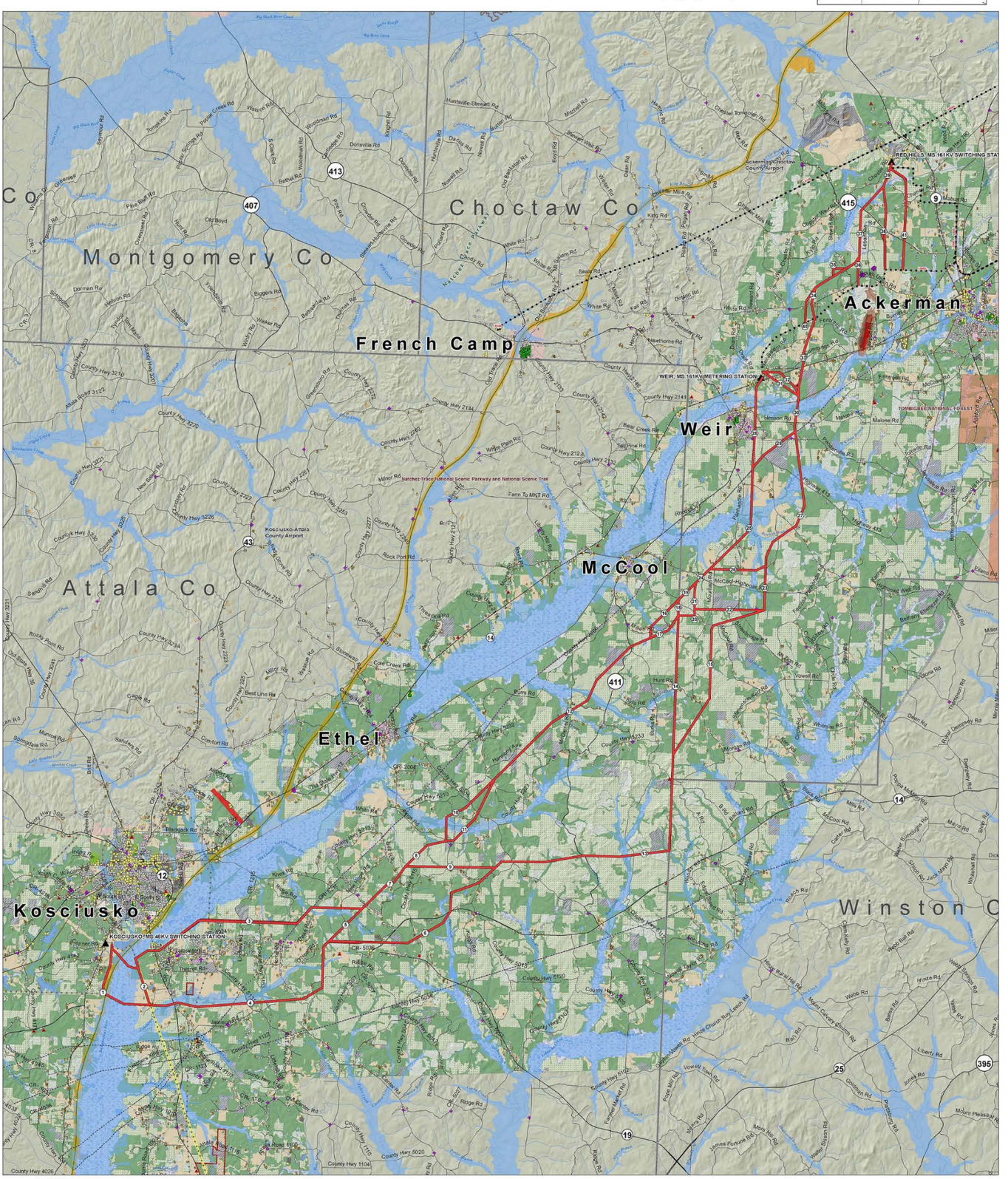

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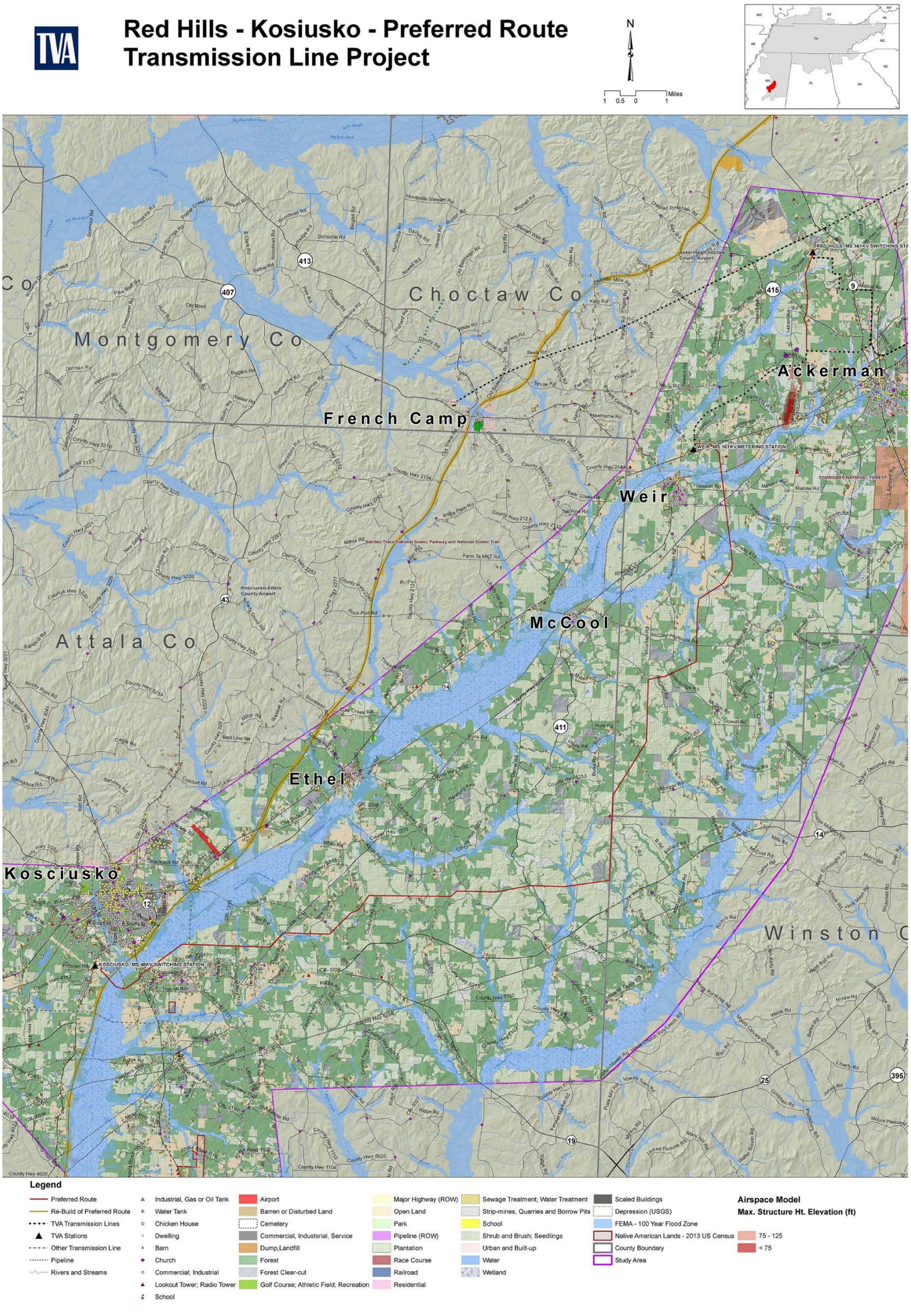
Figure 1-3 Preferred Route for the Proposed Red Hills–Kosciusko 161-kV Transmission Line in Attala, Choctaw and Winston Counties, Mississippi



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CHAPTER 2

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

As described in Chapter 1, TVA proposes to connect Central EPA's proposed Kosciusko 161-kV Substation to TVA's existing Red Hills 161-kV Substation. A description of the proposed action is provided below in Section 2.1.2. Additional background information about construction, operation, and maintenance of a TL is also provided and would be applicable regardless of the location of the proposed facilities.

This chapter has seven major sections:

1. A description of alternatives;
2. A description of the construction, operation, and maintenance of the proposed TL;
3. An explanation of the TL siting process;
4. A comparison of the alternative TL routes;
5. A comparison of anticipated environmental effects by alternative;
6. Identification of mitigation measures; and
7. Identification of the preferred alternative.

2.1 Alternatives

Two alternatives (i.e., the No Action Alternative and the Action Alternative) are addressed in further detail in this EA. Under the No Action Alternative, TVA would not implement the proposed action. The Action Alternative involves the purchase of easements for the ROW and the construction, operation, and maintenance of the proposed TL.

2.1.1 The No Action Alternative – TVA Does Not Provide a New Power Supply to the Central EPA Service Area

Under the No Action Alternative, TVA would not construct the proposed TL to serve Central EPA's planned Kosciusko 161-kV Substation. As a result, the TVA power system in the Central EPA service area would continue to operate under current conditions, increasing the risk for substation and transmission overloading, loss of service, and occurrence of violations of NERC reliability criteria. TVA's ability to provide a strong, reliable source of power for continued economic health and future residential and commercial growth in the area would be jeopardized.

Considering TVA's obligation to provide reliable electric service, 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 an Additional Power Supply to the Central EPA Service Area

Under the Action Alternative, TVA would serve Central EPA's planned Kosciusko 161-kV Substation by building a 43-mile long 161-kV TL connecting the planned substation to TVA's existing Red Hills 161-kV Substation (Figure 1-1). The new TL would utilize about

5.2 miles of the existing Red Hill–Sturgis No. 1 (Tap to Weir) 161-kV TL ROW between structures 523 to 572, which would only require the addition of fiber optic overhead ground wire. The remaining 38 miles would consist of new construction on a new 100-foot-wide ROW.

Temporary access roads would be required for construction and maintenance of the proposed TL.

To facilitate the operation of the new TL, TVA would install a second bus with associated metering, communication, and protective equipment at their Red Hills 161-kV Substation and provide metering equipment for Central EPA to install at its Kosciusko 161-kV Substation. TVA would also install new fiber-optic ground wire on the new TL to facilitate communications with the TVA network. The TVA map board displays would be updated to reflect the new facilities.

Additional information describing implementation of the proposed Action Alternative and how the most suitable TL route was 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.

2.1.3.1 Upgrade the Kosciusko – Leake Transmission Line to 161-kV Capacity

Under this alternative, Central EPA would upgrade its existing Kosciusko 46-kV Substation to a 161-kV substation. As mentioned previously, TVA currently supplies power to the existing substation from its 21.7-mile long Kosciusko-Leake 46-kV TL. Because this TL is the only power source to the 46-kV substation, rebuilding the TL on the existing ROW is not an option since the 46-kV TL cannot be removed from service until a replacement power source is available. Instead, TVA would construct a new 161-kV TL parallel to the existing TL. TVA would utilize half (37.5 feet) of the existing ROW along with an additional 62.5 feet of new ROW to accommodate the new TL. TVA would then retire the existing 46-kV TL after the new TL was in service.

Implementation of this alternative would provide a power source to the Kosciusko 161-kV Substation as requested by Central EPA. However, the Red Hills 161-kV Substation is located at a generating facility (Red Hills Fossil Plant) and is in close proximity to two 500-kV sources (the West Point and Clay substations). As such, the Action Alternative would provide a much stronger power source than this alternative. The action proposed under this alternative would not improve the power supply or address anticipated future load growth in the area to the degree of the Action Alternative. Additionally, this alternative would require the retirement of an existing TL. For these reasons, this alternative was eliminated from further consideration.

2.1.3.2 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.

Power lines can be buried. However, 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. Underground higher voltage TLs require additional measures to ensure proper cooling and to provide adequate access for maintenance. 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, they must be protected from flooding, which could cause an outage. Repairs of buried TLs may require excavation, and the precise location of problem areas can be difficult to determine.

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

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

2.2.1 Transmission Line Construction

2.2.1.1 Right-of-Way Acquisition and Clearing

A ROW utilizes an easement that would be designated for a TL and associated assets. The easement would require maintenance to avoid the risk of fires and other accidents and to ensure reliable operation. The ROW provides a 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 for the proposed new ROW. These easements would give TVA the right to clear the ROW and to construct, operate, and maintain the TL, as well as remove “danger trees” adjacent to the ROW. Danger trees include any trees located beyond the cleared ROW, but that are tall enough to pass within five feet of a conductor or strike a structure should it fall toward the TL. 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 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[2]. Marketable timber would be salvaged where feasible; otherwise, woody debris and other vegetation would be piled and burned, chipped, or taken off site. In some instances, vegetation may be windrowed along the edge of the ROW to serve as sediment barriers.

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

TVA utilizes standard practices for ROW clearing and construction activities. These guidance and specification documents (listed below) 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 2016). TVA transmission projects also utilize best management practices (BMPs) as identified in *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities* (Muncy 2012) to provide guidance for clearing and construction activities.

1. *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 Transmission Construction and Maintenance Activities* (hereafter referred to as "Muncy (2012)")

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 Mississippi's State Implementation Plan for attaining air quality standards.

Following clearing and construction, an appropriate vegetative cover on the ROW would be restored. TVA would utilize appropriate seed mixtures as described in Muncy (2012) or work with property owners with impacted crop land to ensure restoration supports or minimizes 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.

[2] 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.

2.2.1.2 Access Roads

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

Culverts and other drainage devices, fences, and gates would be installed as necessary. Culverts installed in any permanent streams would be removed following construction. However, in ephemeral[3] 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 new 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* (TVA 2016) and *Transmission Construction Guidelines Near Streams* (Muncy 2012).

2.2.1.3 Construction Assembly Areas

A construction assembly area (or "laydown" area) would be required for worker assembly, vehicle parking, and material storage. This area may be on existing substation property or may be leased from a private landowner for the duration of the construction period. The property is 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.

2.2.1.4 Structures and Conductors

The proposed TL would utilize single and double steel-pole structures. Examples of these structure types are shown in Figure 2-1. Structure heights would vary according to the terrain, but would range between 90 and 140 feet above ground.

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

[3] Ephemeral streams are also known as wet-weather conveyances or streams that run only following a rainfall.

Poles at angles (angle points) in the TL may require supporting screw, rock, or log-anchored guys. Some angle structures may be self-supporting poles or steel towers, which would require concrete foundations. 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.

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

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.

2.2.1.5 Conductor and Ground Wire Installation

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

2.2.2 Operation and Maintenance

2.2.2.1 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.

2.2.2.2 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. TVA uses a minimum ground clearance of 24 feet for a 161-kV TL at the maximum line operating temperature. Vegetation management along the ROW would consist of two different activities: felling danger trees adjacent to the cleared ROW (as described in Section 2.2.1.1), and controlling vegetation within the total width of the cleared ROW. These activities occur on approximately 3- to 5-year cycles.

After tall trees and other tall-growing vegetation are removed from the ROW during construction, routine management of vegetation within the cleared ROW is necessary and would include an integrated vegetation management approach designed to encourage the low-growing plant species and discourage tall-growing plant species. A vegetation re-clearing plan would be developed for each TL connection, based on the results of the periodic inspections described above. The two principal management techniques are mechanical mowing (using tractor-mounted rotary mowers) and herbicide application. Herbicides are normally applied in areas where heavy growth of woody vegetation is occurring on the ROW and mechanical mowing is not practical. Herbicides would be selectively applied from the ground with backpack sprayers or vehicle-mounted sprayers.

Any herbicides used are applied in accordance with applicable state and federal laws and regulations. Only herbicides registered with the U.S. Environmental Protection Agency (USEPA) are used. A list of the herbicides currently used by TVA in ROW management is presented in TVA's *Transmission Environmental Protection Procedures Right-Of-Way Vegetation Management Guidelines* (TVA 2016). This list may change over time as new herbicides are developed or new information on presently approved herbicides becomes available.

2.2.2.3 Structure Replacement

Other than vegetation management within ROWs, only minor maintenance work is generally required as TL structures and other components (e.g., conductor, insulators, arms, etc.) 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.

2.3 Siting Process

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

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

2.3.1 Definition of the Study Area

The study area for the Red Hills–Kosciusko TL was determined primarily by the geographic boundaries of existing power system assets. The northern project boundary was set by the location of the Red Hills 161-kV Substation. The western boundary was set by the western edge of the floodplain of the Yockanookany River. The eastern boundary was set by the channel and tributaries of Lobutcha Creek. The southern boundary was determined by the location of the proposed Kosciusko Substation. Extra consideration was made for two possible locations for a crossing of the Natchez Trace Parkway near the city of Kosciusko because of its status as a national park under the jurisdiction of the National Park Service.

2.3.2 Description of the Study Area

The study area has a mix of flat and gently rolling terrain, much of which is utilized for timber production, agriculture, and residential areas. Remaining forested land is a combination of commercial timber (pine plantations) and low-lying timberland likely to be floodplain or forested wetland. The farmland is a mixture of commercial farming (corn, soybeans, and cotton) and cattle pasture. The residential homes are built up around the main road systems. The City of Ackerman is located in the northern portion of the study area and is a blend of residential and commercial development. The City of Kosciusko is in the southern portion of the study area, and is a blend of residential and small commercial development. As a result of being bracketed to the east and west by large river and creek complexes, the study area is also characterized by a high density of wetland features throughout.

2.3.3 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 data including wetlands, and Choctaw, Attala, and Winston county tax maps. Also used were various proprietary data maintained by TVA in a corporate geo-referenced database (i.e., TVA Regional Natural Heritage file data on sensitive plants and animals and archaeological and historical resources).

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.

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

2.3.4 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 the most important elements. Identifying feasible TL routes involves weighing and balancing these criteria.

Each of the TL route options was evaluated according to criteria related to engineering, social, and environmental concerns. Specific criteria 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), total length of the transmission line, pivot-irrigation systems (existing and planned, which can create operational challenges for both the irrigation system and the TL), 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.

2.3.5 Development of General Route Segments and Potential Transmission Line Routes

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

The straight-line distance between the identified power sources (Red Hills 161-kV and Kosciusko 161-kV substations) is about 33 miles. That distance, along with the constraints discussed above, limited the number of practicable alternative corridors that could be identified and studied for the project.

During the siting process, an opportunity to reconfigure the existing Tap to Weir TL was discovered, reducing the overall amount of new TL ROW required to develop a new route from Red Hills Substation to the Kosciusko Substation. This resulted in two separate TL route corridors: Red Hills-Weir and Weir-Kosciusko.

For the Red Hills to Weir section, all new TL route possibilities were presumed to use as much of the existing Tap to Weir TL as practical. In doing so, new construction along this section of TL would only consist of new construction from the Red Hills Substation to the existing Tap to Weir TL. The route alternatives along this new portion of TL would avoid development to the extent practicable.

As the TL corridor traversed south from the Weir Substation toward the Kosciusko Substation, TVA's options were either to route the TL along the eastern portion of the study area or stay along the western part of the study area. Staying along the western portion of the study area resulted in the challenge of routing the TL through areas which contained residential housing and development or the potential for future development. While considering the TL alternative on the eastern side of the study area, the impact of traversing large swaths of managed timber tracts had to be considered.

TL route alternatives along the southernmost portion of the proposed new delivery point, near Central EPA's new Kosciusko Substation, were very limited due to the task of crossing both the wide floodplain of the Yockanookany River and the Natchez Trace Parkway. Both of these constraints present unique challenges to location and construction. In addition, crossing the Natchez Trace Parkway requires a special use permit from the NPS.

One of TVA's objectives when selecting TL route alternatives was to minimize impacts to forested wetlands. Sites with previously mapped wetlands and/or with potential for unmapped wetlands were derived based on existing GIS data to aid in the location process.

As discussed in Section 2.3.2, this presented a significant challenge due to the high density of existing wetlands throughout the study area.

Using the siting criteria identified in Section 2.3.4 and the identified termination points in Section 2.3.1, 41 potential TL route segments were developed and presented at the open houses (Figure 1-2). Eight segments (34-41) were analyzed for the TL route from Red Hills Substation to the Tap to Weir TL. The remaining 33 segments (1-33) were included in the analysis for the TL route from the Tap to Weir TL to the new Kosciusko Substation.

2.3.5.1 Potential Transmission Line Corridors

Using the identified end points, opportunities, and constraints, alternative route segments were identified that could then be used to define alternative transmission line routes. The tax maps provided property boundaries, which were used to locate a route with minimum impact to the number of properties as well as to individual properties. In addition, several site visits were made to further characterize any potential problem areas in the study area. Forty-one route segments were identified for the Red Hills-Kosciusko project. These segments were used to analyze 110 alternative routes, five for the Red Hills to Weir section and 105 for the Weir to Kosciusko section (see Figure 1-2 and Appendix B).

2.4 Identification of the Preferred Transmission Line Route

Each alternative route offers different opportunities and constraints for TL construction. Opportunities include characteristics such as open land, areas less suitable for development, and lack of sensitive environmental areas and land use conflicts. The assessment of the opportunities and constraints for the alternative routes are evaluated by engineering, environmental, and social criteria for each alternative route segment (see Figure 1-2). Some of the key considerations used in identifying and assessing alternative route locations are line length, amount of existing ROW, road/highway crossings, construction access, amount of ROW needed, forest clearing, wetlands, sensitive stream and/or stream crossings, number of parcel/property tracts, development (both commercial and residential), historical areas and structures, archaeological, recreational, and airport flight zones.

2.4.1 Red Hills-Weir Section

Of the alternative TL routes identified for the Red Hills to Weir section (see Table 1, Appendix B), Alternative Route 2, consisting of Segments 38 and 39, was selected. This route alternative was chosen to allow for the usage of the existing Tap to Weir for a majority of the route, thus reducing the overall project length required for new construction along this section. Utilizing this route option resulted in the least amount of wetland impacts when compared to the other alternatives, utilized an existing asset, and tied into an excellent location at the Weir tap line. Furthermore, Segments 38 and 39 had very few overall constraints with the exception of some residential impacts that were ultimately mitigated by minor segment adjustments. Alternative Route 1, which consisted solely of Segment 41, received a great deal of opposition during and after the open house due to the presence of a church, cemetery, and some unmapped development along this path, making it less desirable.

Alternative Routes 3, 4, and 5 shared common constraints which made them less desirable. Choosing any one of these three options would result in longer route lengths, thus increasing the amount of property required for new TL ROW. In addition, all three route options involved more road crossings than the other alternatives.

Segment 37, which makes up a large portion of the route options, received many negative comments due to the perceived impact to development along Lebanon Road. Additionally, this segment crosses many potential wetland and floodplain areas as it traverses south, crossing and paralleling the Besa Chitto Creek for the majority of its length.

2.4.2 Weir-Kosciusko Section

The route analysis for this section begins at the proposed Kosciusko Substation site. One of the challenges in exiting the Kosciusko Substation was crossing the Yockanookany River and the Natchez Trace Parkway. Utilizing the initial portion of Segment 2 to stay along the existing SR 14 highway easement provided for reduced wetland impacts as the TL crossed the Natchez Trace Parkway and Yockanookany River. Additionally, routing the TL along the existing SR 14 easement minimized the amount of trees to be cleared for the new TL ROW. For these reasons, Segment 2 was sought as the favorable route exiting the Kosciusko Substation. However, in subsequent discussions, the NPS objected to this crossing due to concerns that the historic integrity of the SR 14 bridge would be compromised by the TL. Consequently, in collaboration with NPS and after assessment of area constraints and opportunities, TVA selected another location for the TL crossing of the Natchez Trace. NPS approved this location and it is further discussed in section 2.4.3. Alternative routes that included Segments 1 and 4 scored poorly in the analysis because they remained within the floodplain of the Yockanookany River for a majority of the segment lengths and crossed several backwater sloughs and tributaries of this river system, which would likely create construction challenges and potentially impact wetland areas if chosen. Segments 5, 6, 8, 10, 11, 12, and 14 presented the same challenges.

Because Segments 2 and 3 were selected as the best path out of the Kosciusko Substation, Segment 7 was the only remaining choice to continue the route. Segments 9, 13, and 15 were chosen due to the very rural nature of the land as well as the continuous and single usage of large plantation areas. There was virtually no residential or other commercial usage along these segments. Low density of old growth in affected areas was also considered a positive attribute in the analysis.

Using Segment 14 would have kept the TL route toward the western part of the study area, impacting areas which included more residential and commercial properties. By eliminating Segment 14, Segments 18, 19, 20, 21, 24, 25, and 26 were excluded. Segments 23, 27, 30, and 32 continued following along the boundary lines between upland and floodplain, while attempting to limit impacts to other land uses and residential areas. A crossing of the Tibby Creek floodplain, as well as a tributary of the Yockanookany River, presents a challenge, but one that is common to all the alternatives due to the geography and abundance of wetlands areas within the study area. Photo-interpreted data indicated that these crossings could be made at narrow places to minimize the environmental impacts to the watershed.

2.4.3 Explanation of Changes to the Proposed Preferred Transmission Line Route

Considering all the constraints presented along the Red Hills–Kosciusko section of proposed TL, alternative Route 91, consisting of Segments 2, 3, 7, 9, 13, 15, 23, 27, 30, and 32, for the Kosciusko–Weir Section and Route 2, comprising Segments 38 and 39, for the Red Hills–Weir sections, were identified as TVA's preferred TL route (see Table 2, Appendix B).

As a result, TVA's preferred 161-kV TL route from the Red Hills Substation to the Kosciusko Substation consisted of Segments 2, 3, 7, 9, 13, 15, 23, 27, 30, 32, 38, and 39. TVA

announced this preferred route to the public in March 2015. However, this proposed preferred TL route was modified in a few locations from the original alignment as a result of new information obtained at and following the open houses. A brief description of these modifications is provided below.

- At the owner's request, a route adjustment just south of the Weir Substation along Segment 32 was made during survey to avoid a sawmill operation area. This adjustment would result in no impacts to other constraints.
- A route adjustment was made along Segment 9 in response to an owner's request that the TL be kept 50 feet north of his southern border to minimize impact to timber operations. Because this property line was straight, the adjustment did not impact other constraints and the request could be accommodated with only minor adjustments.
- Between the open houses and the center line survey for the proposed preferred route, the property along Segment 7 was sold to an investor group who wanted to put the TL around the perimeter of the property. This change did not impact other constraints and reduced the impacts to adjacent property to the south. Therefore, the requested change to the original route was made.
- A route adjustment was made along Segment 3 to eliminate the impact to a private pond and cabin, to a house site under development, and to reduce the impact to farm operations and future development.
- A route adjustment was made to accommodate a different location for the crossing of the Natchez Trace Parkway as requested by the NPS. The original preferred route composed of Segment 2 was rejected as a preferred crossing by the NPS due to concerns that the historic integrity of the SR 14 bridge would be compromised by the TL. This route would have crossed the Natchez Trace Parkway along a bridge of SR 14. After consultation with the NPS, it was proposed that the TL should cross the Natchez Trace Parkway north of the original proposed route and along Central EPA's existing 46-kV TL ROW (see purple highlighted segment in Figure 1.1).
- Environmental field surveys identified 12 wetlands that warranted further consideration and possible route alignment changes. Based on the model of social, environmental, and engineering criteria, the proposed preferred route was determined to provide the best overall balance of factors for the preferred TL route as a whole. A detailed review of these areas indicated TL relocations in the areas of these wetlands would result in the installation of additional point-of-intersection (PI) structures to several parcels, causing further impact to property owners. Additionally, there would be increased costs associated with the additional engineering and procurement of the structures themselves. The re-survey and additional engineering for these areas would have impacted the schedule such that the project's proposed in-service date would be delayed, thus potentially impacting future growth (economic development) for the area. After a detailed review of all the impacts associated with making these route adjustments, and balancing the social and engineering aspects along with the environmental concerns, TVA determined there was no practicable alternative for the proposed preferred route associated with these wetland areas.

2.5 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 2-1.

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

Resource Area	Impacts From Implementing the No Action Alternative	Impacts From Implementing the Action Alternative
Groundwater and Geology	No effects to local groundwater quality or quantity are expected.	Any effects to groundwater quality or quantity are anticipated to be minor.
Surface Water	No changes in local surface water quality are anticipated.	Any effects to local surface waters would be minor and temporary.
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 temporary and insignificant.
Vegetation	Local vegetation would not be affected.	Site preparation and clearing of the proposed 161-kV TL ROW would have a temporary minor effect on most local vegetation. An insignificant direct long-term effect on approximately 391 acres of forested area is anticipated since most has been previously cleared and the plant communities within are common and well-represented throughout the region.
Wildlife	Local wildlife would not be affected.	Wildlife inhabiting onsite forest, early successional, and edge habitats along the proposed 161-kV TL ROW would be displaced to plentiful adjacent local habitats. Any effects to wildlife are expected to be insignificant.
Endangered and Threatened Species	No effects to endangered or threatened species or any designated critical habitats (DCH) are anticipated.	The proposed action could negatively impact five occurrences of the state-listed Turk's cap lily during initial ROW clearing. However, the effects would be insignificant to the overall state population, which is considered vulnerable, but apparently secure. The clearing of the ROW may have potential long-term benefits on the species by providing sunlight needed for reproduction. No impacts to the federally listed red-cockaded woodpecker and wood stork are anticipated. Tree clearing would remove 72.8 acres of potentially suitable summer roosting habitat for the federally listed as threatened northern long-eared bat. Consultation with the USFWS is currently underway. TVA will finalize all mitigation measures with the USFWS prior to any clearing or construction along the proposed ROW (see Section 2.7).

Resource Area	Impacts From Implementing the No Action Alternative	Impacts From Implementing the Action Alternative
Floodplains	Local floodplain functions would not be affected.	Local floodplain functions would not be affected.
Wetlands	No changes in local wetland extent or function are expected.	A total of 70.81 acres of wetland are located within the proposed ROW, of which, 44.49 are forested (26.81 of superior quality). Forested wetlands would be converted to emergent and/or scrub-shrub wetland habitat, thus reducing some wetland functions; however, with the implementation of identified minimization and mitigation measures, there would be minimal adverse impacts and minimal 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. The proposed TL would present a minor cumulative visual effect.
Archaeological and Historic Resources	No effects to archaeological or historic resources are anticipated.	Three sites that are potentially eligible for listing on the National Register of Historic Places could be adversely impacted under this alternative. TVA is currently in consultation with the Mississippi SHPO to avoid, minimize, or mitigate the adverse effects on these sites (see Section 2.7).
Recreation, Parks, and Natural Areas	No changes in local recreation opportunities or natural areas are expected.	The proposed TL would cross the Natchez Trace Parkway. TVA is currently in consultation with the NPS to minimize potential impacts to the parkway. There would be no impacts to the five nearby natural areas, as they are over two miles from the TL(see Section 2.7).
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 economic stability and growth in the area. Any adverse social, economic or environmental justice effects would be minor and would diminish over time.

2.6 Identification of Mitigation Measures

TVA employs standard practices when constructing, operating, and maintaining transmission lines, structures, and the associated ROW and access roads. These can be found on TVA's transmission website (TVA 2016). Some of the more specific routine measures would be applied to reduce the potential for adverse environmental effects during the construction, operation, and maintenance of the proposed TL and access roads are as follows:

- TVA would utilize standard BMPs, as described by Muncy (2012), 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 (Invasive Species) for revegetating with noninvasive plant species as defined in Muncy (2012).

- Ephemeral streams that could be affected by the proposed construction would be protected by implementing standard BMPs as identified in Muncy (2012).

- Perennial and intermittent streams would be protected by the implementation of Standard Stream Protection (Category A), Protection of Important Permanent Steams, Springs, and Sinkholes (Category B), or Protection of Unique Habitats (Category C) as defined in Muncy (2012) and appendices E and F.

- TVA would utilize *Environmental Quality Protection Specifications for Transmission Substation or Communications Construction* during the proposed work at their Red Hills 161-kV Substation.

- 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 transmission line location in floodplains.

    - Construction or improvement of access roads would be done in such a manner that upstream flood elevations would not be increased.

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.

- Portions of the proposed ROW are located within state-designated source water protection areas for public water supply. Therefore, herbicides with groundwater contamination warnings would not be used during clearing, revegetation, and maintenance activities.

- 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 Mississippi Department of Environmental Quality (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.

- TVA has determined that archaeological sites 22At571, 22Ch875, and 22Ch877 would be impacted from compaction and possible ground disturbance under the

proposed action. TVA is proposing the following mitigation measures pending Mississippi SHPO agreement.

- To avoid potential adverse impacts, TVA proposes to create a 30-meter buffer surrounding each site and place wetland mats within the buffers during construction and vegetation clearing at all three locations.

- To avoid potential cumulative effects, TVA proposes to mark the locations of the sites' 30-meter buffers on all drawings associated with the TL, and place conditions on all future operation and maintenance activities at the site locations. The conditions will state that the operation/maintenance activities will be conducted during times of dry and firm ground, or by using low-ground-pressure equipment, or with mats placed within the site buffers. No drilling, augering, excavation, or grubbing will be allowed within the site buffers without additional review by TVA staff and, if TVA deems necessary, the SHPO and tribes.

- All tree removal in areas determined to provide suitable roosting habitat for the northern long-eared bats would occur during the winter clearing window, October 1 through April 14, outside of the time (June 1 – July 31) when the bat pups could be present in maternity roosts.

2.7 Unresolved Issues

TVA has determined that construction and operation of this proposed TL would have no direct, indirect, or cumulative impacts on the red-cockaded woodpecker or wood stork. TVA has further determined that suitable summer roosting habitat for the federally listed northern long-eared bat occurs within the affected project area. However, TVA finds that, with the above avoidance and minimization measures in place (Section 2.6), the undertaking would result in no adverse effects to any species federally listed as threatened or endangered. Details of this finding can be found in Appendix A in a letter to the USFWS dated November 21, 2016.

The proposed project would affect cultural resources including archaeological site 22AT571 and the Natchez Trace Parkway. TVA has evaluated these effects and is in consultation with the SHPO (and NPS regarding the Natchez Trace Parkway) regarding TVA's determinations. Details can be found in Appendix A in letters to the SHPO and the NPS, both dated November 14, 2016.

TVA finds that, with the above avoidance and minimization measures in place (Section 2.6), the undertaking would result in no adverse effects to any NRHP-eligible archaeological site within the Natchez Trace Parkway boundary.

Further, based on careful consideration of all of the information provided within the EA, TVA proposes that the undertaking would have no adverse effect on historic properties located within the Natchez Trace Parkway.

TVA will continue to consult with the SHPO and the NPS to explore alternatives for the proposed undertaking that would avoid or minimize adverse effects to the NRHP-eligible Natchez Trace Parkway.

TVA will continue to consult with the USFWS on concurrence of no adverse impacts to northern long-eared bat summer roosting habitat.

2.8 The Preferred Alternative

The Action Alternative—that TVA provides an additional power supply to the Central EPA service area—is TVA's preferred alternative for this proposed project. TVA would purchase ROW easements and any associated access road easements to accommodate the construction of a new 161-kV TL.

TVA's preferred route alternatives for the Action Alternative are alternative route Option 2 for the Red Hills-Weir TL section, comprised of alternative route Segments 38 and 39; and alternative route Option 91 for the Weir-Kosciusko TL section, comprised of alternative route Segments 2, 3, 7, 9, 13, 15, 23, 27, 30, and 32. The total length of the TL and ROW would be approximately 43 miles.

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 43-mile TL is described in this chapter. The descriptions below of the potentially affected environment are based on field surveys conducted between February 2016 and August 2016, 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 10-digit hydrologic unit code[4] (HUC) watershed for aquatic animals. The analysis of potential effects to aquatic resources included the local watershed, but was focused on watercourses within or immediately adjacent to the proposed ROW and associated temporary access roads. The analysis of potential effects to wetland resources was conducted within the 8-digit and 12-digit HUCs, representative of the sub-basin and sub-watersheds, respectively, and consistent with wetland regulatory approach. The area of potential effect (APE) for architectural resources included all areas within a 0.5-mile radius from the proposed TL route, as well as any areas where the project would alter existing topography or vegetation in view of a historic resource. The APE with respect to archaeological resources included the entire ROW width as described in Section 2.2.1.1 for the proposed route and the associated temporary access roads.

3.1 Groundwater and Geology

The project area is located in the Coastal Plain physiographic province and according to available mapping is underlain by rock units belonging to the Eocene Age: the Claiborne group and the Wilcox formation. These sedimentary units are comprised primarily of irregular bedded fine to coarse sand and clay which were formed by deposition of marine sediments in the Mississippi embayment. Coastal Plain sedimentary rocks of this age crop out mostly in off-lapping bands that parallel the perimeter of the Mississippi embayment and dip gently southward toward its axis. The entire Coastal Plain sequence thickens greatly toward the axis of the Mississippi embayment and the Gulf Coast geosyncline. There are no significant carbonate rock units contained in these sequences; therefore, the development of karstic features is very remote.

According to available information, the project area overlies the Lower Claiborne-Upper Wilcox aquifer. To the east the region is underlain by the middle Wilcox aquifer. These units are components of the Mississippi embayment aquifer system, which is the primary water-producing aquifer in the region. Water-bearing aquifers consist of an interbedded mix of fluvial sand and gravel, deltaic sand, silt and clay, and marginal marine sand, silt, and clay (Renken 1998).

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

Groundwater is abundant throughout Mississippi. In the project area, public and private wells pump water from several aquifers. Deep wells are used to supply public water systems from deeper aquifers, while private wells are usually cased in shallow aquifers. Contamination of groundwater occurs when contaminants such as pesticides and fertilizers from agriculture runoff seep into the aquifer. Most public water sources are protected from contamination due to the depth of the wells, which are naturally protected by overlying clay (confining) layers. Groundwater is the primary source for public water supply for Choctaw, Attala, and Winston counties (USEPA 2016). Several source water protection areas for public supply wells are located within the proposed TL ROWs (MDEQ 2016).

3.2 Surface Water

This project area drains to several streams in the vicinity of Tibby Creek-Yockanookany River (HUC 0318000111), Cole Creek-Yockanookany River (HUC 0318000112), Lobutcha Creek (HUC 318000107), and Shiola Creek-Yockanookany River (HUC 318000113) 10-digit HUC watersheds.

Precipitation in the general area of the proposed project averages about 57.0 inches per year. The average air temperature in degrees Fahrenheit is 64.1, ranging from a monthly average of 32 degrees Fahrenheit in January to 92 degrees Fahrenheit in July (Bestplaces 2016). Stream flow varies with rainfall and averages about 18.1 inches of runoff per year; i.e., approximately 1.33 cubic feet per second, per square mile of drainage area (USGS 2008).

The CWA requires all states to identify all waters in which required pollution controls are not sufficient to attain or maintain applicable water quality standards and to establish priorities for the development of limits based on the severity of the pollution and the sensitivity of the established uses of those waters. States are required to submit reports to the USEPA. The term “303(d) list” refers to the list of impaired and threatened streams and water bodies identified by the state. Tibby Creek is listed on Mississippi’s 303(d) list due to biological impairment (MDEQ 2014a), and a fish consumption advisory has been posted for the Yockanookany River for PCBs in Attala County and mercury for the entire stream length (MDEQ 2014b). Table 3-1 provides a listing of local streams with their state-designated uses (MDEQ 2010).

Table 3-1 Uses for Streams in the Vicinity of the Proposed 161-kV Transmission Line and Associated Access Roads

Stream	Use Classification[1]				
	FW	REC	PWS	SH	ES
Yockanookany River	X				
Tributaries of Yockanookany River	X				
Besa Chitto Creek	X				
Tibby Creek and tributaries	X				
Rawhide Branch	X				
Egg Creek and tributaries	X				
Hurricane Creek and tributaries	X				
Turkey Creek and tributaries	X				
Lobutcha Creek[2]	X				
Bear Creek	X				
Tom Fork and tributaries	X				
Kyle Creek and tributaries	X				
Cowpen Creek tributaries	X				
Sand Creek tributaries	X				

[1] Codes: FW = Fish and Wildlife; REC = Recreation; PWS = Public Water Supply; SH = Shellfish Harvesting; ES = Ephemeral Stream

[2] Not part of the project area, just shown for river network path.

3.3 Aquatic Ecology

The proposed TL route crosses portions of the Yockanookany River, Tibby Creek, Cole Creek, Lobutcha Creek, and Shiola Creek watersheds. Streams encountered during field surveys were typical of the Southeastern Plains ecoregion, with low to moderate gradient and substrates comprised primarily of sand. Overall, a total of 220 watercourse intersections occur along the proposed TL route, access roads, and/or within the proposed ROW. These watercourses include 24 perennial, 31 intermittent, 165 ephemeral streams[5], and four ponds.

Because TL construction and maintenance activities mainly affect riparian conditions and instream habitat, TVA evaluated the condition of these factors at each stream crossing along the proposed TL route. Riparian conditions were evaluated during a March 2016 field survey using the TVA habitat assessment form. A listing of stream crossings in the project area, excluding ephemeral streams, is provided in Appendix C. Additional information regarding watercourses in the vicinity of the project area can be found in Section 3.2.

Three classes were used to indicate the current condition of streamside vegetation across the length of the proposed TL and access roads, as defined below, and accounted for in Table 3-2.

[5] Ephemeral streams are those small creeks and streams that typically flow only following rainfall events. They are also known as wet-weather conveyances or "WWCs."

- 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.

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

Table 3-2 Riparian Condition of Streams Located Along the Proposed 161-kV - Transmission Line Route and Associated Access Roads

Riparian Condition	Perennial Streams	Intermittent Streams	Total
Forested	14	25	39
Partially forested	7	5	12
Non-forested	3	1	4
Total	**24**	**31**	**55**

The northern third of the proposed preferred TL route is drained by the Tibby Creek-Yockanookany River watershed. The remaining two-thirds of the TL route is drained by the Lobutcha Creek, Shiola Creek-Yockanookany River, and Cole Creek-Yockanookany River watersheds. While some channelization and removal of riparian areas has impacted streams along the proposed TL route, the majority of aquatic resources observed in the project vicinity appeared stable with intact riparian zones in forested areas. The primary impact to watercourses in the project vicinity appeared to be logging operations and in some instances, livestock access to stream channels.

3.4 Vegetation

The proposed upgrades to the TVA transmission system would occur in the Southern Hilly Gulf Coastal Plain Level IV ecoregion (Chapman et al 2004). This ecoregion extends from Mississippi through Alabama into western Georgia, and is underlain by a variety of sand, clay, and marl formations. Oak-hickory-pine forest is the dominant natural vegetation type in the portion of the ecoregion where the proposed project is situated. Currently, land cover is mostly forest intermixed with pasture and cropland.

Field surveys were conducted in March and April 2016 to document plant communities and any infestations of invasive plants, and to search for possible threatened and endangered plant species in areas where work would occur. All areas along the proposed ROW were visited during the survey. Using the national vegetation classification system (Grossman et al. 1998), vegetation types observed during field surveys were classified as a combination of deciduous forest, 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 onsite are common and well represented throughout the region. Vegetation in the proposed transmission line ROW is characterized by two main types: forest (70 percent) and herbaceous (30 percent).

Evergreen forest, which accounts for about 40 percent of total cover, has low species diversity and is dominated by loblolly pine in the overstory. Many of these stands were planted. Canopy trees are approximately the same size and are regularly harvested to produce wood products. These stands bear little resemblance to native plant communities found in the region. Other evergreen forest stands are the result of land use. Here, loblolly pine was the first tree species to colonize a 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, occupies about 20 percent of the proposed ROW. Deciduous forest can be further subdivided into dry upland forest, mesic upland forest, and wetland forest. While there is some overlap in the species composition between these subtypes, there are basic differences in the common plants found in each habitat types. The canopy of dry deciduous forest is dominated by oaks (black, blackjack, post, scarlet, southern red, and white) and shagbark hickory, with the occasional loblolly and shortleaf pine. This forest type typically occurs on ridge tops and upper slopes, and contains relatively few plants in the understory. Typical understory species include Blue Ridge blueberry, cat greenbrier, crippled cranefly, farkeberry, and muscadine.

Mesic upland forest occurs on mid to lower slopes and supports a greater number of species. Common overstory trees in this forest type include American beech, blackgum, cherrybark oak, sweetgum, white oak, and yellow poplar, often with some component of loblolly pine. The herbaceous layer is rich compared to dry deciduous forest, and contains species like broad looseflower sedge, Canadian blacksnakeroot, Christmas fern, devil's grandmother, ebony spleenwort, jack in the pulpit, little sweet Betsy, mayapple, slender woodrats, spring beauty, twoflower melicgrass, violet woodsorrel, and Willdenow's sedge. The invasive plants Chinese privet and Japanese honeysuckle were common in this habitat type. In addition, all occurrences of the state-listed plant Turk's cap lily were located in this forest type. Forested wetlands are described in detail in Section 3.8.

Mixed evergreen-deciduous forest, defined as stands where both evergreen and deciduous species contribute between 25-75 percent of total canopy cover, occurs on about 10 percent of the ROW where work would occur. In general, these forest types are similar to the dry and mesic deciduous forests described above, but contain a greater percentage of loblolly pine, and to a lesser extent, Eastern red cedar and shortleaf pine.

Herbaceous vegetation is characterized by a greater than 75 percent cover of forbs and grasses and less than 25 percent cover of other types of vegetation. The majority of this habitat type occurs along the existing transmission line ROW in the portion of the project area where overhead ground wire replacement would occur, 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 Brazilian vervain, broomsedge, buttercup, crabgrass, dallisgrass, English plantain, hairy buttercup, goldenrod, greasy grass, ironweed, narrowleaf mountain mint, path rush, tall fescue, Vasey's grass, wild garlic, and winter bentgrass. Areas of emergent wetlands were present in the project area. See Section 3.8 (Wetlands) for species indicative of those areas.

EO 13112 serves to prevent the introduction of invasive species and provides for their control to minimize the economic, ecological, and human health impacts that those species potentially cause. In this context, invasive species are non-native species that invade natural areas, displace native species, and degrade ecological communities or ecosystem processes (Miller et al. 2010). During field surveys, non-native invasive plants were prevalent in both forest and herbaceous vegetation types. However, no federally listed noxious weeds were observed. Invasive species present across significant portions of the landscape include Brazilian vervain, Chinese privet, dallisgrass, Japanese honeysuckle, Japanese stilitgrass, and Vasey's grass.

3.5 Wildlife

Wildlife habitat assessments were conducted in February, March, and August 2016 for the proposed TL and associated ROW. The project area occupies approximately 557 acres. Landscape features within and surrounding the project area consist of a variety of forested habitat (natural and pine plantations), wetlands, stream crossings, and early successional habitat (i.e., pasture and agricultural), and residential or otherwise disturbed areas. Of the forested acreage in the project footprint, approximately 391 acres would be cleared for the new TL and maintained as early successional habitat. Each of the varying community types offers suitable habitat for species common to the region, both seasonally and year-round.

Forest types present within the project footprint include evergreen, mixed deciduous-evergreen, and bottomland forests. Evergreen forests comprise approximately 38 percent (213 acres) of the project footprint. Plantations of loblolly pine are the most common type of forest found along the proposed ROW. These forests provide habitat for common terrestrial wildlife. Northern cardinal, tufted titmouse, Carolina chickadee, golden-crowned kinglet, wood thrush, pine warbler, and pileated woodpecker all utilize this habitat (Sibley, 2003). Eastern fox squirrel, Seminole bat, wild pig, and nine-banded armadillo are mammals that may utilize resources found in pine forests (Smithsonian 2016). Eastern hognose snake, corn snake, and ground skink are common reptiles in open pine forests in this region (Bailey et al. 2006).

Mixed deciduous-evergreen forest types comprise approximately 32 percent (178 acres) of the project footprint and provide habitat for an array of common terrestrial animal species. Birds typical of upland habitat include the downy woodpecker, yellow-bellied sapsucker, black-throated green warbler, white-throated sparrow, red-shouldered hawk, wild turkey, eastern towhee, Carolina wren, and eastern phoebe (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, white-footed deer mouse, bobcat, and gray fox are other mammals likely to occur within this habitat (Smithsonian, 2016). Amphibians such as the eastern spadefoot and reptiles such as the eastern box turtle, coal skink, and ring-necked snake are found in deciduous forests in this region (Bailey et al. 2006).

Pastures and agricultural fields comprise approximately 30 percent (166 acres) of the project footprint. Common inhabitants of this type of early successional habitat include killdeer, barn swallow, eastern bluebird, eastern meadowlark, northern bobwhite, broad-winged hawk, and red-tailed hawk (Sibley 2003). White-tailed deer, coyote, eastern cottontail, hispid cotton rat, and red fox are mammals typical of fields and cultivated land

(Smithsonian 2016). Reptiles, including the common garter snake and amphibians such as the southern chorus frog and green frog are also known to occur in this habitat type (Bailey et al. 2006).

Residential developed areas, and areas otherwise previously disturbed by human activity are home to a large number of common species. The American crow, American robin, northern flicker, blue jay, mourning dove, northern mockingbird, and turkey vulture are birds commonly found along road edges, industrial properties, and residential neighborhoods (Sibley 2003). Mammals found in this community type include the eastern gray squirrel, raccoon, and Virginia opossum (Smithsonian 2016). Roadside ditches provide potential habitat for amphibians including the spring peeper and bullfrog. Reptiles potentially present include the eastern rat snake, eastern fence lizard, and five-lined skink (Bailey et al. 2006).

Both forested wetlands and riparian habitat occur within the project footprint. Such habitats provide resources for birds, including the red-bellied woodpecker, prothonotary warbler, belted kingfisher, great blue heron, and barred owl (Sibley 2003). American beaver, muskrat, mink, and river otter are common mammals of emergent wetland and aquatic communities (Smithsonian 2016). Cottonmouth, eastern ribbon snake, red-eared slider, and snapping turtle are common reptiles likely present within this habitat along the proposed ROW (Bailey et al. 2006). Amphibians likely found in forested wetlands in this area include the southern two-lined salamander, eastern newt, gray treefrog, and southern leopard frog (Bailey et al. 2006).

According to the TVA Regional Natural Heritage database, no caves occur within three miles of the project area, and no caves were observed within the project area during the field reviews. High-quality wetlands which contain habitat for the federally listed northern long-eared bat were identified within the project area (see Section 3.6 and 3.8). Habitat for migratory birds and potential foraging habitat for federally threatened wood stork was observed in these wetlands during field surveys.

3.6 Endangered and Threatened Species

Endangered species are those determined to be in danger of extinction throughout all or a significant portion of their range. Threatened species are those determined to be likely to become endangered within the foreseeable future. Section 7 of the ESA requires federal agencies to consult with the USFWS when their proposed actions may affect endangered or threatened species or their critical habitats.

The 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 (DCH). The policy of Congress is that federal agencies must seek to conserve endangered and threatened species and use their authorities in furtherance of the ESA's purposes.

The state of Mississippi provides protection for species considered threatened, endangered, or of special concern within the state other than those federally listed under the ESA. The listing is handled by the Mississippi Commission on Wildlife, Fisheries and Parks; however, the Mississippi Natural Heritage Program and the TVA Regional Natural Heritage database both maintain a list of species considered threatened, endangered, of

special concern, or tracked in Mississippi. A listing of these federally and state-listed species known to occur near the proposed TL ROW is provided as Table 3-3.

Table 3-3 Federally and State-listed Species from and/or within Attala, Choctaw, and Winston Counties, Mississippi[1]

Common Name	Scientific Name	Federal Status[2]	State Status[2]	State Rank[3]
Plants[4]				
Swamp hickory	*Carya glabra* var. *hirsute*	-	SLNS	S2S3
White turtlehead	*Chelone glabra*	-	SLNS	S3
Crested coralroot	*Hexalectris spicata*	-	SLNS	S2
Turk's cap lily[5]	*Lilium superbum*	-	SLNS	S3S4
Carolina anglepod	*Matelea carolinensis*	-	SLNS	S3
Monkey-flower	*Mimulus ringens*	-	SLNS	S1S2
American ginseng	*Panax quinquefolius*	-	SLNS	S3
Mock-orange	*Philadelphus inodorus*	-	SLNS	S2
Crested fringed orchid	*Platanthera cristata*	-	SLNS	S3
Ragged fringe orchid	*Platanthera lacera*	-	SLNS	S1S2
Purple fringeless orchid	*Platanthera peramoena*	-	SLNS	S2S3
American bladdernut	*Staphylea trifolia*	-	SLNS	S3
Heart-leaved foam-flower	*Tiarella cordifolia*	-	SLNS	S2
Horse-gentian	*Triosteum angustifolium*	-	SLNS	S3
Fishes				
Freckled darter[6]	*Percina lenticular*	--	TRKD	S2
Sabine shiner[6]	*Notropis sabinae*	--	TRKD	S3
Birds[7]				
Red-cockaded woodpecker	*Picoides borealis*	LE	END	S1
Wood stork	*Mycteria Americana*	LT	THR	S2N
Mammals[7]				
Northern long-eared bat[8]	*Myotis septentrionalis*	LT	TRKD	S2

[1] Sources: TVA Regional Natural Heritage database, Mississippi Natural Heritage data, and USFWS Ecological Conservation Online System, USFWS Information, Planning, and Assessment (IPaC) database.

[2] Status Codes: END = Endangered; LE = Listed Endangered; LT = Listed Threatened; THR = Threatened; TRKD = Tracked by state natural heritage program (no legal status); SLNS = State Listed, no status assigned.

[3] State Ranks: S1 = Critically imperiled; S2 = Imperiled; S3 = Vulnerable; S4 = Apparently Secure; S#S# = Denotes a range of ranks because the exact rarity of the element is uncertain (e.g., S1S2); S#N = rank of non-breeding population.

[4] Plant species previously reported from within five miles of ROW.

[5] Listed plant species observed in the proposed ROW.

[6] Aquatic animal species identified outside of the affected watersheds but within Choctaw and Winston counties, and both are greater than 10 miles away from the proposed TL route.

[7] Federally listed species occurring within the county where work would occur, but not necessarily within three miles of the project area.

[8] Federally threatened species that the USFWS has determined has the potential to exist in Attala, Choctaw, and Winston Counties, Mississippi, though no records are known to date.

3.6.1 Aquatic Animals

An August 2016 review of the TVA Regional Natural Heritage database indicated that no federally listed species or DCH occurs within the watersheds potentially affected by the proposed TL route within Choctaw, Attala, and Winston counties, or within a 10-mile radius of the proposed project. Two state-listed fish are known from within the Tibby Creek-Yockanookany River, Cole Creek-Yockanookany River, and Lobutcha Creek-Shiola Creek-Yockanookany River watersheds of the proposed project and/or within Choctaw, Attala, and Winston counties (Table 3-3). The state-listed freckled darter and Sabine shiner occur in the Noxubee River and Big Black River; both of which are outside the affected watersheds but within Choctaw and Winston counties. Both are greater than 10 miles away from the proposed TL route.

3.6.2 Plants

A review of the TVA Regional Natural Heritage database indicated no federally listed plant species or DCH have been previously reported from Attala, Choctaw, or Winston counties. Fourteen state-listed plant species have been previously reported within a five-mile vicinity of the project area (Table 3-3). No federally or state-listed plants were observed within the proposed ROW.

Five occurrences of the state-listed Turk's cap lily were observed within the proposed new ROW. This species is wide-ranging and occurs in variety of habitats across the eastern United States (Skinner 2002). Turk's cap lily has been previously reported from 25 counties in Mississippi (MMNS 2016). All of the plants observed were located wholly within the proposed ROW and were vegetative at the time of survey. Although a few plants may flower later in the year, the majority will remain vegetative given the shaded sites where they occur. Three occurrences contained fewer than 10 plants, one contained 64, and one contained about 100 individuals.

3.6.3 Terrestrial Animals

The TVA Regional Natural Heritage database has no records for the presence of federally or state-listed terrestrial animal species from within three miles of the project area (Table 3-3). One federally endangered species (red-cockaded woodpecker) is known from Choctaw and Winston counties. None are known from Attala County. Additionally, the federally threatened northern long-eared bat and wood stork are thought by USFWS to have the potential to occur in all counties associated with this project, although no records of its presence are known to date (Table 3-3).

Red-cockaded woodpeckers typically inhabit open, mature pine forests with a dense groundcover consisting of a variety of grass, forb, and shrub species (NatureServe 2016a). Populations are typically restricted to heavily managed areas where fire management regimes maintain ideal habitat for this species (Turcotte and Watts 1999). These woodpeckers are thought to be extirpated from most of their range including Attala, Choctaw, and Winston counties (NatureServe 2016a). Twenty-one records of nest trees or colonies of the red-cockaded woodpecker are known from Choctaw and Winston counties. The nearest occurs approximately 4.24 miles from the project footprint in the Tombigbee National Forest. Twenty of the 21 records are colonies observed in 1978. The most recent record was in 1984 approximately 20.4 miles east of the project footprint in Winston County. Suitable nesting and foraging habitat for this species does not exist within the project area. The red-cockaded woodpecker would not be impacted by the proposed action.

Wood storks nest in colonies 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 2016b). 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 2016b). Vagrant individuals are believed to occur statewide and the nearest known records are approximately 20 miles east of the project area in Oktibbeha and Winston counties. No known records exist for Attala or Choctaw counties. Although the proposed project ROW includes suitable habitat for the wood stork, it is in an area that contains an existing TL. Expanding the existing ROW may remove some roost trees, but would likely increase foraging habitat. Wood storks are rare in the region and are not likely to be impacted by the proposed action.

The northern long-eared bat predominantly overwinters in large hibernacula such as caves, abandoned mines, and cave-like structures. During the fall, and occasionally in spring, this species utilizes 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. They prefer mature forests with an open understory that is often near sources of water, switch roosts approximately every two days, and have a high site fidelity to summer roosting areas and winter hibernacula. This species has also been documented roosting in abandoned buildings and under bridges, though primary summer roosting sites appear to be trees. Northern long-eared bats emerge at dusk to forage below the canopy of mature forests on hillsides and roads, and occasionally over forest clearings and along riparian areas (USFWS 2014). The USFWS has determined that this species has the potential to occur within the northern half of Mississippi; however, no records are known from Attala, Choctaw, or Winston counties (USFWS 2014). The nearest known record is from 103 miles northeast in Franklin County, Alabama. There are no documented caves within three miles of the project area. No caves or other potential winter or summer roosting man-made structures were observed during field surveys of the project area in February, March, and August 2016. Foraging habitat exists throughout the proposed project area in forest fragments, along forest edges and fence rows, and over wetlands, ponds, and streams. Suitable summer roosting habitat for northern long-eared bat exists within several forested sections of the project area and in many of the moderate and superior wetlands within the ROW (see Appendix D). Assessment of the project area for the presence of summer roosting habitat for northern long-eared bat followed 2015 range-wide Indiana bat summer survey guidelines (USFWS 2015) and resulted in the identification of 40 forest fragments, totaling 72.8 acres. Suitable summer roosting areas were comprised of mature mixed hardwood/evergreen stands dominated by a mixture of white oak, shagbark hickory, and shellbark hickory.

3.7 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 TL route and access roads would cross floodplain areas associated with streams (see Section 3.3) in Attala, Choctaw, and Winston counties.

3.8 Wetlands

Wetlands are those areas inundated by surface or groundwater such that vegetation adapted to saturated soil conditions is prevalent. Examples include bottomland forests, swamps, marshes, wet meadows, and fringe wetlands along the edge of watercourses and impoundments. Wetlands provide many societal benefits including toxin absorption and sediment retention for improved water quality, storm water attenuation for flood control, shoreline buffering for erosion protection, and provision of fish and wildlife habitat for commercial, recreational, and conservation purposes. Field surveys were conducted in February, March, and July 2016 to map wetland areas and delineate forested, scrub-shrub, and emergent wetland habitats potentially affected by the preferred route under the proposed Action Alternative. 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. 2014; USACE 2010; U. S. Department of Defense and USEPA 2003).

Using a TVA-developed modification of the Ohio Rapid Assessment Method (Mack 2001) specific to the TVA region (TVA Rapid Assessment Method or "TVARAM"), wetlands were evaluated by their functions and classified into three categories: low quality, moderate quality, and superior quality. Low quality wetlands are degraded aquatic resources which may exhibit low species diversity, minimal hydrologic input and connectivity, recent or ongoing disturbance regimes, and/or predominance of non-native species. These wetlands provide low functionality and are considered of 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 and there is reasonable potential for restoration. Superior quality wetlands include those wetlands offering high functions and values within a watershed or are of regional/statewide concern. Superior quality wetlands may exhibit little, if any, recent disturbance, provide essential and/or large scale storm water storage, sediment retention, and toxin absorption, contain mature vegetation communities, and/or offer habitat to rare species. Conditions found in superior quality wetlands often represent restoration goals for wetlands functioning at a lower capacity.

The proposed TL route would traverse a rural landscape dominated by pine plantations, forested uplands and bottomlands, and sporadic agricultural fields. The project is located within the Pearl River sub-basin (8-HUC) across 11 sub-watersheds (12-HUC). The ROW corridor crosses several watercourses and their associated bottomland wetland complexes, within the project's watershed. Specifically, the ROW crosses wetland bottoms associated with Beso-Chitto Creek, Tibby Creek, Hurricane Creek, Sand Creek, Bear Creek, Tom Fork, Kyle Creek, Cowpen Creek, the Yockanookany River floodplain (twice), and many floodplain wetlands of unnamed tributary drainages. Field surveys identified the actual extent and quality of wetlands within the proposed ROW and access roads. A total of 122 wetland habitats, across 102 wetland complexes, totaling 70.81 wetland acres were identified within the ROW proposed for construction and access road use (Appendix D). Wetlands identified within the project footprint consisted of emergent, scrub-shrub and forested wetland habitat of varying levels of quality, thus providing varying levels of wetland function and value to the surrounding landscape (Table 3-4 and Appendix D). The combination of land-use practices and landscape dictates the type of wetland habitat and wetland functional capacity. These wetlands were generally identified in association with

ephemeral or intermittent drainage features, headwater flats, or large floodplain bottoms. Tables 3-4 and 3-5 identify the acreage and type of wetlands by watershed within the ROW.

Table 3-4 Acreage of Low, Moderate, and High Quality Wetlands by Watershed Within the Proposed Transmission Line Right-of-Way

Sub-Watershed (12-HUC)	Estimated Total Wetland Acres in Sub-Watershed	Total Wetland Acreage on ROW			
		Low Quality	Moderate Quality	Superior Quality	Total
Besa-Chitto Creek	550	2.95	2.52	3.51	8.98
Upper Yockanookany River	1,300	0.20	0.85	5.69	6.74
Lower Tibby Creek	1,200	2.52	5.74	4.47	12.73
Reedy Creek-Lobutcha Creek	2,100	0	0.06	0	0.06
Panther Creek-Yockanookany River	3,500	0	0.65	0	0.65
Ethel-Hurricane Creek	500	0	1.17	0	1.17
Dry Creek-Lobutcha Creek	1,700	0.15	0.32	2.06	2.53
Bear Creek-Lobutcha Creek	3,400	0	1.90	6.46	8.36
Ethel-Turkey Creek	125	0.38	1.98	0	2.36
Leflore Creek-Yockanookany River	2,700	0	11.34	12.09	23.43
Shiola Creek-Yockanookany River	5,200	0.44	3.36	0	3.80
Total	**>20,000**	**6.64**	**29.89**	**34.28**	**70.81**

Table 3-5 Acreage of Wetland Habitat Type by Watershed Within the Proposed Transmission Line Right-of-Way

Sub-watershed (12-HUC)	Estimated Total Wetland Acres in Sub-Watershed	Total Wetland Acreage on ROW				
		Emergent	Scrub-Shrub	Pine Timber	Forested	Total
Besa-Chitto Creek	550	2.95	0.12	0.10	5.81	8.98
Upper Yockanookany River	1,300	0.20	0	1.36	5.18	6.74
Lower Tibby Creek	1,200	2.32	0.57	2.63	7.21	12.73
Reedy Creek-Lobutcha Creek	2,100	0	0	0	0.06	0.06
Panther Creek-Yockanookany River	3,500	0	0	0.10	0.55	0.65
Ethel-Hurricane Creek	500	0.06	0.16	0	0.95	1.17
Dry Creek-Lobutcha Creek	1,700	0	0	0	2.53	2.53
Bear Creek-Lobutcha Creek	3,400	0.21	0.21	0.43	7.51	8.36
Ethel-Turkey Creek	125	0.72	0.68	0.72	0.24	2.36
Leflore Creek-Yockanookany River	2,700	4.67	4.67	1.03	13.06	23.43
Shiola Creek-Yockanookany River	5,200	0.71	1.70	0	1.39	3.80
Total	**>20,000**	**11.84**	**8.11**	**6.37**	**44.49**	**70.81**

Emergent wetland area within the ROW totaled 11.84 acres across 28 delineated wetlands. Emergent wetlands are generally devoid of woody vegetation with predominant cover by non-woody species across areas periodically saturated and/or inundated. Often emergent wetlands are found where land-use practices deter growth of woody species or saturation and/or inundation of the area is at a frequency which precludes woody vegetation establishment and growth. Within the proposed ROW, this type of wetland habitat comprised lowland fields and pasture in W003, W007, W019, W087, W088, and W096a; early regeneration within clear-cut areas and/or early planted pine in W030, W031a, part of W068, W073, and W075-rr; sedge meadows in W034 and W094b-rr; undeveloped roads through part of W064 and entirely along W084c; wildlife food plots in W078b, W079c-rr, and W094d; existing distributor ROW in W043, W090a, W095c, W097b-rr, W098b-rr, W099b-rr, W100b-rr, W101b-rr, and W102b-rr; and an overflow or seepage swale from a municipal retention basin in W103-rr. All of these wetland areas contain indicators of wetland hydrology influencing soil physiology such that coloration indicative of wetland conditions

was evident in the soil profile. Typical wetland sedges, grasses, rushes, and forbs dominated these habitats. This included wetland pathrushes, panic grasses, bluestem grasses, bulrushes, sedges, giant goldenrod, plumegrass, and occasional stands of cattail. Condition and functional capacity of these wetlands ranged from low to superior in quality, largely due to or dependent on size, landscape position, and degree of impacts evident (e.g. grazing, timber harvest, soil compaction, mowing) (Table 3-6).

Table 3-6 Acreage of Low, Moderate, and High Quality Emergent Wetlands by Watershed Within the Proposed Transmission Line Right-of-Way

Sub-watershed (12-HUC)	Emergent Wetland Acreage on ROW			
	Low Quality	Moderate Quality	Superior Quality	Total
Besa-Chitto Creek	2.95	0	0	2.95
Upper Yockanookany River	0.20	0	0	0.20
Lower Tibby Creek	0.56	1.76	0	2.32
Reedy Creek-Lobutcha Creek	0	0	0	0
Panther Creek-Yockanookany River	0	0	0	0
Ethel-Hurricane Creek	0	0.06	0	0.06
Dry Creek-Lobutcha Creek	0	0	0	0
Bear Creek-Lobutcha Creek	0	0.21	0	0.21
Ethel-Turkey Creek	0.14	0.58	0	0.72
Leflore Creek-Yockanookany River	0	1.74	2.93	4.67
Shiola Creek-Yockanookany River	0.06	0.65	0	0.71
Total	**3.91**	**5.00**	**2.93**	**11.84**

Scrub-shrub wetland area consisted of wetlands dominated by woody vegetation generally less than 15 feet tall and 3 inches diameter (Cowardin et al. 1979). This habitat type can be representative of young saplings in early successional forest (scrubby) or woody species developing to a natural peak height of relatively low stature (shrubby). Scrub-shrub wetland habitat within the proposed ROW totaled 8.11 acres across 14 delineated wetlands. Half of W001 contained scrub-shrub vegetation as a result of dead and fallen trees; W030, W031a, and W068 contained scrubby wetland habitat within clear-cut or timber harvested areas; W041 consisted of a failing pond developing a young stand of hardwood saplings; W064

contained scrubby wetland habitat along an undeveloped road; W071 consisted of a tag alder flat; W086 and W095b consists of old clear cuts with early successional hardwoods; W093-rr is located within an existing and maintained utility ROW; and W079a-rr, W094b-rr, W099-rr, and W100-rr consisted of young black willow basins. All scrub-shrub wetland habitat exhibited wetland hydrology indicators and hydric soil coloration within the soil profile. Hydrophytic saplings, such as black willow, green ash, sweetgum, and loblolly pine, and shrubs such as tag alder and eastern baccharis comprised the dominant species within this wetland type. As with their emergent wetland counterparts, condition and functional capacity of scrub-shrub wetlands ranged from low to superior in quality, due to size, landscape position, and degree of impacts evident (e.g. woody vegetation removal, age of stand, human disturbance, floodplain setting) (Table 3-7 and Appendix D).

Table 3-7 Acreage of Low, Moderate, and High Quality Scrub-Shrub Wetlands by Watershed Within the Proposed Transmission Line Right-of-Way

Sub-watershed (12-HUC)	Scrub-Shrub Wetland Acreage on ROW			
	Low Quality	Moderate Quality	Superior Quality	Total
Besa-Chitto Creek	0	0.12	0	0.12
Upper Yockanookany River	0	0	0	0
Lower Tibby Creek	0.57	0	0	0.57
Reedy Creek-Lobutcha Creek	0	0	0	0
Panther Creek-Yockanookany River	0	0	0	0
Ethel-Hurricane Creek	0	0.16	0	0.16
Dry Creek-Lobutcha Creek	0	0	0	0
Bear Creek-Lobutcha Creek	0	0.21	0	0.21
Ethel-Turkey Creek	0	0.68	0	0.68
Leflore Creek-Yockanookany River	0	1.49	3.18	4.67
Shiola Creek - Yockanookany River	0	1.70	0	1.70
Total	**0.57**	**4.36**	**3.18**	**8.11**

Pine timber forested wetland comprised 6.37 acres of the proposed ROW across 16 delineated wetland areas. These wetlands included W011, W018b, W024, W031b, W032, W033, W038, W058, W059, W061, W062, W074, W077-rr, W078, W079b, and W094c. These areas were dominated by loblolly pine trees, with ongoing silviculture practices maintaining the wetland habitat accordingly. These pine stands overlay greyed soils with a mottled matrix, meeting the definition of hydric soil. Wetland hydrology was evident across these pine stands where standing water, saturated soils, deposited debris, crayfish burrows, and/or landscape setting indicated sufficient hydrology for wetland development.

As such, loblolly pines are considered facultative species capable of withstanding the hydric conditions evidenced by hydrology indicators and hydric soil present. Pine timber wetlands containing mature trees typically have experienced less recent disturbance, and can provide improved wetland value. However, these are manipulated environments whose functional capacity is unstable due to anticipated rotational timber practices and projected impacts.

Forested wetlands in general have deeper root systems and contain greater biomass (quantity of living matter) per area than do emergent and scrub-shrub wetlands, which do not grow as tall. As a result, forested wetlands tend to be able to provide higher levels of wetland functions, such as sediment retention, carbon storage, and pollutant retention and transformation (detoxification), all of which support better water quality (Ainslie et al. 1999; Scott et al. 1990; Wilder and Roberts 2002). Due to landscape position, buffer composition, hydrologic influence, disturbance history, and habitat features, the forested wetland within the ROW varied in quality and associated value provided to the surrounding watershed. Of the 44.49 acres of forested wetland within the ROW, 26.81 acres were superior quality providing high functional capacity; 17.09 acres were of moderate quality and functional capacity; and 0.59 acre of low quality (Table 3-8).

Table 3-8 Acreage of Low, Moderate, and Superior Quality Forested Wetlands by Watershed Within the Proposed Transmission Line Right-of-Way

Watershed (12-HUC)	Forested Wetland Acreage within ROW			
	Low Quality	Moderate Quality	Superior Quality	Total within ROW
Besa-Chitto Creek	0	2.3	3.51	5.81
Upper Yockanookany River	0	0.85	4.33	5.18
Lower Tibby Creek	0.06	2.68	4.47	7.21
Reedy Creek-Lobutcha Creek	0	0.06	0	0.06
Panther Creek-Yockanookany River	0	0.55	0	0.55
Ethel-Hurricane Creek	0	0.95	0	0.95
Dry Creek-Lobutcha Creek	0.15	0.32	2.06	2.53
Bear Creek-Lobutcha Creek	0	1.05	6.46	7.51
Ethel-Turkey Creek	0	0.24	0	0.24
Leflore Creek-Yockanookany River	0	7.08	5.98	13.06
Shiola Creek-Yockanookany River	0.38	1.01	0	1.39
Total	**0.59**	**17.09**	**26.81**	**44.49**

The Besa-Chitto Creek watershed contains an estimated 550 wetland acres, of which approximately 500 acres are anticipated to be forested. This watershed contains wetlands W001 through W013 along the ROW, which total 5.81 acres of forested wetland across 10 delineated wetland areas. All forested wetland area within the ROW in this watershed was of moderate quality, with the exception of W004, which exhibited superior quality wetland features. The moderate quality forested wetland area consisted of nine wetland crossings within wide drainage flats tributary to Besa-Chitto Creek. These nine wetland areas exhibited wetland hydrology indicators, such as inundation, saturated soils, drift deposits, crayfish burrows, drainage patterns, and geomorphic position. The presence of wetland

hydrology influenced the soil profile, and hydric soil coloration was evident. As such, hydrophytic forested vegetation dominated and consisted of sweetgum, loblolly pine, black willow, water oak, red maple, and sweetbay magnolia within these moderate quality wetland areas.

W004 comprises 3.51 acres of the Besa-Chitto Creek floodplain wetland complex where the proposed ROW crosses. This superior quality wetland complex stretches between Besa-Chitto Creek and a backwater tributary. Extending west of the ROW, this wetland is a field. East outside the ROW, W004 remains forested for a total of approximately 25 acres separated, from an additional 20+ acres by a road. W004 exhibited surface water, a high water table, and saturated soils, in addition to other secondary hydrology indicators. The water present has altered the soil profile such that hydric soil coloration is evident. Vernal pools were evident throughout, providing desirable amphibian habitat. The wetland was dominated by common overstory wetland species (sweetgum, water oak, red maple), with a clear influence of loblolly pine timber operation around and within portions of the wetland.

The Upper Yockanookany watershed contains an estimated 1,300 wetland acres of which approximately 1,100 acres are anticipated to be forested. This watershed contains wetlands W014 through W018a, which total 5.18 acres of forested wetland within the ROW. W014 and W015 are moderate quality forested wetlands totaling 0.85 acres within the ROW and connected outside the ROW within a meandering wide wetland drainage totaling an estimated 8 acres before its confluence with the Yockanookany River wetland floodplain. These areas exhibited wetland hydrology, hydric soils, and a dominance of younger forested wetland trees and saplings.

W016, W017, and W018a comprise 4.33 acres of superior quality wetland habitat feeding and within the Yockanookany River floodplain wetland complex. While W016 consists of 0.68 acres of superior quality forested wetland along a wide tributary flat, W017 and W018a comprise the ROW crossing of the Yockanookany floodplain bottom. W017 and W18a are separated by a railroad track, but hydrology between the two is maintained via culverts. Wetland hydrology indicators included inundation, saturation, high water table, drainage patterns, crayfish burrows, and geomorphic position. W016 is dominated by buttressed wetland trees across a drain containing vernal pools and braided channels. W017 and W018a contain older mature (greater than 18 inches diameter at breast height [dbh]) and buttressed trees, vernal pools, and braided channels. Dominant hydrophytic vegetation consisted of a combination of cherrybark oak, water oak, willow oak, swamp chestnut oak, and sweetgum. Vernal pools provide desirable habitat for amphibian species. This wetland complex extends east and west of the ROW for an estimated 300 acres.

The Lower Tibby Creek watershed contains an estimated 1,200 wetland acres of which nearly all are anticipated to be forested. This watershed contains wetlands W020 through W036, which total 7.21 acres of forested wetland within the ROW across 11 delineated forested wetland areas. W020 is considered low quality forested wetland due to size, lack of hydrologic influence, and pine timber impacts. W021, W022, W024, W025, W026, W033, W035, W036 are all moderate quality wetlands exhibiting wetland hydrology, soils, and forest vegetation composition similar to the moderate forested wetlands located in Besa-Chitto and upper Yockanookany River watersheds. All moderate quality forested wetland areas crossed by the ROW in this watershed are associated with wide ephemeral or intermittent drainage flats tributary to Tibby Creek.

W023 comprises 3.30 acres of superior quality wetland habitat within the Tibby Creek floodplain crossed by the ROW. Wetland hydrology indicators included inundation, saturation, high water table, water marks on trees, sediment deposits, water stained leaves, drainage patterns, crayfish burrows, and geomorphic position. W023 contained vernal pools, backwater sloughs, and meander scar depressions. Hydric soil coloration was evident throughout. W023 exhibited mature (greater than 18 inches dbh) and buttressed swamp tupelo and cypress lining open water depressions and channels within the floodplain. Other dominant hydrophytic vegetation consisted of large mature red maples and water oaks. During field surveys, an image of a bat (species indiscernible) was photographed within a cavity of a live swamp tupelo along a backwater slough within this floodplain wetland bottom. Similarly, W027 and W028 comprise an additional 1.17 acre of this superior quality forested wetland bottom where the ROW crosses the eastern boundary of the Tibby Creek floodplain further south. These wetland areas contain groundwater seeps over mucky mineral soils, vernal pools, and braided channels. These wetlands were dominated by large mature (greater than 18 inches dbh) and buttressed sweetbay magnolia. W027 and W028 were also deemed suitable habitat for the federally listed as threatened northern long-eared bat. This floodplain wetland complex is estimated to total 500 acres in the immediate vicinity.

The Reedy Creek-Lobutcha Creek, Panther Creek-Yockanookany River, Ethel-Hurricane Creek, and Ethel-Turkey Creek watersheds each contain moderate forested wetlands W037, W039-W040, W042 and W044-W048, and W070 and W072, respectively. These forested wetland areas total 1.56 acres, all dominated by red maple, sweetgum, and/or loblolly pine, with a clear impact by pine timber practices within and around these wetlands. All wetlands exhibited indicators of wetland hydrology and hydric soils. All wetlands were identified along linear wetland drainage features extending outside the ROW and tributary to the larger creek basin within their watershed. These watersheds range in estimated forested wetland cover from 100 acres to over 1,000.

The Dry Creek-Lobutcha Creek watershed contains an estimated 1,700 wetland acres, of which 1,200 acres are anticipated to be forested. This watershed contains wetlands W049 and W051-W056, which total 2.53 acres of forested wetland within the ROW. W049, W051, W052, W053 are moderate quality forested wetlands dominated by sweetgum, red maple, and loblolly pine within a pine timber landscape. These wetlands total 0.32 acres within the watershed. All were identified along linear wetland drainages extending well outside the ROW to feed Sand Creek, which is tributary to the Lobutcha Creek floodplain. These wetlands also exhibited indicators of wetland hydrology and hydric soils. W056, totaling 0.15 acre within the ROW, is a low quality forested wetland due to its small size, limited hydrologic influence, and impact of pine timber harvest operations.

W054 and W055 comprise superior quality forested wetland habitat within the Dry Creek-Lobutcha Creek watershed. W054 and W055 consist of two branches of the same floodplain wetland flat along Sand Creek, totaling 2.06 acre of superior quality forested wetland within the ROW. The ROW passes along the edge of the wetland complex at W054, then bends west at a right angle within the W054, traverses an upland knoll, and then crosses the second finger of the same wetland complex at W055. These wetland areas contained standing water, a high water table, saturated soils, drift deposits, drainage patterns, and crayfish burrows, accompanied by a hydric soil profile. Dominant hydrophytic vegetation consisted of swamp chestnut oak, sweetgum, sweetbay magnolia, water oak, red maple, Elliot's blueberry, and musclewood, with an understory dominated by rivercane and cinnamon fern. Trees were buttressed and vernal pools were scattered throughout.

This wetland floodplain complex is estimated to total 50 acres adjacent to further wetland area, as the floodplain extends south of a road crossing.

The Bear Creek-Lobutcha Creek watershed contains an estimated 3,400 wetland acres, of which 3,100 is anticipated to be forested. This watershed contains wetlands W050 through W069, totaling 7.51 acres of forested wetland across ten delineated wetland areas. W050, W057, W063, W064, and W068 are moderate quality forested wetland area dominated by sweetgum, red maple, and/or sweetbay magnolia. These wetlands total 1.05 acres of forested wetland within the watershed. All were identified at the headwaters or along wide linear drainages tributary to Bear Creek, which feeds the Lobutcha Creek floodplain. These wetlands also exhibited indicators of wetland hydrology and hydric soils.

W060 contains 3.32 acres of superior quality forested wetland within the ROW crossing at the floodplain of Bear Creek. This floodplain wetland complex is estimated to cover in excess of 500 acres. Wetland hydrology indicators included inundation, saturation, high water table, water marks on trees, sediment deposits, drift deposits, drainage patterns, moss trim lines, crayfish burrows, and geomorphic position. W060 contained vernal pools, backwater sloughs, meander scar depressions and braided channels throughout. Hydric soil coloration was evident. W060 exhibited mature (greater than 18 inches dbh) and buttressed trees consisting of large mature sweetbay magnolia, swamp chestnut oak, cherrybark oak, sweetgum, water oak, and cypress with pneumatophores. Similarly, W065, W066, W067, and W069 comprise an additional superior quality forested wetland habitat along tributaries of Bear Creek. W066 and W065 comprise 1.51 acres of superior quality forested wetland within the Tom Fork floodplain, tributary to Bear Creek. W067 consists of 1.09 acres of superior quality forested wetland associated with the Kyle Creek floodplain, which feeds Bear Creek. W069 consists of 0.54 acres of superior quality forested wetland within an unnamed tributary of Kyle Creek. W066 and W069 contain groundwater seeps over mucky mineral soils. W065, W066, W069 contain vernal pools. W065 and W067 contain mature and buttressed trees. These wetlands were dominated by sweetbay magnolia, sweetgum, water oak, and/or swamp chestnut oak.

The Leflore Creek-Yockanookany River watershed contains an estimated 2,700 wetland acres, of which 2,300 are anticipated to be forested. This watershed contains wetlands W080-rr through W095c, totaling 13.06 acres of forested wetland across 14 delineated wetland areas. W080-rr, W081-rr, W082-rr, W091-rr, W092-rr, W093-rr, W094e, and W095a are moderate quality forested wetland area dominated by sweetgum, red maple, and/or sweetbay magnolia. W080-rr, W081-rr, and W091-rr were identified along wide linear drainages tributary to the Yockanookany River. W092-rr, W093-rr, W094e and W095a are finger extensions of the Yockannokany River floodplain crossed by the ROW but separated with upland knolls. All of these wetlands contained sufficient indicators of wetland hydrology, hydric soils, and dominant hydrophytic trees comprised of sweetgum, red maple, green ash, and/or willow oak.

W083 is a 0.48-acre superior quality forested wetland located along a tributary to the Yockanookany River. Due to its buffer extent and condition, hydrologic influence, lack of habitat disturbance, and quality forested habitat, this wetland provides superior wetland function. W084a-b, W085, W089, and W090b comprise 5.5 acres of superior quality forested wetland within the ROW crossing the floodplain of Cowpen Creek, tributary to the Yockanookany River. This floodplain wetland complex is estimated to cover in excess of 100 acres. Wetland hydrology indicators include saturation, high water table, water stained leaves, sediment deposits, and geomorphic position. These wetlands contained vernal

pools and mature forest. Hydric soil coloration was evident. Hydrophytic vegetation consisted of green ash, sweetgum, willow oak, and American elm.

The Shiola Creek-Yockanookany River watershed contains an estimated 5,200 wetland acres, of which 4,900 acres are anticipated to be forested. This watershed contains wetlands W096a through W103-rr, totaling 1.39 acre of forested wetland across five delineated wetland areas. W096b is located along a wide linear drain tributary to the Yockanookany River, and is dominated by sweetgum, green ash, and American elm. W097a-rr through W102-rr parallel an existing ROW as it crosses the Yockanookany River floodplain and the Natchez Trace Parkway. W097a-rr and W098a-rr are considered low quality forested wetlands due to their lack of hydrologic influence, small size, and young forest stature. W101a is a moderate quality oak forested wetland within the ROW at the Yockanookany River floodplain crossing. W102a is influenced by the Yockanookany River floodplain, but located north of the Natchez Trace Parkway. This wetland area is dominated by sweetgum and American elm. All of these wetlands contained sufficient indicators of wetland hydrology and hydric soils. Within this area, the proposed TL would cross portions of wetlands on NPS land (see Appendix D). The Natchez Trace National Scenic Parkway and National Scenic Trail property contains W102a-rr and W102b-rr, entirely; about half of W0101a-rr and W101b-rr overlap their property. As shown in Appendix D, a portion of these NPS-delineated wetlands is forested and a portion is located on existing ROW and maintained as low stature.

Thirteen potential wetlands, totaling 12.72 acres, were identified via desktop review within the 5.2-mile ROW area proposed for overhead ground wire installation (Table 3-9).

Table 3-9 Potential Wetlands Within 5.16-mile Right-of-Way Proposed for Overhead Ground Wire

Wetland Identifier	Wetland Acres
OHGW-W1	0.39
OHGW-W2	0.75
OHGW-W3	0.45
OHGW-W4	1.06
OHGW-W5	0.73
OHGW-W6	0.23
OHGW-W7	2.03
OHGW-W8	3.24
OHGW-W9	1.48
OHGW-W10	0.65
OHGW-W11	0.66
OHGW-W12	0.04
OHGW-W13	1.01
Total	**12.72**

Aerial imagery, NWI data, Natural Resources Conservation Service county soil survey data (SSURGO), and USGS topographic data were compiled for the purpose of identifying these potential wetland areas. All would be located within an existing ROW, where wetland vegetation is routinely maintained at emergent/scrub-shrub stature to accommodate clearance of overhead conductors.

3.9 Aesthetics

3.9.1 Visual Resources

The physical, biological, and cultural features of an area combine to make the visual landscape character both identifiable and unique. Scenic integrity indicates the degree of unity or wholeness of the visual character. Scenic attractiveness is the evaluation of outstanding or unique natural features, scenic variety, seasonal change, and strategic location. Where and how the landscape is viewed affects the more subjective perceptions of its aesthetic quality and sense of place. Views of a landscape are described in terms of what is seen in foreground, middle ground, and background distances.

In the foreground, defined as an area within 0.5 miles of the observer, details of objects are easily distinguished in the landscape. In the middle ground, normally between 0.5 and 4 miles from an observer, objects may be distinguishable, but their details are weak and they tend to merge into larger patterns. Details and colors of objects in the background, the distant part of the landscape, are not normally discernable unless they are especially large and standing alone. The impressions of an area's visual character can have a significant influence on how it is appreciated, protected, and used.

The criteria for classifying the quality and value of scenery have been adapted from a scenic management system development by the U.S. Forest Service (USFS) and integrated with current planning methods used by the TVA. The classification process (i.e., the scenic value criteria for scenery inventory and management) is also based on fundamental methodology and descriptions adapted from USFS (USDA 1995).

The proposed transmission line project is approximately 43 miles in length and located in Attala, Choctaw, and Winston counties in rural Mississippi (see Figure 3-1). At its northernmost end, the TL would connect to the Red Hills Substation in Choctaw County, northwest of the town of Ackerman, MS. The alignment runs predominately south past the Weir Substation, and then traverses southwest from the border of Winston County through Attala County to the Kosciusko Substation, south of the town of Kosciusko. Along the length of the route, the project would utilize existing rural TL ROWs and cross agricultural fields and forested areas. The proposed route crosses over four small two-lane highways, including SR 415 and SR 12 in Choctaw County, and SR 35 southeast of Kosciusko, in Attala County. After SR 35, the route parallels SR 14, turns north to cross the Natchez Trace Parkway along Central EPA's existing 46-kV TL ROW, and then turns south to run parallel to SR 14 again.

3.9.2 Noise and Odors

The Weir Ackerman County Airport is located near the Red Hills-Weir segment of the proposed TL. There are no single major sources of noise along the proposed TL route. However, some traffic noise is generated along SR 35, SR 415, SR 14, and SR 12, and from the towns of Weir, Ackerman, and Kosciusko, which are in close proximity to the

proposed TL route. The traffic noise has become part of the ambient noise and thus is not noticeable.

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

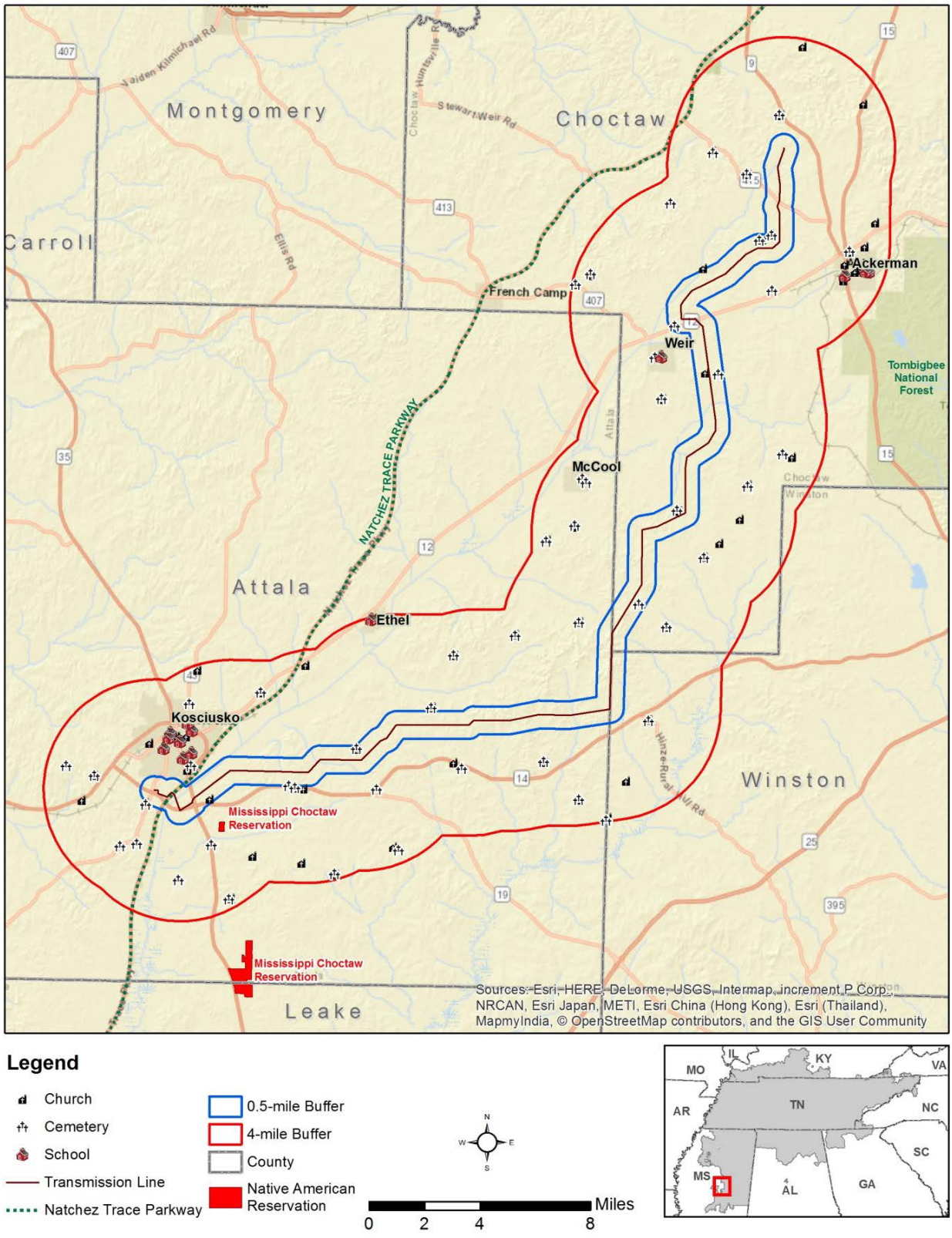

Figure 3-1 Visual Resources Area of Potential Effect for the Proposed Transmission Line

3.10 Archaeological and Historic Resources

Federal agencies are required by Section 106 of the NHPA and by the NEPA to consider the possible effects of their proposed actions (or undertakings) on historic properties. The term "historic property" includes any historic or prehistoric site, district, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (NRHP) maintained by the NPS. "Undertaking" means any project, activity, or program that has the potential to have an effect on a historic property and that is under the direct or indirect jurisdiction of a federal agency, or is licensed or assisted by a federal agency.

To determine an undertaking's possible effects on historic properties, a four-step review process is conducted. These steps are:

1. Initiation (defining the undertaking and the APE, and identifying the parties to be consulted in the process);
2. Identification of historic properties within the APE;
3. Assessment of effects to historic properties; and
4. Resolution of adverse effects by avoidance, minimization, or mitigation.

During the Section 106 process, the agency must consult with the appropriate SHPO, federally recognized tribes that have an interest in the undertaking, and any other party with a vested interest in the undertaking. TVA is coordinating its Section 106 compliance with NEPA's requirement to assess adverse impacts on cultural or historical resources.

TVA has defined the APE for archaeological resources for proposed actions as the preferred route (43 miles) with a 100-foot-wide ROW and 20-foot-wide associated temporary access roads. Of the 58 planned access roads, 27 are within the proposed TL ROW, while 31 access roads totaling 17.4 miles are located outside the ROW; these off-ROW access roads are also included in the APE. The archaeological APE includes four rerouted segments, totaling 6.8 miles in length. Three of the TL segments had a 100-foot-wide ROW, and the most easterly rerouted segment was 250 feet wide. For historic architectural resources, the APE is defined as areas within a 0.5-mile radius surrounding the preferred route centerline that would have a direct line of sight to the proposed new TL.

A Phase I cultural resources survey of the APE was conducted to identify any historic properties that may be impacted by the undertaking. The investigation included an archaeological survey and a survey for historic aboveground (architectural) resources. Initially, background research conducted prior to the survey indicated that no archaeological sites had been identified previously within the archaeological APE. However, two sites were revisited in the rerouted segments: 22AT540 and 22AT571. As a result of the surveys, eight archaeological sites (22Ch874, 22Ch875, 22Ch876, 22Ch877, 22At540, 22At571, 22Ch1190, and 22Ch1189) and five isolated finds of archaeological material were identified in the APE. TVA has determined that sites 22Ch874, 22Ch876, 22Ch1190, 22Ch1189, the portion of 22AT540 that falls within the APE, and all five isolated finds are ineligible for inclusion in the NRHP due to a lack of potential to provide information important to the past. TVA has determined that sites 22Ch875 and 22Ch877 may have such potential and should be considered to be of undetermined NRHP eligibility based on available information. Additionally, TVA recommends that the portion of 22At571 within the APE has the potential to significantly contribute to research concerning the prehistory of the

region and thus holds an undetermined NRHP eligibility status. These determinations are pending agreement from the Mississippi SHPO.

The survey of aboveground resources identified 30 newly documented architectural resources (designated IS-6 through IS-35) located within the project APE. TVA has determined that all of the newly documented properties are ineligible for the NRHP due to their lack of architectural distinction and loss of integrity caused by modern alterations. The survey also revisited three previously documented architectural resources (019-ACK-5007, 019-ACK-5051, and 007-KOS-5042) located within the 0.5 radius. Due to the rolling terrain combined with mature tree growth, resources 019-ACK-5007 and 019-ACK-5051 are located outside a direct line of sight to the project area and are therefore outside the undertaking's APE. The survey noted that previously recorded property 007-KOS-5042 has been destroyed since its initial recordation. No additional architectural resources were present in the rerouted segments. These findings and determinations are pending agreement from the Mississippi SHPO.

Lastly, the project intersects a segment of the Natchez Trace Parkway (007-KOS-5042) south of Kosciusko. This property is considered eligible by the NPS and the SHPO under criterion A for its association with a number of events that have made significant contributions to the broad patterns of American history. The archaeological survey identified no archaeological resources within the portion of the APE that overlaps the Natchez Trace Parkway boundary.

3.11 Recreation, Parks, and Natural Areas

This section describes recreational opportunities and natural areas near the proposed TL, ROW, and access roads. Natural areas include ecologically significant sites; federal, state, or local park lands; national or state forests; wilderness areas; scenic areas; wildlife management areas (WMAs); recreational areas; greenways; trails; Nationwide Rivers Inventory streams; and Wild and Scenic Rivers.

A 0.14-mile segment of the proposed TL crosses the Natchez Trace Parkway, a 444-mile national parkway maintained by the NPS to commemorate the original route of the historic Natchez Trace Trail (NPS 2016). The parkway includes an 800-foot boundary that parallels the route. Initial construction was authorized in 1934, and the road was designated a national parkway in 1938.

There are five natural areas within five miles of the proposed TL:

- Elmer E. Mabus Memorial Natural Area – A 40-acre undisturbed mixed pine-hardwood forest located approximately 2.7 miles west of the proposed TL.

- Mabus Family Natural Area – This 152-acre site is a relatively undisturbed xeric ridge forest located 2.8 miles west of the proposed TL.

- Noxubee River – The Noxubee River is listed on the National River Inventory from river mile 0 at its confluence with the Tombigbee River to river mile 25 at the Mississippi state line. Recognized for scenic, historic, recreational, and wildlife value, the river is located 4.5 miles southeast of the proposed TL.

- Tombigbee National Forest – Approximately 2.7 miles southeast of the proposed TL, the national forest is comprised of 67,005 acres managed for hunting and recreation.

- Choctaw State WMA – Located within the boundaries of Tombigbee National Forest, the WMA is managed for small and large game hunting and recreation.

There are no developed outdoor recreation areas or parks within the pathway or in the immediate vicinity of the proposed TLs. Some informal recreational activity such as hunting, target practice, nature observation, and walking for pleasure may occur in the vicinity of the proposed TLs.

3.12 Socioeconomics and Environmental Justice

The proposed project is located in the Mississippi counties of Attala, Choctaw, and Winston. Table 3-10 contains the estimated 2014 population for the three counties and the state of Mississippi. In 2014, the estimated percentage of minority black or African American population in Choctaw County was less than the state of Mississippi as a whole, while the percentage of white population in the county was higher than that of the state. In comparison, the estimated percentage of black or African American populations in Attala and Winston counties was higher than the state populations, but the percentage of white populations in both counties were lower. For Hispanic or Latino minority populations, Attala, Choctaw, and Winston counties had smaller population percentages than the state of Mississippi. (USCB 2016)

Economic conditions in Attala, Choctaw, and Winston counties, based on 2010 – 2014 estimates, show that the populations of the three counties have a lower per capita income and a lower median household income than the overall population in the state of Mississippi. The estimated percentage of population living below the poverty level for each of the three counties was higher than the state population percentage. (USCB 2016)

Table 3-10 Socioeconomic and Demographic Conditions in Attala, Choctaw, and Winston Counties, Mississippi

Demographic Characteristic	Choctaw County	Attala County	Winston County	Mississippi
Estimated 2014 population	8,294	19,163	18,478	2,994,079
Black or African American (2014)	29.5%	42.3%	46.3%	37.5%
Hispanic or Latino (2014)	1.3%	2.0%	1.2%	3.0%
White (excluding Hispanic or Latino 2014)	67.7%	54.8%	50.5%	57.3%
Per capita income (2010-2014)	$17,359	$17,894	$19,172	$20,956
Median household income (2010-2014)	$30,768	$31,671	$33,969	$39,464
Below poverty level (2010-2014)	25.2%	27.1%	30.3%	22.6%

Source: USCB 2016 Mississippi, Attala, Choctaw, Winston

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 documented in this chapter. The potential effects are presented below by resource in the same order as in Chapter 3. Cumulative effects are discussed, as appropriate and necessary, under the respective resource areas.

4.1 No Action Alternative

As stated in Section 2.1.1, under the No Action Alternative, TVA would not construct the proposed TL to serve Central EPA's planned Kosciusko 161-kV Substation. 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 Central EPA's service area under the current conditions.

Because the proposed construction, operation, and maintenance of the new TL facilities 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

4.2.1 Groundwater and Geology

Portions of the proposed ROW are located within state-designated source water protection areas for public water supply. A majority of the project area is underlain by an aquitard which acts as a confining unit by separating the surface area from the aquifers below. This confining unit should provide adequate protection from potential groundwater contamination. However, during clearing, revegetation and maintenance activities, herbicides with groundwater contamination warnings would not be used. Although some herbicides break down quickly, others may persist in groundwater. Use of fertilizers and herbicides would be considered with caution, and applied according to the manufacturer's label. TVA's BMPs for herbicide and herbicide-related fertilizer application would be used to prevent impacts to groundwater. BMPs would be used to control sediment infiltration from storm water runoff. With the application of appropriate BMPs, during construction, operation, and maintenance of the proposed TL, potential direct and indirect effects to

groundwater under the Action Alternative would be insignificant. No cumulative impacts are anticipated.

4.2.2 Surface Water

Soil disturbances associated with ROW clearing and site grading for structures, access roads, or other construction, maintenance, and operation activities can potentially result in adverse water quality impacts. Soil erosion and sedimentation can clog small streams and threaten aquatic life. Removal of the tree canopy along stream crossings can increase water temperatures, algal growth, and dissolved oxygen depletion, and cause adverse impacts to aquatic biota. Improper use of herbicides to control vegetation could result in runoff to streams and subsequent aquatic impacts.

To minimize such impacts, appropriate soil erosion prevention BMPs would be followed, 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 large construction storm water general permit would be required if the project disturbs more than five acres. This permit also requires 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. BMPs, as described in Muncy (2012), would be used to avoid contamination of surface water in the project area. See Appendix C for stream crossing details.

TVA routinely includes precautions in the design, construction, and maintenance of its TL projects to minimize these potential impacts. Permanent stream crossings that cannot be avoided are designed to not impede runoff patterns and the natural movement of aquatic fauna. Temporary stream crossings and other construction and maintenance activities would comply with appropriate state permit requirements and TVA requirements as described in Muncy (2012). ROW maintenance would employ manual and low-impact methods wherever possible. Proper implementation of these controls is expected to result in only minor temporary impacts to surface waters. No cumulative impacts are anticipated.

Additionally, impervious infrastructure prevents rain from percolating through the soil and results in additional runoff of water and pollutants into storm drains, ditches, and streams. Because the steel transmission poles have such a small footprint, this construction would not significantly impact impervious surface area. All flows would need to be properly treated with either implementation of the proper BMPs or an engineered discharge drainage system that could handle any increased flows.

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. Equipment washing and dust control discharges would be handled in accordance with BMPs described in the SWPPP for water-only cleaning.

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 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.

4.2.3 Aquatic Ecology

Aquatic life could potentially be affected by the proposed Action Alternative from storm water runoff resulting from construction and maintenance activities along the TL ROW. Impacts would either occur directly by the alteration of habitat conditions within the stream or indirectly due to modification of the riparian zone.

Potential impacts due to removal of streamside vegetation within the riparian zone may 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 and by herbicide runoff into streams. Siltation has a detrimental effect on many aquatic animals adapted to riverine environments. Turbidity caused by suspended sediment can negatively impact spawning and feeding success of fish and mussel species (Brim Box and Mossa 1999; Sutherland et al. 2002).

Watercourses that convey only surface water during storm events (such as ephemeral streams) and that could be affected by the proposed TL route would be protected by standard BMPs as identified in Muncy (2012) and/or standard storm water permit requirements. 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 directly affected by the Action Alternative 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 width of the SMZs is determined by the type of watercourse, primary use of the water resource, topography, or other physical barriers (Muncy 2012).

The applicable USACE 404 permit 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 Muncy (2012). All streams were assigned Category A (Standard Stream Protection) SMZs, as defined in Muncy (2012) (see Appendix C). This standard (basic) level of protection for streams and the habitats around them is designed to minimize the amount and length of disturbance to the water bodies without causing adverse impacts on the construction work. Because appropriate BMPs would be implemented during construction, operation, and maintenance activities, any direct or indirect effects to aquatic ecology would be temporary and insignificant as a result of implementing the proposed Action Alternative. No cumulative impacts are anticipated.

4.2.4 Vegetation

Implementation of the Action Alternative would require the clearing of approximately 391 acres of forest. Such ground-disturbing activities would directly affect the existing plant communities in these areas. Additionally, vegetation management along the ROW is necessary to prevent tall, woody vegetation from becoming established within the ROW. Therefore, the type of vegetative cover that occurs on the ROW would be directly affected.

Converting forested land to managed ROW for construction of the proposed TL would be long-term in duration, but insignificant. Virtually all of the forest in project area has been

previously cleared (with the possible exception of a small cypress-tupelo forest) and the plant communities found there are common and well represented throughout the region. As of 2014, there were well over 3,000,000 acres of forest land in Attala, Choctaw, Winston counties and the surrounding Mississippi counties (USFS 2016). 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.

Nearly the entire project area currently has a substantial component of invasive terrestrial plants, and adoption of the Action Alternative would not significantly affect the extent or abundance of these species at the county, regional, or state level. The use of TVA standard operating procedure of vegetating with noninvasive species (Muncy 2012) would serve to minimize the potential introduction and spread of invasive species in the project area.

Plant communities found within the proposed ROW are common and well represented throughout the region. No unique plant habitats possessing conservation value would be negatively impacted by construction, operation, and maintenance of the new TL. Adoption of the Action Alternative would not significantly affect the terrestrial ecology of the region. Cumulative effects of the project on common plant communities are expected to be negligible.

4.2.5 Wildlife

Under the Action Alternative, TVA would construct the proposed TL and would clear some or all of the 166 acres of early-successional, herbaceous habitat (pastures, cultivated fields, and residential areas). In many areas, the TL would span 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 construction.

Approximately 391 acres of forest would be removed and maintained as early successional habitat for the life of the TL. 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 similarly forested and herbaceous habitat exists in the surrounding landscape.

Construction-associated disturbances and habitat removal likely would 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 that utilize early successional habitat would return to the project area upon completion of construction.

Cumulative effects of the project on common wildlife species are expected to be negligible. Most of the proposed TL footprint has previously been heavily impacted by agriculture and timber sales, leaving only small areas of natural, undisturbed vegetation. Proposed actions across the TL would 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.

4.2.6 Endangered and Threatened Species

4.2.6.1 Aquatic Animals

No federally listed aquatic species or designated critical habitat occur within the watersheds potentially affected by the proposed TL route, within Attala, Choctaw, and Winston counties, or within a 10-mile radius of the proposed project. Therefore, no direct, indirect, or cumulative impacts to federally or state-listed as threatened and endangered aquatic species are expected to occur under the Action Alternative.

4.2.6.2 Plants

Implementing the proposed Action Alternative, would not impact federally listed plants or DCH because neither occurs in the project area. Adoption of the Action Alternative may negatively impact the state-listed Turk's cap lily, but effects to the species would not be significant. The five occurrences located within the project area are located wholly within the proposed ROW and may be extirpated during clearing and construction for the proposed TL. However, the TVA Regional Natural Heritage database, which only covers 16 of the 25 counties where the species occurs in Mississippi, contains over 70 previously documented sites for Turk's cap lily. In addition, the Mississippi Natural Heritage Program ranks the species as S3S4, which indicates a level of rarity between "vulnerable" and "apparently secure" in the state. Given the total number of records and the relatively wide distribution across the state, TVA determined the potential loss of the five occurrences would not significantly affect the species. Despite the potential for negative impacts, clearing of forest for the proposed ROW on sites where the Turk's cap lily occurs may serve to enhance habitat for the species by providing the additional sunlight required for flowering and seed set. Currently, all occurrences of the species observed in the proposed ROW are in heavily shaded situations and will not flower. Therefore, the proposed action may also have some beneficial effect on the plant.

4.2.6.3 Terrestrial Animals

No federal or state-listed terrestrial animal species were documented within three miles of the project area. However, three federally listed terrestrial animal species were assessed based on county occurrence records and the potential for species to occur in the project area. The federally listed red-cockaded woodpecker was assessed based on documented presence within Choctaw and Winston counties. No red-cockaded woodpeckers were observed during field surveys in February, March, and August 2016. The project footprint also lacks suitable red-cockaded woodpecker nesting and foraging habitat. Red-cockaded woodpeckers would not be impacted by the proposed project activities.

The wood stork was addressed based on the potential for the species to occur in the project footprint. Wood storks do not breed in Mississippi; however, vagrant individuals are believed to occur statewide. No wood storks were observed during field surveys in February, March, and August 2016. The project footprint contains suitable wood stork foraging habitat within an existing TL ROW and roosting habitat within the proposed ROW.

The proposed project may clear potential roosting habitat and increase foraging habitat. Wood storks are rare in the region and are not likely to be impacted by the proposed action.

The northern long-eared bat was addressed based on the potential for the species to occur in the project footprint. No caves or other winter hibernacula for northern long-eared bat exist in the project footprint or would be impacted by the proposed actions. However, suitable foraging habitat does exist over ponds, streams, and wetlands within the proposed ROW. BMPs would be utilized in SMZs and around wetlands, thus minimizing sedimentation and avoiding any changes to hydrology. Additional foraging habitat for northern long-eared bats exists along fence rows and within forest fragments. This forested foraging habitat would be removed in association with the proposed actions; however, similarly suitable forested foraging habitat is plentiful in the surrounding landscape. Summer roosting habitat surveys were performed in February, March, and August 2016 in accordance with federal guidelines. During these surveys, 729 suitable roost trees were identified across 40 forest fragments along the proposed ROW based on the high number of white oaks, snags, and nearby water sources. A total of 72.8 acres of suitable summer roosting habitat for northern long-eared bat would be removed for the proposed ROW. Consultation with the USFWS under Section 7 of the ESA is underway. Proposed actions relevant to this consultation cannot proceed until concurrence from the USFWS has been received.

4.2.7 Floodplains

As a federal agency, TVA is subject 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" (USWRC 1978). 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. The EO requires that agencies avoid the 100-year floodplain unless there is no practicable alternative.

Under the Action Alternative, the proposed TL and access roads would be constructed. Portions of the TL would cross the 100-year floodplains of Bear Creek, Cowpen Creek, Tibby Creek, and the Yockanookany River in Attala, Choctaw, and Winston counties, Mississippi. Consistent with EO 11988, overhead TLs and related support structures are considered to be repetitive actions in the 100-year floodplain that should result in minor impacts (46 FR 22845). The conducting wires of the TL would be located well above the 100-year elevation.

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

Based upon a review of Choctaw and Attala counties, Mississippi, flood insurance rate maps, portions of access roads AR03, AR17-AR20, AR30, AR32, AR45, AR50, and potentially AR54-AR58 would be located within 100-year floodplains. To minimize adverse impacts, any road construction or improvements would be done in such a manner that upstream flood elevations would not be increased. 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 transmission line location in floodplains.
- Construction or improvement of access roads would be done in such a manner that upstream flood elevations would not be increased.

Based upon implementation of the above standard mitigation measures, the proposed TL and access roads would have no significant impact on floodplains.

4.2.8 Wetlands

Activities in wetlands are regulated under Section 401 and 404 of the CWA and are addressed by EO 11990 (Protection of Wetlands). Section 401 requires water quality certification by the state for projects permitted by the federal government (Strand 1997). Section 404 implementation requires activities resulting in the discharge of dredge or fill into waters of the U.S. to be authorized through a nationwide general permit or individual permit issued by the USACE. EO 11990 requires federal agencies to avoid to the extent possible the long- and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative.

Under the Action Alternative, the proposed overhead ground wire installation and uprate would take place along 5.2 miles of existing ROW and 38.55 miles of transmission line would be constructed within a new 100-foot-wide ROW. Access roads would be used or temporarily improved/built for use during overhead ground wire installation and transmission line construction. See Section 2.2 for descriptions of the methods for construction, operation, and maintenance of the TL, ROW, and access road actions. As described in Section 2.2.2.2, establishing a TL corridor requires tree clearing within the full extent of the ROW, and future maintenance of low-stature vegetation to accommodate clearance and abate interference with overhead wires. As such, emergent and scrub-shrub wetlands typically experience temporary impacts during construction, but recover relatively quickly. The trees comprising forested wetland areas within the proposed ROW are cleared, and the habitat is permanently converted to emergent-scrub shrub for the perpetuity of the TL's existence.

The proposed ROW construction footprint contains 70.81 acres of wetlands across 122 delineated wetland habitat types, comprising 102 wetland crossings (Appendix D). The emergent wetland (11.84 acres) and scrub-shrub wetlands (8.11 acres) would be temporarily affected by overhead utility line construction. Their existing low stature recovers quickly post-construction, and because the TL conductors would span these wetlands, the existing functional capacity would be maintained long-term. The majority of the scrub-shrub wetland habitat is dominated by tree saplings at a scrubby stature. With time and lack of habitat alteration, these habitats are expected to convert to forest. The proposed ROW maintenance regime would keep these scrub-shrub wetlands in their current condition, providing existing wetland functions and values to the surrounding landscape.

The planted pine wetlands (6.32 acres) are currently in a manipulated state, where timber harvest is a recurring event. Timber harvest from these areas would be required for line clearance within the ROW corridor. Following removal of these pine trees, timber operations would cease and these wetland areas would be maintained as emergent/scrub-shrub wetland habitat. While pine trees contribute to wetland value, timber practices and regimens are considered a negative effect on wetland functional capacity. The functional value of these wetland areas under timber land-use verses naturalized scrub-shrub maintenance is similar.

The 44.49 acres of forested (non-pine-timber) wetland area would be cleared and permanently converted to emergent and/or scrub-shrub wetland habitat for the perpetuity of the TL. This forested wetland acreage is comprised of 0.59 low quality acres, 17.09 moderate quality acres, and 26.81 superior quality acres. The poor functions and values provided by the low quality forested wetlands are expected to be sustained without substantial degradation resulting from the proposed habitat conversion. Low quality forested wetlands identified within the ROW receives little hydrologic input, contains young immature habitat, and/or exhibits considerable disturbance from timber operations. The converted emergent/scrub-shrub habitat is anticipated to have minimal effects on the existing low functions and values that these wetlands provide.

The existing suite of functions and values provided by the 17.09 acres of moderate quality wetlands is expected to diminish but remain within the calculated range used to classify moderate quality wetlands. Moderate quality forested wetlands within the project footprint already have experienced some level of disturbance to their habitat. However, landscape position, hydrologic influence, size, and/or intact upland buffers drive the moderate level of function and value these wetlands provide. Although functional loss from habitat conversion would occur, the other factors would remain intact, including naturalized lower stature wetland vegetation, to support continued functional capacity within the range typical of moderate quality wetlands.

The high functions and values provided by the 26.81 acres of superior quality forested wetlands within the ROW are expected to incur greater functional loss, considering their existing superior condition. These superior quality wetland areas contain mature forest with greater vegetative mass providing increased value for improved water quality. Unlike moderate quality wetlands, the mature trees of these superior quality forested wetlands typically have not been exposed to recent habitat degradation. Therefore, habitat conversion across the 26.81 acres of superior quality forested wetlands is anticipated to diminish the existing functions and values to a greater extent than the affected lesser quality wetlands. However, similar to moderate quality forested wetlands, other factors feed the superior functionality of these 26.81 forested wetland acres, including landscape position, hydrologic influence, size, and/or intact buffers. These other factors would remain unaffected by the TL.

These superior quality wetland areas are all associated with large and extensive bottomland wetland complexes. Therefore, although functional loss is anticipated from forested wetland clearing within the ROW, the larger and extensive associated wetland area outside the ROW would sustain superior quality functions and values for the surrounding watershed. Likewise, all of the delineated forested wetland areas encountered within the ROW are located adjacent, connected, or within a larger wetland complex extending outside the ROW. Therefore, although the functional capacity of converted forested wetland area within the ROW would diminish, naturalized lower stature vegetation

would persist, and the wetland basins at-large would remain intact and continue providing valuable wetland functions to the landscape. In addition, neither TL structures nor conductors would interfere with the hydrologic flow or inundation regimes. The affected forested wetlands' functions and values would be provided at the level typical of emergent and scrub-shrub habitat in the same landscape setting, while the unaffected wetland area outside the ROW sustains existing functions within the larger wetland complex. Under the CWA, the EPA and USACE are tasked to ensure maintenance of the chemical, physical, and biological integrity of the nation's waters, including wetlands. TVA would comply with all CWA wetland regulatory requirements to ensure the proposed forested wetland conversion results in less than minimal, adverse impacts to the aquatic environment and the objective of the CWA is met.

Although this compliance would ensure that adverse impacts would be minimal, because the project area is in a watershed basin rich in wetlands with roughly 10 percent of the area comprising forested wetlands and because these wetlands are dispersed throughout the area, avoiding wetlands entirely along the route is virtually impossible. TVA considered 110 routes in its environmental review. The preferred route has the best overall environmental ranking. Wetlands were among the environmental resources considered in evaluating routes to come up with the environmental rankings. Redesigning the preferred route to avoid all wetlands led to impacts to other sensitive resources. Additionally, such redesigning would require the use of 11 additional angle structures, thereby increasing project costs, and increasing the construction schedule by 67 weeks. Prolonging the construction schedule would cause increased impacts to the current land use of property owners. Additionally, project delays are likely to result in the loss of economic development opportunities for two local power companies and also impact system reliability in this area. Therefore, after balancing all project constraints including schedule, cost, engineering feasibility, environmental resources, and disruptions to landowners whose lands would be traversed by the route (Sections 2.1 and 2.4), TVA had determined the preferred alternative avoids impacts to wetlands to the extent practicable. In compliance with EO 11990, TVA finds there is no practicable alternative to the wetland impacts described above.

EO 11990 and TVA procedures for compliance with NEPA (TVA 1983) additionally provide that if TVA makes a determination that there is no practicable alternative to impacting wetlands, then TVA must also implement all practical measure to minimize impacts on the floodplain or wetland. TVA uses a variety of techniques and BMPs to minimize wetland disturbance during construction (Muncy 2012). These can include using a feller-buncher, low ground-pressure equipment and/or mats to reduce soil compaction and minimize rutting to less than 12 inches for any and all work necessary within the delineated wetland boundaries. They also can include limiting heavy vehicular equipment to narrowed access corridors along the ROW for structure and conductor placement. Similarly, potential structure placement in wetlands can be conducted within the parameters and meet the conditions of an approved USACE permit. Fill associated with pole placement in wetlands is generally considered to be minimal with nominal adverse effects on the larger wetland's functional capacity. TVA also, on occasion, purchases mitigation credits from a wetland mitigation bank where warranted by the facts of the specific TL.

TVA's proposal would span one wetland within the NPS Natchez Trace Parkway and includes one structure. The nominal fill would be an insignificant effect on the wetland, which would continue to be maintained and function as a shrub-scrub/emergent wetland.

Fiber optic overhead ground wire and conductor installation is accomplished through the use of pulleys and temporary pull structures at roadsides, with crews accessing each structure in the ROW to allow ground wire pull, tensioning, and clamping (see Section 2.2.1.5). About 12.76 acres of potential wetland were identified within the 5.2 miles of existing ROW where this activity would take place. These wetlands are maintained as scrub-shrub/emergent wetland habitat during routine ROW vegetation maintenance to facilitate conductor clearance. Heavy equipment travel across wetlands to access structures could affect the wetland habitats within the ROW. However, all BMPs would be in place for all identified wetland areas such that only minimal and temporary wetland impacts would be anticipated as a result of overhead ground wire installation along this portion of ROW.

Cumulative impact analysis of wetland effects takes into account wetland loss and conversion at a watershed scale currently and within the reasonable and foreseeable future. Forested wetland conversion resulting from the proposed ROW construction would result in less than 0.0 percent change in existing forested wetland extent within the larger upper Pearl River basin, based on estimates from office-level resources. Forested wetland conversion across the 11 sub-watersheds (12-HUC) within this sub-basin (8-HUC) would result in a range of less than 0.0 to 1 percent change in the estimated forested wetland extent (Table 4-1).

Table 4-1 Projected Forested Wetland Conversion by Watershed Within the Proposed Transmission Line Right-of-Way

Sub-Watershed (12-HUC)	Estimated Percent Total Wetland Cover in Sub-Watershed	Estimated Percent Forested Wetland Cover in Sub-Watershed	Estimated Percent Forested Wetland Conversion
Besa-Chitto Creek	4%	4%	1.0%
Upper Yockanookany River	6%	5%	0.5%
Lower Tibby Creek	7%	7%	0.6%
Reedy Creek-Lobutcha Creek	8%	4%	<0.0%
Panther Creek-Yockanookany River	14%	4%	<0.0%
Ethel-Hurricane Creek	5%	5%	0.1%
Dry Creek-Lobutcha Creek	6%	4%	0.2%
Bear Creek-Lobutcha Creek	10%	9%	0.2%
Ethel-Turkey Creek	1%	1%	0.2%
Leflore Creek-Yockanookany River	9%	7%	0.6%
Shiola Creek-Yockanookany River	29%	27%	<0.0%
Total in Upper Pearl River Basin (8-HUC)	**10%**	**8%**	**<0.0%**

Studies have shown that large watersheds, such as the greater upper Pearl River basin, 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 reduce the estimated existing forested wetland extent within the upper Pearl River sub-basin. In addition, forested wetland conversion does not constitute wetland loss. The functions and values associated with a forest's water storage, uptake, assimilation, filtration, and transpiration of storm water run-off 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, EPA, USACE, and MDEQ mandates, such that regulatory requirements ensure wetland impacts do not result in cumulative loss. Therefore, the proposed wetland impacts would be minimal on a cumulative scale due to the avoidance, minimization, and compliance measures in place, in accordance with the CWA and the directives of EPA and USACE/MDEQ ensuring no more than minimal adverse effects on the aquatic environment.

4.2.9 Aesthetics

Visual consequences were examined in terms of visual changes between the existing landscape and proposed actions, sensitivity of viewing points available to the general public, their viewing distances, and visibility of proposed changes.

4.2.9.1 Visual Resources

The visual attributes of existing scenery, along with the anticipated attributes resulting from the proposed action, are reviewed and classified in the visual analysis process. The classification criteria are adapted from a scenic management system developed by the USFS and integrated with planning methods used by TVA. The classifications are based on methodology and descriptions from the USDA (1995) and TVA (2003). Sensitivity of viewing points available to the general public, their viewing distances, and visibility of proposed changes are also considered during the analysis. Scenic integrity indicates the degree of intactness or wholeness of the landscape character. These measures help identify changes in visual character based on commonly held perceptions of landscape beauty, and the aesthetic sense of place. The foreground, middle ground, and background viewing distance parameters were previously described in Section 3.9.1.

Transmission structures tend to be the most visible element of the electric transmission system. Where the proposed project involves the addition of lines on existing structures or in existing ROW, changes in the viewshed would be negligible. The proposed TL would be visible to motorists on SR 415 and SR 12 in Choctaw County, and SR 35 and SR 14 southeast of Kosciusko in Attala County. Motorists would also briefly view the proposed TL where it crosses the Natchez Trace Parkway. Along most of the transmission line route, the view from local highways would be limited by the natural density of the tree growth near the road alignments. A few local residents would also be able to see the line. However, the line was routed to avoid residential areas to the extent possible. Thus, motorists along local roads and area residents would notice a minor change in the landscape due to the presence of new transmission structures and lines. For residents, some views may be as far as middle ground distances in both directions. As these distances increase, details become weak and visually insignificant. For a few residents, the views would be in the foreground. Foreground views of the new transmission line would be presented to motorists mainly at road crossings. Such views would tend to be brief, resulting in minor visual effects.

In August 2016, TVA prepared a visual assessment of the proposed TL crossing of the Natchez Trace Parkway (Appendix E). The proposed crossing would add a small number of contrasting elements, but would be similar to the landscape as the TL would only expand the existing road ROW corridor. By expanding existing features, the landscape would be able to absorb the negative visual discord created by the proposed TL construction. Therefore, the assessment determined that the proposed crossing would result in minor impacts to the scenic integrity of the Natchez Trace Parkway.

Operation, construction, and maintenance of the proposed transmission line would cause minor visual effects. There may be some minor cumulative visual discord during the construction period due to an increase in personnel and equipment and the use of laydown and materials storage areas. These minor visual obtrusions would be temporary until the ROW and laydown areas have been restored through the use of TVA standard BMPs. Therefore, any direct, indirect, or cumulative visual impacts anticipated as a result of implementing this project would be minor.

4.2.9.2 Noise and Odors

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

4.2.10 Archaeological and Historic Resources

For NRHP-listed or eligible archaeological resources located in the APE, project effects could result from vegetation clearing, construction, maintenance, and operation of the proposed Red Hills-Kosciusko TL. TVA is currently consulting with the Mississippi SHPO concerning the survey findings to reach a consensus determination regarding the NRHP eligibility of the archaeological sites and historic architectural resources identified in the APE.

Based on the results of its survey, TVA finds that the project, as currently planned, has the potential to result in adverse effects to archaeological sites 22At571, 22Ch875, and 22Ch877 (should those sites be determined eligible for inclusion in the NRHP). Site 22At571 is located on a proposed temporary access road. Adverse effects to the site could result from compaction from heavy equipment, the mixing of stratigraphic layers, displacement and removal of artifacts and features due to ground disturbance, and looting or vandalism stemming from the increased exposure of archaeological deposits due to vegetation clearing. Sites 22Ch875 and 22Ch877 are located within the proposed ROW. A point-of-intersection structure is proposed in the vicinity of 22Ch875. The structure would not be within the site boundaries, but would be within approximately four meters of the site boundary and ten meters from the nearest location where artifacts were discovered. Guy wires would be required to support the point-of-intersection structure. Anchors for the guy wires would be located in the vicinity of site 22Ch875, but not within the site boundary. Installation of structure legs and guy wire anchors would require augering and excavation. TVA finds that this ground disturbance in proximity to 22Ch875 would not occur within the site boundary and would not result in an adverse effect to the site (should the site be found eligible by some future as-yet unplanned testing investigation).

Vehicles to be used in TL construction would pass over sites 22At571, 22Ch875, and 22Ch877. Vegetation clearing would be required within the boundaries of sites 22Ch875 and 22Ch877, and could result in compaction and ground disturbance. To avoid potential adverse impacts to all three sites from compaction and possible ground disturbance that may occur during construction and vegetation clearing, TVA will create a 30-meter buffer surrounding each site, and will place wetland mats within the buffers during construction and vegetation clearing at all three locations. TVA finds (pending SHPO agreement) that, with these measures in place, the undertaking would not result in adverse effects to any NRHP-eligible archaeological site.

Cumulative effects to sites 22At571, 22Ch875, and 22Ch877 (should those sites be determined eligible for inclusion in the NRHP) could occur in the future resulting from the operation and maintenance of the TL. Operation and maintenance would require periodic inspections, vegetation maintenance (mowing, or spraying, or trimming woody vegetation), and occasional replacement of components of the TL structures, conductor, and overhead ground wire. The types of equipment that TVA uses in operation and maintenance are similar or identical to those used during construction. Cumulative effects to sites 22At571, 22Ch875, and 22Ch877 could result from ground compaction, ground disturbance, or erosion caused by the use of this equipment within the site boundaries. To avoid the possibility of such effects, TVA would mark the locations of the sites' 30-meter buffers on all drawings associated with the TL, and would place conditions on all future operation and maintenance activities at the site locations. The conditions would state that the operation/maintenance activities would be conducted during times of dry and firm ground, or by using low-ground-pressure equipment, or with wetland mats placed within the site buffers. No drilling, augering, excavation, or grubbing would be allowed within the site buffers without additional review by TVA staff and, if TVA deems necessary, the SHPO and tribes. TVA finds that, with these measures in place, the undertaking would not result in adverse effects to any NRHP-eligible archaeological site. TVA has submitted its finding to the SHPO and is awaiting a response.

As there are no NRHP-listed or eligible aboveground (historic architectural) resources within the APE, the undertaking would result in no effects to such resources.

TVA will continue to consult with the SHPO to explore alternatives for the proposed undertaking that would avoid or minimize adverse effects to NRHP-eligible archaeological sites. In the event that no alternatives can be identified that would avoid or adequately minimize project effects to these archaeological sites, TVA would conduct additional investigations at the sites to fully determine their NRHP eligibility. If, based on the results of the investigations, TVA and the SHPO agree that any of the three sites is eligible, TVA would consult further with SHPO to avoid, minimize, or mitigate the potential adverse effect.

TVA will continue to consult with the SHPO and the NPS to explore alternatives for the proposed undertaking that would avoid or minimize adverse effects to the NRHP-eligible Natchez Trace Parkway.

4.2.11 Recreation, Parks, and Natural Areas

Under the Action Alternative, the proposed project would be implemented. There would be 0.14-miles of new TL crossing on a portion of the Natchez Trace Parkway. TVA is currently in consultation with the NPS to identify any measures necessary to minimize potential impacts to the Natchez Trace Parkway.

Five natural areas (Elmer E. Mabus Memorial Natural Area, Mabus Family Natural Area, Noxubee River, Tombigbee National Forest, and Choctaw State WMA) are located within a five-mile radius of the project. Because the distance from the project site to these features is sufficient (more than two miles), no direct, indirect, or cumulative impacts to these natural areas are anticipated as a result of the proposed action.

Under the Action Alternative, construction of the proposed 161-kV TL and associated access roads could cause some minor shifts in informal outdoor recreation use patterns in the immediate vicinity of the TL ROW corridor. However, the extent of any such impacts should be minor and insignificant.

4.2.12 Socioeconomics and Environmental Justice

Under the proposed project Action Alternative, TVA would purchase an easement from private landowners to construct the proposed TL. That easement gives TVA the right to locate, operate, and maintain the TL across the property owner's land (see Section 2.2.1.1). In certain cases, TVA may be required to acquire ownership in a property. In either case, current landowners would be compensated for the value of such rights or properties. Nonetheless, the direct local economic effect from the purchase of any additional property or ROW easements would be minor.

Virtually the entire ROW would cross agricultural and forested lands; developed areas have been avoided to the extent possible. Therefore, any effects to residential property values are expected to be minor.

Implementing the proposed Action Alternative would increase power reliability for the areas served by the Central EPA in Choctaw, Attala, and Winston counties. Therefore, there could be some long-term indirect economic benefits to the area. As shown in Table 3-10 (Socioeconomic and Demographic Conditions), none of the project area counties are densely populated. The populations in Choctaw, Attala, and Winston counties all have lower incomes than the state average, and higher poverty levels, although there is a less than 10 percent difference from the state poverty percentage. While a greater number of black or African Americans live in Attala and Winston counties than reside in the state of Mississippi, this is a less than 10 percent difference. Choctaw County has fewer black or African Americans in residence than the state. Nonetheless, undertaking the proposed actions, including the construction, operation, and maintenance of the proposed transmission line, is not expected to disproportionally affect any economically disadvantaged or minority populations.

4.2.13 Post-construction Effects

4.2.13.1 Electric and Magnetic Fields

TLs, like all other types of electrical wiring, generate both electric and magnetic fields (i.e., EMFs). 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 a source 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 F). 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 is not associated with any adverse health effects in humans or livestock.

Other public interests and concerns have included potential interference with AM radio reception, television reception, satellite television, and implanted medical devices. Interference with radio or television reception is typically due to unusual failures of power line insulators or poor alignment of the radio or television antenna and the signal source. Both conditions are readily correctable.

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, 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 no longer interfere (JAMA 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 adverse effects or effects on health or the above considerations have been reported for the low-energy power frequency fields (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 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 (e.g., AMA 1994; National Research Council 1997; 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 World Health Organization (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 (IARC 2002).

TVA follows medical and health research related to EMFs, as well as media coverage and reports that do not undergo the same scientific or medical peer review that medical research does. 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).

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 scientific and medical communities' position 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; DOE 1996; NIEHS 1998).

Although no federal standards exist for maximum EMF field 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 EMF.

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.

4.2.13.2 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.

4.2.13.3 Transmission Structure Stability

The structures, similar to those shown in Section 2.2.1.4, that would be used on the proposed TL are the result of detailed engineering design and have been used by TVA 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.

4.3 Long-term and Cumulative Impacts

The presence of the TL would present long-term visual effects to the mostly rural character of the local area. However, because the route of the proposed TL would traverse mainly rural areas in Choctaw, Attala, and Winston counties, with few residences and the involvement of only a few road crossings, the TL would not be especially prominent in the local landscape. Where the proposed alignment would cross the Natchez Trace Parkway, alongside an existing LPC ROW, the visual effects would be long-term, but the TL would only be visible to motorists briefly and any impacts would be minimized due to the present TL ROW and density of tree growth. The establishment of easements for the proposed ROW with local landowners would 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 transmission line.

The increase in power supply reliability is one factor in improving the overall infrastructure in the local Central EPA area, which over time could make the counties included in the project more attractive to additional commercial and residential development. 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 mainly rural area would be minor, long-term, and a cumulative consequence of the proposed transmission system improvements.

4.4 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.
- Trees would not be permitted to grow within the TL ROW or to a determined height adjacent to the ROW that would endanger the TL. 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 plant and wildlife, and the loss of about 391 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 44.49 acres of forested wetland to emergent or scrub-shrub habitat, and maintenance of a total of 70.81 acres of wetland habitat as scrub-shrub habitat for the life of the TL.
- The proposed TL would result in minor long-term visual effects on the landscape in the immediate local area.

4.5 Relationship of Local 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. Approximately 524 acres of ROW, including the purchase of about 461 acres for new ROW and 63 acres of existing ROW, would be utilized for the proposed project (as described in Sections 1.1 and 2.2.1.1). Some of this acreage would be converted from its current use as pasture, agricultural fields, and forest to use as an ROW. 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 re-clearing of the ROW would preclude forest management within 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.

4.6 Irreversible and Irretrievable Commitments of Resources

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

The materials used for construction of the proposed TL would be committed for the life of the TL. Some materials, such as ceramic insulators and concrete foundations, may be irrevocably committed, but the metals used in equipment, conductors, and supporting steel structures could be recycled. The useful life of steel-pole transmission structures or laced-steel towers is expected to be at least 60 years. Thus, recyclable materials would be irretrievably committed until they are eventually recycled.

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

CHAPTER 5

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CHAPTER 6

6.0 ENVIRONMENTAL ASSESSMENT RECIPIENTS

6.1 Federal Agencies

National Park Service – Natchez Trace Parkway

U. S. Army Corps of Engineers

U. S. Fish and Wildlife Service

6.2 Federally Recognized Tribes

The following tribes were notified of the availability of the document:

Alabama-Coushatta Tribe of Texas

Jena Band of Choctaw Indians

Choctaw Nation of Oklahoma

Mississippi Band of Choctaw Indians

6.3 State Agencies

Mississippi State Historic Preservation Office

Mississippi Department of Environmental Quality

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CHAPTER 7

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Appendix A – Correspondence

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

May 19, 2016

Mr. Jim Woodrick, Director
Mississippi Department of Archives and History
Historic Preservation Division
Post Office Box 571
Jackson, Mississippi 39205-0521

Dear Mr. Woodrick:

TENNESSEE VALLEY AUTHORITY (TVA), RED HILLS-LEAKE 161-KV TRANSMISSION LINE PROJECT, ATTALA, CHOCTAW, AND WINSTON COUNTIES, MISSISSIPPI (FROM 33° 22.496705' N, 89° 13.044894' W TO 33° 1.841979' N, 89° 36.027914' W)

TVA is planning changes in its power grid in order to increase power reliability in areas served by the Central Electric Power Association (Central EPA) and 4-County Electric Power Association in Attala, Choctaw, and Winston Counties, Mississippi. TVA serves power to this area with long transmission lines out of West Point. Power outages in any one of these lines result in low voltage and thermal overloads. This project will address overloading and contingency issues with the existing system.

Central EPA would upgrade the existing Kosciusko Substation to allow 161-kV service. TVA would construct a new 161-kV line to serve the upgraded substation, then continue to the connection point in the Leake-Singleton 161-kV transmission line. This would create a new Red Hills-Leake 161-kV transmission line with the Weir and Kosciusko stations tapped off the new system line. This would improve reliability and resolve loading issues with the current configuration.

The new Red Hills-Leake line would consist of about 42 miles of 161-kV single circuit line on a 100-foot right-of-way (ROW). The project would also include the replacement of overhead ground wire on 5.16 miles of the existing 161-kV tap line to Weir. The new 161-kV TL would be built using single steel pole structures centered on a 100-foot ROW. The steel pole structures would range in height from 80 to 120 feet above ground and would be installed using an auger mounted on a bucket truck. TVA's access to the ROW for construction would be on existing roads of various types (dirt, gravel, and paved roads). Figure 1.1, below, shows the locations of the project centerline and half-mile radius.

Work crews would deliver reels of overhead ground wire and conductor to various staging areas throughout the ROW. TVA would install temporary clearance poles at road crossings to keep the wire and conductor clear of traffic during construction. A rope, connected to the wire and conductor, would be pulled across a series of structures and used to pull the wire and conductor through pulleys mounted on cross arms on the steel pole structures. A bulldozer and

Mr. Jim Woodrick
Page Two
May 19, 2016

specialized tensioning equipment would be used to pull conductors and ground wires to the proper tension.

TVA has determined that this proposed transmission line project is an undertaking (as defined at 36 CFR § 800.16(y)) that has the potential to cause effects on historic properties. We are initiating consultation under Section 106 of the National Historic Preservation Act for this undertaking. TVA has identified the area of potential effects (APE) for archaeological resources as the circa 42 miles of planned 100-foot ROW and the associated off-ROW access roads, and the circa 5.16-mile section of the 161-kV tap line to Wier that would receive new overhead ground wire. TVA identified the APE for historic architectural resources as areas within a one-half mile radius of the proposed new transmission line that would have a direct line of sight to the new line.

TVA contracted with Tennessee Valley Archaeological Research (TVAR) to perform a phase I cultural resource survey of the APE. Once the draft report has been completed, TVA will provide a copy for your review.

Pursuant to 36 CFR Part 800.3(f)(2), TVA will consult with federally recognized Indian tribes regarding historic properties within the APE that may be of religious and cultural significance and eligible for listing in the NRHP.

TVA will consult with the National Park Service regarding the project's potential to affect historic properties in the area, where it would cross the Natchez Trance Parkway

If you have any questions or comments, please contact Richard Yarnell in Knoxville, Tennessee, at (865) 632-3463 or by email at wryarnell@tva.gov.

Sincerely,

Clinton E. Jones
Manager, Biological and Cultural Compliance
Safety, River Management and Environment

SCC:CSD
Enclosures

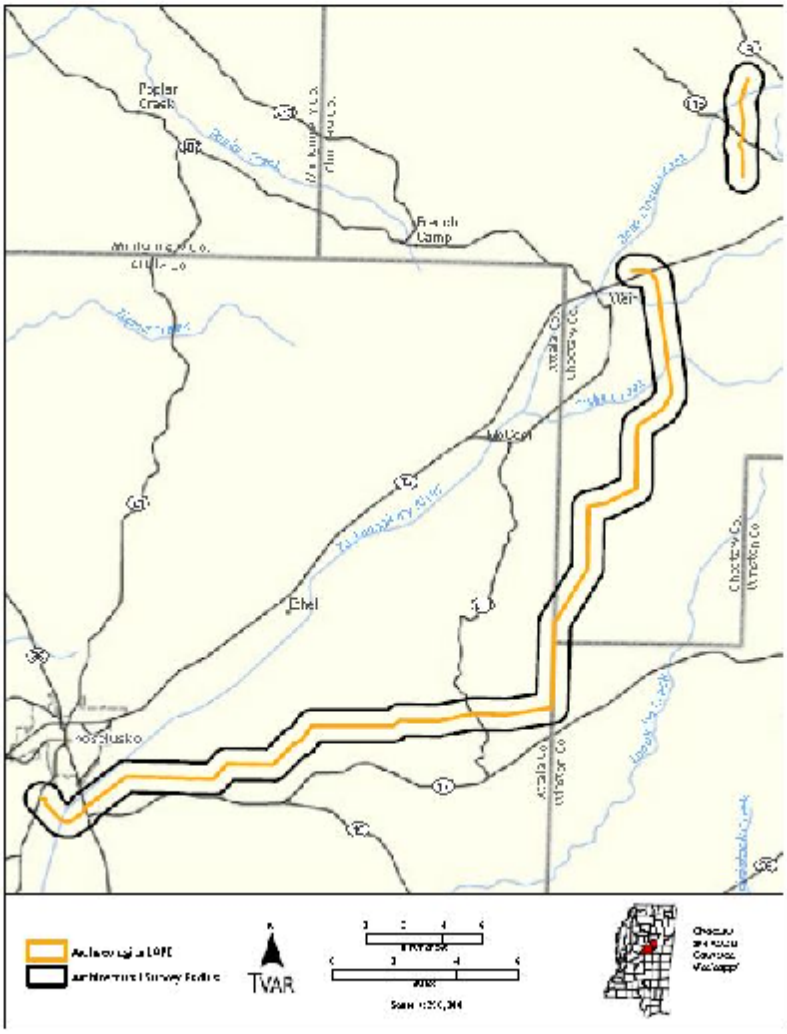

Figure 1. Proposed right-of-way ("Archaeological APE") and half-mile radius ("Architectural Survey Radius") for TVA's Red Hills-Leake 161-kV Transmission Line Project.

INTERNAL COPIES:

Michelle Cagley, KFP 1T-KST
Amy Henry, WT11D-K
Susan Jacks, WT11C-K
Todd Liskey, MR 4 G-C
Skip Markham, BR 4A-C
Paul Pearman, BR 4A-C
Emily Willard, MR 4G-C
Richard Yarnell, WT 11D-K
ECM, WT CA-K

Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, Tennessee 37902-1499

July 29, 2016

Mary Risser
Superintendent
2680 Natchez Trace Parkway
Tupelo, MS 38804

Ms. Risser,

ENVIRONMENTAL ASSESSMENT (EA) – RED HILLS-KOSCIUSKO 161-KV TRANSMISSION LINE, ATTALA, WINSTON AND CHOCTAW COUNTIES, MISSISSIPPI

The Tennessee Valley Authority (TVA) received your June 30, 2016 request to participate as a cooperating agency in the preparation of TVA's EA on the proposed Red Hills-Kosciusko 161-kV Transmission Line (previously referred to as Red Hills-Leake Transmission Line) which crosses the Natchez Trace Parkway. TVA welcomes your participation in the EA under 40 C.F.R. § 1501.6.

TVA is proposing to construct, operate, and maintain a new 43-mile 161-kV transmission line in Attala, Winston, and Choctaw counties, Mississippi. TVA held public scoping meetings on September 8 and 9, 2014 in Ackerman and Kosciusko, Mississippi, respectively.

TVA can meet either in person or by telephone to provide you more details about the environmental review process that TVA uses for transmission lines, the proposed project and schedule, and how our two agencies can cooperate in this review.

Anita E. Masters, NEPA Specialist III, NEPA Program & Valley Projects, has been assigned as the NEPA project manager for this EA. Ms. Masters can be reached at (423)751-6697 or at aemasters@tva.gov. Written comments should be sent to Ms. Masters at Tennessee Valley Authority, 1101 Market St., BR 4A, Chattanooga, TN 37402. Please call Ms. Masters to discuss the next steps.

TVA looks forward to working with Natchez Trace on this project.

Sincerely,

Wilbourne C. Markham Jr.
Director
TVA, Environmental Permitting and Compliance

Ms. Mary Risser
Page 2
July 29, 2016

INTERNAL COPIES, NOT INCLUDED WITH OUTBOUND LETTER:

AEM:TDY
cc (Electronic distribution):
C. A. Austin, MR 4G-C
J. T. Baxter, WT 11C-K
S. C. Cole, WT 11 D-K
K. D. Choate, MR 4G-C
M. V. Gillen, WT 6A-K
A. B. Henry, WT 11D-K
S. R. Jacks, WT 11A-K
C. E. Jones, WT 11C-K
A. E. Masters, BR 4A-C
J. E. Melton, MR 4G-C
K. Pilarski-Hall, WT 11C K
W. Richard Yarnell, WT 11D-K
E. P. Willard, MR 4G-C

Prepared by Anita E. Masters (NP&VP) with concurrence from Maria V. Gillen (OGC).

United States Department of the Interior

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

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

SEP 0 8 2016

Mr. Wilbourne C. Markham, Jr., Director
TVA Environmental Permitting and Compliance
400 West Summitt Hill Drive
Knoxville, TN 39702-1499

Dear Mr. Markham:

The National Park Service (NPS) formally accepts your July 29, 2016, invitation to become a cooperating agency in the development of an environmental assessment (EA) for a proposed transmission line crossing at Red Hills-Kosciusko 16-kV located in Attala County near the City of Kosciusko, Mississippi. This acceptance includes all phases of the project that have the potential to affect the Natchez Trace Parkway (Parkway) and NPS operations.

Regulations implementing the procedural provisions of the National Environmental Policy Act of 1969 (NEPA), call for agency cooperation in the NEPA process with the ultimate goal of "*…decisions that are based on understanding of environmental consequences, and … actions that protect, restore, and enhance the environment.*" (40 C.F.R. §1500.1) The NPS accepts cooperating agency status in developing the EA to ensure that pertinent NPS mission statements, legislative authorities, and policies are duly considered by the Tennessee Valley Authority (TVA) when developing any alternatives, related management actions, or options applicable to the Parkway. As a cooperating agency, the NPS proposes to assist TVA in developing the EA and provide guidance relating to alternatives, related management actions, or options that could potentially affect the Parkway.

We appreciate your coordination with us and look forward to working with TVA on this important project and EA. Should you have any questions or need additional information concerning this response, please contact Superintendent Mary Risser at (662) 680-4005.

Sincerely,

Stan Austin
Regional Director

United States Department of the Interior
NATIONAL PARK SERVICE
Natchez Trace Parkway
Office of the Superintendent
2680 Natchez Trace Parkway
Tupelo, MS 38804

In Reply Refer To:
A3815(NATR)

Mr. Wilbourne C. Markham Jr., Director
TVA Environmental Permitting and Compliance
400 West Summitt Hill Drive
Knoxville, TN 39702-1499

Dear Mr. Markham:

As a cooperating agency for the environmental assessment (EA) of a proposed Red Hills-Kosciusko 161-kV transmission line, the National Park Service (NPS) has completed an initial review of the EA and have identified additional content needed to address the project's impact to the environment. The proposed crossing will affect the Natchez Trace Parkway (Parkway), NPS operations, and connected natural resources.

TVA will need to obtain a right-of-way (ROW) permit from the NPS for the proposed transmission line. Once a ROW permit is authorized, a construction permit will be required for installation on NPS lands. This process takes time and is dependent on completion of compliance. It is mutually beneficial for the NPS and TVA to work together as cooperating agencies on an EA to satisfy the National Environmental Policy Act (NEPA) requirements for both agencies.

Environmental and cultural resource compliance is a required preliminary step in the ROW permitting process. The Parkway must have an NPS-approved environmental/cultural assessment document under NEPA to issue a permit. The NPS requests that TVA submit an Application for Transportation and Utility Systems and Facilities on Federal Lands (SF-299) to initiate the right-of-way application process. Following the Superintendent's approval of the application, and completion of the appropriate level of environmental and cultural compliance under NEPA and the National Historic Preservation Act (NHPA), the ROW is drafted at the Parkway and forwarded to the Regional Solicitor's Office in Atlanta for legal review. Permits are then submitted to the Southeast Region Field Office for approval and signature by the Southeast Regional Director, National Park Service, and returned to the Parkway for distribution and implementation. Although the EA is a requirement of the ROW permit, work towards the application will help expedite the procees by gathering required information. NPS staff sent TVA information on the ROW application process in June 2016 and can re-send if needed.

Before the NPS can provide specific comments to the EA, there are sections of the document that need further clarification. The NPS can assist with these portions of the document; however, we are unable to do so without additional information. The Parkway is requesting TVA address the following:

- The EA identifies working in consultation with the NPS, but there is no mention that the Parkway is a cooperating agency on the EA and that the EA would cover NEPA requirements for the NPS. Once the EA draft meets NPS standards, the Department of the Interior strongly recommends a 30-day public comment period.
- Section 106 and Section 7 consultation with the State Historical Preservation Office and the US Fish and Wildlife Service, respectively, has not been completed for the project. Although these consultations are a separate part of the NEPA process, the NPS cannot make a decision with regard to the project on natural and cultural resources without the completed consultations.
- Would the transmission line employ best practices from the Avian Power Line Interaction Committee? There appears to be no design discussions to avoid electrocution, nor siting to reduce collisions from wildlife.
- An archeological survey was completed under an Archeological Resources Protection Act permit, but TVA has not submitted the report. The NPS must review the report to ensure the survey was adequate and concur with the determination no archeological sites will be impacted.
- In Section 2.4.2 of the EA, TVA cites the preferred Highway 14 easement to have reduced wetland impacts when compared to the NPS preferred route, but does not provide any rationale as to why the NPS did not prefer that route. In addition, TVA describes that the route will clear fewer trees; however, the NPS and the public need a better comparison and description of the impacts to document the NPS preferred route. Since the Parkway is eligible for listing on the National Register, the aerial line will affect the designed cultural landscape wherever it is located. When describing the route selected by the NPS, TVA does not mention that crossing at Highway 14 would result in an adverse impact on a contributing feature of the designed landscape (the bridge). This should be clarified in Section 2.4.3 of the EA.
- Impacts to NPS resources are not specifically addressed with each impact topic; however, the Parkway is mentioned specifically in section 3.11 Recreation, Parks, and Natural Areas. The NPS resources need to be adequately addressed in all the impact topics that relate to Parkway resources. Both temporary (access and staging areas) and permanent impacts (pole placement and height, access roads frequency, and type of maintenance) need to be considered. As a cooperating agency, Parkway resources have to be addressed for the document to fulfill the NPS NEPA requirement.
- The Parkway needs additional information on impacts to NPS wetlands to determine if wetlands will be spanned or if poles will be installed. Impacts to NPS wetlands and connected wetlands may require the development of a Wetlands Statement of Findings per NPS Director's Orders 77-1. A better description of the permanent and temporary impacts to wetlands is needed.
- Mitigation needs to be addressed for environmental impacts, so the NPS can adequately consider impacts of the project. Past utility projects on NPS lands have placed smaller utility lines underground to mitigate impacts to Parkway scenic resources. Placing a utility line underground is always a preferred alternative in regards to scenic resources.

Initial EA Comments
Red Hills-Kosciusko Transmission Line

Page 3

Did TVA consider and dismiss the alternative to underground a segment of the transmission line at the Highway 14 crossing?

- It is unclear if TVA consulted directly with the Mississippi Natural Heritage Program regarding the five occurrences of the state listed Turk's cap lily that will be impacted by the project. It is also not clear as to why this impact was determined to be insignificant.
- Impact thresholds for environmental topics need to be supported with documentation to understand the decision process. If an impact is described as insignificant, the EA should discuss the background information for the determination.
- Cumulative impacts are not addressed adequately to provide a basis or explanation regarding past, present, or foreseeable future actions. How feasible is a future upgrade for the proposed 161-kV transmission line? The NPS considers cumulative impacts as part of the NEPA process and some topics need further explanation regarding cumulative impacts. In Section 4.3, the discussion of Cumulative Impacts for the Parkway only describes the Highway 14 crossing as a proposed alignment.

We appreciate your coordination, and the NPS will assist TVA in developing the EA. We look forward to working with you to address these comments. Should you have any questions, or need additional information concerning this request, please contact Natural Resource Specialist Deanna Boensch at (662) 680-1632, or email her at Deanna_Boensch@nps.gov.

Sincerely,

Mary Risser
Superintendent

National Park Service Comments and TVA Responses

The proposed transmission line would require a crossing of the Natchez Trace Parkway. As such, the Tennessee Valley Authority (TVA) invited the National Park Service (NPS) as a cooperating agency. TVA continues to work on a solution with the NPS for crossing the parkway. TVA received the following questions on September 8th, 2016 from NPS regarding the crossing (Letter A3815[NATR]). Below are TVA's responses to these questions and the Draft EA has been revised as indicated.

1.) The EA identifies working in consultation with the NPS, but there is no mention that the Parkway is a cooperating agency on the EA and that the EA would cover NEPA requirements for the NPS. Once the EA draft meets NPS standards, the Department of the Interior strongly recommends a 30-day public comment period.

Comment noted and may be addressed within the context of the proposal above. Additional text has been added to Section 1.5 indicating that NPS is a cooperating agency. TVA plans a two week public comment period for the draft EA. TVA understands that if the NPS issues a separate EA or adopts TVA's EA, an additional public comment period will be required prior to issuance of a FONSI.

2.) Section 106 and Section 7 consultation with the State Historical Preservation Office and the US Fish and Wildlife Service, respectively, has not been completed for the project. Although these consultations are a separate part of the NEPA process, the NPS cannot make a decision with regard to the project on natural and cultural resources without the completed consultations.

Comment noted and may be addressed within the context of the proposal above. TVA is consulting with the SHPO and USFWS concerning potential effects of the proposed project. TVA expects a reply from the USFWS in mid-December. However, a return reply in regards to SHPO consultation is not likely to be obtained until early 2017. Because TVA findings were insignificant and TVA expects concurrence from both USFWS and the SHPO, TVA proposes to move forward with the draft EA by including commitments to state that no construction activities would occur until consultation and concurrence had been completed (see Section 2.6), by providing language informing the reader of the unresolved issues (see Section 2.7), and by revising the final EA to include results of any finalized consultation.

3.) Would the transmission line employ best practices from the Avian Power Line Interaction Committee? There appears to be no design discussions to avoid electrocution, nor siting to reduce collisions from wildlife.

TVA's standard transmission line design exceeds the 60 inch minimum horizontal separation between energized conductors as outlined in the guidance; TVA also takes additional measures to minimize impacts is warranted. TVA's avian specialist concluded that no additional measures as outlined in the Avian Power Line Interaction Committee Guidelines were warranted for the construction of the Red Hills–Kosciusko Transmission Line.

4.) An archeological survey was completed under an Archeological Resources Protection Act permit, but TVA has not submitted the report. The NPS must review the report to ensure the survey was adequate and concur with the determination no archeological sites will be impacted.

The archaeological report summarizing the survey findings were sent to NPS and the SHPO on November 14, 2016.

5.) In Section 2.4.2 of the EA, TVA cites the preferred Highway 14 easement to have reduced wetland impacts when compared to the NPS preferred route, but does not provide any rationale as to why the NPS did not prefer that route. In addition, TVA describes that the route will clear fewer trees; however, the NPS and the public need a better comparison and description of the impacts to document the NPS preferred route. Since the Parkway is eligible for listing on the National Register, the aerial line will affect the designed cultural landscape wherever it is located. When describing the route selected by the NPS, TVA does not mention that crossing at Highway 14 would result in an adverse impact on a contributing feature of the designed landscape (the bridge). This should be clarified in Section 2.4.3 of the EA.

Sections 2.4.2 and 2.4.3 have been revised to address NPS's reasoning for rejecting the proposed transmission line alternative, which crossed the Natchez Trace Parkway along State Route 14.

6.) Impacts to NPS resources are not specifically addressed with each impact topic; however, the Parkway is mentioned specifically in section 3.11 Recreation, Parks, and Natural Areas. The NPS resources need to be adequately addressed in all the impact topics that relate to Parkway resources. Both temporary (access and staging areas) and permanent impacts (pole placement and height, access roads frequency, and type of maintenance) need to be considered. As a cooperating agency, Parkway resources have to be addressed for the document to fulfill the NPS NEPA requirement.

TVA evaluated the environmental impacts of the entire transmission line project as its action, but will provide a discussion of the impacts occurring at the Natchez Trace Crossing to the NPS for inclusion in the NPS EA.

7.) The Parkway needs additional information on impacts to NPS wetlands to determine if wetlands will be spanned or if poles will be installed. Impacts to NPS wetlands and connected wetlands may require the development of a Wetlands Statement of Findings per NPS Director's Orders 77-1. A better description of the permanent and temporary impacts to wetlands is needed.

As described in Section 4.2.8, TVA does not anticipate permanent impacts to wetlands because it is employing clearing methods that allow the wetlands to maintain their functionality as scrub/shrub wetlands (i.e., feller-buncher low ground-pressure equipment, and/or mats to reduce soil compaction and minimize rutting). Currently, one proposed structure would be located in a NPS wetland. This structure would require less than a 0.10 acre of fill for installation; therefore, it is not subject to a U.S. Corp of Engineers (USACE) preconstruction notice. Additional language has been added to Section 4.2.8 to clarify impacts to this wetland

8.) Mitigation needs to be addressed for environmental impacts, so the NPS can adequately consider impacts of the project. Past utility projects on NPS lands have placed smaller utility lines underground to mitigate impacts to Parkway scenic resources. Placing a utility line underground is always a preferred alternative in regards to scenic resources. Did TVA consider and dismiss the alternative to underground a segment of the transmission line at the Highway 14 crossing?

TVA considered NPS's suggestion that TVA consider burying the 161-kV crossing at the Natchez Trace. This proposed mitigation measure is discussed in Section 2.1.3.2 in the draft EA. This measure was eliminated for several reasons. Burying the 161-kV line across the Natchez Trace would require extensive excavation during construction, would exponentially increase future maintenance costs, would entail significant cooling requirements, would require the construction of permanent access roads for maintenance, and would complicate the ability to protect the line from flooding and outages, all of which would increase costs. For all these reasons, TVA concluded in the draft EA that this is not a feasible option. TVA is considering other mitigation options which we expect to generate continued discussions to find a satisfactory resolution for both TVA and NPS.

9.) It is unclear if TVA consulted directly with the Mississippi Natural Heritage Program regarding the five occurrences of the state listed Turk's cap lily that will be impacted by the project. It is also not clear as to why this impact was determined to be insignificant.

TVA only consults with Mississippi Natural Heritage Program if our significance determination is unclear. The TVA database has records for about 66 percent of the counties where the species has been previous reported in Mississippi, contains 70 occurrences, does not include occurrences outside of the TVA Power Service Area, and the Mississippi rank of S3S4 indicates that the species is not uncommon. Accordingly, TVA concluded the species is too common to be significantly impact by our project and did not believe concurrence with the Mississippi Natural Heritage Program was necessary.

10.) Impact thresholds for environmental topics need to be supported with documentation to understand the decision process. If an impact is described as insignificant, the EA should discuss the background information for the determination.

TVA believes it has provided those discussions, but is happy to discuss sections where NPS believes these discussions are missing or are inadequate.

11.) Cumulative impacts are not addressed adequately to provide a basis or explanation regarding past, present, or foreseeable future actions. How feasible is a future upgrade for the proposed 161-kV transmission line? The NPS considers cumulative impacts as part of the NEPA process and some topics need further explanation regarding cumulative impacts. In Section 4.3, the discussion of Cumulative Impacts for the Parkway only describes the Highway 14 crossing as a proposed alignment.

Comment noted. TVA disagrees. Each resource includes a description of past actions (current condition), present actions (proposal), and foreseeable actions to the degree possible. At this time TVA has no plans or reasons to need an upgrade in the future.

"Where the proposed alignment would cross the Natchez Trace Parkway alongside the Central EPA's 46-kV transmission line ROW, the visual effects would be long-term, but the line would only be visible to motorists briefly and any impacts would be minimized due to the existing transmission lines and structures and density of tree growth."

EA will be revised to reflect the current proposed crossing location suggested by NPS.

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

November 14, 2016

Mr. Jim Woodrick
Director
Mississippi Department of Archives and History
Historic Preservation Division
Post Office Box 571
Jackson, Mississippi 39205-0521

Dear Mr. Woodrick:

Tennessee Valley Authority (TVA), RED HILLS-KOSCIUSKO 161-KV TRANSMISSION LINE PROJECT, ATTALA, CHOCTAW, AND WINSTON COUNTIES, MISSISSIPPI
(START: 33° 22.496705' N, 89° 13.044894' W. END: 33° 1.841979' N, 89° 36.027914' W)
T. 14 North, R. 7 East, Sections 32, 33, and 34
T. 14 North, R. 8 East, Sections 13, 14, 20, 21, 22, 23, 27, 28, 29, 30, 31
T. 14 North, R. 9 East, Sections 1, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, and 24
T. 15 North, R. 9 East, Section 36
T. 15 North, R. 10 East, Sections 7, 8, 9, 17, 18, 19, 20, 30, and 31
T. 16 North, R. 10 East, Sections 3, 4, 10, 15, 22, 27, 28, and 33
T. 17 North, R. 10 East, Sections 2, 11, 14, 22, 23, 27, 28, 29, and 32
T. 18 North, R. 8 East, Section 35

In May of this year we notified you of TVA's plans to construct a new 161-kV transmission line (TL) to serve Central Electric Power Association's (Central EPA's) existing Kosciusko Substation. The new Red Hills-Kosciusko (formerly referred to as "Red Hills-Leake") 161-kV TL would improve reliability and resolve loading issues with the current configuration. TVA would build about 43 miles of 161-kV single and double circuit line on a 100-foot right-of-way (ROW) using single and double steel pole structures. The structures would range in height from 80 to 120 feet above ground and would be installed using an auger mounted on a bucket truck. TVA's access to the ROW for construction would be on existing roads of various types (dirt, gravel, and paved roads). Figure 1, below, shows the locations of the project centerline and half-mile radius. TVA has determined that this proposed transmission line project is an undertaking (as defined at 36 CFR § 800.16(y)) that has the potential to cause effects on historic properties.

APE
TVA has identified the area of potential effects (APE) for archaeological resources as the ca. 43 miles of planned 100-foot ROW, ca. 1.6 miles of 75-foot ROW, the ca. 5.16 mile section of the 161-kV tap line to Wier that would receive new overhead ground wire, and the associated off-ROW

access roads. TVA identified the APE for historic architectural resources as areas within a one-half mile radius of the TL centerline that would have a direct line of sight to the new TL.

While the Phase I Cultural Resources survey was ongoing, TVA modified the proposed TL route in response to concerns expressed by your office. Because the project must connect to Central EPA's Kosciusko Substation, it cannot avoid crossing the Parkway. TVA has considered two alternative Parkway crossings, a south alternate and a north alternate. The south alternate (ca. 1.29 mi or 2.07 km) would run parallel to State Highway 14, which passes over the Parkway on a bridge. It is our understanding that, although this bridge was built ca. 2000, it was designed in the 1930s, is in accord with the Parkway's historic character, and contributes to the Parkway's historic significance. The north alternate (ca, 1.53 mi or 2.47 km) would cross the Parkway ca. 645 feet north of mile marker 159, roughly 2,200 feet north of State Highway 14, and would parallel an existing Central EPA 46-kV TL ROW. During a conference call with TVA planners on June 30, 2016, National Park Service (NPS) staff expressed a preference for the north alternate, due to concerns that the south alternate would compromise the historic integrity of the State Highway 14 bridge. Because of this, the south alternate was eliminated from consideration; TVA's preferred route now includes the north alternate. The change resulted in a slight increase in the length of the APE. TVA included both alternates in the cultural resources survey.

TVA also modified the APE by re-routing two sections of ROW in order to resolve concerns expressed by private landowners. TVA modified the route by moving a point-of-intersection structure (Structure 25) approximate 55 meters, which affected a ca. 2.67 mile segment of ROW. TVA included both the original and the re-routed section in the cultural resources survey. This change had no effect on the total length of the APE.

Survey

TVA contracted with Tennessee Valley Archaeological Research (TVAR) to perform a Phase I Cultural Resources survey of the APE (including the above-described re-routes). Enclosed are three bound copies of the draft report titled, *A Phase I Cultural Resources Survey of the Red Hills-Kosciusko Transmission Line Project in Attala, Choctaw, and Winston Counties, Mississippi*, along with three CDs containing digital copies of the report.

Identified Resources

TVAR's background research, conducted prior to the field study, resulted in the identification of four previously documented architectural resources that are at least 50 years old (019-ACK-5007, 019-ACK-5051, 007-KOS-5042, and the NRHP eligible Natchez Trace Parkway). The survey noted that 019-ACK-5007 and 019-ACK-5051 are located outside the project's viewshed, and are therefore outside the architectural APE. Resource 007-KOS-5042 is no longer extant, having been destroyed since it was recorded. The survey identified 36 previously undocumented architectural resources, which TVAR designated IS-1 through IS-36. TVAR recommends that the Natchez Trace Parkway continues to be eligible for inclusion in the NRHP. TVAR recommends further that the undertaking would result in an effect on the Natchez Trace Parkway, but that the effect would not be adverse. TVAR recommends that all 36 newly recorded architectural properties are ineligible for the NRHP.

Table 1. Architectural resources investigated in the survey

Site	Recorded	TVAR recommends	TVA
019-ACK-5007	previously	outside APE	agrees
019-ACK-5051	previously	outside APE	agrees
007-KOS-5042	previously	[destroyed]	agrees
Natchez Trace Parkway	previously	eligible	agrees
IS-1 through IS-36	newly	all ineligible	agrees

TVAR's background research also noted the presence of two previously recorded archaeological sites (22AT540 and 22AT571) within the archaeological APE. The archaeological investigation identified six previously unrecorded sites (22CH874, 22CH875, 22CH876, 22CH877, 22CH1189, and 22CH1190) and six isolated finds within the APE. TVAR's investigation of the portion of 22AT540 within the APE did not identify characteristics that would contribute to the site's research potential or NRHP eligibility under Criterion D. TVAR recommends that the investigated portion of 22AT571 would contribute to the site's research potential and NRHP eligibility under Criterion D, and that the site should be avoided or investigated further. (This site is located within the Natchez Trace Parkway boundary). The investigated portions of 22CH874, 22CH876, 22CH1189, and 22CH1190 appear to lack the potential to contribute to their respective sites' research potential and NRHP eligibility under Criterion D. Similarly, all six of the isolated finds lack research potential and are recommended ineligible for listing on the NRHP. TVAR recommends that 22CH875 and 22CH877 would contribute to the sites' research potential and NRHP eligibility under Criterion D, and that these sites should be avoided or investigated further.

Table 2. Archaeological sites investigated in the survey

Site	Recorded	TVAR recommends	TVA
22AT540	previously	ineligible (portion in APE)	agrees
22AT571	previously	undetermined	agrees
22CH874	newly	ineligible	agrees
22CH875	newly	undetermined	agrees
22CH876	newly	ineligible	agrees
22CH877	newly	undetermined	agrees
22CH1189	newly	ineligible	agrees
22CH1190	newly	ineligible	agrees

TVA has read the enclosed report and agrees with the authors' recommendations. Based on this investigation, TVA proposes that the Natchez Trace Parkway continues to be eligible for inclusion in the NRHP, and that the 36 newly identified architectural resources in the APE are ineligible for the NRHP. TVA proposes further that three of the identified archaeological sites(22AT571, 22CH875, and 22CH877) should be considered to be of "undetermined" NRHP eligibility. The remaining sites fail to meet NRHP eligibility criteria. Although portions of 22AT540 outside the APE could contain important data, the portion of the site within the APE lacks significance.

Mr. Jim Woodrick
Page Four
November 14, 2016

Evaluations of Effect

TVA finds that the undertaking would result in an effect on the Natchez Trace Parkway, due to the widening of an existing 46-kV TL corridor (by removing additional trees). Figure 2, below, is a satellite image captured from Bing showing the location where Central EPA's existing 46-kV TL crosses the Natchez Trace Parkway. Figure 3, taken from Google Street View, shows the current appearance of the existing 46-kV TL at the Natchez Trace Parkway. Figure 4, prepared by Amec Foster Wheeler for TVA, displays a rendering of the possible appearance of this area upon completion of the new Red Hills-Kosciusko TL. TVA's Red Hills-Kosciusko 161-kV TL would parallel the existing 46-kV TL on the west side, requiring an additional 50 foot width of cleared ROW. TVA finds that the effect would be non-adverse, as it would represent an addition to an existing visual intrusion. In addition, it is worth noting that TVA's selection of this alternate for crossing the Natchez Trace Parkway avoids the adverse effect that could result from the State Highway 14 alternate.

The three undetermined archaeological sites would be affected by vegetation clearing. Two of the sites (22CH875 and 22CH877) would also be affected by the use of an access road within the ROW (Figures 5 and 6). No TL structures would be installed within any of the sites. Current plans call for the installation of one TL structure adjacent to 22CH875, in an area where shovel testing was negative (Figure 5). Equipment used to install the structure may need to drive over the site, but no ground disturbance would result.

Table 3. Potential effects to "undetermined" archaeological sites.

Site	Access Rd	Clearing	TL Structure(s)	Resolution
22AT571	X	X		BMPs for clearing and equipment
22CH875	X	X		BMPs for clearing and equipment
22CH877	X			BMPs for clearing and equipment

TVA proposes to avoid or minimize project effects resulting from access road use and vegetation clearing by modifying the construction design. The design will include restrictions that must be followed by the work crews when working within 30 meters of any NRHP-eligible or –undetermined archaeological site. TVA will place a 30 meter buffer surrounding each of the three "undetermined" sites. The buffers will be marked on all project drawings and work crews will be instructed to adhere to the conditions. Potential adverse effects to 22CH875 and 22CH877 resulting from access road use (including stationing equipment for structure installation adjacent to 22CH875) would be avoided by restricting equipment to the existing roads, and by restricting the use of the road to times when the ground is dry and firm, or by using low ground pressure equipment, or by placing wetland mats within the site buffer during use of the access roads. At all three sites, TVA will require the use of a tracked feller buncher and/or chain saws operated by workers on foot for all vegetation clearing.

Tracked feller-bunchers have a lower ground-pressure than wheeled equipment, and are less prone to rutting and compaction. Vegetation within the site buffer will be cut just above the ground surface and stumps will be left in place.

TVA finds that, with the above avoidance and minimization measures in place, the undertaking would result in no adverse effects to any NRHP-eligible archaeological site.

Based on careful consideration of all of the information provided above, TVA proposes a finding of No Adverse Effect for this undertaking.

Pursuant to 36 CFR Part 800.4(d)(1), we are seeking your agreement with TVA's determinations concerning the NRHP eligibility of the identified resources, and with TVA's effect findings for the Natchez Trace Parkway and "undetermined" archaeological sites 22AT571, 22CH875, and 22CH877.

Pursuant to 36 CFR Part 800.3(f)(2), TVA is consulting with federally recognized Indian tribes regarding historic properties within the APE that may be of religious and cultural significance and eligible for listing in the NRHP.

TVA is consulting with the National Park Service regarding the project's potential to affect historic properties within the Natchez Trance Parkway. We have asked that the NPS provide your office with a copy of their comments on the report and TVA's finding of No Adverse Effect. We ask that you provide a copy of your comments to Mary Risser, Natchez Trace Parkway Park Superintendent, at the following address: Natchez Trace Parkway, 2680 Natchez Trace Parkway, Tupelo, MS 38804.

Should you have any questions or comments, please contact Richard Yarnell in Knoxville by email, wryarnell@tva.gov or by phone, (865) 632-3463.

Sincerely,

Clinton E. Jones
Manager
Biological and Cultural Compliance

SCC:ABM
Enclosures
cc:

Ms. Mary Risser
Superintendent
Natchez Trace Parkway
2680 Natchez Trace Parkway
Tupelo, Mississippi 38804

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

April M. Cagley, KFP 1T-KST
Stephen C. Cole, WT 11D-K
Amy B. Henry, WT 11C-K
Susan R. Jacks, WT 11C-K
Joseph E. Melton, MR 4G-C
M. Susan Smelley, BR 4A-C
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Emily P. Willard, MR 4G-C
W. Richard Yarnell, WT11D-K
ECM, WT CA-K

A Phase I Cultural Resources Survey of the Red Hills-Kosciusko Transmission Line Project in Attala, Choctaw, and Winston Counties, Mississippi

Tennessee Valley Archaeological Research

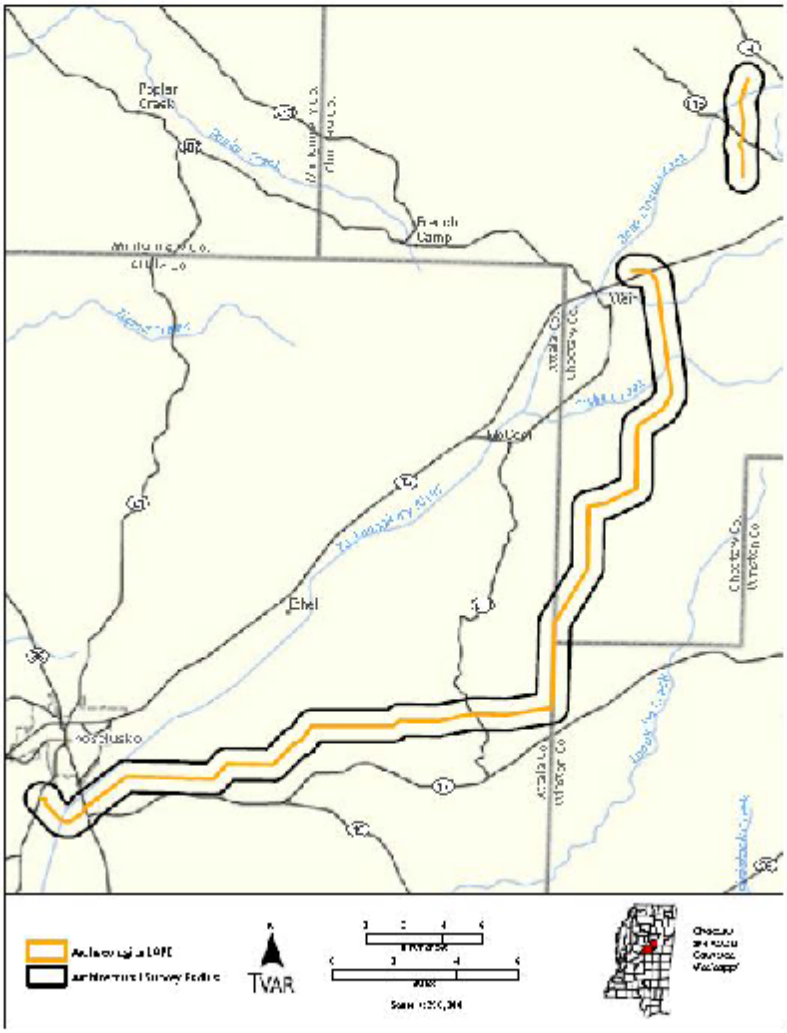

Figure 1. Proposed right-of-way ("Archaeological APE") and half-mile radius ("Architectural Survey Radius") for TVA's Red Hills-Leake 161-kV Transmission Line Project.

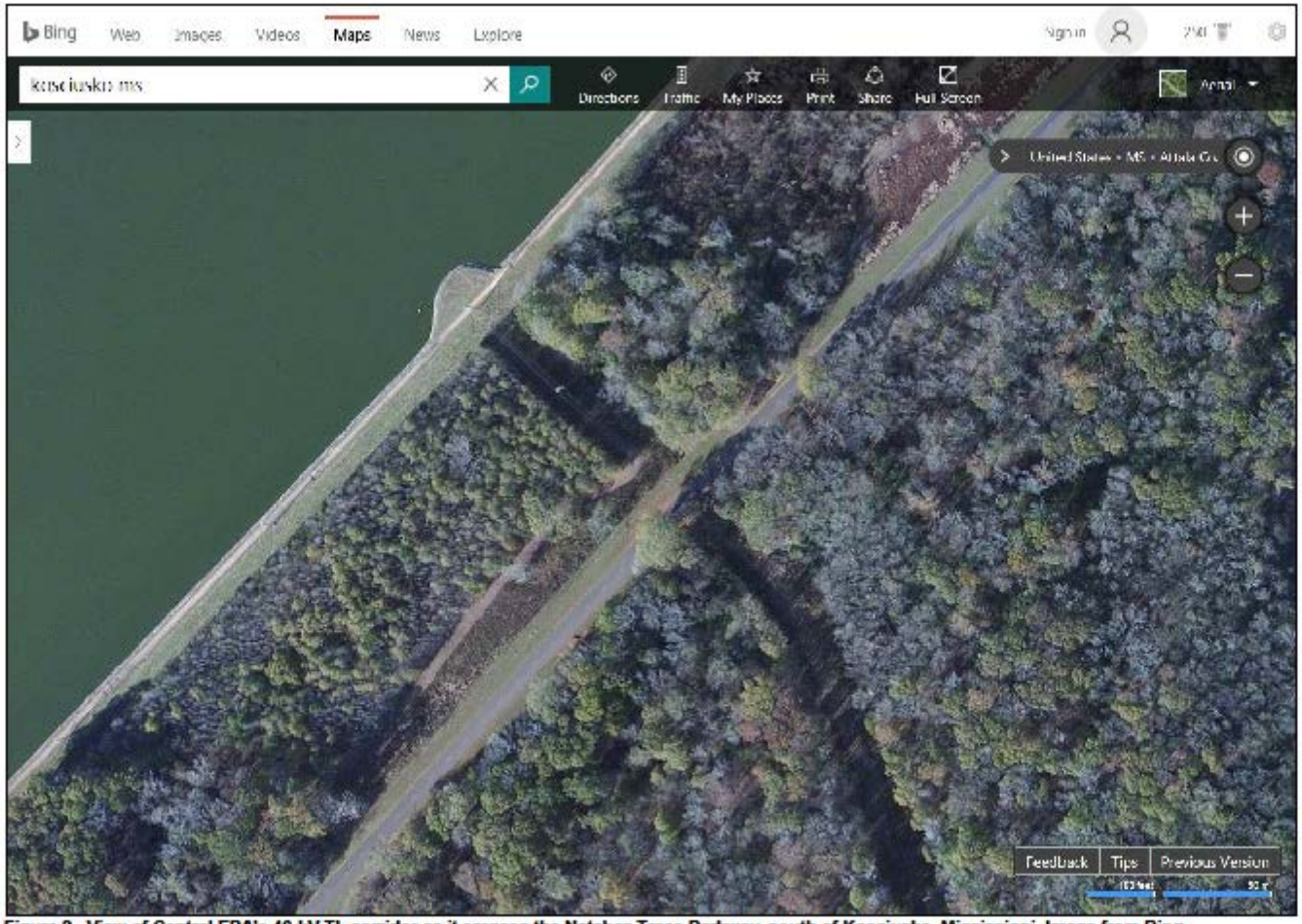

Figure 2. View of Central EPA's 46-kV TL corridor as it crosses the Natchez Trace Parkway, south of Kosciusko, Mississippi. Image from Bing.

Figure 3. View, taken from Google Street View, showing Central EPA's 46-kV TL where it crosses the Natchez Trace Parkway. View to northwest.

Figure 4. Visual rendering of the proposed new 161-kV TL as it would look at the location where Central EPA's 46-kV TL crosses the Natchez Trace Parkway. View to northwest. Developed using the Google Street View image shown in Figure 3, above.

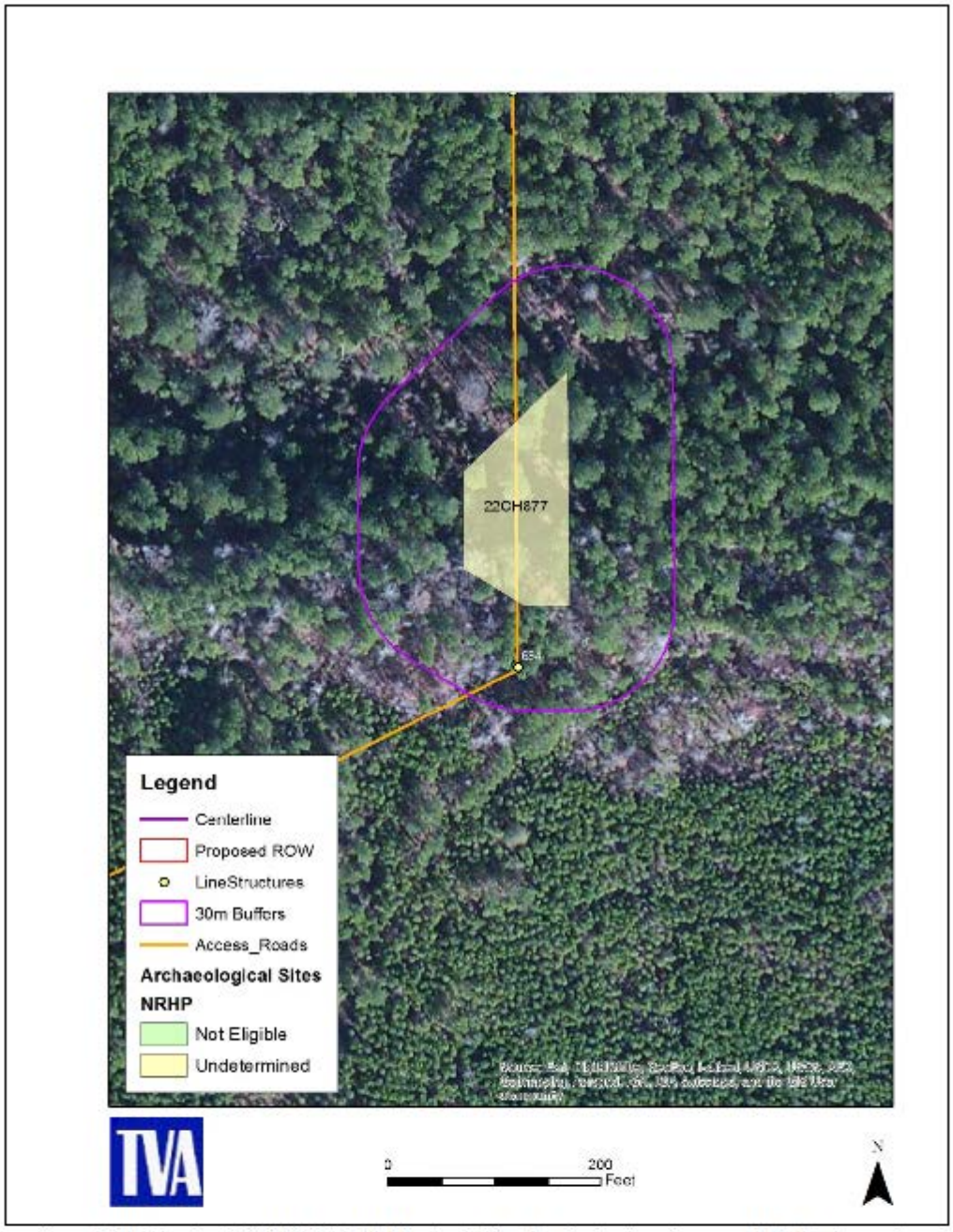

Figure 6. Undetermined site 22CH877, with 30-meter buffer, showing location of proposed TL structure and within-ROW access road.

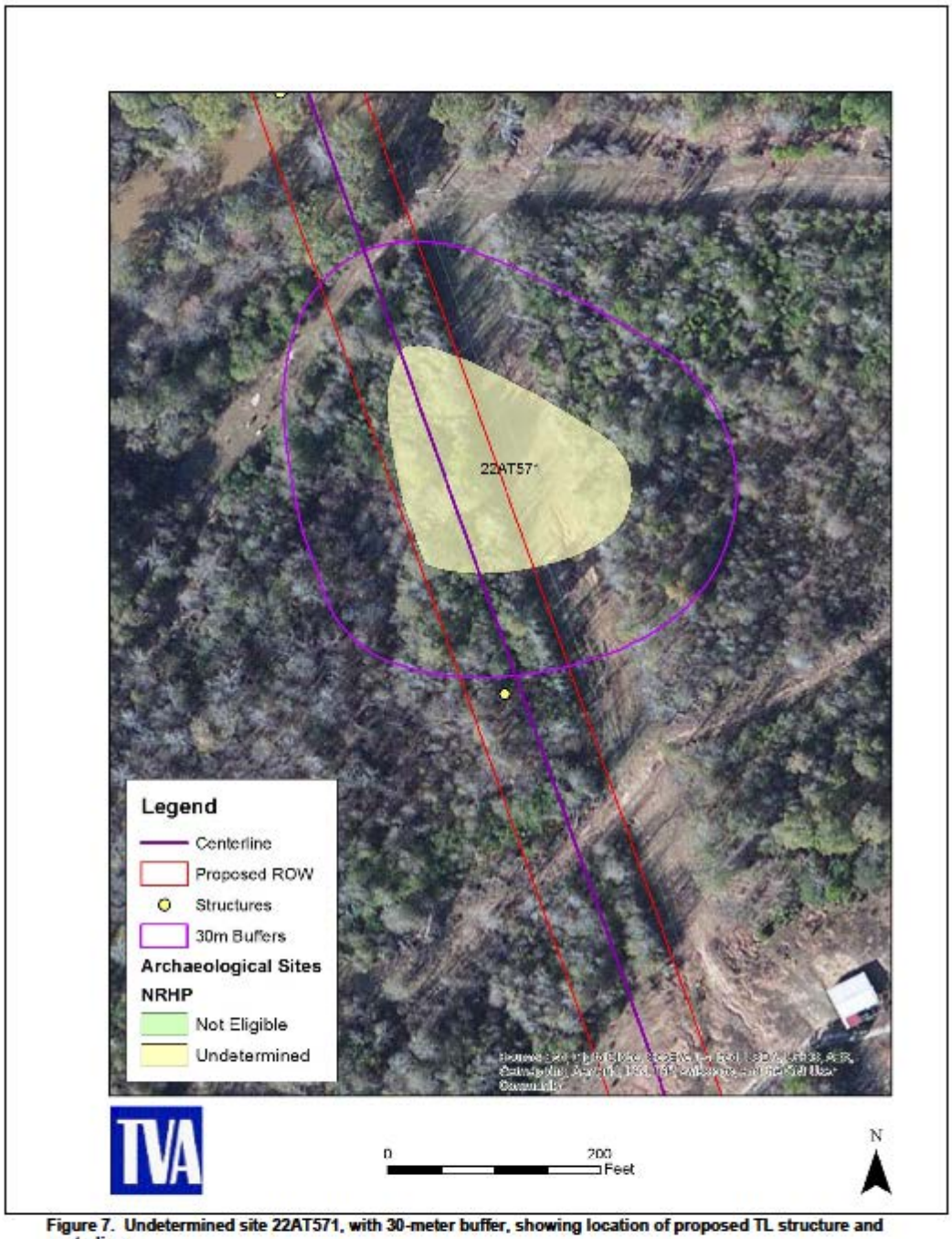

Figure 7. Undetermined site 22AT571, with 30-meter buffer, showing location of proposed TL structure and centerline.

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

November 14, 2016

Ms. Mary Risser
Superintendent
Natchez Trace Parkway
2680 Natchez Trace Parkway
Tupelo, Mississippi 38804

Dear Mr. Risser:

Tennessee Valley Authority (TVA), RED HILLS-KOSCIUSKO 161-KV TRANSMISSION LINE PROJECT, ATTALA, CHOCTAW, AND WINSTON COUNTIES, MISSISSIPPI
(START: 33° 22.496705' N, 89° 13.044894' W. END: 33° 1.841979' N, 89° 36.027914' W)
T. 14 North, R. 7 East, Sections 32, 33, and 34
T. 14 North, R. 8 East, Sections 13, 14, 20, 21, 22, 23, 27, 28, 29, 30, 31
T. 14 North, R. 9 East, Sections 1, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, and 24
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T. 17 North, R. 10 East, Sections 2, 11, 14, 22, 23, 27, 28, 29, and 32
T. 18 North, R. 8 East, Section 35

TVA is proposing to construct a new 161-kV Transmission Line (TL) in Attala, Choctaw, and Winston Counties, Mississippi. The new Red Hills-Kosciusko 161-kV TL would serve Central Electric Power Association's (Central EPA's) existing Kosciusko Substation, and would improve reliability and resolve loading issues with the current configuration. TVA would build about 43 miles of 161-kV single and double circuit line on a 100-foot right-of-way (ROW) using single and double steel pole structures. The structures would range in height from 80 to 120 feet above ground and would be installed using an auger mounted on a bucket truck. TVA's access to the ROW for construction would be on existing roads of various types (dirt, gravel, and paved roads). Figure 1, below, shows the locations of the project centerline and half-mile radius. A ca. 1,460 foot section of the proposed new TL's eastern end would cross the Natchez Trace Parkway. TVA has determined that this proposed transmission line project is an undertaking (as defined at 36 CFR § 800.16(y)) that has the potential to cause effects on historic properties. We are initiating consultation under Section 106 of the National Historic Preservation Act for the portion of the undertaking that has potential to affect historic properties within the Natchez Trace Parkway.

APE
TVA has identified the area of potential effects (APE) for archaeological resources as the ca. 42 miles of planned 100-foot ROW, ca. 1.6 miles of 75-foot ROW, the ca. 5.16 mile section of the 161-kV tap line to Wier that would receive new overhead ground wire, and the associated off-ROW

access roads. TVA identified the APE for historic architectural resources as areas within a one-half mile radius of the TL centerline that would have a direct line of sight to the new TL.

TVA is consulting with the Mississippi State Historic Preservation Officer (SHPO) regarding the survey findings. In this letter, we focus solely on the portion of the undertaking that has potential to affect historic properties within the Natchez Trace Parkway ("Parkway").

Survey

TVA contracted with Tennessee Valley Archaeological Research (TVAR) to perform a phase I cultural resources survey of the APE. Enclosed are three bound copies of the draft report titled, *A Phase I Cultural Resources Survey of the Red Hills-Kosciusko Transmission Line Project in Attala, Choctaw, and Winston Counties, Mississippi*, along with three CDs containing digital copies of the report.

While the Phase I cultural resources survey was ongoing, TVA modified the proposed TL route in response to concerns expressed by your office. Because the project must connect to Central EPA's Kosciusko Substation, it cannot avoid crossing the Parkway. TVA has considered two alternatives, a south alternate and a north alternate. The south alternate (ca. 1.29 mi or 2.07 km) would run parallel to State Highway 14, which passes over the Parkway on a bridge. It is our understanding that, although this bridge was built ca. 2000, it was designed in the 1930s, is in accord with the Parkway's historic character, and contributes to the Parkway's historic significance. The north alternate (ca, 1.53 mi or 2.47 km) would cross the Parkway ca. 645 feet north of mile marker 159, roughly 2,200 feet north of State Highway 14, and would parallel an existing Central EPA 46-kV TL ROW. During a conference call with TVA planners on June 30, 2016, NPS staff expressed a preference for the north alternate, due to concerns that the south alternate would compromise the historic integrity of the State Highway 14 bridge. Because of this, TVA's preferred route now includes the north alternate. The change resulted in a slight increase in the length of the APE. TVA included both alternates in the cultural resources survey.

Resources identified in the Natchez Trace Parkway

TVAR's background research, conducted prior to the field study, identified one previously documented architectural resource within the Parkway boundary: the NRHP eligible Natchez Trace Parkway. TVAR recommends that the Natchez Trace Parkway continues to be eligible for inclusion in the NRHP. TVAR recommends further that the undertaking would result in an indirect effect on the Natchez Trace Parkway, but that the effect would not be adverse.

The archaeological investigation included one previously recorded site (22AT571) within this portion of the APE. TVAR recommends that 22AT571 would contribute to the site's research potential and NRHP eligibility under Criterion D, and that the site should be avoided or investigated further.

Evaluations of Effect

TVA finds that the undertaking would result in an effect on the Natchez Trace Parkway, due to the widening of an existing 46-kV TL corridor (by removing additional trees). Figure 2, below, is a satellite image captured from Bing showing the location where Central EPA's existing 46-kV TL

crosses the Parkway. Figure 3, taken from Google Street View, shows the current appearance of the existing 46-kV TL as seen from the Parkway. Figure 4, prepared by Amec Foster Wheeler for TVA, displays a rendering of the possible appearance of this area upon completion of the new Red Hills-Kosciusko TL. The Red Hills-Kosciusko 161-kV TL would require an additional 50 foot width of cleared ROW. TVA finds that the effect would be non-adverse, as it would represent an addition to an existing visual intrusion. In addition, it is worth noting that TVA's selection of this alternate for crossing the Parkway avoids the adverse effect that could result from the south alternate.

Archaeological site 22AT571 could be affected by vegetation clearing and by the use of an access road within the ROW (Figure 5, below). No TL structures would be installed within the site. The nearest proposed TL structure would be installed approximately 36 meters (121 feet) south of the site's boundary, according to current project plans. Equipment used to install the structure would not need to enter the site.

TVA proposes to avoid or minimize potential project effects to 22AT571 resulting from access road use and vegetation clearing by modifying the construction design. The design will include restrictions that must be followed by the work crews when working within 30 meters of any NRHP-eligible or –undetermined archaeological site. TVA will place a 30 meter buffer surrounding 22AT571. The buffer will be marked on all project drawings and work crews will be instructed to adhere to the conditions. No access road would be allowed to intersect the site buffer, and no vehicles would be permitted to enter the site buffer with the exception of low-ground pressure tracked equipment. When vegetation clearing is conducted, TVA will require the use of a tracked feller buncher and/or chain saws operated by workers on foot. Tracked feller-bunchers have a lower ground-pressure than wheeled equipment, and are less prone to rutting and compaction. Vegetation within the site buffer will be cut just above the ground surface and stumps will be left in place.

TVA finds that, with the above avoidance and minimization measures in place, the undertaking would result in no adverse effects to any NRHP-eligible archaeological site within the Parkway boundary.

Based on careful consideration of all of the information provided above, TVA proposes that the undertaking would have no adverse effect on historic properties located within the Natchez Trace Parkway.

Pursuant to 36 CFR Part 800.2(c)(5), we are asking for your comment on TVA's determinations concerning the NRHP eligibility of 22AT571, and with TVA's finding of No Adverse Effect on historic properties within the Parkway boundary.

Pursuant to 36 CFR Part 800.3(f)(2), TVA is consulting with federally recognized Indian tribes regarding historic properties within the APE that may be of religious and cultural significance and eligible for listing in the NRHP.

Ms. Mary Risser
Page Four
November 14, 2016

Pursuant to 36 CFR Part 800.4(d)(1), TVA is consulting with the SHPO regarding the project's potential to affect historic properties in the APE. We have asked that the SHPO provide your office with a copy of their comments on the report and TVA's finding of No Adverse Effect. We ask that you provide a copy of your comments to Mr. Jim Woodrick, Director; Mississippi Department of Archives and History; Historic Preservation Division; Post Office Box 571; Jackson, Mississippi 39205-0521.

Should you have any questions or comments, please contact Richard Yarnell in Knoxville by email, wryarnell@tva.gov or by phone, (865) 632-3463.

Sincerely,

Clinton E. Jones
Manager
Biological and Cultural Compliance

SCC:ABM
Enclosures
cc (enclosures):

Mr. David W. Morgan
Director
Southeast Archeological Center
National Park Service
2035 E. Paul Dirac Drive
Johnson Building, Suite 120
Tallahassee, Florida 32310

Mr. Jim Woodrick
Director
Mississippi Department of Archives and History
Historic Preservation Division
Post Office Box 571
Jackson, Mississippi 39205-0521

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A Phase I Cultural Resources Survey of the Red Hills-Kosciusko Transmission Line Project in Attala, Choctaw, and Winston Counties, Mississippi

Tennessee Valley Archaeological Research

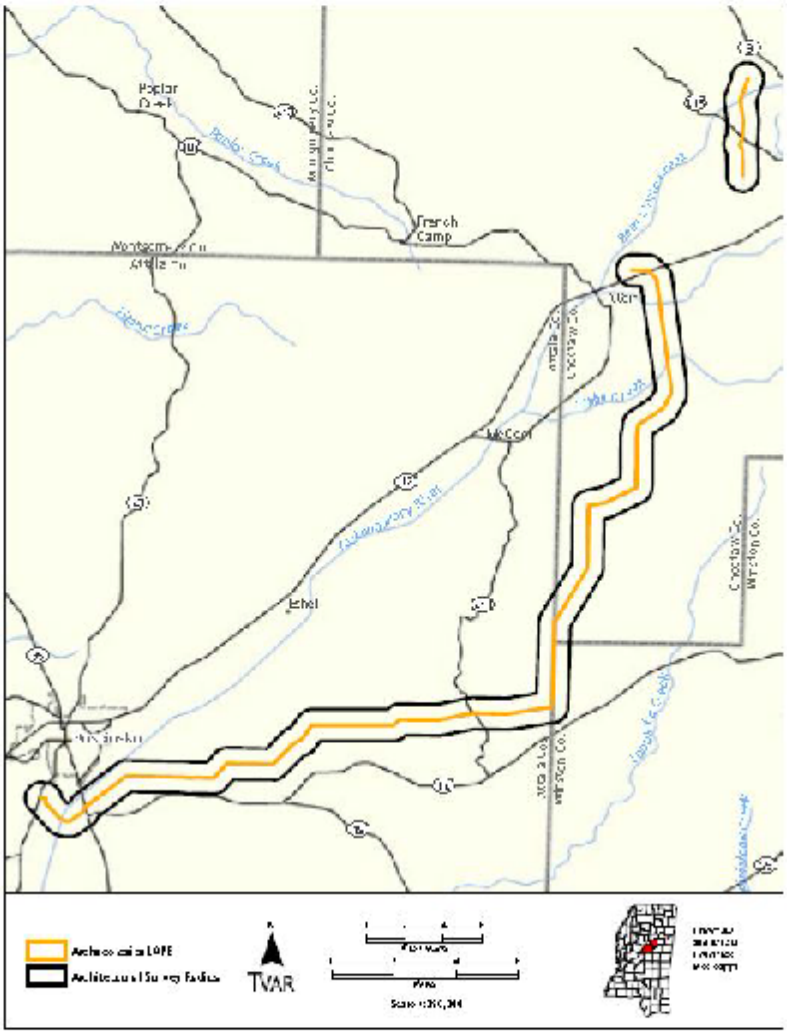


Figure 1. Proposed right-of-way ("Archaeological APE") and half-mile radius ("Architectural Survey Radius") for TVA's Red Hills-Leake 161-kV Transmission Line Project.

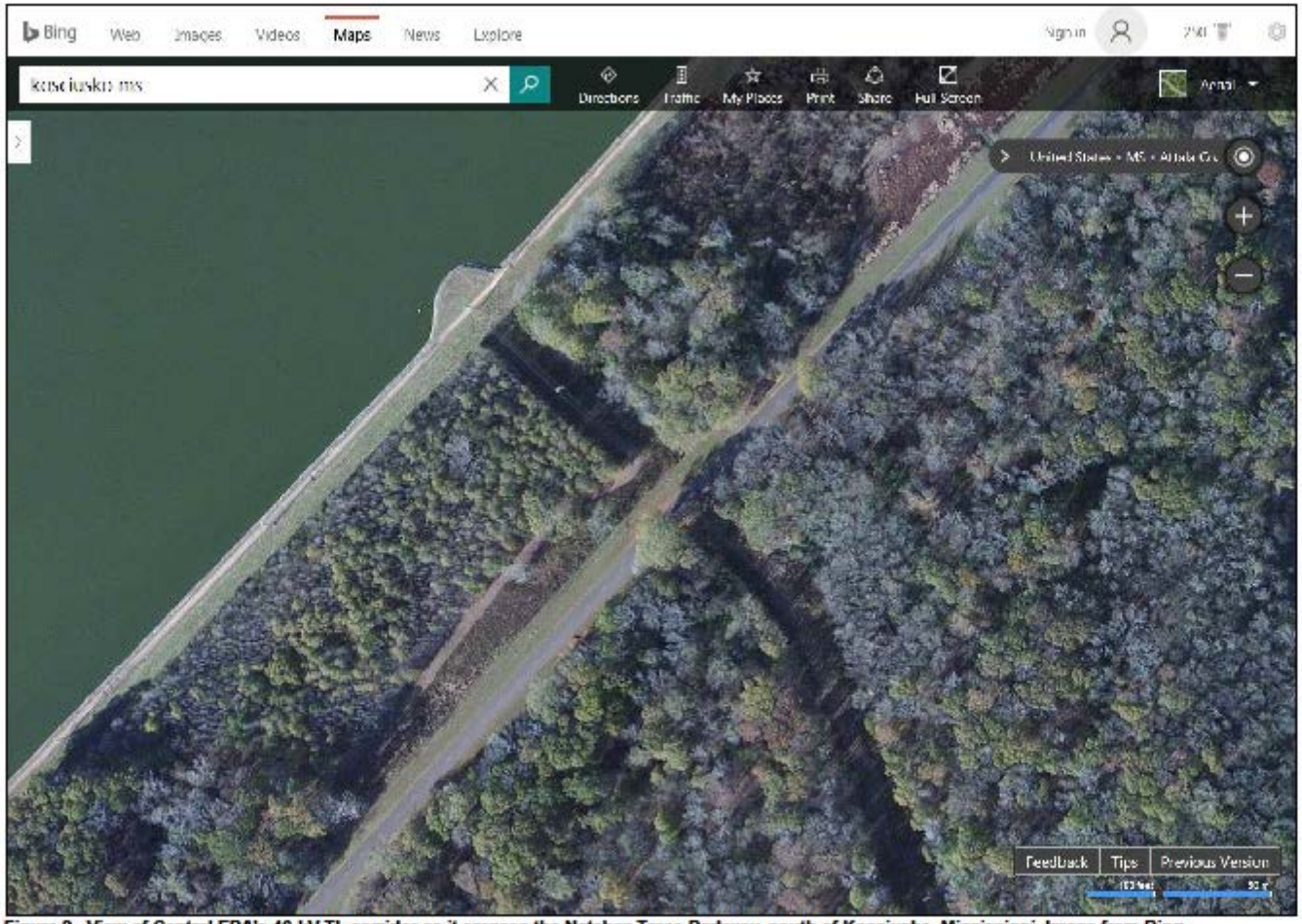


Figure 2. View of Central EPA's 46-kV TL corridor as it crosses the Natchez Trace Parkway, south of Kosciusko, Mississippi. Image from Bing.

Figure 3. View, taken from Google Street View, showing Central EPA's 46-kV TL where it crosses the Natchez Trace Parkway. View to northwest.

Figure 4. Visual rendering of the proposed new 161-kV TL as it would look at the location where Central EPA's 46-kV TL crosses the Natchez Trace Parkway. View to northwest. Developed using the Google Street View image shown in Figure 3, above.

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

November 21, 2016

Mr. David Felder
U.S. Fish and Wildlife Service
Ecological Services
6578 Dogwood View Parkway, Suite A
Jackson, Mississippi 39213

Dear Mr. Felder:

TENNESSEE VALLEY AUTHORITY (TVA) – RED HILLS-KOSCIUSKO 161-KV TRANSMISSION LINE – 161KV TRANSMISSION LINE CONSTRUCTION AND OPERATION

The Tennessee Valley Authority (TVA) proposes to supply electric power to the Central Electric Power Association (Central EPA) Kosciusko Substation in Kosciusko, Mississippi. Central EPA plans to upgrade its existing Kosciusko 46-kilovolt (kV) Substation in Kosciusko, Mississippi, to a 161-kV substation. TVA would supply power to this substation by constructing and operating approximately 43 miles of new 161-kV transmission line (TL) which would connect the planned substation to TVA's existing Red Hills 161-kV Substation in Ackerman, Mississippi (see attached Technical Report). The proposed project would require approximately 524 acres of right-of-way (ROW), including about 461 acres of new ROW and 63 acres of existing ROW. The new TL would be constructed using single and double steel-pole structures.

The ROW to be utilized for this project is as follows:

- Approximately 3.2 miles of new 100-foot-wide ROW from the Red Hills 161-kV Substation to existing structure 523 on the Red Hill-Sturgis No. 1 (Tap to Weir) 161-kV TL.
- Approximately 5.2 miles of existing 100-foot-wide TVA ROW between structures 523 and 572 on the Red Hill-Sturgis No. 1 (Tap to Weir) 161-kV TL.
- Approximately 34.8 miles of new 100-foot-wide ROW from the Weir 161-kV Substation to the upgraded Kosciusko 161-kV Substation.

Additionally, TVA would install a second bus with associated metering, communication, and protective equipment at its Red Hills 161-kV Substation and provide metering equipment for Central EPA to install at its upgraded Kosciusko 161-kV Substation. TVA would also install new fiber optic ground wire on the new TL to facilitate communications with the TVA network.

Review of the TVA Regional Natural Heritage database and the U.S. Fish and Wildlife Service IPaC website indicated three species listed as threatened, endangered or delisted and monitored under the Endangered Species Act within the project action area in Choctaw, Attala,

and Winston Counties, Mississippi. These species include two birds (red-cockaded woodpecker and wood stork) and one mammal (northern long-eared bat - NLEB) that have the potential to occur within the project action area; based on historic range, proximity to known occurrence records, biological characteristics, and/or physiographic characteristics.

Field reviews were conducted within the project action area February 29 – March 2, 2016, March 28 - 29, 2016, and August 1-2, 2016 to determine whether suitable habitat for federally listed species occurs within the project action area. No suitable nesting and foraging habitat for red-cockaded exists within the project area. Although the proposed project ROW includes suitable habitat for the wood stork, it is in an area that contains an existing transmission line. Expanding the existing ROW may remove some roost trees, but would likely increase foraging habitat for this species in the project action area. Wood storks are rare in the region and are not anticipated to be encountered within the project action area. TVA has determined that construction and operation of this proposed transmission line would have no direct, indirect, or cumulative impacts on red-cockaded woodpecker or wood stork.

Phase 1 Habitat Assessments (2015 Range-Wide Indiana Bat Summer Survey Guidelines, April 2015) were conducted during field surveys. This habitat is considered suitable for use by summer roosting federally threatened NLEB. Habitat was identified as moderately to highly suitable summer roosting habitat due to the high number of white oaks, shagbark hickories, and snags with exfoliating bark, cavities, and crevices and their proximity to water sources. All requested information is contained within the Technical Report (e.g., project description, methods, survey locations, maps, summary of results, photos etc.).

Suitable NLEB foraging habitat exists over ponds, streams, and wetlands within the proposed right-of-way. Best Management Practices (BMPs) would be used in streamside management zones around these bodies of water, minimizing sedimentation and avoiding changes to hydrology which could affect the prey base for foraging bats.

Approximately 391 acres of forested habitat would be removed and permanently maintained as early successional habitat for the proposed transmission line, right-of-way, and access roads. The proposed project activities would remove approximately 72.8 acres of potentially suitable habitat for NLEB. See attached Technical Report for a more detailed project description, figures, and photos.

The USFWS has determined that this species has the potential to occur within the northern half of Mississippi; however, no records are known from Attala, Choctaw, or Winston counties (USFWS 2014). The nearest known record is from 103 miles northeast in Franklin County, Alabama. There are no documented caves within three miles of the project area. No caves or other potential winter or summer roosting man-made structures were observed during field surveys of the project area in February, March, and August 2016. Foraging habitat exists throughout the proposed project area in forest fragments, along forest edges and fence rows, and over wetlands, ponds, and streams. Suitable summer roosting habitat for northern long-eared bat exists within several forested sections of the project area. Assessment of the project area for the presence of summer roosting habitat for northern long-eared bat followed 2015

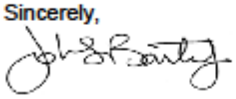
range-wide Indiana bat summer survey guidelines (USFWS 2015) and resulted in the identification of 40 forest fragments, totaling 72.8 acres. Suitable summer roosting areas were comprised of mature mixed hardwood/evergreen stands dominated by a mixture of white oak, shagbark hickory, and shellbark hickory. No known NLEB maternity roosting sites are present within 150 feet of the project area. No known NLEB hibernacula are present within 0.25 miles of the project area. All tree removal would occur during the winter clearing window, October 1 through April 14, outside of the time (June 1 - July 31) when NLEB pups could be present in maternity roosts. Therefore all potential for direct impacts to NLEB would be avoided.

TVA has determined that while removal of suitable roosting habitat could have indirect adverse effects on NLEB and result in 'take' as defined in the Endangered Species Act (ESA), this 'take' is excepted from ESA Section 9 Take Prohibitions. Determinations regarding potential effects on NLEB were made per the Key to Northern Long-Eared Bat 4(d) Rule for Federal Actions that May Affect Northern Long-Eared Bats (USFWS - January 2016) and the Programmatic Biological Opinion on Final 4(d) Rule for the Northern Long-Eared Bat and Activities Excepted from Take Prohibitions (2016 BO).

TVA requests confirmation from your office that any incidental take of NLEB (as measured by removal of suitable roosting habitat) resulting from this action is covered by the 2016 BO. It is our understanding that TVA's actions are in compliance with the ESA 4(d) rule.

Should you have any questions or wish to discuss the project in more detail, please contact Jesse Troxler at 865-632-2285.

Sincerely,



John T. Baxter, Jr.
Manager
Endangered Species Act Compliance

EBH:ABM
Enclosures

INTERNAL COPIES, NOT INCLUDED WITH OUTBOUND LETTER:

John T. Baxter, WT11C-K
Elizabeth B. Hamrick, WT11C-K
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Appendix B – Alternative Route Corridors with Constituent Segments

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Appendix B

Table 1 - Alternative Route Corridors with Constituent Segments (Red Hills – Weir TL Section)

Alternative Route	Constituent Segments
1	**41**
2	**38,39**
3	**36,37,39**
4	**34,35,37,39**
5	**35,37,39,40**

Table 2 - Alternative Route Corridors with Constituent Segments (Weir – Kosciusko TL Section)

Alternative Route	Constituent Segments
6	1,4,6,13,15,23,27,30,33
7	1,4,6,13,14,20,21,24,25,29,30,33
8	1,4,6,13,14,20,21,24,26,27,30,33
9	1,4,6,13,14,20,22,23,27,30,33
10	1,4,5,7,9,13,15,23,27,30,33
11	1,4,5,7,9,13,14,20,22,23,27,30,33
12	1,4,5,7,9,13,14,20,21,24,26,27,30,33
13	1,4,5,7,9,13,14,20,21,24,25,29,30,33
14	1,4,5,7,8,11,12,17,20,22,23,27,30,33
15	1,4,5,7,8,11,12,17,20,21,24,26,27,30,33
16	1,4,5,7,8,11,12,16,19,24,26,27,30,33
17	1,4,5,7,8,11,12,17,18,19,24,25,29,30,33
18	1,4,5,7,8,10,12,17,20,22,23,27,30,33
19	1,4,5,7,8,10,12,17,20,21,24,26,27,30,33
20	1,4,5,7,8,10,12,17,20,21,24,25,29,30,33
21	1,4,5,7,8,10,12,17,18,19,24,25,29,30,33

Alternative Route	Constituent Segments
22	1,4,5,7,8,10,12,16,19,24,25,29,30,33
23	1,4,5,7,8,10,12,16,19,24,26,27,30,33
24	1,4,5,7,8,10,12,16,19,24,25,28
25	1,4,5,7,8,11,12,16,19,25,28
26	1,4,5,7,8,10,12,17,20,21,24,25,28
27	1,4,5,7,8,11,12,17,20,21,24,25,28
28	1,4,5,7,8,11,12,17,18,19,24,25,28
29	1,4,5,7,8,10,12,17,18,19,24,25,28
30	1,4,6,13,14,20,21,24,25,28
31	1,4,5,7,9,13,14,20,21,24,25,28
32	2,4,6,13,15,23,27,30,33
33	2,4,6,13,14,20,22,23,27,30,33
34	2,4,6,13,14,20,21,24,26,27,30,33
35	2,4,6,13,14,18,19,24,26,27,30,33
36	2,4,6,13,14,20,21,24,25,29,30,33
37	2,4,6,13,14,18,19,24,25,29,30,33
38	2, 3,7,9,13,15,23,27,30,33
39	2,3,7,9,13,14,20,22,23,27,30,33
40	2,3,7,9,13,14,20,21,24,26,27,30,33
41	2,3,7,9,13,14,18,19,24,26,27,30,33
42	2,3,7,9,13,14,18,19,24,25,29,30,33
43	2,3,7,9,13,14,20,21,24,25,29,30,33
44	2,3,7,9,13,14,20,21,24,25,28
45	2,3,7,9,13,14,18,19,24,25,28
46	2,3,7,8,11,12,17,20,21,24,25,28
47	2,3,7,8,11,12,17,18,19,24,25,28
48	2,3,7,8,11,12,16,19,24,25,28

Alternative Route	Constituent Segments
49	2,3,7,8,10,12,16,19,24,25,28
50	1,4,6,13,15,23,27,30,32
51	1,4,5,7,9,13,15,23,27,30,31
52	1,4,5,7,9,13,14,20,22,23,27,30,32
53	1,4,5,7,9,13,14,20,22,23,27,30,31
54	1,4,5,7,9,13,14,20,21,24,26,27,30,32
55	1,4,5,7,9,13,14,20,21,24,26,27,30,31
56	1,4,5,7,9,13,14,20,21,24,25,29,30,32
57	1,4,5,7,9,13,14,20,21,24,25,29,30,31
58	1,4,5,7,8,11,12,17,20,22,23,27,30,32
59	1,4,5,7,8,11,12,17,20,22,23,27,30,31
60	1,4,5,7,8,11,12,17,20,21,24,26,27,30,32
61	1,4,5,7,8,11,12,17,20,21,24,26,27,30,31
62	1,4,5,7,8,11,12,16,19,24,26,27,30,32
63	1,4,5,7,8,11,12,16,19,24,26,27,30,31
64	1,4,5,7,8,11,12,17,18,19,24,25,29,30,32
65	1,4,5,7,8,11,12,17,18,19,24,25,29,30,31
66	1,4,5,7,8,10,12,17,20,22,23,27,30,32
67	1,4,5,7,8,10,12,17,20,22,23,27,30,31
68	1,4,5,7,8,10,12,17,20,21,24,26,27,30,32
69	1,4,5,7,8,10,12,17,20,21,24,26,27,30,31
70	1,4,5,7,8,10,12,17,20,21,24,25,29,30,32
71	1,4.5,7,8,10,12,17,20,21,24,25,29,30,31
72	1,4,5,7,8,10,12,17,18,19,24,25,29,30,32
73	1,4,5,7,8,10,12,17,18,19,24,25,29,30,31
74	1,4,5,7,8,10,12,16,19,24,25,29,30,32
75	1,4,5,7,8,10,12,16,19,24,25,29,30,31

Alternative Route	Constituent Segments
76	1,4,5,7,8,10,12,16,9,24,26,27,30,32
77	1,4,5,7,8,10,12,16,19,24,26,27,30,31
78	2,4,6,13,15,23,27.30,32
79	2,4,6,13,15,23,27,30,31
80	2,4,6,13,14,20,22,23,27,30,32
81	2,4,6,13,14,20,22,23,27,30,31
82	2,4,6,13,14,20,21,24,26,27,30,31
83	2,4,6,13,14,20,21,24,26,27,30,31
84	2,4,6,13,14,18,19,24,26,27,30,32
85	2,4,6,13,14,18,19,24,26,27,30,32
86	2,4,6,13,14,20,21,24,25,29,30,32
87	2,4,6,13,14,20,21,24,25,29,30,31
88	2,4,6,13,14,18,19,24,25,29,30,32
89	2,4,6,13,14,18,19,24,25,29,30,31
90	2,3,7,9,13,15,23,27,30,31
91	2,3,7,9,13,15,23,27,30,32
92	2,37,9,13,14,20,22,23,27,30,32
93	2,3,7,9,13,14,20,22,23,27,30,31
94	2,3,7,9,13,14,20,21,24,26,27,30,32
95	2,3,7,9,13,14,20,21,24,26,27,30,31
96	2,3,7,9,13,14,18,19,24,26,27,30,32
97	2,3,7,9,13,14,18,19,24,26,27,30,31
98	2,3,7,9,13,14,18,19,24,25,29,30,32
99	2,3,7,9,13,14,18,19,24,25,29,30,31
100	2,3,7,9,13,14,20,21,24,25,29,30,32
101	2,3,7,9,13,14,20,21,24,25,29,30,31
102	1,4,6,13,15,23,27,30,32

Alternative Route	Constituent Segments
103	1,4,6,13,15,23,27,30,31
104	1,4,6,13,14,20,21,24,25,29,32,33
105	1,4,6,13,14,20,21,24,25,29,30,31
106	1,4,6,13,14,20,21,24,26,27,30,32
107	1,4,6,13,14,20,21,24,26,27,30,31
108	1,4,6,13,14,20,22,23,27,30,32
109	1,4,6,13,14,20,22,23,27,30,31
110	1,4,5,7,9,13,15,23,27,30,32

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Appendix C – Stream Crossings along the Proposed Transmission Line and Access Roads

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Stream Crossings along the Proposed Red-Hills-Kosciusko 161-kV Transmission Line Right-of-Way in Choctaw, Attala, and Winston Counties, Mississippi

Stream ID	Stream Type	Streamside Management Zone Category	Stream Name	Field Notes
001	Perennial	SMZ Category A (50ft)	Chitto Creek	Perennial deep channel. 12'w 6'd fish and aquatic insects observed
002	Intermittent	SMZ Category A (50ft)	Tributary to Chitto Creek	Intermittent, 2'w 6"d strong bed/bank, gravel/sand substrate
003	Perennial	SMZ Category A (50ft)	Tributary to Chitto Creek	Perennial, swamp draining into main channel, 3'w 1'd gravel/sand substrate. crawfish observed
004	Other	SMZ Category A (50ft)	Pond	Pond no connectivity
005	Other	SMZ Category A (50ft)	Pond	Pond no connectivity
006	Other	SMZ Category A (50ft)	Pond	Pond no connectivity
007	Perennial	SMZ Category A (50ft)	Tributary to Yockanoka River	Perennial, 5'w 6-12" d sand gravel main substrate, defined bed and bank
008	Perennial	SMZ Category A (50ft)	Tributary to Yockanoka River	Perennial 6'w 6-12"d, San/clay primary substrate
009	Perennial	SMZ Category A (50ft)	NA	Perennial 25w' 2.5'd, Strong bed+ bank, big stream with fish observed, sand/gravel main substrate
010	Perennial	SMZ Category A (50ft)	NA	Perennial 3'w 6"d, strong bed and bank, below root line, clay/sand substrate
011	Intermittent	SMZ Category A (50ft)	Tributary to Tibby Creek	Intermittent 5'w 5'd, strong bed and bank, clay/sand primary substrate
012	Intermittent	SMZ Category A (50ft)	Tributary to Tibby Creek	Intermittent. 6'w 3'd, Strong bed and bank. Sand/gravel as primary substrate
013	Intermittent	SMZ Category A (50ft)	Tributary to Tibby Creek	5-15'w 6-12"d clay/mud as substrate. flowing into wetland
014	Perennial	SMZ Category A (50ft)	Tibby Creek	Perennial. 20'w 6'd sand/clay as substrate. braided like/swampy
015	Perennial	SMZ Category A (50ft)	Tributary to Tibby Creek	Perennial 20'w 6'd sand/clay. fish observed
016	Intermittent	SMZ Category A (50ft)	Tributary to Tibby Creek	Intermittent. Highly eroded, strong bed and bank 2.5w 4.5d clay/sand
017	Perennial	SMZ Category A (50ft)	Tributary to Tibby Creek	Perennial, Strong bed and bank braided channel. below rootwad. sand 3.5w 3.5d
018	Intermittent	SMZ Category A (50ft)	Rawhide Branch	Intermittent gravel 2'w 4" deep
019	Perennial	SMZ Category A (50ft)	Tributary to Tibby Creek	Perennial, fast flowing well defined bed and bank. runs/riffles bedrock/gravel
020	Perennial	SMZ Category A (50ft)	Egg Creek	Perennial sand/ gravel bedrock. Strong bed and bank 4'w 6"d
021	Perennial	SMZ Category A (50ft)	Tributary to Egg Creek	Perennial clay/gravel 4'w 3'd strong bed and bank wetland around
022	Intermittent	SMZ Category A (50ft)	NA	Intermittent Clay/sand strong bed and bank 3'w 2.5'w

Stream ID	Stream Type	Streamside Management Zone Category	Stream Name	Field Notes
023	Intermittent	SMZ Category A (50ft)	NA	Intermittent strong bed and bank 3'w 1'd clay/sand
024	Intermittent	SMZ Category A (50ft)	NA	Intermittent. benches and bars aquatic insects observed 3'w 2'd sand/clay
025	Intermittent	SMZ Category A (50ft)	NA	Intermittent. Aquatic insects observed, pool-riffle 3'w 6"d clay/sand
026	Intermittent	SMZ Category A (50ft)	NA	Intermittent water/flowing, sand/clay 3'w 6"d aquatic insects observed.
027	Intermittent	SMZ Category A (50ft)	NA	Intermittent large headcut pool riffle 3'w 3-7"d
028	Intermittent	SMZ Category A (50ft)	Hurricane Creek Tributary	Intermittent 4'd 4'w run/riffle observed, sand//clay
029	Intermittent	SMZ Category A (50ft)	Hurricane Creek Tributary	Intermittent 2'w .5'd grand and head controls clay/sand
030	Intermittent	SMZ Category A (50ft)	NA	Intermittent headcuts and grade controls flowing water 2'w 1.5'd clay/sand
031	Intermittent	SMZ Category A (50ft)	Tributary to Sand Creek	Intermittent 2'w 3-10"d aquatic insects observed clay/sand substrate
032	Perennial	SMZ Category A (50ft)	Tributary to Sand Creek	Perennial strong bed and bank. benches present sand primary substrate 4'w 1.5'd
033	Intermittent	SMZ Category A (50ft)	Tributary to Bear Creek	Intermittent 5'w 4"d clay/mud aquatic insects observed
034	Perennial	SMZ Category A (50ft)	Bear Creek	Perennial 7'wide 2'd strong bed and bank clay/sand strong presence of aquatic insects
035	Perennial	SMZ Category A (50ft)	Bear Creek	Perennial 4-6'w 2"-3"d fish observed sand/silt
036	Perennial	SMZ Category A (50ft)	Bear Creek	Perennial 7'w 2-3'd fish observed sand/silt
037	Intermittent	SMZ Category A (50ft)	Tributary to Tom Fork	Intermittent sand/silt 3'w 3-10"d pool-riffle present with aquatic insects
038	Perennial	SMZ Category A (50ft)	Tom Fork	Perennial fish observed gavel/sand 5'w 4'd strong bed and bank
039	Perennial	SMZ Category A (50ft)	Kyle Creek	Perennial Fish/aquatic insects observed sand/silt 3'w 2-7"d
040	Perennial	SMZ Category A (50ft)	Kyle Creek	Perennial 3'w 1'd sand/clay strong bed and bank aquatic insects blue line
041	Intermittent	SMZ Category A (50ft)	Tributary to Kyle Creek	Intermittent 3'w 1'd aquatic insects gradecuts sand/clay
042	Intermittent	SMZ Category A (50ft)	NA	Intermittent 2.5w 1'd wetland around aquatic insects observed
043	Intermittent	SMZ Category A (50ft)	NA	Intermittent water flowing 3'w 2'd wetland around clay/mud
44	Intermittent	SMZ Category A (50ft)	Tributary to Turkey Creek	Chan/wet width 2', wet depth 3", channel depth 3', woody debris, erosion, 1:2 banks, 10-20% adjacent slopes
45	Intermittent	SMZ Category A (50ft)	NA	Intermittent, scattered pools, drains to aje06, 5ft x 5 ft
46	Perennial	SMZ Category A (50ft)	NA	Perennial, several streams drain to stream, minnows observed, 8ft x 6 ft

Stream ID	Stream Type	Streamside Management Zone Category	Stream Name	Field Notes
47	Intermittent	SMZ Category A (50ft)	NA	Intermittent, Flowing with narrow channels, no fish observed, 10ft x 7ft
48	Intermittent	SMZ Category A (50ft)	NA	Intermittent, Pools scattered, 4ft x 3ft
49	Intermittent	SMZ Category A (50ft)	NA	Channel/wet width 3', wet depth 4", channel depth 3.5', eroded banks, pools/riffles, vertical/undercut banks, 2% adjacent slope
50	Intermittent	SMZ Category A (50ft)	Tributary to Cowpen Creek	Channelized, eroded/undercut/vertical banks, gravel/clay btm, channel/wet width 6', wet depth 3", chan. depth 3', pool/riffle/run
51	Perennial	SMZ Category A (50ft)	NA	Perennial, minnows observed, 15ft x 12ft
52	Perennial	SMZ Category A (50ft)	NA	Perennial, Minnows Observed, Steep Banks, 6ft x 3ft
53	Intermittent	SMZ Category A (50ft)	NA	Intermittent, Pools scattered, 12ft x 12ft
54	Other	SMZ Category A (50ft)	Pond	Pond no connectivity
55	Intermittent	SMZ Category A (50ft)	Tributary to Yockanoka River	Possibly channelized, undercut banks, 8' wide, 8' deep, culvert crossing at point, 0-5% adjacent slopes
56	Intermittent	SMZ Category A (50ft)	Tributary to Yockanoka River	5' wide, 8' deep, 10" water within, vertical banks highly eroded 5:1 banks, 5-10%
57	Intermittent	SMZ Category A (50ft)	Tributary to Yockanoka River	6' wide, 2' deep, wetted depth 6", 3:1 banks, 5-10% adjacent slopes
58	Intermittent	SMZ Category A (50ft)	Yockanookany River	60' wide channel, Perennial
59	Perennial	SMZ Category A (50ft)	Yockanookany River	60' wide channel, Perennial

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Appendix D – Wetlands Located Within the 38.55-mile Proposed Transmission Line Construction ROW and Access Roads

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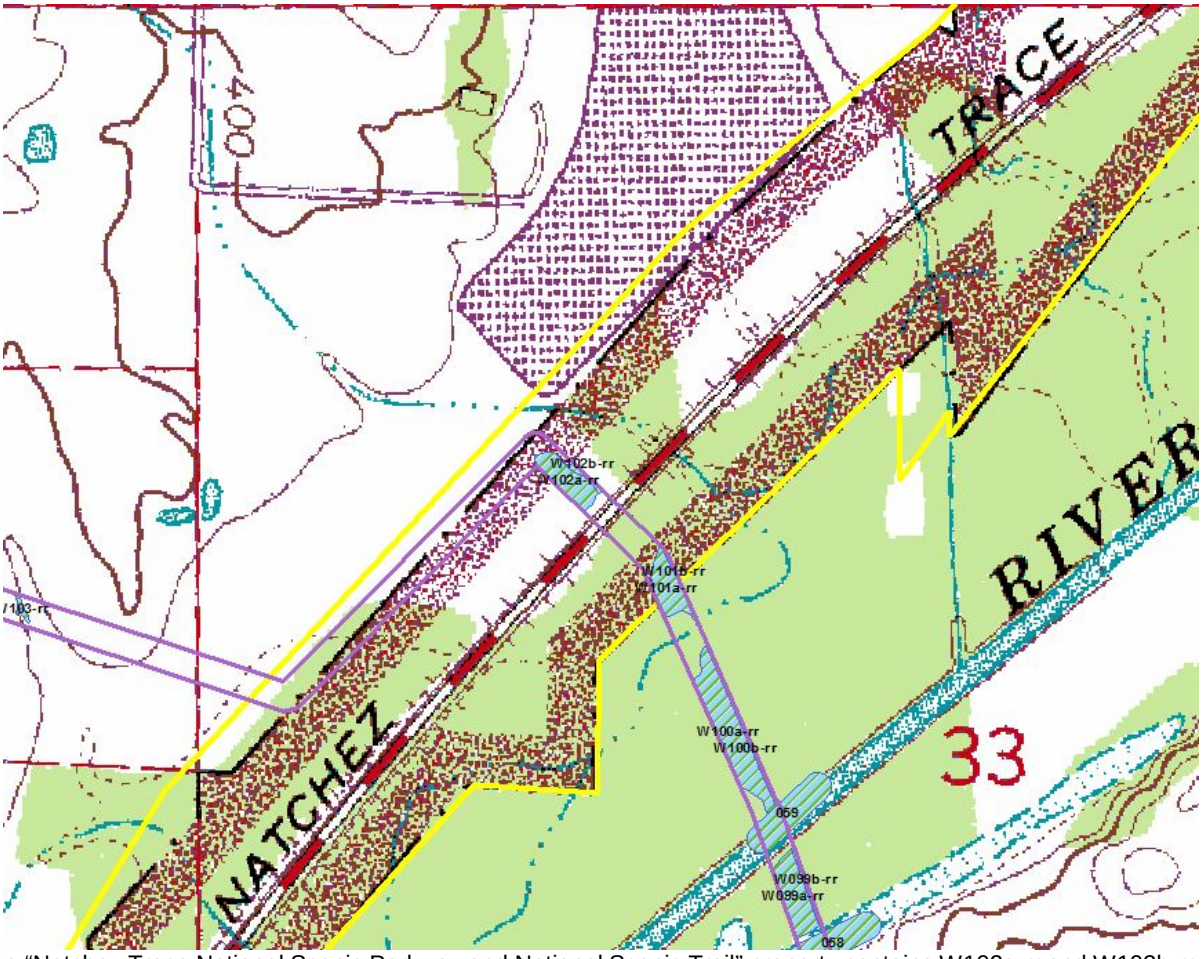
Wetlands Located Within the 38.55-mile Proposed Transmission Line Construction ROW and Access Roads

Wetland Identifier	Wetland Type[1]	TVARAM[2] Existing Functional Capacity (Score)	Wetland Acres	Forested Wetland Acres	Scrub-Shrub Wetland Acres	Emergent Wetland Acres	Pine Timber Wetland Acres	Northern Long-Eared Bat Habitat
W001	PSS/PFO1E	Moderate (35.5)	0.25	0.13	0.12	--	--	
W002	PFO1E	Moderate (43)	0.16	0.16	--	--	--	
W003	PEM1E	Low (25.5)	2.07	--	--	2.07	--	
W004	PFO1E	Superior (60.5)	3.51	3.51	--	--	--	X
W005	PFO1E	Moderate (45.5)	0.43	0.43	--	--	--	
W006	PFO1E	Moderate (45.5)	0.28	0.28	--	--	--	
W007	PEM1E	Low (25)	0.88	--	--	0.88	--	
W008	PFO1E	Moderate (59.5)	0.78	0.78	--	--	--	X
W009	PFO1E	Moderate (35.5)	0.20	0.20	--	--	--	X
W010	PFO1E	Moderate (33.5)	0.07	0.07	--	--	--	X
W011	PFO4Ef	Moderate (31)	0.10	--	--	--	0.10	X
W012	PFO1E	Moderate (32)	0.14	0.14	--	--	--	
W013	PFO1E	Moderate (32)	0.11	0.11	--	--	--	
W014	PFO1E	Moderate (51)	0.42	0.42	--	--	--	
W015	PFO1E	Moderate (51)	0.43	0.43	--	--	--	
W016	PFO1E	Superior (64)	0.68	0.68	--	--	--	
W017	PFO1E	Superior (79)	2.80	2.80	--	--	--	X
W018a	PFO1E	Superior (79)	0.85	0.85	--	--	--	X
W018b	PFO4Ef	Superior (79)	1.36	--	--	--	1.36	
W019	PEM1E	Low (27)	0.20	--	--	0.20	--	
W020	PFO1E	Low (29.5)	0.06	0.06	--	--	--	
W021	PFO1E	Moderate (55)	0.19	0.19	--	--	--	
W022	PFO1E	Moderate (55)	0.33	0.33	--	--	--	
W023	PFO1E	Superior (88)	3.30	3.30	--	--	--	X
W024	PSS4Ef	Moderate (34)	0.41	--	--	--	0.41	
W025	PFO1E	Moderate (48)	0.89	0.89	--	--	--	X
W026	PFO1E	Moderate (48)	0.30	0.30	--	--	--	X
W027	PFO1E	Superior (74)	0.63	0.63	--	--	--	X
W028	PFO1E	Superior (60)	0.54	0.54	--	--	--	X
W029	PFO1E	Moderate (52)	0.41	0.41	--	--	--	X
W030	PEM/PSS1E	Low (28.5)	0.75	clearcut	0.38	0.37	--	
W031a	PEM/PSS1E	Low (28.5)	0.38	clearcut	0.19	0.19	--	
W031b	PFO4Ef	Low (28.5)	0.86	--	--	--	0.86	
W032	PFO4Ef	Low (28)	0.47	--	--	--	0.47	
W033	PFO4Ef	Moderate (37)	0.89	--	--	--	0.89	
W034	PEM1E	Moderate (55)	1.76	--	--	1.76	--	
W035	PFO1E	Moderate(36)	0.35	0.35	--	--	--	X
W036	PFO1E	Moderate (35)	0.21	0.21	--	--	--	
W037	PFO1E	Moderate (34)	0.06	0.06	--	--	--	
W038	PEM/PSS4Ef	Moderate (32.5)	0.10	--	--	--	0.10	
W039	PFO1E	Moderate (45.5)	0.15	0.15	--	--	--	
W040	PFO1E	Moderate (45.5)	0.40	0.40	--	--	--	
W041	PSS1E	Moderate (52)	0.16	--	0.16	--	--	
W042	PFO1E	Moderate (45)	0.01	0.01	--	--	--	
W043	PEM1E	Moderate (43)	0.06	--	--	0.06	--	
W044	PFO1E	Moderate (45)	0.28	0.28	--	--	--	
W045	PFO1E	Moderate (46)	0.19	0.19	--	--	--	X
W046	PFO1E	Moderate (46)	0.08	0.08	--	--	--	X
W047	PFO1E	Moderate (46)	0.13	0.13	--	--	--	X
W048	PFO1E	Moderate (43)	0.26	0.26	--	--	--	
W049	PFO1E	Moderate (47)	0.11	0.11	--	--	--	X
W050	PFO1E	Moderate (47)	0.12	0.12	--	--	--	
W051	PFO1E	Moderate (47)	0.05	0.05	--	--	--	X

Wetland Identifier	Wetland Type[1]	TVARAM[2] Existing Functional Capacity (Score)	Wetland Acres	Forested Wetland Acres	Scrub-Shrub Wetland Acres	Emergent Wetland Acres	Pine Timber Wetland Acres	Northern Long-Eared Bat Habitat
W052	PFO1E	Moderate (47)	0.09	0.09	--	--	--	
W053	PFO1E	Moderate (47)	0.07	0.07	--	--	--	X
W054	PFO1E	Superior (76.5)	1.17	1.17	--	--	--	
W055	PFO1E	Superior (76.5)	0.89	0.89	--	--	--	
W056	PFO1E	Low (29)	0.15	0.15	--	--	--	
W057	PFO1Ef	Moderate (32)	0.05	0.05	--	--	--	
W058	PFO4Ef	Moderate (32)	0.08	--	--	--	0.08	
W059	PFO4Ef	Moderate (32)	0.11	--	--	--	0.11	
W060	PFO1E	Superior (78.5)	3.32	3.32	--	--	--	X
W061	PFO4Ef	Moderate (32)	0.09	--	--	--	0.09	
W062	PFO4Ef	Moderate (32)	0.15	--	--	--	0.15	
W063	PFO1E	Moderate (51)	0.66	0.66	--	--	--	
W064	PEM/SS/FO1E	Moderate (40)	0.49	0.17	0.16	0.16	--	X
W065	PFO1E	Superior (66)	0.98	0.98	--	--	--	X
W066	PFO1E	Superior (67.5)	0.53	0.53	--	--	--	
W067	PFO1E	Superior (67.5)	1.09	1.09	--	--	--	X
W068	PEM/SS/FO1E	Moderate (31)	0.15	0.05	0.05	0.05	--	
W069	PFO1E	Superior (61)	0.54	0.54	--	--	--	
W070	PFO1E	Moderate (50)	0.12	0.12	--	--	--	X
W071	PSS1E	Moderate (53)	0.41	--	0.41	--	--	
W072	PFO1E	Moderate (49.5)	0.12	0.12	--	--	--	
W073	PEM1E	Low (28)	0.09	--	--	0.09		
W074	PFO4Ef	Low (28)	0.24	--	--	--	0.24	
W075-rr[3]	PEM1E	Low (28)	0.05	--	--	0.05		
W077-rr	PFO4Ef	Moderate (46)	0.17	--	--	--	0.17	
W078a	PFO4Ef	Moderate (40)	0.05	--	--	--	0.05	
W078b	PEM1E	Moderate (40)	0.33	--	--	0.33	--	
W079a-rr	PSS1E	Moderate (38)	0.27	--	0.27	--	--	
W079b-rr	PFO4Ef	Moderate (38)	0.26	--	--	--	0.26	
W079c-rr	PEM1E	Moderate (38)	0.25	--	--	0.25	--	
W080-rr	PFO1E	Moderate (50)	0.60	0.60	--	--	--	X
W081-rr	PFO1E	Moderate (50)	0.60	0.60	--	--	--	X
W082-rr	PFO1E	Moderate (49)	0.04	0.04	--	--	--	
W083	PFO1E	Superior (60)	0.48	0.48	--	--	--	
W084a	PFO1E	Superior (60)	0.28	0.28	--	--	--	
W084b	PFO1E	Superior (60)	1.90	1.90	--	--	--	
W084c	PEM1E	Superior (60)	0.90	--	--	0.9	--	
W085	PFO1E	Superior (60)	2.19	2.19	--	--	--	
W086	PSS1E	Superior (60)	3.18	--	3.18	--	--	
W087	PEM1E	Superior (61.5)	1.33	--	--	1.33	--	
W088	PEM1E	Superior (61.5)	0.51	--	--	0.51	--	
W089	PFO1E	Superior (61.5)	0.74	0.74	--		--	
W090a	PEM1E	Superior (61.5)	0.19	--	--	0.19	--	
W090b	PFO1E	Superior (61.5)	0.39	0.39	--	--	--	
W091-rr	PFO1E	Moderate (45)	0.35	0.35	--	--	--	X
W092-rr	PFO1E	Moderate (48)	0.46	0.46	--	--	--	
W093-rr	PSS/PFO1E	Moderate (47)	0.45	0.30	0.15	--	--	
W094b-rr	PSS/PEM1E	Moderate (59)	1.13	--	0.38	0.75	--	
W094c	PFO4Ef	Moderate (59)	1.03	--	--	--	1.03	
W094d	PEM1E	Moderate (59)	0.18	--	--	0.18	--	
W094e	PFO1E	Moderate (59)	0.42	0.42	--	--	--	
W095a	PFO1E	Moderate (59)	4.31	4.31	--	--	--	
W095b	PSS1E	Moderate (59)	0.96	--	0.96	--	--	
W095c	PEM1E	Moderate (59)	0.81	--	--	0.81	--	
W096a	PEM1E	Moderate (44.5)	0.16	--	--	0.16	--	
W096b	PFO1E	Moderate (44.5)	0.11	0.11	--	--	--	
W097a-rr	PFO1E	Low (27.5)	0.20	0.20	--	--	--	

Wetland Identifier	Wetland Type[1]	TVARAM[2] Existing Functional Capacity (Score)	Wetland Acres	Forested Wetland Acres	Scrub-Shrub Wetland Acres	Emergent Wetland Acres	Pine Timber Wetland Acres	Northern Long-Eared Bat Habitat
W097b-rr	PEM1E	Low (27.5)	0.01	--	--	0.01	--	
W098a-rr	PFO1E	Low (29)	0.18	0.18	--	--	--	
W098b-rr	PEM1E	Low (29)	0.01	--	--	0.01	--	
W099a-rr	PSS1E	Moderate (48)	0.59	--	0.59		--	
W099b-rr	PEM1E	Moderate (48)	0.06	--		0.06	--	
W100a-rr	PSS1E	Moderate (46)	1.11	--	1.11		--	
W100b-rr	PEM1E	Moderate (46)	0.12	--	--	0.12	--	
W101a-rr	PFO1E	Moderate (46)	0.44	0.44	--	--	--	
W101b-rr	PEM1E	Moderate (46)	0.26	--	--	0.26	--	
W102a-rr	PFO1E	Moderate (46)	0.46	0.46	--	--	--	
W102b-rr	PEM1E	Moderate (46)	0.05	--	--	0.05	--	
W103-rr	PEM1E	Low (18)	0.04	--	--	0.04	--	
Total Acres			**70.81**	**44.49**	**8.11**	**11.84**	**6.37**	

[1]Classification codes as defined in Cowardin et al. (1979): E = Seasonally flooded/saturated; f=Farmed; H=Permanently Flooded; EM1=Emergent, persistent vegetation; FO1=Forested, broadleaf deciduous vegetation; FO4=Forested, needle-leaved evergreen; P=Palustrine; SS1=Scrub-shrub, broadleaf deciduous vegetation; SS4=Scrub-shrub, needle-leaved evergreen.
[2]TVARAM = A TVA Rapid Assessment Method that categorizes wetland quality by their functional capacity.
[3]rr = Located on rerouted ROW adjusted from original alignment



The “Natchez Trace National Scenic Parkway and National Scenic Trail” property contains W102a-rr and W102b-rr, entirely; about half of W0101a-rr and W101b-rr overlap their property, too. “a” indicates forested portion of delineated wetland; “b” indicates portion of wetland area located on existing ROW and maintained as low stature.

Appendix E – Visual Assessment of the Proposed Red Hills-Kosciusko 161-kV Transmission Line Crossing of the Natchez Trace Parkway

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Visual Assessment of the Red Hills to Leake Transmission Line Crossing of the Natchez Trace Parkway

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August 2016

Visual Assessment
Red Hills to Leake Transmission Line Crossing of the Natchez Trace Parkway

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List of Abbreviations and Acronyms

kV	kilovolt
Natchez Trace Parkway	Parkway
NEPA	National Environmental Policy Act
ROW	right of way
SR	state route
TVA	Tennessee Valley Authority

Visual Assessment
Red Hills to Leake Transmission Line Crossing of the Natchez Trace Parkway

1 INTRODUCTION

TVA is proposing to build a new 34.8-mile 161-kv transmission line from the existing Red Hills Substation to Central Electric Power Association's upgraded Kosciusko Substation. The line would then continue to the Leake-Singleton 161-kV Transmission Line, creating the new Red Hills-Leake transmission line. This new line would power three local substations, increase power reliability for the area, and enhance overall reliability of the Tennessee Valley Authority (TVA) system.

The proposed line would cross the Natchez Trace Parkway (Parkway) near the Red Hills Substation, which was established as a unit of the National Park Service in 1938. This visual assessment of the alternative crossings of the Natchez Trace Parkway is prepared to support the decision making process under the National Environmental Policy Act (NEPA).

2 ALTERNATIVES

2.1 Description of Alternatives

This section describes the alternatives TVA evaluated in this review. Alternatives evaluated in detail include:

- Alternative A – No Action Alternative
- Alternative B – North Crossing
- Alternative C – State Route 14 Crossing

For Alternatives B and C, the proposed transmission towers would consist of double-steel pole structures that would be left unpainted. Along the route, the structures would carry three-conductors (wires) on the outside of each pole for a total of 6 conductors and each conductor would be connected to the pole via an arm (three arms/pole). The towers would range in height from 90 to 140 feet depending on topography. Structures located at angle points along the routes would require guy lines to help balance the tension on these structures, as the conductor will be pulling on the poles from two separate directions.

2.1.1 Alternative A – No Action Alternative

As part of the No Action Alternative, TVA would avoid constructing a new transmission line across the Parkway. TVA analyzed the No Action Alternative for several important reasons, including that it establishes a baseline against which to compare impacts of action alternatives. This is important context information in determining the relative magnitude and intensity of impacts. The impacts of No Action are the impacts of existing activities or conditions (man-made or natural) projected into the future. The conditions of No Action include the manner in which the environment of the project area would either continue to degrade in conjunction with on-going stressors, or improve conditions by natural restoration and recovery processes

2.1.2 Alternative B – North Crossing

Under Alternative B, TVA would construct the new transmission line parallel to the right-of-way (ROW) for an existing 46-kV transmission line. The new TVA ROW would be 100 feet wide, resulting in the centerlines of the two transmission lines being approximately 75-feetapart from each other. This crossing would require 50 feet of new ROW for approximately 1,300 feet along the northwest Natchez Trace Parkway boundary as the line runs parallel to the parkway. The

crossing would run perpendicular to the Parkway for approximately 788 feet and require a total of 2.4 acres of new easement.

2.1.3 Alternative C – State Route 14 Crossing

Under Alternative C, TVA would construct the new transmission line along State Route 14 (SR 14). This alternative would not require any new ROW at this time; however, should highway expansion be required in the future, the transmission line would require an additional 60 feet of additional width parallel to SR 14 on the north edge. The crossing would extend perpendicular to the Parkway for approximately 780 feet.

3 AFFECTED ENVIRONMENT

This assessment provides a review and classification of the visual attributes of existing scenery, along with the anticipated attributes resulting from the proposed action. The classification criteria used in this analysis are adapted from a scenic management system developed by the U.S. Forest Service and integrated with planning methods used by TVA. The classification process is also based on fundamental methodology and descriptions adapted from Landscape Aesthetics, A Handbook for Scenery Management, Agriculture Handbook Number 701 U.S. Forest Service, 1995.

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

Scenic visibility of a landscape may be described in terms of three distance contexts: foreground, middleground, and background. In the foreground, an area within 0.5 mile of the observer, individual details of specific objects are important and easily distinguished. In the middleground, from 0.5 to 4 mile from the observer, object characteristics are distinguishable but their details are weak and they tend to merge into larger patterns. In the distant part of the landscape, the background, details and colors of objects are not normally discernible unless they are especially large, standing alone, or have a substantial color contrast. In this assessment the background is measured as 4 to 10 miles from the observer.

Visual and aesthetic impacts associated with a particular action may occur as a result of the introduction of a feature that is not consistent with the existing viewshed. Consequently, the character of an existing site is an important factor in evaluating potential visual impacts. For this analysis, the affected environment is considered to include the existing physical and biological features of the landscape that includes Alternatives B and C (Figure 3-1). The terrain of the affected environment ranges from slightly rolling to mainly flat. In the foreground of the project area, the relatively flat or rolling landscape and predominant forested corridor along the Parkway create a natural landscape dominated by horizontal features. In areas outside of the Parkway the landscape is dominated by the colors and geometries of croplands and pastures, which are punctuated by wooded tree lines. Along the Parkway, passing motorists and other

users can view existing transmission corridors and road overpasses when they intersect with the Parkway. The overall viewscape around the project area is dominated by the horizontal lines of the Parkway with the bordering forested areas.

Based on the above characteristics, the scenic attractiveness of the affected environment is considered to be common, whereas the scenic integrity is considered to be moderate (Table 3-1). The rating for scenic attractiveness is due to the ordinary or common visual quality. The forms, colors, and textures in the affected environment are normally seen through the characteristic landscape; therefore do not have any distinctive quality. The scenic integrity has been slightly lowered by human alteration such as existing Parkway, transmission lines, and other roads. However, in the middleground and foreground these alterations are not substantive enough to dominate the view of the landscape. Based on the criteria used for this analysis, the overall scenic value class for the affected environment is considered to be good.

Table 3-1. Visual Assessment Ratings for Existing Affected Environment

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

4 ENVIRONMENTAL CONSEQUENCES

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. To support the impact assessment process, artistic renderings were completed for Alternatives B and C as described below.

4.1 Alternative A – No Action Alternative

Under Alternative A, TVA would not construct a transmission line across the Parkway, resulting in no changes to the existing environment. Landscape character and integrity would remain in its current state; therefore, there would be no impact to aesthetics and visual resources.

4.2 Alternative B – North Crossing

Alternative B would result in additional minor visual discord during the construction/installation phase of the proposed transmission line due to an increase in personnel and equipment. However, this would be temporary and only lasting until all activities have been completed by TVA.

The proposed transmission line would be visible in the foreground by motorists along the Parkway. In contrast, proposed modifications are not expected to be visible in the middleground and background. The installation of the new towers and transmission line would contrast with the predominately green and brown colors of the existing landscape. The color contrast of the metal poles against the vegetation would be greatest in the foreground to passing motorists, although color would be less noticeable in the middleground and background. The dominant shapes in the landscape include the vertical lines of trees and existing transmission structures against the horizon. The proposed transmission line and structures would add a small number of discordantly contrasting elements to the existing landscape, however it would be consistent with the existing transmission line that it parallels (Figure 4-1). The permanent removal of woody vegetation within the proposed ROW creates a visible corridor in addition to the overhead portion of the line. Because this alternative would parallel an existing transmission line across the Parkway, it would effectively expand the existing corridor feature rather than create a new visible corridor (Figure 4-2).

There are no sensitive visual receptors within the foreground of the proposed corridor for Alternative B (Figure 4-3, Table 4-1). The half-mile area around the affected environment includes the Parkway and undeveloped forested areas. The middleground includes a total of ten churches, nine cemeteries, four parks, and one golf course. The closest church is the Parkway Baptist Church, located approximately 1.0 mile to the northeast (see Figure 4-3). The nearest cemetery is West Union Cemetery, located approximately 0.8 mile to the southwest of the proposed corridor. While the Parkway is a scenic resource located within all viewing distances, the nearest recreational area within the middleground is the Hugh P. Ellard Park, located approximately 0.7 mile to the north. All of these sensitive resources would be considered to be in the middleground viewing distance, where details are weak as they tend to merge into larger patterns. The background includes 86 potentially sensitive visual receptors, including 42 cemeteries, 41 churches, and three scenic areas/parks (Figure 4-4, Table 4-1). At the middleground and background distances, the proposed transmission line is not expected to be discernable nor would contrast with the overall landscape.

Table 4-1. Sensitive Visual Receptors Within Viewing Distances – Alternative B

Sensitive Visual Receptor	County	Distance (mi)
Middleground		
Hugh P. Ellard Park	Attala	0.7
West Union Cemetery	Attala	0.8
Parkway Baptist Church	Attala	1.0
Parkway Cemetery	Attala	1.2
Williamsville Baptist Church	Attala	1.3
Second Baptist Church	Attala	1.9
Kosciusko First Methodist Church	Attala	2.0
Jackson Street Baptist Church	Attala	2.0
First Baptist Church	Attala	2.0
Herring Cemetery	Attala	2.0
Saint Theresa Catholic Church	Attala	2.1
Dodd Cemetery	Attala	2.2
Jason Niles Park	Attala	2.3
Bullock Cemetery	Attala	2.5
Redbud Springs Golf Course & Golf Club	Attala	2.6

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Red Hills to Leake Transmission Line Crossing of the Natchez Trace Parkway

Table 4-1. Sensitive Visual Receptors Within Viewing Distances – Alternative B

Sensitive Visual Receptor	County	Distance (mi)
Silas Grove Cemetery	Attala	2.7
Northside Park	Attala	3.0
Pony League Park	Attala	3.0
Fletcher Cemetery	Attala	3.1
Hurricane Church	Attala	3.1
Presley Cemetery	Attala	3.2
Faith Temple	Attala	3.6
Silas Grove Church	Attala	3.6
Hurricane Cemetery	Attala	3.8
Background		
Brooks Cemetery	Attala	4.1
Pleasant Hill Church and Cemetery	Attala	4.2
Mount Vernon Church and Cemetery	Attala	4.4
Samarra Cemetery	Attala	4.4
Marble Rock Church	Attala	4.5
Skeen Cemetery	Attala	4.5
Holly Hill Picnic Area	Attala	4.6
New Garden Church	Attala	4.7
Buffalo Church and Cemetery	Attala	4.8
Palestine Church	Attala	5.0
Malett Cemetery	Attala	5.2
Jerusalem Church	Attala	5.2
Attala Memory Gardens	Attala	5.3
Hurricane Creek Nature Trail	Attala	5.3
Coleman Cemetery	Attala	5.3
Salem Church	Attala	5.4
McAdams Methodist Church	Attala	5.6
McAdams Baptist Church	Attala	5.6
Little Hill Church	Attala	5.8
Damascus Church	Attala	6.0
Marvin Chapel	Attala	6.0
Cedar Grove Cemetery	Attala	6.0
Marvin Chapel Cemetery	Attala	6.0
Isaac Cemetery	Attala	6.3
Attala Youth Club Lake	Attala	6.4
Smyrna Cemetery	Attala	6.4
Smyrna Presbyterian Church	Attala	6.5
Plantation Church	Attala	6.6
Jenkins Cemetery	Attala	6.8
Bethlehem Church	Attala	6.8
Yockanookany Baptist Church	Attala	6.9
Bethlehem Cemetery	Attala	7.0
Nile Church	Attala	7.1
Pleasant Ridge Church	Attala	7.2
Breazeale Cemetery	Attala	7.3
Pleasant Ridge Cemetery	Attala	7.4

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Table 4-1. Sensitive Visual Receptors Within Viewing Distances – Alternative B

Sensitive Visual Receptor	County	Distance (mi)
Musselwhite Cemetery	Attala	7.5
County Line Baptist Church	Leake	7.5
Turnage Cemetery	Leake	7.5
Teague Cemetery	Attala	7.5
Hill Springs Cemetery	Attala	7.6
Russell Cemetery	Attala	7.6
Delydia Hill Church	Leake	7.6
Hill Springs Church	Attala	7.8
Bulah Church	Attala	7.8
Springdale Church	Attala	7.8
Brown Cemetery	Attala	7.9
Mount Moriah Church	Attala	8.1
Cummings Cemetery	Attala	8.3
Mount Moriah Cemetery	Attala	8.3
Bethel Church and Cemetery	Attala	8.5
Sweet Pilgrim Church and Cemetery	Attala	8.6
Galilee Church	Leake	8.6
Nash Cemetery	Leake	8.7
Singleton Cemetery	Attala	8.7
Springdale Cemetery	Attala	8.8
Singleton United Methodist Church	Leake	8.8
New Bethel Cemetery	Attala	8.8
Shelley Cemetery	Attala	9.0
McCord Cemetery	Attala	9.0
Dorsey Cemetery	Leake	9.0
New Bethel Church	Attala	9.1
Antioch Cemetery	Attala	9.1
Pierces Chapel Cemetery	Attala	9.2
Ellington Cemetery	Attala	9.2
Pierce Chapel	Attala	9.2
Center Church	Attala	9.3
Zemuly Church	Attala	9.3
Harmon Cemetery	Attala	9.5
Wright Cemetery	Leake	9.5
Ethel Baptist Church	Attala	9.6
Mount Leviton Church and Cemetery	Attala	9.6
Hesterville Church of Christ	Attala	9.7
Patterson Church	Attala	9.8
Palmer Cemetery	Attala	9.8
Tabernacle Methodist Church and Cemetery	Attala	9.8
New Home Church	Leake	9.9
Sallis Baptist Church	Attala	9.9
Corinth Baptist Church	Leake	9.9
Corinth Church	Leake	10.0

The existing transmission line and associated structures already contribute some minor visual discord with the landscape. These elements contribute to the landscape's ability to absorb negative visual change. Additionally, vegetative areas within the foreground and along the Parkway provide screening, allowing the landscape to absorb the minor visual changes associated with the proposed transmission line.

While Alternative B would contribute to a minor decrease in visual integrity of the landscape, it is not expected that the existing scenic class would be reduced two or more levels, which is the threshold of significance of impact to the visual environment. Scenic attractiveness would remain common and scenic integrity would be moderate (Table 4-2). The forms, colors, and textures that of the landscape that make-up the scenic attractiveness would not be affected and remain common or ordinary. Impacts to scenic integrity are anticipated to be greatest in the foreground for motorists and other users of the Parkway. In the middleground and background, impacts are not considered to be significant as they are not expected to alter the overall landscape. Based on the criteria used for this analysis, the scenic value class for the affected environment after the proposed modifications is still good and impacts are minor.

Table 4-1. Visual Assessment Ratings for Affected Environment Resulting from Alternative B

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

4.3 Alternative C – State Route 14 Crossing

As described for Alternative B, there would be some additional minor visual discord during the construction/installation phase of the proposed transmission line under Alternative C as a result of an increase in personnel and equipment. However, this would be temporary and only lasting until all activities have been completed by TVA.

Under Alternative C, the proposed transmission line would be visible in the foreground by motorists both along the Parkway and SR 14. In contrast, proposed modifications are not expected to be visible in the middleground and background. The dominant shapes in the landscape include the vertical lines of trees against the horizon and the horizontal lines of the existing roadways. The proposed transmission line and structures would add a small number of discordantly contrasting elements to the existing landscape, however it would be consistent with the existing roadway corridor that it parallels (Figure 4-5). In addition, Alternative C would not require the removal of woody vegetation as the existing corridor along SR 14 is adequate for the proposed transmission line. The installation of the new towers and transmission line would contrast with the predominately green and brown colors of the landscape. The color contrast of the metal poles against the vegetation would be greatest in the foreground to passing motorists and be less noticeable in the middleground and background. Since this alternative would parallel an existing roadway overpass across the Parkway, it would effectively expand and modify the existing corridor feature rather than create a new visible corridor.

There are no sensitive visual receptors within the foreground of the proposed corridor for Alternative C (Figure 4-6, Table 4-3). The half-mile area around the affected environment includes the Parkway, SR 14, and undeveloped forested areas. The middleground includes a total of ten churches, nine cemeteries, and four parks, and one golf course. West Union Cemetery, located approximately 0.7 mi to the southwest, is the nearest cemetery (Figure 4-6). The closest church is the Parkway Baptist Church, located approximately 1.4 mi to the southwest. While the Parkway is a scenic resource located within all viewing distances, the nearest recreational area within the middleground is Hugh P. Ellard Park, located approximately 1.1 mi to the north. All of these sensitive resources would be considered to be in the middleground viewing distance, where details are weak as they tend to merge into larger patterns. The background includes 88 potentially sensitive visual receptors, including 44 cemeteries, 39 churches, and three scenic areas/parks (Figure 4-7, Table 4-3). At the middleground and background distances, the proposed transmission line is not expected to be discernable nor would contrast with the overall landscape.

Table 4-3. Sensitive Visual Receptors Within Viewing Distances – Alternative C

Sensitive Visual Receptor	County	Distance (mi)
Middleground		
West Union Cemetery	Attala	0.7
Hugh P. Ellard Park	Attala	1.1
Parkway Baptist Church	Attala	1.4
Parkway Cemetery	Attala	1.6
Williamsville Baptist Church	Attala	1.6
Herring Cemetery	Attala	1.8
Second Baptist Church	Attala	2.1
Dodd Cemetery	Attala	2.2
Bullock Cemetery	Attala	2.3
Kosciusko First Methodist Church	Attala	2.3
Jackson Street Baptist Church	Attala	2.3
First Baptist Church	Attala	2.4
Saint Theresa Catholic Church	Attala	2.4
Jason Niles Park	Attala	2.6
Silas Grove Cemetery	Attala	2.7
Fletcher Cemetery	Attala	2.8
Redbud Springs Golf Course & Golf Club	Attala	2.8
Hurricane Church	Attala	3.0
Silas Grove Church	Attala	3.3
Northside Park	Attala	3.3
Pony League Park	Attala	3.4
Presley Cemetery	Attala	3.6
Faith Temple	Attala	3.7
Hurricane Cemetery	Attala	3.7
Background		
Pleasant Hill Church and Cemetery	Attala	4.2
Samarra Cemetery	Attala	4.2
Skeen Cemetery	Attala	4.3
Holly Hill Picnic Area	Attala	4.3
Brooks Cemetery	Attala	4.5

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Red Hills to Leake Transmission Line Crossing of the Natchez Trace Parkway

Table 4-3. Sensitive Visual Receptors Within Viewing Distances – Alternative C

Sensitive Visual Receptor	County	Distance (mi)
Mount Vernon Church and Cemetery	Attala	4.7
Palestine Church	Attala	4.8
Marble Rock Church	Attala	4.9
New Garden Church	Attala	5.0
Malett Cemetery	Attala	5.0
Attala Memory Gardens	Attala	5.1
Coleman Cemetery	Attala	5.2
Buffalo Church	Attala	5.2
Salem Church	Attala	5.2
Buffalo Cemetery	Attala	5.2
Jerusalem Church	Attala	5.4
McAdams Methodist Church	Attala	5.5
McAdams Baptist Church	Attala	5.5
Hurricane Creek Nature Trail	Attala	5.7
Little Hill Church	Attala	5.8
Mount Zion Church and Cemetery	Attala	5.9
Damascus Church	Attala	6.0
Isaac Cemetery	Attala	6.1
Cedar Grove Cemetery	Attala	6.1
Attala Youth Club Lake	Attala	6.3
Marvin Chapel and Cemetery	Attala	6.4
Jenkins Cemetery	Attala	6.6
Smyrna Cemetery	Attala	6.6
Yockanookany Baptist Church	Attala	6.6
Smyrna Presbyterian Church	Attala	6.6
Bethlehem Church and Cemetery	Attala	6.7
Nile Church	Attala	7.1
Plantation Church	Attala	7.1
Pleasant Ridge Church and Cemetery	Attala	7.2
County Line Baptist Church	Leake	7.3
Turnage Cemetery	Leake	7.3
Delydia Hill Church	Leake	7.4
Hill Springs Cemetery	Attala	7.4
Teague Cemetery	Attala	7.4
Russell Cemetery	Attala	7.4
Musselwhite Cemetery	Attala	7.5
Hill Springs Church	Attala	7.6
Breazeale Cemetery	Attala	7.6
Brown Cemetery	Attala	7.8
Bulah Church	Attala	7.8
Springdale Church	Attala	7.9
Cummings Cemetery	Attala	8.1
Mount Moriah Church	Attala	8.4
Galilee Church	Leake	8.4
Nash Cemetery	Leake	8.4
Shelley Cemetery	Attala	8.6

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Table 4-3. Sensitive Visual Receptors Within Viewing Distances – Alternative C

Sensitive Visual Receptor	County	Distance (mi)
Mount Moriah Cemetery	Attala	8.6
Singleton United Methodist Church and Cemetery	Leake	8.6
New Bethel Cemetery	Attala	8.7
Sweet Pilgrim Church and Cemetery	Attala	8.7
Bethel Church and Cemetery	Attala	8.7
Springdale Cemetery	Attala	8.7
Dorsey Cemetery	Leake	8.9
New Bethel Church	Attala	9.0
Ellington Cemetery	Attala	9.1
Zemuly Church	Attala	9.1
Wright Cemetery	Leake	9.2
Antioch Cemetery	Attala	9.3
Harmon Cemetery	Attala	9.3
Center Church	Attala	9.4
McCord Cemetery	Attala	9.4
Pierces Chapel and Cemetery	Attala	9.6
New Home Church	Leake	9.7
Corinth Baptist Church	Leake	9.7
Corinth Church	Leake	9.8
Sallis Baptist Church	Attala	9.8
Hesterville Church of Christ	Attala	9.9
Sallis Cemetery	Attala	9.9
Wyse Cemetery	Attala	9.9
Patterson Church	Attala	9.9
Palmer Cemetery	Attala	9.9
Big Spring Church and Cemetery	Leake	9.9

The existing SR14 overpass already contributes some minor visual discord with the landscape and to the landscape's ability to absorb negative visual change. Additionally, vegetative areas within the foreground and along the Parkway provide screening, allowing the landscape to absorb the minor visual changes associated with the proposed transmission line.

While Alternative C would contribute to a minor decrease in visual integrity of the landscape, it is not expected that the existing scenic class would be reduced two or more levels, which is the threshold of significance of impact to the visual environment. Scenic attractiveness would remain common and scenic integrity would be moderate (Table 4-4). The forms, colors, and textures that of the landscape that make-up the scenic attractiveness would not be affected and remain common or ordinary. Impacts to scenic integrity are anticipated to be greatest in the foreground for motorists and other users of the Parkway. In the middleground and background, impacts are not considered to be significant as they are not expected to alter the overall landscape. Based on the criteria used for this analysis, the scenic value class for the affected environment after the proposed modifications is still good and impacts are minor.

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Table 4-4. Visual Assessment Ratings for Affected Environment Resulting from Alternative C

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

5 REFERENCES

U.S. Forest Service, 1995. Landscape Aesthetics, *A Handbook for Scenery Management,* Agriculture Handbook Number 701.

Visual Assessment
Red Hills to Leake Transmission Line Crossing of the Natchez Trace Parkway

FIGURES

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Visual Assessment
Red Hills to Leake Transmission Line Crossing of the Natchez Trace Parkway

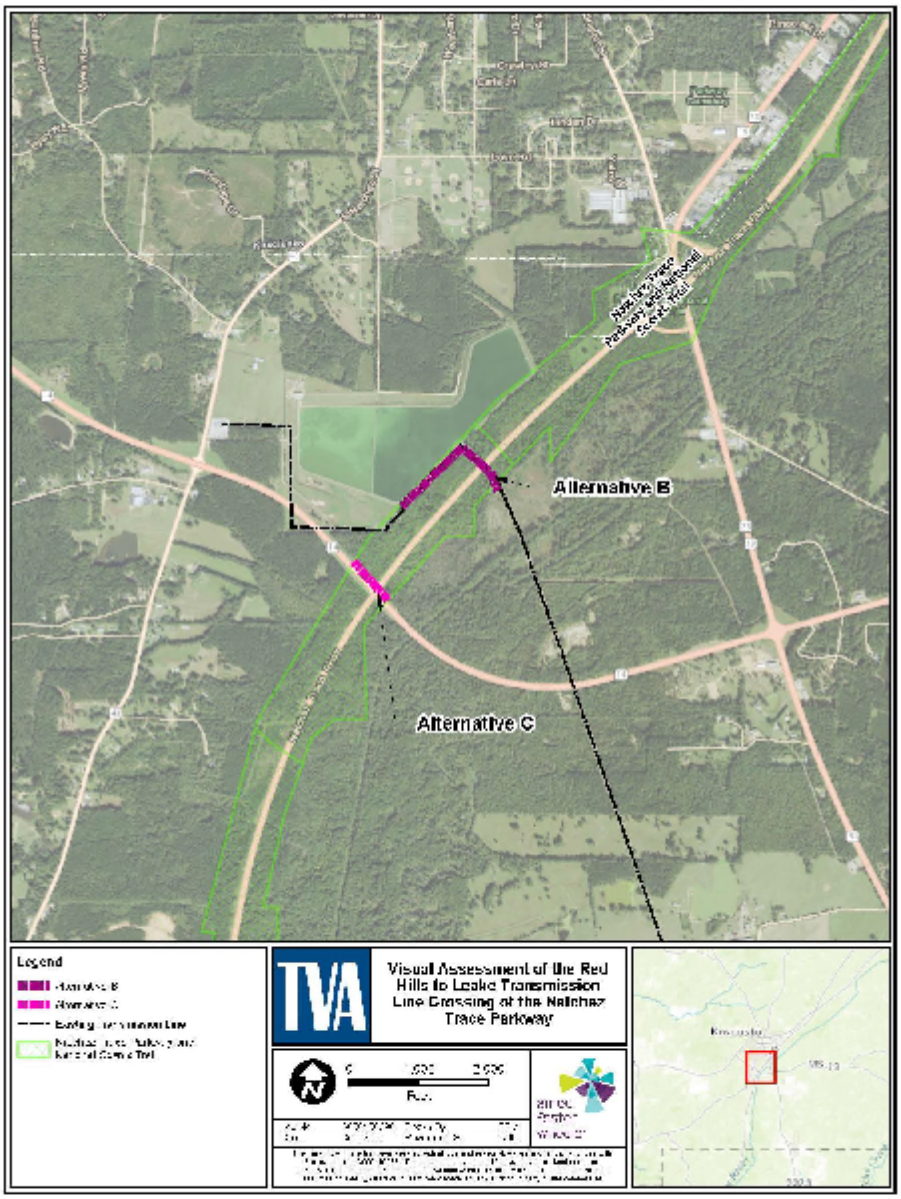

Figure 3-1. Affected Environment for Alternatives B and C

Visual Assessment
Red Hills to Leake Transmission Line Crossing of the Natchez Trace Parkway

Drawn by:	JOE
Checked by:	SLM
Date	8/15/10
Project No.:	3252100401

amec foster wheeler

Figure 4-1. Visual Rendering of Alternative B - North Crossing

Visual Assessment
Red Hills to Leake Transmission Line Crossing of the Natchez Trace Parkway

Drawn by:	JCE
Checked by:	SJM
Date:	8/15/16
Project No.:	325216046

amec foster wheeler

Figure 4-2. Visual Rendering of Alternative B Viewed from along the Parkway

Visual Assessment
Red Hills to Leake Transmission Line Crossing of the Natchez Trace Parkway

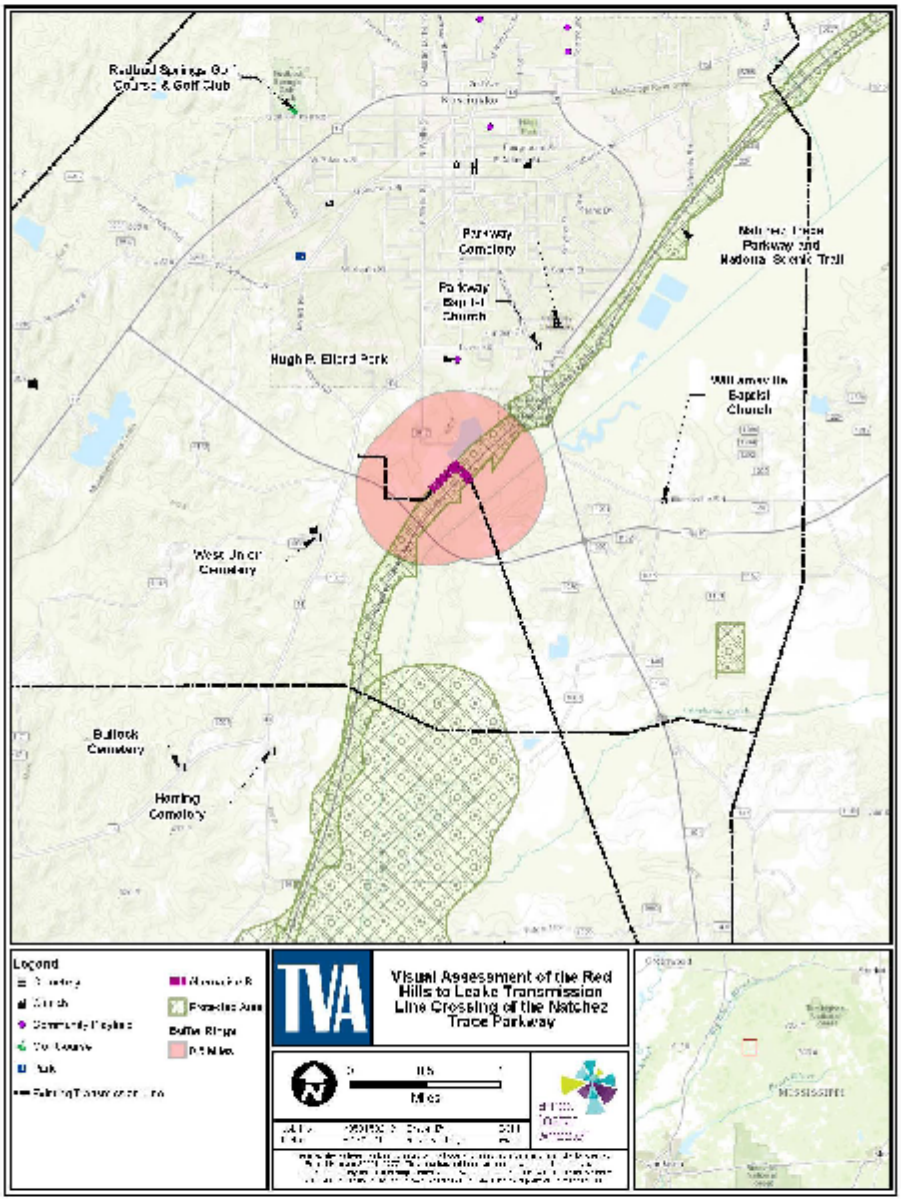

Figure 4-3. Nearest Sensitive Visual Receptors to Alternative B

Visual Assessment
Red Hills to Leake Transmission Line Crossing of the Natchez Trace Parkway

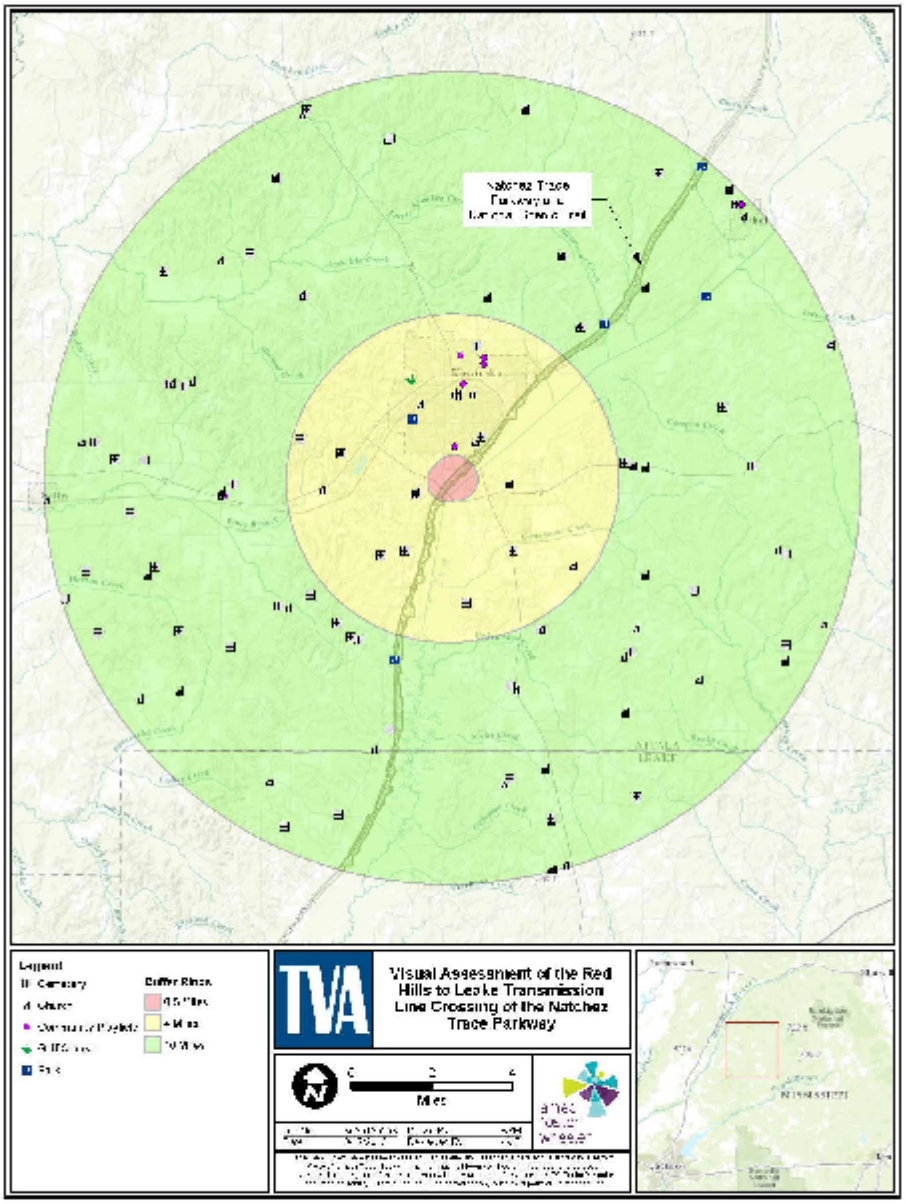

Figure 4-4. Sensitive Visual Receptors within Viewing Distances – Alternative B

Visual Assessment
Red Hills to Leake Transmission Line Crossing of the Natchez Trace Parkway

Drawn by:	JCT
Checked by:	SJM
Date:	8/15/15
Project No.	325210040

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Figure 4-5. Visual Rendering of Alternative C – SR 14 Crossing

Visual Assessment
Red Hills to Leake Transmission Line Crossing of the Natchez Trace Parkway

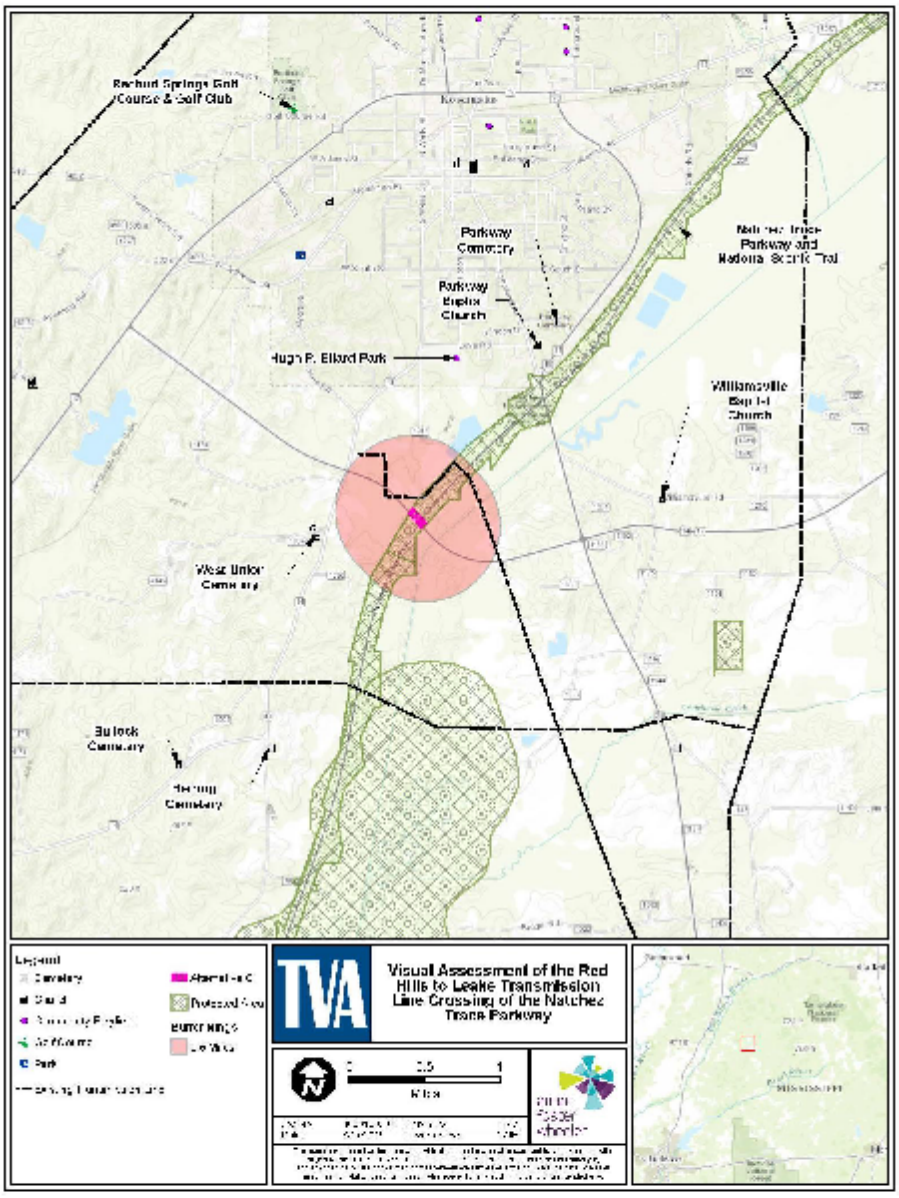

Figure 4-6. Nearest Sensitive Visual Receptors to Alternative C

Visual Assessment
Red Hills to Leake Transmission Line Crossing of the Natchez Trace Parkway

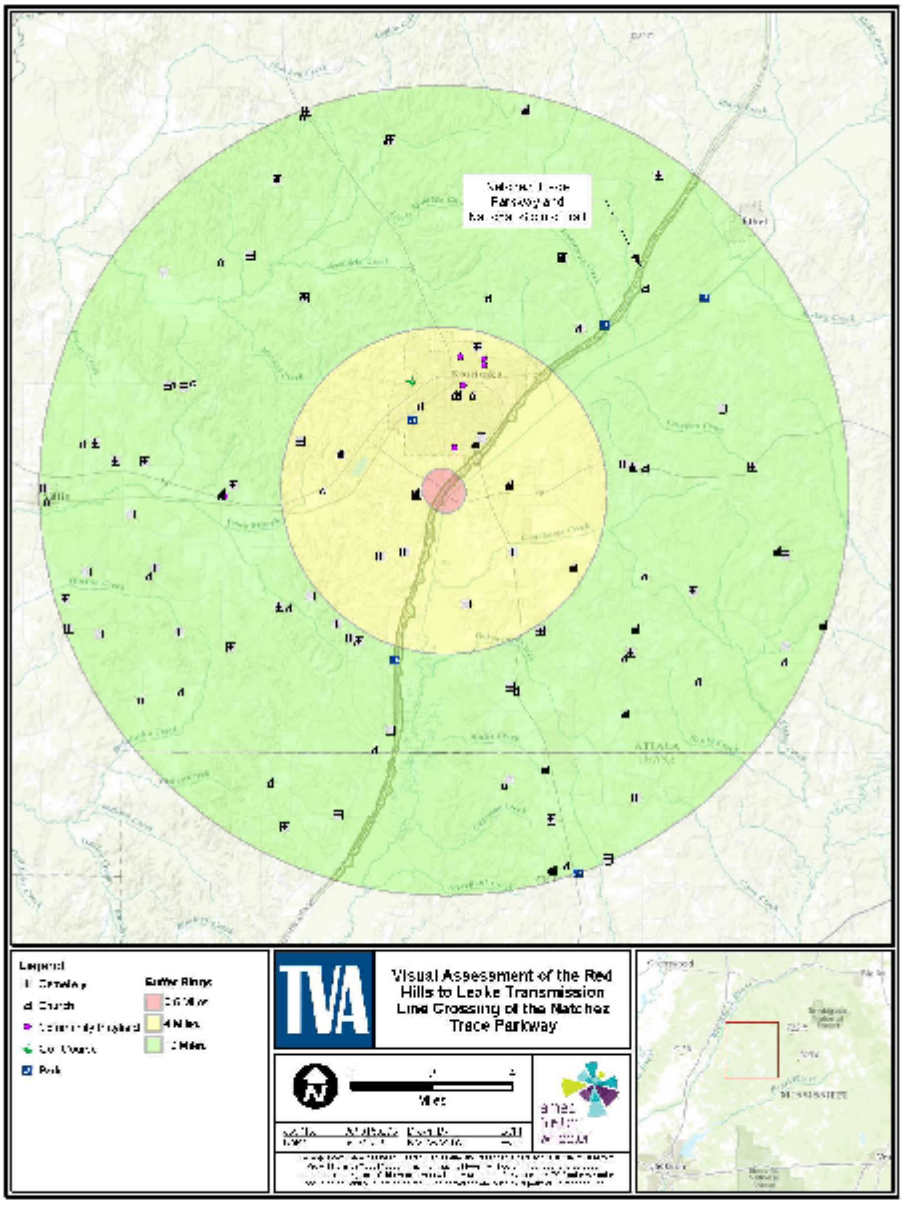

Figure 4-7. Sensitive Visual Receptors within Viewing Distances – Alternative C

Appendix F – 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 U.S. Environmental Protection Agency (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 (dBA)	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 transmission line 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 transmission line 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 transmission lines, 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.

Literature Cited

Bolt, Beranek, and Newman Inc. 1971. *Noise From Construction Equipment and Operation, Building Equipment, and Home Appliances.* U.S. Environmental Protection Agency Report NTID300.1.

Cowan, J. P. 1993. *Handbook of Environmental Acoustics*. Wiley, New York.

Federal Interagency Committee on Noise (FICON). 1992. *Federal Agency Review of Selected Airport Noise Analysis Issues.* Fort Walton Beach, Fla.: Spectrum Sciences and Software Inc.