

**GENERATOR INTERCONNECTION
PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT**
Tennessee Valley Authority Power Service Area Wide

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EXECUTIVE SUMMARY

GENERATOR INTERCONNECTION PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

INTRODUCTION

The Tennessee Valley Authority (TVA) is preparing this Programmatic Environmental Impact Statement (PEIS) to establish a bounded programmatic framework for reviewing the environmental effects of generator interconnection-related transmission actions. The framework would support efficient, consistent, and predictable National Environmental Policy Act (NEPA) review for generator interconnection-related actions including those conducted under TVA's Large Generator Interconnection Procedures (LGIP), Small Generator Interconnection Procedures (SGIP), and Expedited Resource Addition Study (ERAS).

TVA proposes to use this PEIS to evaluate recurring types of transmission facilities and activities at a programmatic level while preserving TVA's ability to conduct additional site-specific NEPA review when a proposed interconnection-related action exceeds the PEIS bounding criteria or could affect resources in a manner not addressed programmatically.

PURPOSE AND NEED

The purpose of the proposed action is to provide a consistent, efficient, and predictable approach for environmental review of recurring interconnection-related actions while supporting TVA's statutory mission to provide sufficient electricity at the lowest feasible rates. The need for the proposed action is driven by increasing electricity demand within the TVA Power Service Area (PSA), including demand associated with population growth, industrial expansion, and other economic development. Increased demand has contributed to the need for additional generating capacity and supporting transmission infrastructure. The proposed programmatic framework would establish environmental bounding criteria and screening procedures that would allow TVA to evaluate interconnection-related actions more efficiently, improve schedule certainty, support near-term resource adequacy and grid reliability needs, and retain the ability to conduct additional site-specific environmental review for actions that fall outside the scope of the programmatic analysis.

ALTERNATIVES

This PEIS evaluates two alternatives: Alternative A, the No Action Alternative, and Alternative B, the Action Alternative.

Under the No Action Alternative, TVA would continue to evaluate interconnection-related actions through its standard project-specific NEPA process and would not adopt the PEIS screening framework.

Under the Action Alternative, TVA would use this PEIS, the Environmental Screening Checklist (ESC), siting criteria, and environmental bounding analysis to determine whether future interconnection-related actions are within the scope of the programmatic analysis or require additional site-specific NEPA review. TVA has identified the Action Alternative as its preferred alternative.

PREFERRED ALTERNATIVE

Alternative B, the Action Alternative, is TVA's preferred alternative because it would establish a consistent programmatic framework for evaluating the bounded environmental effects of interconnection-related actions needed to support TVA's generator interconnection processes. Under this alternative, TVA would use the PEIS, ESC, siting criteria, and bounding analysis to determine whether future tiered interconnection-related actions are within the environmental bounds evaluated in this PEIS or require additional site-specific NEPA review.

This approach would support more efficient environmental review, improve schedule certainty for interconnection actions that fall within the bounding analyses of this PEIS, and preserve TVA's ability to conduct additional project-specific analysis, permitting, consultation, and mitigation when warranted.

SUMMARY OF ENVIRONMENTAL IMPACTS

Implementation of the Action Alternative is not expected to result in significant environmental impacts because future interconnection-related actions would be limited to the bounding criteria established in the PEIS and would be subject to TVA's ESC. Future actions would also be subject to applicable permitting requirements, best management practices (BMPs), avoidance and minimization measures, mitigation where required, and additional site-specific NEPA review when warranted.

Under the No Action Alternative, TVA would continue to evaluate interconnection-related actions through its existing project-specific NEPA process. This alternative would not provide the efficiencies, consistency, or schedule certainty associated with the programmatic approach.

Under the Action Alternative, impacts to land use and prime farmland would generally be minor and could result from temporary construction disturbance or limited permanent conversion associated with substations, switchyards, access roads, and other permanent facilities. Most transmission line rights-of-way would remain compatible with agricultural uses after construction. Where required, prime farmland impacts would be evaluated through applicable Natural Resources Conservation Service review procedures.

Impacts on geology and groundwater would generally be minor and localized. Construction activities could involve excavation, grading, erosion, sedimentation, or temporary encounters with shallow groundwater. These impacts would be minimized through engineering design, erosion controls, and BMPs.

As a result of construction activities, surface waters, floodplains, and wetlands could experience minor direct and indirect impacts, including erosion, sedimentation, temporary turbidity, stormwater runoff, fill placement, and temporary disturbance associated with access roads, transmission structures, and facility construction. TVA would avoid affecting these resources where practicable and would implement BMPs, stormwater controls, permit conditions, and mitigation measures consistent with applicable federal and state requirements, including Clean Water Act requirements and executive orders addressing floodplain and wetland protection.

Aquatic ecology resources could experience temporary and localized impacts from sedimentation, turbidity, habitat disturbance, and short-term water quality changes associated with construction activities near aquatic habitats. Terrestrial wildlife and vegetation resources could experience minor impacts from vegetation clearing, habitat modification, fragmentation, noise, human activity, and operation and maintenance of transmission facilities. These impacts would be minimized through siting, environmental screening, seasonal clearing restrictions, restoration measures, invasive species controls, and implementation of TVA environmental protection specifications and BMPs.

Threatened and endangered species, migratory birds, bald eagles, and other protected flora and fauna could be affected by habitat disturbance, vegetation clearing, construction noise, or other project activities. TVA would conduct project-specific screening, surveys, consultation, and coordination, as appropriate, and would implement avoidance, minimization, seasonal restrictions, and conservation measures necessary to comply with the Endangered Species Act, Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, and applicable state regulations. Therefore, impacts to protected species are expected to be minor for actions that remain within the PEIS bounding criteria.

Air quality impacts would be minor and temporary and would primarily result from construction equipment emissions and fugitive dust generated during clearing, grading, excavation, and construction activities. Operational air quality impacts would be minimal. Greenhouse gas emissions would be limited primarily to potential sulfur hexafluoride losses from electrical equipment, which would be minimized through equipment specifications, leak detection, and maintenance practices.

Transportation impacts would generally be minor and temporary and would result from construction traffic, equipment deliveries, oversized loads, access road improvements, and temporary lane closures. Noise impacts would be temporary and primarily occur during construction from heavy equipment operation, vegetation clearing, grading, pile driving, blasting, and related activities. Operational noise would typically be below background levels and limited to transformer, breaker, and transmission line corona noise.

Visual impacts could range from minor to moderate depending on the location, existing visual character, viewer sensitivity, distance, screening, and facility design. New transmission structures, substations, switchyards, cleared rights-of-way, access roads, or lighting could be visible from nearby residences, transportation corridors, parks, trails, or other visually sensitive areas. These effects would be minimized through siting, use of existing corridors where practicable, vegetation retention, and lighting controls.

Natural areas, parks, recreation resources, and cultural resources could experience minor impacts where future facilities are located near sensitive recreational, scenic, historic, archaeological, or culturally significant areas. TVA would avoid these resources where practicable and would coordinate with managing agencies, State Historic Preservation Offices, federally recognized tribes, and other consulting parties, as appropriate. Additional site-specific

review, consultation, and mitigation would be conducted where required to ensure compliance with applicable laws and regulations.

Hazardous materials, solid waste, utilities, service systems, socioeconomics, and public safety would experience minor impacts under the Action Alternative. Construction activities would generate limited quantities of solid and hazardous waste, which would be managed in accordance with applicable regulations. Temporary beneficial socioeconomic impacts could occur from construction employment and local expenditures, while temporary adverse effects could result from traffic, noise, and construction activity. Public health and safety risks associated with construction, operation, and maintenance would be minimized through compliance with applicable safety standards, environmental protection requirements, spill prevention measures, and project-specific safety planning.

Overall, the Action Alternative would provide a programmatic framework for supporting TVA's generator interconnection processes while maintaining environmental protections through screening, permitting, consultation, avoidance and minimization measures, mitigation, and supplemental site-specific review when warranted. Environmental impacts would generally be temporary, localized, and minor, with project-specific effects depending on facility location, design, and surrounding environmental conditions. Interconnection-related actions with the potential to exceed the environmental assumptions evaluated in this PEIS would require additional site-specific environmental review, permitting, consultation, or mitigation before implementation.

SCOPING AND PUBLIC INVOLVEMENT

TVA published a Notice of Intent in the Federal Register on July 14, 2026, to begin scoping for this PEIS. The scoping period provided an opportunity for agencies, federally recognized tribes, stakeholders, and the public to comment on the proposed programmatic approach, the range of interconnection-related actions to be evaluated, and the environmental resources and issues that should be considered. Scoping comments were received from the National Park Service and from the U.S. Environmental Protection Agency, which were considered in the development of the Draft PEIS.

TVA's public and agency involvement for the Draft PEIS includes publication of a public notice and a 30-day public review period. To solicit public input, TVA announced the availability of the Draft PEIS via a media advisory to local news outlets and posted the Draft PEIS on TVA's website. Comments received on the Draft PEIS will be considered in preparing the Final PEIS.

MITIGATION MEASURES

TVA would apply standard practices, routine BMPs, permit conditions, resource-specific avoidance and minimization measures, and nonroutine mitigation measures, as appropriate, to avoid, minimize, or reduce adverse effects from interconnection-related actions. Measures would be identified during project-specific screening using the ESC.

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CHAPTER 1 PURPOSE AND NEED FOR ACTION

1.1 BACKGROUND

The Tennessee Valley Authority (TVA) Power Service Area (PSA) covers approximately 80,000 square miles in the southeastern United States, including nearly all of Tennessee and parts of Mississippi, Kentucky, Alabama, Georgia, North Carolina, and Virginia (Figure 1-1). Electricity demand in the TVA region is increasing for a variety of reasons, including but not limited to population growth, employment growth, industrial expansion, and data center development. To maintain planning reserve margins and reliable system operations, TVA needs a mix of reliable, firm, dispatchable, flexible, and increasingly clean energy generation resources. These resources support TVA's statutory mission to provide electricity to the PSA at the lowest feasible rates. TVA administers several generator interconnection processes for new, upgraded, modified, and existing generation resources that connect to the TVA transmission system within the TVA PSA. These processes include the Large Generator Interconnection Procedures (LGIP) (TVA 2024a), Small Generator Interconnection Procedures (SGIP) (TVA 2018), and Expedited Resource Addition Study (ERAS) (TVA 2026a).

TVA is preparing this Programmatic Environmental Impact Statement (PEIS) pursuant to the National Environmental Policy Act (NEPA) to evaluate, at a programmatic level, the potential environmental effects of interconnection-related transmission actions associated with TVA's generator interconnection processes, including LGIP, SGIP, and ERAS. The PEIS would support a programmatic NEPA approach for transmission-related actions needed to reliably integrate generation resources into the TVA system. As part of this approach, TVA has developed an Environmental Screening Checklist (ESC) and bounding analysis to promote consistent environmental review, identify the types and levels of effects that may be addressed programmatically, and determine when additional site-specific NEPA review may be required.

1.2 PURPOSE AND NEED

Under the proposed action, TVA would complete a programmatic NEPA evaluation of bounded environmental criteria for the types of environmental effects typically associated with TVA's generator interconnection processes, allowing TVA to separate the environmental review of interconnection-related transmission actions from the environmental review of individual generation projects while ensuring NEPA compliance through appropriate tiering. Subsequent, tiered implementing actions could incorporate and summarize the analysis completed in the PEIS, allowing TVA to determine whether each interconnection-related action falls within the established bounding criteria or requires additional site-specific NEPA review.

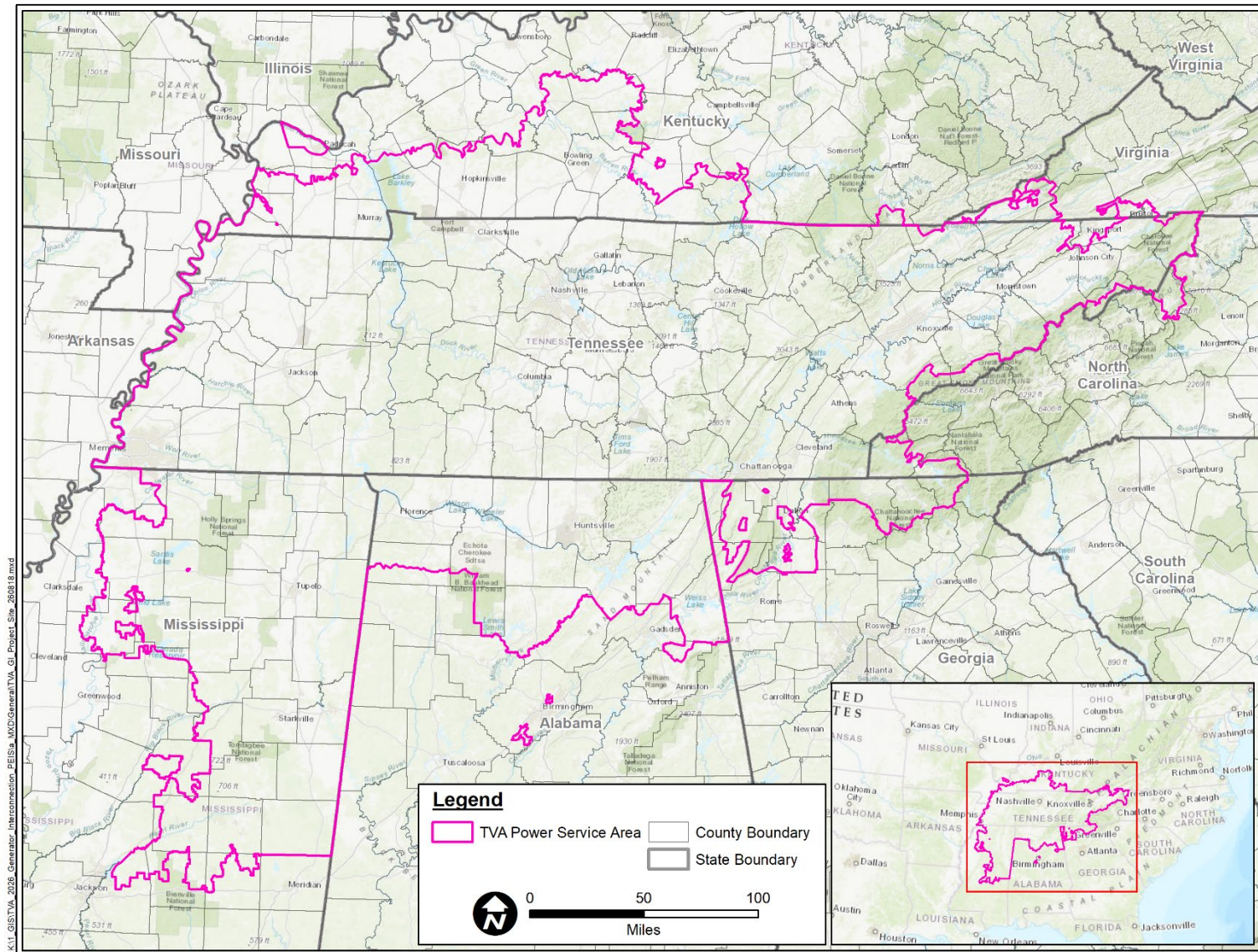


Figure 1-1. TVA Power Service Area

Implementation of the proposed action would more efficiently and effectively support TVA’s generator interconnection processes by allowing TVA to:

1. Enable interconnections under TVA’s transmission processes (including LGIP, SGIP, and ERAS) where projects meet the applicable process requirements and where interconnection-related actions fall within the bounded criteria evaluated in this PEIS. Site-specific NEPA reviews would be conducted when actions fall outside the bounded environmental criteria evaluated in this PEIS.
2. Evaluate projects under TVA’s transmission processes to identify transmission upgrades or other solutions needed to maintain TVA transmission system reliability.
3. Use programmatic screening tools, such as the ESC and standardized siting criteria established through this PEIS, to support timely review of interconnection activities and, when warranted by near-term needs, deployment of temporary or phased transmission solutions.
4. Maintain the ability of TVA-owned and third-party-owned generation projects to participate in TVA’s interconnection processes, provided they meet the applicable process requirements.
5. Improve schedule certainty for transmission actions needed to integrate generation onto the TVA system.
6. Identify interconnection actions that may fall outside the bounded criteria evaluated in this PEIS or otherwise require additional site-specific environmental review or consultation.

The purpose of the proposed action is to establish a bounded programmatic NEPA approach for TVA’s generator interconnection processes. This approach would support TVA’s statutory mission to provide sufficient electricity to its service territory at the lowest feasible rates while helping TVA respond to increasing regional electricity demand and maintain planning reserve targets consistent with TVA’s most recent Integrated Resource Plan (IRP), which was approved by the Board of Directors in August 2026. TVA’s service territory has experienced substantial population and industrial growth, which, based on TVA’s experience and expertise, has contributed to increased electricity demand and the need for additional generating capacity

1.3 PROGRAMMATIC ANALYSIS AND TIERING

On January 21, 2026, TVA adopted new NEPA implementing regulations that address the use of programmatic environmental documents. These regulations provide that programmatic documents may be prepared for a proposed program, policy, or plan, or for a proposed action with a wide geographic scope (Title 18, Section 1318.502(a) of the Code of Federal Regulations [CFR]). They also recognize that programmatic documents can support broad or high-level decision-making and provide a foundation for efficient review of specific, tiered implementing actions (18 CFR 1318.502(b)).

TVA currently evaluates interconnection-related transmission activities as connected actions with the associated power generation project. Implementation of a PEIS would allow TVA to

separate the environmental review of interconnection-related transmission actions from the environmental review of individual generation projects, while ensuring NEPA compliance through appropriate tiering. Accordingly, this PEIS evaluates only the transmission actions needed to interconnect generating resources to the TVA transmission system; it does not evaluate or authorize the construction or operation of the associated generation projects, which would remain subject to separate NEPA review, as applicable.

A programmatic NEPA document is appropriate for TVA’s generator interconnection processes because these processes generally involve recurring types of interconnection-related transmission activities and consistent categories of environmental effects. These effects can be evaluated using bounded criteria, allowing tiered project-specific reviews to incorporate and summarize the analysis completed in the PEIS. This approach would also allow TVA to evaluate generation projects and their associated interconnection-related actions separately, where appropriate, while determining whether each interconnection-related action satisfies the bounding criteria or requires additional site-specific NEPA review. Interconnection processes assessed in the PEIS include:

- LGIP: Applies to generation greater than 20 megawatts (MW), processed through the Annual Cluster or Resource Solicitation Cluster.
- SGIP: Applies to generation less than or equal to 20 MW.
- ERAS: A targeted, time-limited process for generation greater than 20 MW that meets additional requirements to address near-term capacity needs. ERAS uses terms and conditions from LGIP and may include accelerated steps where appropriate.

Under the proposed approach, TVA would use the bounded programmatic NEPA review as a mechanism to support near-term resource adequacy and grid reliability needs within the TVA service territory. The approach is intended to provide consistent, efficient, and predictable environmental review for interconnection-related actions, including transmission system impacts, siting needs, and construction activities associated with projects that could achieve commercial operation within a 0- to 5-year planning horizon. By adopting this framework, TVA seeks to reduce schedule risk across its interconnection processes while preserving the ability to conduct additional tiered site-specific NEPA reviews when needed.

TVA has prepared this PEIS to provide a foundation for efficient review of specific, tiered implementing actions. The programmatic approach includes an ESC, siting criteria, and bounding analyses to evaluate potential environmental effects within TVA’s service territory. This PEIS will establish the general siting and environmental criteria to determine whether proposed impacts fall within the bounds analyzed in the PEIS for each tiered action. TVA would apply these criteria consistently to interconnection-related transmission activities, regardless of the applicable interconnection process. Siting or construction elements that do not meet the PEIS bounding criteria would require additional site-specific environmental review or consultation.

1.4 ENVIRONMENTAL SCREENING CHECKLIST

If a proposed interconnection-related action does not qualify for an existing categorical exclusion, TVA would use the ESC in Appendix A to determine whether the proposed action is within the scope of this PEIS. The ESC would document the physical characteristics of proposed facilities, associated construction activities, potential environmental effects, and any applicable permits, consultations, or mitigation measures that may be required. The screening criteria reviewed in the ESC are based on the bounding values developed for this PEIS, as described in Section 2.1.2.2.

If TVA determines through the ESC that a proposed interconnection-related action falls within the bounding criteria evaluated in this PEIS and would not result in effects beyond those analyzed programmatically, the NEPA analysis and impact findings in this PEIS would apply to that action. If TVA determines that the interconnection-related action would exceed the bounding criteria or may affect sensitive resources in a manner not addressed in this PEIS, TVA would conduct additional site-specific environmental review consistent with TVA NEPA procedures (TVA 2026b). Relevant portions of this PEIS may be incorporated by reference into any subsequent site-specific review.

The ESC would support consistent documentation of proposed interconnection-related actions, confirm whether those actions are covered by the PEIS bounding analysis, and help TVA conduct efficient environmental review for future actions.

1.5 DECISION TO BE MADE

TVA must decide whether to adopt a bounded programmatic NEPA approach for future interconnection-related actions that may be needed to support generator interconnection requests within the TVA PSA. This PEIS is being prepared to inform TVA decision-makers and the public about the environmental consequences of the proposed action at a programmatic level. TVA's decision will consider the PEIS bounding analysis, potential environmental effects, applicable compliance requirements, and TVA's long-term goals.

1.6 SCOPE OF THE PEIS

This PEIS provides a programmatic, bounding analysis of the potential environmental effects associated with TVA's generator interconnection processes and related transmission actions within the TVA PSA. The PEIS does not evaluate or approve a specific generation project or site-specific interconnection action; rather, it establishes an analytical framework for determining whether future interconnection-related actions are within the environmental bounds analyzed in this document. A detailed description of the proposed action, programmatic approach, and alternatives considered is provided in Chapter 2.

For purposes of this programmatic analysis, the study area is the TVA PSA, including locations where interconnection-related actions may be needed to connect new, upgraded, modified, or existing generation resources to the TVA transmission system. For future tiered actions, TVA would define site-specific study areas during subsequent environmental review based on the proposed footprint of the interconnection facilities, associated rights-of-way, access roads,

substations, switchyards, and any resource-specific analysis areas needed to evaluate potential impacts.

TVA intends to use the PEIS and associated ESC to support consistent, efficient review of future interconnection-related actions. The bounding analysis identifies the types and levels of potential effects that may be addressed programmatically and provides the basis for determining whether an action qualifies for coverage under this PEIS or requires additional site-specific NEPA review. The following resources have the potential to be affected by the proposed action:

- Land Use and Prime Farmland
- Geology and Groundwater
- Surface Water
- Floodplains
- Wetlands
- Aquatic Ecology
- Terrestrial Zoology
- Vegetation
- Threatened and Endangered Species
- Air Quality and Climate Change
- Transportation (including Navigation)
- Noise
- Visual Impacts
- Natural Areas, Parks, and Recreation
- Cultural Resources
- Hazardous Materials and Solid and Hazardous Waste
- Utilities and Service Systems
- Safety
- Socioeconomics

1.7 SCOPING AND PUBLIC INVOLVEMENT

On July 14, 2026, TVA initiated scoping for this PEIS by publishing a Notice of Intent in the Federal Register. The notice announced TVA's intent to prepare a PEIS evaluating, at a programmatic level, the potential environmental effects of transmission system actions needed to support generator interconnection requests across the TVA PSA. TVA requested comments from agencies, federally recognized tribes, stakeholders, and members of the public on the scope of the analysis through August 14, 2026. Scoping comments were received from the

National Park Service and from the U.S. Environmental Protection Agency (EPA) and are included in Appendix B. Comments received during the scoping period were considered in developing the Draft PEIS.

TVA's public and agency involvement for the Draft PEIS includes the publication of a public notice and a 30-day public review. To solicit public input, TVA announced the availability of the Draft PEIS via a media advisory to local news outlets and posted the Draft PEIS on TVA's website at www.tva.com/nepa. Comments received on the Draft PEIS will be considered in preparing the Final PEIS.

1.8 RELATED ENVIRONMENTAL REVIEWS

TVA reviewed related environmental documents and planning materials to inform this PEIS. These documents provide relevant background, programmatic analysis, and resource information that support the bounded analysis and project-specific screening framework. Where appropriate, this PEIS incorporates information from these documents by reference and uses it to describe existing conditions, identify reasonably foreseeable activities, and inform the evaluation of potential effects from interconnection-related actions.

- 2026 Integrated Resource Plan (IRP) and associated Final Environmental Impact Statement (FEIS) (TVA 2026c): TVA's 2026 IRP identifies power supply portfolios and strategic direction for meeting regional electricity demand over a 20-year planning period, and the associated programmatic FEIS evaluates the environmental effects of those planning alternatives. The IRP and IRP FEIS do not approve specific generator interconnection projects or associated transmission actions, but they provide planning context for this PEIS, including regional demand growth, resource adequacy needs, and potential future resource additions that may influence generator interconnection activity.
- Transmission System Vegetation Management Final Programmatic Environmental Impact Statement (TVA 2019): TVA's 2019 Transmission System Vegetation Management PEIS, incorporated by reference, evaluates the environmental effects of vegetation management activities across TVA's transmission system within the TVA PSA. The analysis addresses vegetation management methods and tools used to maintain transmission rights-of-way and support reliable operation of the transmission system. TVA issued a Record of Decision in the Federal Register on October 18, 2019, selecting a condition-based control strategy intended to maintain rights-of-way in a meadow-like end state.¹ This PEIS relies on the 2019 vegetation management analysis, as appropriate, to inform the discussion of routine operation and maintenance activities, right-of-way vegetation management, vegetation and habitat effects, and standard practices that may apply to interconnection-related actions evaluated under the PEIS bounding criteria.
- Transmission System Routine Periodic Vegetation Management Fiscal Years 2027, 2028, and 2029 Environmental Assessment (EA) (TVA 2026d): TVA's 2026 EA and Finding of No

¹ Record of Decision available at <https://www.govinfo.gov/content/pkg/FR-2019-10-18/pdf/2019-22243.pdf>.

Significant Impact (FONSI) tier from the 2019 Transmission System Vegetation Management PEIS and evaluate routine vegetation management on previously maintained transmission rights-of-way. The PEIS uses this 2026 EA to inform the discussion of recurring right-of-way maintenance activities and to distinguish those activities from new clearing or ground disturbance that would be evaluated through the ESC during project-specific screening.

On September 28, 2026, in *Sherwood v. TVA*, No. 3-12-CV-156, the district court for the Eastern District of Tennessee lifted the longstanding injunction limiting TVA's implementation of a comprehensive vegetation management program within TVA's existing rights-of-way. TVA will evaluate and subsequently consider implementing the vegetation management program evaluated in the PEIS or the final EA and FONSI described above and will no longer continue to maintain the buffer zones on the edge of its rights-of-way in a manner described in the 1997 and 2008 Line Maintenance Manuals (TVA 1997 and 2008).

1.9 NECESSARY PERMITS, LICENSES, AND CONSULTATIONS

Proposed interconnection-related actions would comply with applicable local, state, and federal regulations and permit requirements, and best management practices (BMPs) would be implemented as discussed in Section 2.4. During project-specific review, TVA would determine whether any permits, licenses, approvals, or consultations are required for a proposed interconnection-related action area (action area). TVA anticipates that implementation of interconnection-related actions could require one or more of the following permits or approvals:

- National Pollutant Discharge Elimination System (NPDES) construction stormwater permit coverage may be required for construction activities that disturb one or more acres. A Stormwater Pollution Prevention Plan (SWPPP) would be prepared, as required, to identify sediment and erosion control BMPs appropriate for the interconnection-related action area.
- Actions involving impacts to Waters of the United States would be subject to federal Clean Water Act (CWA) Section 404 permit requirements.
- A CWA Section 401 Water Quality Certification or applicable state aquatic resource authorization may be required for actions that involve or affect streams, wetlands, or other regulated waters.
- Local building or construction permit as required by local governments.
- An NPDES permit or permit modification may be required for new wastewater discharges or changes to existing permitted discharges.
- Transportation or right-of-way permits may be required for transmission line construction, access roads, driveway entrances, or crossings of state highways, federal interstates, or other transportation rights-of-way.

- Hazardous and solid waste permits, notifications, or approvals may be required for activities involving regulated waste management, storage, handling, transport, or disposal.

Any other necessary permits would be evaluated based on the proposed interconnection-related action area and site-specific conditions. Details of permitting requirements would be determined using the ESC based upon final design.

CHAPTER 2 ALTERNATIVES

2.1 DESCRIPTION OF ALTERNATIVES

2.1.1 Alternative A – The No Action Alternative

Under the No Action Alternative, TVA would continue to evaluate interconnection-related actions through its standard project-specific NEPA process and would not adopt the PEIS screening framework.

2.1.2 Alternative B – Action Alternative

Under Alternative B, TVA would use the PEIS bounding analysis and ESC to determine whether each proposed interconnection-related action is within the scope of the programmatic analysis. During the project-specific screening process, TVA would gather information about the interconnection-related action area, facilities, construction activities, and potential environmental effects. TVA would use this information to document whether the action is consistent with the PEIS bounding criteria or whether additional site-specific NEPA review, permitting, consultation, or mitigation would be required.

2.1.2.1 Description of Interconnection Infrastructure

This PEIS evaluates the types of interconnection-related transmission infrastructure that may be required to connect new, upgraded, modified, or existing generation resources to the TVA transmission system. The activities evaluated are described further in Section 2.2 of this PEIS and include the construction, operation, maintenance, rebuilding, replacement, and modification of transmission lines, communication systems, substations, switchyards, access roads, and associated support facilities. These activities are evaluated programmatically within the bounding criteria identified in this PEIS and would be further reviewed through the ESC during tiered project-specific screening.

Transmission Lines and Communication Systems

- Acquiring new rights-of-way or expanding existing rights-of-way, as needed, to provide space for transmission structures, conductor clearance, access, construction workspace, and long-term operation and maintenance.
- Clearing and preparing rights-of-way, including removal of incompatible vegetation, grading where required, establishment or improvement of access roads, and development of temporary work areas, pull sites, and laydown areas.
- Installing new transmission structures and associated foundations, including steel poles, lattice towers, guy wires, anchors, insulators, shield wire, optical ground wire, conductors, and related hardware.
- Stringing, tensioning, and terminating conductors and communication lines, including temporary pulling and tensioning sites and equipment access needed to complete line installation.

- Upgrading, reconductoring, rebuilding, replacing, or modifying existing transmission facilities to address interconnection-related system needs, including replacement or modification of structures, foundations, conductors, switches, and related appurtenances.
- Installing, replacing, or modifying communication systems needed for system protection, control, monitoring, and operation, including fiber optic facilities, microwave or radio equipment, communication towers or poles, shelters, grounding, power supply, and associated disturbance footprints.
- Installing or modifying underground components, where needed, such as grounding systems, buried fiber optic lines, ducts, conduit, control cables, foundations, and other subsurface utilities associated with transmission and communication facilities.
- Operating and maintaining new and existing transmission and communication infrastructure, including inspections, vegetation management, access road maintenance, structure repair or replacement, hardware replacement, and other routine activities needed to maintain system reliability.

Substations and Switchyards

- Identifying and evaluating potential substation or switchyard sites, including the permanent facility footprint, temporary construction workspace, laydown areas, access, drainage, grading limits, and areas needed for future operation and maintenance.
- Acquiring property, easements, or other land rights needed for new or expanded substations, switchyards, access roads, utility connections, and associated construction and maintenance areas.
- Clearing, grubbing, excavating, importing and placing borrow material, grading, compacting, and stabilizing the facility site to establish a level pad, stormwater controls, internal roads, equipment foundations, and erosion and sediment control measures.
- Installing new substation or switchyard equipment, which may include transformers, breakers, switches, buswork, control houses, relay panels, protection and control systems, metering, capacitor banks, reactors, lightning protection, lighting, fencing, security systems, and grounding systems.
- Modifying existing substations or switchyards to accommodate interconnection-related needs, including expansion of equipment bays, replacement or addition of transformers, breakers, switches, buswork, relay and control equipment, protection systems, metering, and associated foundations or support structures.
- Constructing, improving, or maintaining permanent and temporary access roads, including entrances, culverts, drainage features, aggregate surfacing, gates, and areas needed for equipment delivery and maintenance access.
- Installing or modifying underground systems, such as grounding grids, conduits, cable trenches, control and power cables, oil containment systems, stormwater conveyance,

water or sanitary service, station service, and other subsurface utilities required for facility operation.

- Operating and maintaining new and existing substation and switchyard equipment, including inspections, testing, equipment replacement, vegetation and grounds maintenance, stormwater and oil containment maintenance, access maintenance, and other activities needed to maintain reliable operation.

2.1.2.2 Bounding Analysis

The bounding analysis identifies a reasonable range of potential impacts from construction, operation, and maintenance of interconnection-related transmission infrastructure. The analysis uses maximum conservative assumptions to define the types and levels of effects that may be addressed programmatically in this PEIS. Individual interconnection actions may result in impacts that are less than the bounded impacts analyzed in this PEIS.

TVA compiled available information on siting, construction, operation, and maintenance requirements for interconnection-related transmission facilities to support evaluation of potential direct and indirect effects. This information was summarized as bounding attributes and used to support the resource-specific impact analyses in Chapter 3.

Table 2-1 summarizes facility attributes for potential interconnection-related actions, including construction, operation, and maintenance characteristics. Table 2-2 summarizes environmental bounding values that may apply to future interconnection-related actions. Together, these tables provide thresholds for determining whether a proposed interconnection-related action is covered by the analysis in this PEIS. After completion of this PEIS and a project-specific ESC, any interconnection action that does not meet the applicable bounding conditions would require additional site-specific NEPA review.

Table 2-1. Facility Attributes for Potential Interconnection-Related Transmission Actions

Feature	Characteristic	Bounding Parameter
Substation Facility Attributes		
Substation	Capacity	Up to 500 kV.
	Land requirements	Up to 80 acres of ground disturbance.
	Maximum structure height	Up to 150 feet.
	Lighting	Security and operational lighting would be designed to direct light downward and minimize light above the horizontal plane, consistent with applicable Illuminating Engineering Society and American National Standards Institute guidelines.
	Potable water requirements	Limited potable water use for restroom or maintenance needs; typically less than 50 gallons per day.
	Stormwater management	Stormwater controls may include on-site basins, conveyances, or other BMPs. Construction stormwater discharges would be managed under applicable NPDES permit coverage; operational stormwater would be managed in accordance with applicable permit conditions and site-specific requirements.
Transmission Facility Attributes		
New Transmission Line	Capacity	Up to 500 kV.
	Maximum right-of-way width	Up to 250 feet.
	Maximum length	Up to 20 miles.
	Maximum right-of-way acreage	Up to 610 acres.
	Maximum tower height	Up to 150 feet.
	Appearance	Transmission structures may include lattice steel towers, single-pole structures, double-pole structures, conductors, shield wire, optical ground wire, and related hardware.
	Access roads	Up to 1.5 miles of access road per mile of transmission line, not to exceed 30 miles total.

Feature	Characteristic	Bounding Parameter
Construction-Phase Activities and Attributes		
Substation and New Transmission Line	Transportation	Construction materials and equipment would be transported primarily by truck. Existing rail or barge infrastructure may be used where available; no new rail or barge infrastructure is assumed.
	Types of construction equipment	Construction equipment may include pickup trucks, dump trucks, concrete trucks, feller-bunchers, bulldozers, excavators, graders, piledrivers, augers, rollers, etc. May include rock blasting.
	Depth of underground system components	Up to approximately 15 feet for substation components and up to approximately 20 feet for transmission infrastructure.
	Construction laydown areas (worker assembly, vehicle parking, and material storage)	Up to 10 acres per laydown area, not to exceed 50 acres total.
	Maximum number of construction workers	Up to 1,000 construction workers.
	Max duration of construction	Up to 4 years.
	Construction schedule	Construction may occur up to 7 days per week, primarily during daylight hours.
	Maximum rate of spoil and/or borrow transport	Up to 200 combined truckloads per day for spoil removal and borrow delivery.
	Borrow source	Existing, permitted borrow site.
	Waste and spoil disposition	Construction waste and excess spoil would be transported to existing permitted disposal facilities and managed in accordance with applicable federal, state, and local requirements.
	Water requirements	Construction water needs would be limited and may include water for dust suppression, concrete work, and related construction activities.
Operation and Maintenance Activities and Attributes		
Substation Operation	Maximum operational noise levels	Operational noise may include transformer fan noise up to approximately 85 dBA at 3 feet and brief breaker operation noise up to approximately 105 dBA at 50 feet.
Transmission Line Operation	Maximum operational noise levels	Corona noise from transmission lines may occur during wet weather and could reach approximately 61 dBA under maximum recorded conditions.
Substation and Transmission Line Operation	Vegetation management	Vegetation management would be conducted in accordance with applicable TVA transmission specifications, BMPs, and operation and maintenance requirements.

Key = BMP = best management practice; dBA = A-weighted decibel; kV = kilovolt; NPDES = National Pollutant Discharge Elimination System

Table 2-2. Environmental Bounding Values for Interconnection-Related Transmission Actions

Resource	Parameter	Bounding Value/Characteristic
Air Quality	Emissions	Construction-related air emissions would be temporary and minor and would primarily result from vehicle and equipment exhaust and fugitive dust from clearing, grading, and other ground-disturbing activities.
Greenhouse Gases	Emissions	Electrical equipment may contain SF ₆ . TVA would use appropriate equipment specifications, leak detection, and maintenance practices to minimize SF ₆ emissions.
Land Use	Land Use	Where applicable, proposed facilities would be evaluated for consistency with applicable local zoning ordinances, land use plans, and existing land use conditions.
	Prime Farmland	Where applicable, TVA would evaluate potential farmland conversion using the applicable NRCS Prime Farmland conversion impact rating form and coordinate with the NRCS. New transmission rights-of-way generally would not constitute permanent conversion of prime farmland where agricultural use could continue.
Water Quality/Aquatic Ecology	Potential impacts to receiving streams and wetlands	Construction stormwater discharges would comply with applicable NPDES permit requirements. TVA would implement BMPs to minimize erosion, sedimentation, and indirect effects to receiving waters and aquatic habitat.
Floodplains	Floodplains	Substations and other permanent facilities would avoid the 100-year floodplain, or the 500-year floodplain for critical actions, where practicable. If avoidance is not practicable, TVA would complete the appropriate floodplain review, including any required public notice and mitigation measures, consistent with EO 11988.
Species of Concern	Protected species and habitat	Federally and state-listed species, migratory birds, bald and golden eagles, and other protected species would be evaluated through the ESC. TVA would implement applicable avoidance, minimization, seasonal restriction, consultation, and conservation measures as needed. Activities must comply with the Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, Endangered Species Act, and state regulations for state-listed species. Construction activities within 660 feet of any known protected species nests require oversight from the USDA. Avoid potential impacts to federally listed bats by observing seasonal restrictions on tree clearing and avoiding impacts to roost trees, caves, water bodies, sinkholes, buildings, and bridges. Interconnection-related actions with the potential to spread invasive species must be in compliance with the Federal Noxious Weed Act/Plant Protection Act and follow USDA APHIS PPQ guidelines in addition to TVA's transmission BMP guidelines. Project activities would conform with all applicable federal, state, and local regulations and measures regarding federal and state-listed species and other species of concern.

Resource	Parameter	Bounding Value/Characteristic
Surface Waters and Wetlands	Streams, wetlands, lakes, etc.	Streams, wetlands, reservoirs, and other aquatic resources would be avoided where practicable. Unavoidable impacts would be subject to applicable CWA Sections 401 and 404 requirements, state aquatic resource requirements, EO 11990, and compensatory mitigation where required.
Cultural and Historic Resources	NRHP-listed and NRHP-eligible properties	TVA would review interconnection-related actions in accordance with Section 106 of the NHPA, TVA's applicable programmatic agreements or procedures, and consultation with SHPOs, federally recognized tribes, and other consulting parties, as appropriate.
Hazardous Waste	Management of hazardous wastes	Hazardous materials and regulated wastes would be managed, stored, transported, and disposed of in accordance with applicable RCRA requirements and federal, state, and local regulations.
Solid Waste	Management of solid wastes	Solid waste generated during construction, operation, and maintenance would be minimized, recycled where practicable, and disposed of at appropriately permitted facilities in accordance with applicable federal, state, and local requirements.
Natural Areas, Parks, and Recreation	Natural areas/parks within 0.1 miles	Direct impacts to managed and natural areas, parks, and recreation areas would be avoided where practicable. If avoidance is not practicable, TVA would coordinate with the appropriate managing agency and apply site-specific mitigation, as needed.
Socioeconomics	Employment	Construction phase: up to 1,000 people. Operational phase: N/A.
	Community Facilities	No direct impacts to community facilities. New transmission infrastructure would not displace, nor impede access to, any community facilities.
Transportation and Navigation	Construction Transport	Construction materials and equipment would be transported primarily by truck using existing roadways. Existing rail or barge infrastructure may be used where available; no new rail or barge infrastructure is assumed.
	Navigable Waters	If a proposed transmission line would cross navigable waters, TVA would obtain applicable authorizations, such as a USACE Section 10 permit, before construction.
Noise and Vibration	Rock blasting	If required during construction, blasting will not occur within 500 feet of residential, commercial, or public buildings or structures.
Visual Resources	Foreground viewshed	Not located within the foreground viewshed (within 0.5 mile) of a national scenic or historic trail, national heritage area, wild and scenic river, or national scenic highway or byway.

Key: APHIS = Animal and Plant Health Inspection Service; BMP = best management practice; CWA = Clean Water Act; EO = Executive Order; NHPA = National Historic Preservation Act; NPDES = National Pollutant Discharge Elimination System; NRCS = Natural Resources Conservation Service; NRHP = National Register of Historic Places; PPQ = Plant Protection and Quarantine; RCRA = Resource Conservation and Recovery Act; SF₆ = sulfur hexafluoride; SHPO = State Historic Preservation Office; USACE = U.S. Army Corps of Engineers; USDA = U.S. Department of Agriculture

2.2 GENERATOR INTERCONNECTION TRANSMISSION AND SUBSTATION ACTIVITIES

Generator interconnection-related actions may include the construction, modification, operation, and maintenance of transmission lines, substations, switchyards, switching stations, communication facilities, access roads, and related support facilities needed to connect new, upgraded, modified, or existing generation resources to the TVA transmission system. The facilities required for a specific interconnection would vary based on the generator location, voltage requirements, point of interconnection, existing transmission system configuration, engineering requirements, and results of the interconnection study process.

Typical activities may include constructing new transmission line segments, taps, or loop lines; rebuilding, uprating, or reconductoring existing transmission lines; installing or replacing optical ground wire or fiber optic communication facilities; constructing new substations or switching stations; expanding or modifying existing substations or switchyards; and installing protection, control, communication, and metering equipment. These activities would be designed, constructed, operated, and maintained in accordance with applicable TVA specifications, environmental quality protection requirements, BMP guidance, permit conditions, and project-specific environmental commitments.

TVA uses standard practices for transmission-related clearing and construction activities. The following guidance and specification documents are provided on TVA’s transmission system projects web page (TVA 2026e):

1. *Right-of-Way Clearing Specifications*
2. *Site Clearing and Grading Specifications*
3. *Environmental Quality Protection Specifications for Transmission Line Construction*
4. *Transmission Construction Guidelines Near Streams*
5. *Environmental Quality Protection Specifications for Transmission Substation or Communications Construction*
6. *Substation Lighting Guidelines*
7. *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities* (hereafter referred to as “TVA 2022”)

For the purposes of this PEIS, the term interconnection-related actions refers collectively to the construction, modification, operation, and maintenance activities and facilities associated with generator interconnections described in this section. The locations where these activities would occur are referred to as interconnection-related action areas (or action areas).

2.2.1 Property Acquisition, Easements, and Preconstruction Activities

Before construction, TVA may evaluate potential substation or switching station sites, transmission line routes, access routes, temporary workspaces, pulling and tensioning sites, and laydown areas. Preconstruction activities may include engineering surveys, environmental and

cultural resources surveys, geotechnical investigations, agency coordination, landowner coordination, constructability reviews, and development of construction access plans.

Property acquisition or other land rights may be needed for new or expanded substations, switchyards, switching stations, transmission rights-of-way, access roads, communication facilities, and temporary construction areas. These land rights may include fee acquisition, permanent easements, temporary construction easements, or rights to use or improve existing access. Land acquisition and easement needs would be identified during project development and evaluated, if necessary, during project-specific environmental review.

Transmission facility siting involves weighing relevant social, engineering, environmental, and constructability factors to identify a balanced solution. TVA's transmission line siting process generally includes the following steps:

- Define the study area.
- Determine existing transmission lines to connect to the substation.
- Collect data to minimize potential impacts to social, engineering, and environmental (cultural and natural) features.
- Determine potential substation options.
- Develop associated transmission line routes.
- Gather public input.
- Incorporate public input into the final selection of the preferred substation location and associated transmission lines.

Transmission right-of-way is typically established through an easement designated for a transmission line and associated assets. The easement allows TVA to clear, construct, operate, and maintain the transmission line and to remove "danger trees" adjacent to the right-of-way, as needed to maintain safe and reliable operation. Danger trees are trees located outside the cleared right-of-way that are tall enough to pass within 5 feet of a conductor or strike a structure if they fall toward the transmission line. The landowner would retain fee simple ownership of the land within the right-of-way, and many activities and land uses could continue on the property. However, the easement agreement would prohibit certain activities, such as constructing buildings or conducting other activities within the right-of-way that could interfere with operation or maintenance of the transmission line or create a hazardous condition.

2.2.2 Substation, Switchyard, and Switching Station Construction

Substation, switchyard, and switching station construction may include clearing, grubbing, grading, excavation, compaction, and stabilization of the facility footprint to create a level pad, internal access, equipment foundations, drainage features, and work areas. Construction may also require borrow material, spoil management, erosion and sediment controls, stormwater management features, and temporary or permanent access roads.

Facilities may include fenced and graveled yards, foundations, grounding grids, oil containment systems, stormwater conveyance features, control houses or relay buildings, transformers, reactors, breakers, switches, buswork, relays, protection and control systems, metering, communication equipment, lighting, security systems, and other electrical equipment. Existing substations or switchyards may be expanded or modified to add bays, replace equipment, improve protection and control systems, accommodate new transmission line terminations, or support system reliability.

Substation and communications construction would follow applicable TVA requirements, including TVA's *Environmental Quality Protection Specifications for Transmission Substation or Communications Construction* (TVA 2026e), TVA's *Site Clearing and Grading Specifications* (TVA 2026e), project-specific stormwater controls, permit conditions, and environmental commitments. Substation lighting would be designed in accordance with TVA's *Substation Lighting Guidelines* (TVA 2026e) to support safe facility operation while minimizing unnecessary light spill, glare, and upward-directed light where practicable.

2.2.3 Transmission Line Construction

Transmission line construction may include building new line segments, taps, or loop lines; rebuilding, uprating, or reconductoring existing lines; replacing or modifying transmission structures; and installing conductors, shield wire, optical ground wire, fiber optic cable, insulators, switches, guys, anchors, and related hardware. Structures may include steel poles, wood poles, H-frame structures, lattice towers, foundations, and associated appurtenances. Typical 500-kilovolt (kV) transmission line structures would consist of self-supporting, galvanized, laced-steel structures or H-frame steel-pole structures similar to those shown in Figure 2-1. Typical 161-kV transmission line structures would consist primarily of steel, single or double pole and H-frame structures as shown in Figure 2-2.

Construction may require new or expanded rights-of-way, use of existing transmission corridors, temporary pulling and tensioning sites, structure assembly areas, conductor stringing, work pads at structure locations, and access for cranes, bucket trucks, line trucks, tensioning equipment, and other construction equipment. Where work occurs near streams, wetlands, floodplains, roads, railroads, or other sensitive features, construction methods, access, and work areas would be adjusted, as appropriate, to avoid or minimize effects and comply with applicable permits and TVA environmental requirements.



Figure 2-1. Typical 500-kV H-Frame and Laced Steel-Pole Structures



Figure 2-2. Typical 161-kV Single and Double Steel-Pole Structures

Tower foundations would vary with structure design. Laced-steel structures would require foundations of reinforced concrete, and H-frame steel-pole structures would be directly imbedded into an augured hole and backfilled with concrete. After clearing, construction would generally progress in the following order:

1. Excavating foundation or grillage holes.
2. Installing the foundations and grillages.
3. Assembling, on the ground, large portions of steel structures.
4. Placing the assembled structures on the foundations using cranes.
5. Hanging insulators with “pulling blocks” or pulleys attached to allow the new conductors and ground wires to be pulled through.
6. Pulling the ground wires and conductors into place.
7. “Sagging” the conductor; that is, adjusting it to the proper tension and height to meet the required clearances.
8. Clipping the conductor into place at the end of the insulators.
9. Inspecting and testing the line.
10. Restoring the right-of-way and cleaning up.

Equipment used during the construction phase would include trucks, truck-mounted augers, and drills, 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.

Transmission line construction would follow applicable TVA requirements, including TVA *ROW Clearing Specifications*, TVA’s *Environmental Quality Protection Specifications for Transmission Line Construction*, TVA’s *Transmission Construction Guidelines Near Streams and Site Clearing and Grading Specifications* (TVA 2026e), and TVA transmission BMP guidance (TVA 2022). These documents would guide construction access, right-of-way clearing, stream protection, erosion and sediment control, work near sensitive resources, stabilization, revegetation, and other practices used to avoid or minimize environmental effects.

2.2.4 Right-of-Way Clearing, Site Preparation, and Restoration

Clearing and site preparation may be required for substation or switching station sites, transmission rights-of-way, structure work areas, access roads, laydown areas, pull sites, and temporary construction areas. Activities may include tree and shrub removal, mowing, grubbing, stump removal, minor grading, excavation, cut-and-fill work, placement of borrow material, slope stabilization, and installation of erosion and sediment controls.

Right-of-way clearing would generally be limited to the area needed for construction, conductor clearance, access, and long-term operation and maintenance. Clearing and vegetation management would be conducted in accordance with TVA *ROW Clearing*

Specifications (TVA 2026e), applicable TVA transmission specifications, TVA transmission BMP guidance (TVA 2022), and project-specific environmental commitments. Depending on site conditions, clearing may also be subject to stream buffers, wetland avoidance, seasonal tree-clearing restrictions, sensitive species surveys, cultural resources review, or other resource-specific restrictions.

After construction, areas not needed for permanent facilities, access, or long-term operation and maintenance would generally be stabilized and restored to preconstruction conditions where practicable. Restoration may include removing temporary construction materials, grading disturbed areas to stable contours, installing permanent drainage or erosion controls, seeding, mulching, revegetating with appropriate vegetation, using seed mixtures consistent with TVA BMP guidance (TVA 2022), and maintaining erosion and sediment controls until disturbed areas are stabilized. TVA would also coordinate with property owners where cropland is affected to support restoration and minimize effects on agricultural production.

2.2.5 Access Roads, Laydown Areas, and Construction Support Areas

Construction may require the use of existing roads or the construction or improvement of temporary or permanent access roads. Access road work may include grading, aggregate placement, culvert installation, drainage improvements, driveway or entrance improvements, gates, and stabilization of road surfaces and shoulders. Access roads may be needed for construction, inspection, emergency response, and long-term operation and maintenance.

Temporary laydown, staging, and assembly areas may be used for worker parking, construction trailers, material storage, equipment staging, and assembly of transmission or substation components. These areas would generally be sited to minimize disturbance, avoid sensitive resources where practicable, and provide efficient construction access. Erosion and sediment controls, spill prevention measures, and stabilization measures would be implemented consistent with applicable TVA specifications, stormwater permits, and project-specific BMPs.

A construction assembly area, or laydown area, may be required for worker assembly, vehicle parking, and material storage. Laydown areas may be located on an existing substation parcel or leased from a private landowner for the duration of construction. TVA typically seeks properties that require little or no site preparation, such as existing parking lots or previously disturbed commercial areas. Preferred laydown areas are generally up to 10 acres in size, relatively flat, well drained, previously cleared, preferably graveled and fenced, accessible from an existing paved road, and sufficiently separated from streams, wetlands, or other sensitive environmental features. Some sites may require minor grading, drainage improvements, culvert installation, graveling, or fencing. Trailers used for material storage or office space would be placed on the site during construction. After construction is complete, TVA would remove trailers, unused materials, and construction debris. TVA-installed fencing would be removed, and the site would be restored at the landowner's discretion.

2.2.6 Construction Equipment, Materials, and Waste Management

Construction equipment may include pickup trucks, dump trucks, concrete trucks, cranes, bucket trucks, line trucks, bulldozers, excavators, graders, augers, drills, rollers, feller-bunchers, skidders, tractors, tensioning equipment, and other heavy equipment. Materials and equipment would generally be transported by truck using existing public roads and project access roads. Construction water may be used for dust suppression, concrete work, equipment cleaning, or other construction-related purposes.

Construction waste, excess spoil, packaging materials, and other materials would be reused, recycled, managed, or disposed of in accordance with applicable federal, state, and local requirements, TVA procedures, and project-specific environmental commitments. Hazardous materials, fuels, oils, and lubricants would be managed using appropriate spill prevention, containment, storage, and response measures.

2.2.7 Communication, Protection, and Control Facilities

Interconnection-related actions may require communication and control system improvements for system protection, monitoring, communication, and reliable operation. These activities may include installing or replacing optical ground wire, fiber optic cable, microwave or radio equipment, communication shelters, control cables, relay panels, power supply equipment, grounding systems, and related support facilities. Communication facilities may be constructed within substations, along transmission rights-of-way, on existing or new structures, or in associated support areas. These activities would follow applicable TVA environmental quality protection specifications and project-specific requirements.

2.2.8 Operation and Maintenance of Transmission Lines

After transmission lines are energized, TVA would conduct periodic inspections to identify damaged conductors, insulators, structures, hardware, or other conditions that could affect safe and reliable operation. Inspections may include aerial patrols, drone inspections, foot patrols, or climbing inspections. TVA would also monitor vegetation within and adjacent to the right-of-way to identify maintenance and vegetation management needs.

National Electrical Safety Code (NESC) standards establish minimum clearance distances between conductors and grounded objects, including trees, buildings, vehicles, roads, and railroads. These clearances vary by voltage. Vegetation management would be needed to maintain safe clearances, provide access, and support system reliability. Activities may include mowing, manual cutting, mechanical removal, selective herbicide application, removal of incompatible vegetation, and danger tree removal. TVA generally manages rights-of-way to promote compatible low-growing vegetation and discourage tall-growing species that could interfere with conductors, structures, access, or reliable operation.

Vegetation management along proposed rights-of-way would be necessary to maintain structure access and adequate clearance between transmission line conductors and vegetation. Adequate clearance accounts for construction, design, and survey tolerances, including conductor sag. TVA uses clearance distances that are more conservative than those required by

the NESC, including minimum ground clearances of 24 feet for 161-kV transmission lines and 30 feet for 500-kV transmission lines at maximum line operating temperature. Vegetation management along the right-of-way would include danger tree removal adjacent to the cleared right-of-way and vegetation control within the cleared right-of-way. These activities typically occur on approximately 3-year cycles.

As discussed in Section 1.8, TVA completed the *Transmission System Vegetation Management PEIS* in 2019, which addresses tools and methods TVA may use to manage right-of-way vegetation. TVA also completed subsequent site-specific NEPA documents tiered from that PEIS (TVA 2020, 2021, 2023, 2024b, and 2026d) to evaluate whether resource impacts would be avoided, minimized, or mitigated. Vegetation management within the cleared right-of-way would use an integrated vegetation management approach to promote compatible low-growing plant species and discourage tall-growing species. TVA would develop a vegetation re-clearing plan for each transmission line connection based on periodic inspection results. The two principal management techniques are mechanical mowing, using tractor-mounted rotary mowers, and selective herbicide application. Herbicides are typically used where heavy woody vegetation is present and mechanical mowing is not practical. Herbicides would be selectively applied from the ground using backpack or vehicle-mounted sprayers or, in rare cases, by helicopter. Vegetation management would also be conducted in accordance with applicable TVA transmission vegetation management requirements, TVA *ROW Clearing Specifications*, TVA transmission BMP guidance (TVA 2022), and project-specific commitments or restrictions.

Equipment used for right-of-way clearing may include chainsaws, skidders, bulldozers, tractors, and low ground-pressure feller-bunchers. Marketable timber would be salvaged where feasible. Other woody debris and vegetation would be piled and burned, chipped, or removed from the site. In some cases, vegetation may be windrowed along the edge of the right-of-way to serve as a sediment barrier. Herbicides, where used, would be applied in accordance with applicable federal and state laws and product label directions. Applications near receiving waters or sensitive resources would be controlled to avoid unacceptable impacts.

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

Other transmission line maintenance would generally be limited and may include repair or replacement of damaged structures, conductors, insulators, guys, anchors, hardware, or communication components. If structure replacement is needed, TVA would typically remove the existing structure and install the replacement in the same or a nearby location using crane-like equipment. Access would generally use existing roads or approved access routes. Structure replacement could require limited grading or leveling around the work area, but the disturbance would typically be minor compared with initial construction.

2.2.9 Operation and Maintenance of Substations, Switchyards, and Switching Stations

Operation and maintenance of substations, switchyards, and switching stations would include routine inspection, testing, repair, and replacement of electrical and support equipment to maintain safe and reliable operation. Activities may include inspection and maintenance of transformers, reactors, breakers, switches, buswork, relays, control houses or switch houses, protection and control systems, metering, grounding systems, oil containment systems, stormwater controls, fencing, lighting, security systems, communication equipment, and access roads.

Maintenance may also include upkeep of stormwater drainage features, oil containment systems, yard surfacing, gates, fencing, lighting, and vegetation or grounds within and around the facility. TVA may periodically test electrical equipment, replace aging or damaged components, maintain communication and control systems, and conduct emergency repairs following equipment failures or storm events. These activities would generally occur within the existing facility footprint or established access areas and would follow applicable TVA specifications, environmental quality protection requirements, BMPs, and permit conditions.

Substation lighting would be maintained in accordance with TVA's Substation Lighting Guidelines (TVA 2026e). Oil containment, stormwater systems, and other environmental controls would be inspected and maintained to ensure proper function. Wastes generated during maintenance, such as used oils, spent materials, packaging, or equipment components, would be managed or disposed of in accordance with applicable federal, state, and local requirements and TVA procedures.

2.3 COMPARISON OF ALTERNATIVES

Impacts evaluated may be beneficial or adverse and may apply to natural, aesthetic, historic, cultural, and socioeconomic resources within future action areas and surrounding areas where direct or indirect environmental effects could occur. Impact severity depends on relative magnitude, intensity, and resource sensitivity. In this document, four descriptors are used to characterize the level of impacts in a manner consistent with TVA's current practice:

- No Impact (or "absent") – Resource not present or, if present, not affected by project alternatives under consideration.
- Minor – Environmental effects are not detectable or are so minor that they would not noticeably alter any important attribute of the resource.
- Moderate – Environmental effects are sufficient to alter noticeably, but not to destabilize important attributes of the resource.
- Significant – Environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

The environmental impacts of each alternative are summarized in Table 2-3 and described by resource area in Chapter 3.

Table 2-3. Summary and Comparison of Alternatives by Resource Area

Resource Area	Impacts From No Action Alternative	Impacts From Action Alternative
Land Use and Prime Farmland	No change from existing conditions. Site-specific interconnection-related actions would continue to be evaluated under TVA's existing NEPA procedures.	Minor impacts on land use and prime farmland soils could occur. Temporary construction areas would generally be restored to compatible uses. Permanent facilities could result in conversion of land uses or prime farmland soils where avoidance is not practicable.
Geology and Groundwater	No change from existing conditions. Site-specific interconnection-related actions would continue to be evaluated under TVA's existing NEPA procedures.	Localized, short-term minor impacts to subsurface conditions and groundwater resources could occur during construction. Impacts would be minimized through appropriate siting, design, construction practices, and BMPs.
Surface Water	No change from existing conditions. Site-specific interconnection-related actions would continue to be evaluated under TVA's existing NEPA procedures.	Minor direct impacts to streams and other surface waters could occur where crossings or work near surface waters cannot be avoided. Impacts would be avoided, minimized, permitted, and mitigated, as applicable. Minor indirect construction or maintenance impacts would be minimized through stormwater controls and BMPs.
Floodplains	No change from existing conditions. Site-specific interconnection-related actions would continue to be evaluated under TVA's existing NEPA procedures.	Minor direct and indirect impacts could result from temporary or permanent disturbance, fill, or changes to floodplain functions. Floodplain impacts would be avoided or minimized where practicable and reviewed in accordance with applicable floodplain requirements.
Wetlands	No change from existing conditions. Site-specific interconnection-related actions would continue to be evaluated under TVA's existing NEPA procedures.	Minor direct and indirect impacts to wetlands could occur during construction and maintenance activities. Wetland impacts would be avoided where practicable or minimized, permitted, and mitigated, as applicable.
Aquatic Ecology	No change from existing conditions. Site-specific interconnection-related actions would continue to be evaluated under TVA's existing NEPA procedures.	Minor direct impacts to aquatic organisms and habitat could occur where work affects streams, wetlands, or other aquatic resources. Impacts would be avoided, minimized, permitted, and mitigated, as applicable.
Terrestrial Zoology	No change from existing conditions. Site-specific interconnection-related actions would continue to be evaluated under TVA's existing NEPA procedures.	Minor impacts to wildlife could occur from temporary disturbance, displacement, or localized habitat alteration during construction and maintenance activities. Limited permanent habitat conversion or fragmentation could occur where new facilities or rights-of-way are required.
Vegetation	No change from existing conditions. Site-specific interconnection-related actions would continue to be evaluated under TVA's existing NEPA procedures.	Minor impacts to vegetation could occur from temporary and permanent disturbance, including clearing within new rights-of-way and facility footprints. Operation and maintenance would generally maintain compatible low-growing vegetation within rights-of-way.

Resource Area	Impacts From No Action Alternative	Impacts From Action Alternative
Threatened and Endangered Species	No change from existing conditions. Site-specific interconnection-related actions would continue to be evaluated under TVA's existing NEPA procedures.	Potential impacts to federally or state-listed species and designated critical habitat would be evaluated through site-specific review, surveys, consultation, seasonal restrictions, and conservation measures, as appropriate. Adverse impacts to listed species or critical habitat are not anticipated when applicable avoidance and minimization measures are implemented. Impacts on listed plants would generally be minimal to minor.
Air Quality and Climate Change	No change from existing conditions. Site-specific interconnection-related actions would continue to be evaluated under TVA's existing NEPA procedures.	Minor, temporary construction-related air quality impacts could occur from vehicle and equipment exhaust and fugitive dust. Operational greenhouse gas emissions would be limited, and TVA would implement appropriate equipment specifications, leak detection, and maintenance practices to minimize sulfur hexafluoride where applicable.
Transportation and Navigation	No change from existing conditions. Site-specific interconnection-related actions would continue to be evaluated under TVA's existing NEPA procedures.	Minor, temporary transportation impacts could occur from construction traffic, equipment deliveries, temporary lane closures, access road improvements, or movement of oversized loads. Existing rail or barge infrastructure may be used where available; no new rail or barge infrastructure is assumed. If work would affect navigable waters, TVA would obtain applicable authorizations before construction.
Noise	No change from existing conditions. Site-specific interconnection-related actions would continue to be evaluated under TVA's existing NEPA procedures.	Minor, temporary construction noise impacts could occur from heavy equipment, vegetation clearing, grading, blasting, or related activities. Generally, operational noise would be low and would primarily consist of transformer, breaker, or corona noise. Noise effects would be minimized through applicable design practices, work-hour restrictions, and compliance with local requirements, as applicable.
Visual Impacts	No change from existing conditions. Site-specific interconnection-related actions would continue to be evaluated under TVA's existing NEPA procedures.	Minor to moderate visual impacts could occur where new transmission structures, cleared rights-of-way, access roads, substations, switchyards, or lighting are visible from nearby residences, roads, parks, trails, or other visually sensitive areas. Impacts would depend on existing visual character, viewer sensitivity, distance, screening, and facility design. Visual impacts would be minimized through siting, use of existing corridors where practicable, and lighting controls.
Natural Areas, Parks, and Recreation	No change from existing conditions. Site-specific interconnection-related actions would continue to be evaluated under TVA's existing NEPA procedures.	Minor impacts to natural areas, parks, and recreation resources could occur from temporary construction noise, traffic, visual changes, or access disruption where such resources occur near interconnection-related action areas. Direct impacts would be avoided where practicable. If avoidance is not practicable, TVA would coordinate with the appropriate managing agency and identify site-specific avoidance, minimization, or mitigation measures, as needed.

Resource Area	Impacts From No Action Alternative	Impacts From Action Alternative
Cultural Resources	No change from existing conditions. Site-specific interconnection-related actions would continue to be evaluated under TVA's existing NEPA procedures.	Potential impacts on archaeological sites, historic structures, or other cultural resources would be evaluated through site-specific review and consultation under Section 106 of the National Historic Preservation Act, including programmatic agreements, as applicable. TVA would coordinate with State Historic Preservation Offices, federally recognized tribes, and other consulting parties, as appropriate. TVA would resolve adverse effects on historic properties through avoidance, minimization, or mitigation, using measures agreed upon with consulting parties.
Hazardous Materials and Solid and Hazardous Waste	No change from existing conditions. Site-specific interconnection-related actions would continue to be evaluated under TVA's existing NEPA procedures.	Minor impacts could occur from the use, storage, transport, or disposal of fuels, oils, lubricants, construction materials, solid waste, or regulated wastes. Hazardous materials and wastes would be managed in accordance with applicable federal, state, and local requirements. Spill prevention, containment, response measures, recycling, reuse, and disposal at permitted facilities would minimize potential impacts.
Utilities and Service Systems	No change from existing conditions. Site-specific interconnection-related actions would continue to be evaluated under TVA's existing NEPA procedures.	Minor impacts to utilities and service systems could occur from temporary construction water use, wastewater needs, utility crossings, line relocations, or temporary service interruptions. Potable water and wastewater needs would generally be limited. TVA would coordinate with utility providers, avoid or minimize conflicts, and obtain applicable permits or approvals where needed.
Safety	No change from existing conditions. Site-specific interconnection-related actions would continue to be evaluated under TVA's existing NEPA procedures.	Minor safety-related impacts could occur during construction, operation, and maintenance due to heavy equipment, electrical work, traffic, vegetation clearing, fire risk, hazardous materials, or work near energized facilities. TVA would minimize risks through compliance with applicable safety standards, National Electrical Safety Code requirements, Occupational Safety and Health Administration requirements, traffic control, construction safety procedures, and site-specific safety planning.
Socioeconomics	No change from existing conditions. Site-specific interconnection-related actions would continue to be evaluated under TVA's existing NEPA procedures.	Minor socioeconomic impacts could occur from temporary construction employment, local spending, traffic, noise, or short-term disruption near construction areas. New transmission infrastructure would not be expected to displace community facilities or substantially affect population, housing, employment, or public services. Effects would generally be temporary and localized.

Key: NEPA = National Environmental Policy Act

2.4 IDENTIFICATION OF ROUTINE AND NONROUTINE MITIGATION MEASURES

This section summarizes the standard practices, BMPs, environmental commitments, and mitigation measures that TVA would use, as applicable, to avoid, minimize, or reduce adverse effects from interconnection-related actions evaluated in this PEIS. TVA's analysis of potential impacts assumes implementation of applicable routine measures, including TVA construction and maintenance BMPs, permit conditions, resource-specific avoidance and minimization measures, and compliance with applicable federal, state, and local requirements. Based on project-specific information developed through the ESC, TVA would confirm whether each proposed interconnection-related action is consistent with the facility attributes and environmental bounding values identified in Table 2-1 and Table 2-2. If a proposed interconnection-related action exceeds the applicable bounding criteria or may affect resources in a manner not addressed in this PEIS, TVA would conduct additional site-specific NEPA review, permitting, consultation, and mitigation as appropriate.

2.4.1 Standard Practices and Routine Measures

All proposed interconnection-related actions would be subject to applicable standard practices, routine BMPs, permit conditions, and resource-specific avoidance and minimization measures. TVA's analysis assumes that these routine measures would be implemented, as applicable, to avoid or reduce adverse effects from construction, operation, and maintenance. During a project-specific screening, TVA would use the ESC to identify the measures that would apply to each action area. Common routine measures are summarized below and incorporated into the analysis in Chapter 3.

Soil Erosion and Surface Water

- Low ground-pressure-type equipment would be used in specified locations (such as areas with soft ground) to reduce the potential for environmental impacts.
- Measures would be implemented to minimize erosion during site preparation.
- A project-specific SWPPP would be prepared, if required, before the start of construction and would identify erosion and sediment control measures appropriate for the action area.
- Perennial, intermittent, and ephemeral streams that could be affected by construction would be protected through implementation of applicable BMPs, including measures identified in the project SWPPP.
- Equipment washing and dust control discharges would be handled in accordance with BMPs described in the SWPPP for water-only cleaning and/or the applicable state SWPPP guidance manual for industrial activities to minimize construction impacts to surface waters.
- Erosion and sediment control measures, such as sediment barriers, stabilized construction entrances, temporary seeding, mulch, and buffer zones around streams where practicable, would be implemented to minimize sediment transport from disturbed areas.

Air Quality

- Fugitive dust produced from construction activities would be controlled by BMPs (e.g., wet suppression) as required by state and local agencies.
- Construction equipment with diesel emission controls and cleaner fuel (ultra-low sulfur diesel) would be used when possible.
- Truck and construction equipment emissions would be minimized, where practicable, through use of properly maintained equipment, idling restrictions, and up-to-date emission control technologies.

Vegetation

- Disturbed construction areas would be stabilized and revegetated, as appropriate, with native and/or noninvasive vegetation consistent with Executive Order (EO) 13112.
- Vegetation clearing would be limited to the area needed for construction, operation, and maintenance of the interconnection-related action and would be conducted in accordance with applicable TVA transmission specifications and BMPs.
- When pesticides or herbicides are used, they would be applied in accordance with manufacturers' recommendations and applicable TVA practices. To the extent practicable, TVA would use the least toxic effective product for the target species, with product selection evaluated based on site-specific conditions.

Hazardous Materials and Solid Waste

- Solid and hazardous wastes generated during construction, operation, and maintenance would be managed, recycled, or disposed of in accordance with applicable federal, state, and local requirements and TVA procedures.
- Appropriate spill prevention, containment, and disposal requirements for hazardous wastes would be implemented to protect construction workers, the public, and the environment in accordance with applicable state and federal regulations.
- Equipment refueling and maintenance operations would be conducted at designated locations using applicable BMPs.

Safety

- Construction would include customary industrial safety standards, applicable BMPs, and jobsite safety plans to maintain worker and public safety.

2.4.2 Nonroutine Mitigation Measures

As part of project-specific screening, TVA would identify any nonroutine mitigation measures needed for a proposed interconnection-related action. These measures would be applied, as appropriate, when the action area includes sensitive resources, when impacts cannot be avoided through routine BMPs, or when additional resource-specific review, permits, consultation, or approvals are required.

Floodplain Management

- TVA would evaluate whether permanent facilities, temporary workspaces, laydown areas, access roads, fill, or other components of an action area would be located within a 100-year floodplain, or the 500-year floodplain for critical actions, or otherwise subject to floodplain requirements. Where practicable, these features would be located outside the 100-year floodplain. If avoidance is not practicable, TVA would complete the appropriate floodplain review and implement measures to minimize adverse effects consistent with EO 11988, Floodplain Management.

Wetlands and Surface Waters

- TVA would determine whether wetlands, streams, rivers, reservoirs, or other aquatic resources are present within the action area and whether the proposed interconnection-related action could adversely affect those resources. Wetlands and surface waters would be avoided where practicable. Any unavoidable impacts would be subject to applicable permitting, consultation, and mitigation requirements, including those under Sections 401 and 404 of the CWA, applicable state regulations, and EO 11990.

Threatened and Endangered Species

- TVA's commitment to abiding by the Endangered Species Act (ESA) and state-level regulations would minimize impacts to aquatic and terrestrial species that are federally or state-listed. If tree clearing, ground disturbance, work near caves, sinkholes, cedar glades, streams, wetlands, bridges, buildings, or other habitat features could affect federally or state-listed species or other protected species, TVA would conduct additional review, surveys, or consultation, as appropriate. Measures may include seasonal work restrictions, avoidance of sensitive or unique terrestrial habitat, protection of aquatic habitat, sediment and spill controls, lighting controls, or other species-specific conservation measures identified through the ESC or consultation process.
- For actions with the potential to impact federally listed bats, TVA has committed to implementing specific conservation measures in accordance with TVA's ESA Section 7 Programmatic Bat Consultation (TVA 2024c). If site-specific interconnection-related actions warrant, a TVA Bat Strategy Project Review Form would be completed prior to carrying out those actions and any conservation measures identified during the review would be implemented.
- Under the bounding condition, project activities would comply with the Migratory Bird Treaty Act (MBTA) and Bald and Golden Eagle Protection Act (BGEPA), as construction activities would be at least 660 feet away from any known protected species nests or would comply with applicable MBTA and BGEPA permitting requirements.

Cultural and Historic Resources

- TVA would evaluate the interconnection-related action area for potential effects to historic properties in accordance with Section 106 of the National Historic Preservation Act (NHPA) and TVA’s applicable cultural resources procedures or programmatic agreements (PAs). If the interconnection-related action has the potential to affect archaeological sites, historic architectural resources, traditional cultural properties, or other historic properties, TVA would consult with the appropriate State Historic Preservation Officer (SHPO), federally recognized tribes, and other consulting parties, as appropriate. If adverse effects cannot be avoided, TVA would resolve those effects through appropriate mitigation measures developed in consultation with the consulting parties.

Visual Resources

- TVA would consider visual effects during project-specific reviews when proposed transmission structures, substations, switchyards, access roads, lighting, or other facilities could be visible from sensitive viewpoints or could create a noticeable contrast with the surrounding setting. Where warranted, TVA would consider practicable mitigation measures such as siting adjustments, use of existing rights-of-way or disturbed areas, minimizing vegetation clearing, downward-directed lighting, or vegetative screening.

2.5 THE PREFERRED ALTERNATIVE

Alternative B – Action Alternative is TVA’s preferred alternative because it would establish a consistent programmatic framework for evaluating the bounded environmental effects of interconnection-related actions needed to support TVA’s generator interconnection processes. Under this alternative, TVA would use the PEIS, ESC, siting criteria, and bounding analysis to determine whether future tiered interconnection-related actions are within the environmental bounds evaluated in this PEIS or require additional site-specific NEPA review. This approach would support more efficient environmental review, improve schedule certainty for interconnection-related actions, and preserve TVA’s ability to conduct additional project-specific analysis, permitting, consultation, and mitigation when warranted.

CHAPTER 3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the baseline environmental conditions, or affected environment, for resources within the TVA PSA and the potential effects, or environmental consequences, that could result from implementation of the alternatives described in Chapter 2. Because specific interconnection-related actions have not yet been identified, this PEIS evaluates effects programmatically using the bounding criteria described in Chapter 2 and the screening framework that would be applied to future action areas. Resource-specific criteria for evaluating the potential environmental impacts of the No Action Alternative and Action Alternative are described in the following sections.

For purposes of this PEIS, an action area for a future interconnection-related action would include the proposed facility footprint, transmission right-of-way, access roads, temporary workspaces, laydown areas, and other areas where direct or indirect environmental effects could occur. Action areas would be defined during project-specific screening using the ESC. Environmental consequences would be evaluated based on the construction, operation, and maintenance activities associated with each action area.

Impacts may apply to natural, aesthetic, historic, cultural, and socioeconomic resources within the TVA PSA, future action areas, and surrounding areas where direct or indirect environmental effects could occur. Impact severity depends on relative magnitude, intensity, and resource sensitivity. The context and intensity of potential environmental impacts are described in terms of duration, magnitude, whether they are direct or indirect, and whether they are adverse or beneficial, as summarized below:

- Short-term or long-term: Short-term impacts are those that would occur only for a limited, finite time with respect to the interconnection-related action. Long-term impacts are those that would be persistent and chronic throughout the life of the action or would last years after an impact producing activity occurred.
- Less-than-significant (no impact, minor, moderate) or significant, as defined in Section 2.3.
- Direct or indirect: Direct impacts are those that would occur as a result of and at the same time and place as the interconnection-related action. Indirect impacts are those that would be caused by the interconnection-related action but would occur at a different time or place.
- Adverse or beneficial: An adverse impact would cause unfavorable or undesirable outcomes on the human-made or natural environment. A beneficial impact would cause positive outcomes on the human-made or natural environment.

The impact analysis also considers effects associated with reasonably foreseeable future actions that would have a close causal relationship to interconnection-related action areas. Potential effects could result from other actions occurring at the same time and in proximity to a future action area. Because specific action areas have not yet been identified, specific reasonably foreseeable future actions with a close causal relationship also cannot be identified at this programmatic stage. For all alternatives, TVA assumes that reasonably foreseeable future actions in the vicinity of future action areas would comply with applicable local, state, and federal regulations and permit requirements, and that BMPs would be implemented in accordance with the applicable environmental resource. Any reasonably foreseeable future actions that may affect environmental resources would be addressed during separate site-specific analyses, as appropriate.

TVA would use the ESC to review each proposed interconnection-related action and determine whether that action is within the scope of the PEIS bounding analysis. During project-specific screening, TVA would evaluate the action area, facility attributes, construction activities, potential environmental effects, and applicable permits or consultations. If TVA determines that the proposed interconnection-related action would remain within the PEIS bounding criteria and would not have the potential for effects beyond those addressed programmatically, the findings of this PEIS with respect to NEPA compliance would apply. If TVA determines that the proposed interconnection-related action would exceed the bounding criteria or may affect sensitive resources in a manner not addressed in this PEIS, the action would be subject to additional site-specific environmental review consistent with TVA NEPA procedures.

3.1 LAND USE AND PRIME FARMLAND

3.1.1 Affected Environment

3.1.1.1 Regulatory Framework for Land Use and Prime Farmland

Land use within the TVA PSA is regulated through a combination of federal, state, and local authorities. The TVA Act gives TVA authority to regulate the use of lands it manages, as well as development across, along, or in the Tennessee River or its tributaries. Various state laws and local ordinances also regulate land use, although portions of the TVA PSA are not subject to local zoning ordinances.

The Farmland Protection Policy Act (FPPA) (7 U.S. Code [USC] 4201 et seq.) promotes the conservation of important farmland soils and discourages the conversion of prime farmland, unique farmland, and farmland of statewide or local importance to nonagricultural uses. The FPPA requires federal agencies to evaluate potential effects on these farmland resources before authorizing or undertaking actions that would permanently convert farmland to uses incompatible with agriculture.

3.1.1.2 Land Use

As described in TVA’s 2026 IRP FEIS (TVA 2026c), major land uses in the TVA region include forested land, agricultural land, and developed land, including urban, suburban, and industrial development. The greatest land use change since 1982 has been the expansion of developed land, which nearly doubled because of urban and suburban growth in much of the TVA PSA. The rate of development was highest during the 1990s and early 2000s and slowed in the late 2000s (TVA 2026c).

Land cover data from the National Land Cover Dataset are summarized in Table 3-1 (U.S. Department of Agriculture [USDA] 2024). Based on these data, forested land is the dominant land cover type in the TVA PSA, comprising approximately 45 percent of the area. Farmland and cropland, including pasture/hay and cultivated crops, comprise approximately 33 percent of the TVA PSA, and developed land comprises approximately 11 percent.

Forestland is predicted to decrease between 1997 and 2060 in most counties in the TVA PSA, with several counties in the vicinity of Memphis, Nashville, Huntsville, Chattanooga, Knoxville, and the Tri-Cities area of Tennessee predicted to lose more than 25 percent of forestland (Wear and Greis 2013). Loss of forestland within the TVA PSA is primarily a result of increasing urbanization and development.

Timberland is unreserved forestland that is producing or capable of producing more than 20 cubic feet of merchantable wood per acre per year (USFS 2025). As described in TVA’s 2026 IRP FEIS (TVA 2026c), approximately 50 percent of the forestland in the TVA region is classified as timberland. Approximately 13 percent of timberland is publicly owned, including national forests, state and local lands, and other federal lands. Public lands are addressed in Section 3.14, Natural Areas, Parks, and Recreation. Corporations and noncorporate landowners privately own the remaining timberland.

Agriculture is a major land use and industry within the TVA PSA. Average farm sizes range from approximately 170 to 328 acres and generally increased in size between 2017 and 2022 (USDA 2024). Agricultural production varies across the region. Compared with farms in the southern and western portions of the TVA PSA, farms in the eastern and northern portions tend to be smaller and receive a higher proportion of income from livestock sales than from crop sales. Regionally, major crops by land area include forage crops, soybeans, wheat, corn, and cotton. Major agricultural commodities by sales include cattle and calves, poultry and eggs, grains and beans, cotton, and nursery products (TVA 2026c).

Shrubland/grassland, wetlands, open water, and barren land make up the remaining land cover types in the TVA PSA (Table 3-1).

Table 3-1. Land Cover in the TVA PSA

Land Cover Description	Area (acres)	Percentage of Total Land Cover in TVA PSA
Forested Land ^(a)	22,238,003	45.3
Farmland/Cropland ^(b)	16,013,328	32.6
Developed Land ^(c)	5,538,718	11.3
Shrubland/Grassland ^(d)	1,331,296	2.7
Wetlands ^(e)	2,765,027	5.6
Open Water	1,116,680	2.3
Barren Land	103,990	0.2
TVA PSA Land Cover Total	49,107,042	–

Source: USDA 2024

Notes:

(a) Includes deciduous forest, evergreen forest, and mixed forest landcover types.

(b) Includes pasture/hay and cultivated crops landcover types.

(c) Includes developed, open space; developed, low intensity; developed, medium intensity; and developed, high intensity landcover types.

(d) Includes shrub/scrub and grassland/herbaceous landcover types.

(e) Includes woody wetlands and emergent herbaceous wetlands land cover types.

3.1.1.3 Prime Farmland

The FPPA and its implementing regulations at 7 CFR 658 recognize the importance of prime farmland and other important farmland soils and require federal agencies to evaluate effects before permanently converting such lands to nonagricultural uses.

Prime farmland soils have the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. These soils can produce high yields with minimal expenditure of energy and economic resources. In general, prime farmland soils have an adequate and dependable water supply, favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt and sodium content, and few or no rocks. Prime farmland soils are permeable to water and air, are not excessively erodible or saturated for extended periods, and are protected from frequent flooding.

Prime farmland soils within the TVA PSA were identified using the USDA Natural Resource Conservation Service (NRCS) Web Soil Survey (NRCS 2025) and are summarized in Table 3-2. Approximately 18.5 million acres (36.0 percent) of the TVA PSA consist of soils mapped as prime farmland, farmland of statewide or local importance, or prime farmland if drained, irrigated, or protected from flooding during the growing season.

Prime farmland soils may occur near existing or proposed interconnection-related facilities. TVA also routinely operates transmission lines across agricultural lands, including lands that may contain prime farmland soils. In many cases, agricultural uses can continue within transmission line rights-of-way, subject to operational and safety requirements.

Table 3-2. Acreage of Prime Farmland Within the TVA PSA

Prime Farmland	Area (acres)	Percentage of TVA PSA
Not Prime Farmland	32,838,780	64.0
Prime Farmland Classifications		
All Areas are Prime Farmland	12,085,574	23.6
Farmland of Statewide Importance	3,531,374	6.9
Farmland of Local Importance	326,923	0.6
Prime Farmland if Drained, Irrigated, or Protected from Flooding During Growing Season	2,489,673	4.9
Total Prime Farmland (all Classifications)	18,433,544	36.0
Total TVA PSA	51,272,325	–

Source: NRCS 2025

3.1.2 Environmental Consequences

3.1.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, TVA would not establish a programmatic bounding analysis and ESC to review interconnection-related actions. TVA would continue to use the standard project-specific NEPA process to evaluate interconnection-related actions. Therefore, there would be no direct land use or prime farmland effects at the programmatic level, but it could indirectly affect TVA's ability to process interconnection requests efficiently and consistently. Impacts from future interconnection-related actions on land use or prime farmland would remain project-specific and would be evaluated in separate NEPA reviews.

3.1.2.2 Alternative B – Action Alternative

Under the Action Alternative, interconnection-related actions covered by the programmatic analysis could include up to 610 acres of ground disturbance for transmission line rights-of-way, up to 80 acres for substations and switchyards, and up to 50 acres for laydown areas, if required.

Construction of interconnection-related actions could result in temporary impacts and limited permanent conversion of existing land uses. Most impacts associated with development of transmission line rights-of-way and temporary laydown areas would be short term. Following construction, transmission line rights-of-way would generally be restored or revegetated and could return to compatible preconstruction land uses, such as agriculture, managed vegetation, or other uses consistent with transmission line operation and safety requirements. Temporary laydown areas would also generally be restored unless they are converted to a long-term use. Permanent land use conversion would occur primarily where substations, switchyards, access roads, or other permanent facilities are constructed.

TVA would consider applicable land use plans and zoning ordinances during site-specific review. Because zoning and land use requirements vary across the TVA PSA and may not apply uniformly, compatibility with local requirements would be evaluated based on the action area. TVA generally seeks to design and site interconnection-related actions in a manner consistent with local zoning regulations and land use plans, where practicable. However, as a federal entity, TVA is not subject to local zoning or land use requirements. Therefore, in some cases, proposed interconnection-related actions may be located in areas where the proposed use is not compatible with local zoning regulations or land use plans.

Prime farmland soils could be present within transmission line rights-of-way, substation or switchyard sites, access roads, or laydown areas. Construction within transmission line rights-of-way could temporarily disturb agricultural land or prime farmland soils; however, agricultural production would typically be able to continue within transmission line rights-of-way after construction, subject to operational and safety restrictions. Therefore, transmission line construction and operation would generally not result in irreversible conversion of prime farmland where agricultural use can continue.

Permanent facilities, such as substations, switchyards, and associated access roads, could result in permanent conversion of prime farmland soils if such facilities are sited on farmland subject to FPPA. TVA would determine on a case-by-case basis whether prospective action areas contain prime farmland or other important farmland soils. If FPPA review is required, TVA would complete the applicable NRCS Prime Farmland Conversion form and coordinate with the NRCS, as appropriate. If an action area receives a score exceeding 160, TVA would give further consideration to farmland protection and evaluate alternative sites, as appropriate.

Based on the use of the ESC and site-specific review, effects on land use and prime farmland under the Action Alternative would be minor at the programmatic level. Projects with the potential to exceed the assumptions evaluated in this PEIS or to result in greater land use or prime farmland impacts would require additional site-specific review and consultation, as appropriate.

3.2 GEOLOGY AND GROUNDWATER

3.2.1 Affected Environment

3.2.1.1 Geology

Physiographic Provinces

The TVA PSA includes portions of several physiographic provinces and sections that reflect the region's varied geologic history, terrain, and underlying bedrock conditions. These provinces, shown in Figure 3-1, generally trend northeast to southwest across the TVA PSA and include

upland plateaus, folded mountain belts, low-relief sedimentary plains, and major alluvial floodplains (U.S. Geological Survey [USGS] 2020):

- Appalachian Plateaus
 - Cumberland Mountain
 - Cumberland Plateau
- Blue Ridge
 - Southern Blue Ridge
- Coastal Plain
 - East Gulf Coastal Plain
 - Mississippi Alluvial Plain
- Interior Low Plateaus
 - Highland Rim
 - Nashville Basin
- Valley and Ridge
 - Tennessee

The TVA PSA includes portions of the Appalachian Plateaus Province, specifically the Cumberland Mountain and Cumberland Plateau sections. This province is an elevated region west of the Valley and Ridge Province and is characterized by relatively flat-lying, horizontal Paleozoic sedimentary rock layers (USGS 2020; Huth 2026). The Cumberland Plateau rises approximately 1,000 to 1,500 feet above adjacent provinces, while the Cumberland Mountains contain peaks exceeding 3,000 feet (TVA 2025a). Compared to adjacent provinces, the region has experienced limited folding and faulting and has been shaped largely by erosional processes (Huth 2026).

The Blue Ridge Province, including the Southern Blue Ridge section, extends into the easternmost portion of the TVA PSA. It is part of the Appalachian Mountain system formed during multiple Paleozoic orogenic events (USGS 2020; Huth 2026). This province exhibits rugged and highly variable terrain, with elevations ranging from approximately 1,000 feet in valley bottoms to more than 6,000 feet at higher peaks (TVA 2025a). The Blue Ridge is composed of primarily Proterozoic igneous and metamorphic rocks that were subsequently deformed through tectonic activity (Huth 2026).

The Coastal Plain Province, including the East Gulf Coastal Plain section, extends across much of the western and southwestern TVA PSA. This province is part of a broad, low-relief region formed by the accumulation of sediments along a passive continental margin (USGS 2020; Huth 2026). The terrain is generally flat to gently rolling, with low elevations and broad river valleys (TVA 2025a).

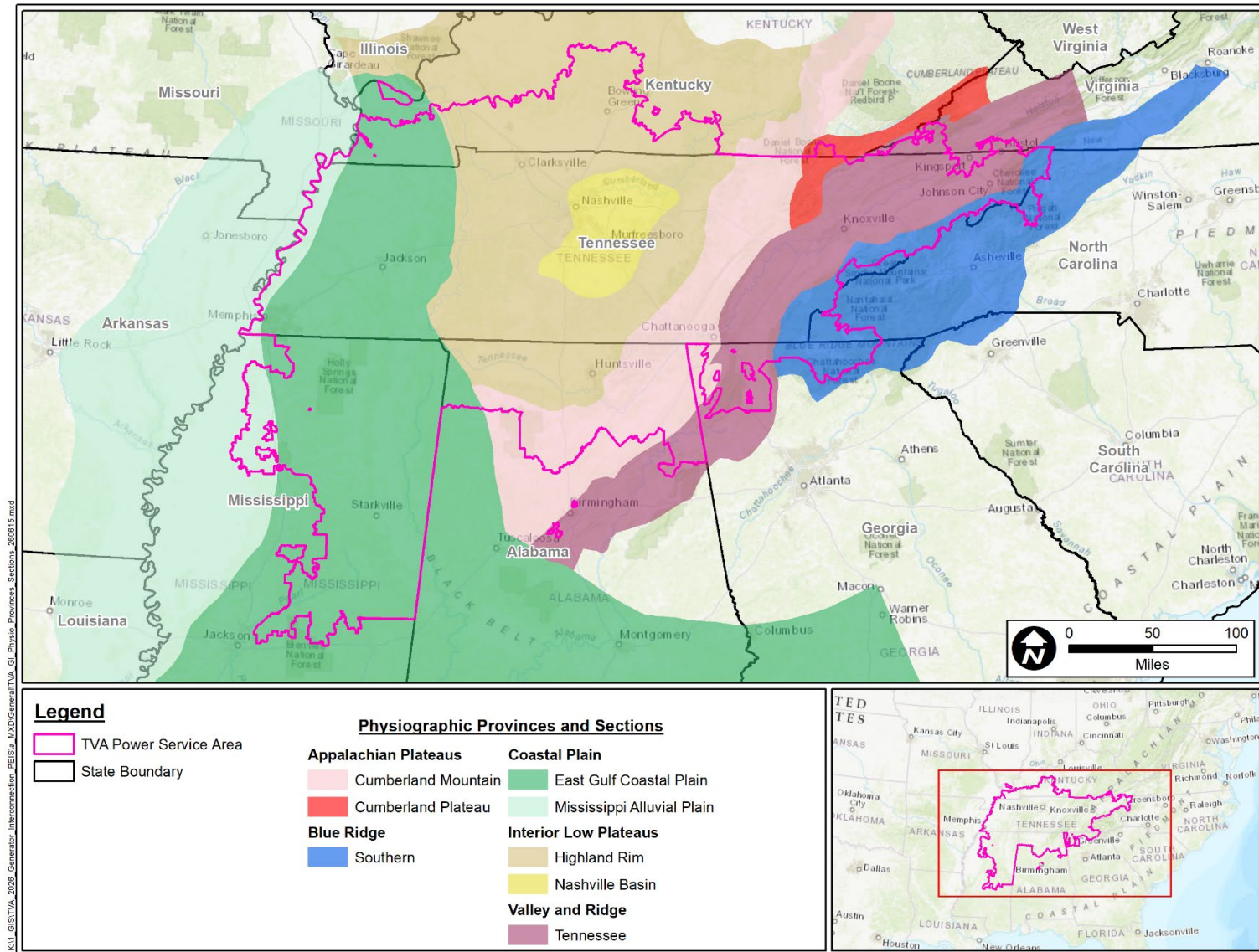


Figure 3-1. Physiographic Provinces and Sections of the TVA PSA

The Mississippi Alluvial Plain extends along the western edge of the TVA PSA and consists of a broad, low-lying floodplain associated with the Mississippi River system (USGS 2020; Huth 2026). This section is characterized by very low elevations, minimal relief, and flat terrain shaped by ongoing fluvial deposition processes (TVA 2025a).

The Interior Low Plateaus Province includes the Highland Rim and Nashville Basin sections within the TVA PSA. This province is characterized by relatively low relief compared to surrounding regions and is underlain predominantly by flat-lying Paleozoic sedimentary rocks, particularly limestone (Huth 2026). The Highland Rim forms a dissected plateau, with rolling-to-hilly terrain, while the Nashville Basin is a lower-lying area, with elevations approximately 200 feet below the surrounding Highland Rim (TVA 2025a). Karst features are common throughout both sections (Huth 2026).

The Valley and Ridge Province, specifically the Tennessee section, is located between the Blue Ridge and Appalachian Plateaus Provinces. This province is characterized by a series of parallel ridges and valleys that trend northeast to southwest (USGS 2020; Huth 2026). These landforms are underlain by folded and faulted Paleozoic sedimentary rocks, with more resistant sandstones forming prominent ridges and less resistant shales and other sedimentary units forming the intervening valleys (Huth 2026). Ridge elevations commonly reach up to approximately 3,000 feet, creating a distinct, repetitive topographic pattern (TVA 2025a).

Geologic Hazards

Karst topography forms through the dissolution of carbonate rocks such as limestone and dolomite (USGS 2021). Karst is common in portions of the TVA PSA, particularly within the Valley and Ridge and Interior Low Plateaus Provinces, and is characterized by features such as sinkholes, caves, springs, and subsurface drainage systems.

The TVA PSA is subject to moderate seismic activity, with peak ground acceleration values generally at or above 0.1 gravitational pull (g), requiring structural design considerations for seismic resilience where applicable (TVA 2025b).

Based on the U.S. Geological Survey Quaternary Fault Viewer, mapped Quaternary features within the TVA PSA are primarily concentrated near the western portion of the PSA (USGS 2026). These include the Reelfoot scarp and associated structures of the New Madrid Seismic Zone along the western border of Tennessee, as well as Quaternary liquefaction features associated with the Wabash Valley Seismic Zone along the western border of Kentucky. No mapped Quaternary faults occur beneath most of the interior TVA PSA; however, proximity to these seismically active regions may be relevant to future project planning and design.

3.2.1.2 Groundwater

Groundwater resources in the TVA PSA are protected through federal and state programs that regulate drinking water sources, wellhead protection, underground injection, and potential sources of contamination. The Safe Drinking Water Act (SDWA) of 1974 established the Sole Source Aquifer Protection Program, which applies to aquifers that provide at least 50 percent of

the drinking water for the overlying area. No sole source aquifers are present within the TVA PSA (EPA 2026a).

The SDWA also established the Wellhead Protection Program, a pollution prevention and management program implemented by states to protect underground sources of drinking water. In addition, the SDWA created the Underground Injection Control Program to protect underground sources of drinking water from contamination associated with fluids injected into wells. Other federal environmental laws, including the Resource Conservation and Recovery Act (RCRA); the Comprehensive Environmental Response, Compensation, and Liability Act; and the Federal Insecticide, Fungicide, and Rodenticide Act also include provisions that support groundwater protection.

Regional Aquifers

Four primary aquifer types are present in the TVA PSA: carbonate rock, sandstone, semi-consolidated sand, and unconsolidated sand and gravel aquifers (TVA 2025b). Variations in their geologic composition influence how groundwater is stored and transmitted within each system.

Carbonate aquifers, such as those formed in limestone and dolomite, contain abundant carbonate minerals, such as calcite, that can dissolve when exposed to slightly acidic groundwater (TVA 2025b). This process enlarges fractures and creates cavities within the rock, allowing groundwater to move readily and forming karst features such as sinkholes and caves where geologic conditions allow (TVA 2025b). Wells in Mississippian and Ordovician carbonate aquifers are typically 50 to 200 feet deep, or up to about 250 feet, with common yields ranging from about 5 to 50 gallons per minute (GPM), although higher yields up to 400 GPM may occur (TVA 2025a). Water from these aquifers is generally hard, and elevated concentrations of iron, sulfide, and sulfate can occur in some areas.

Sandstone aquifers primarily depend on fractures, joints, and bedding planes for groundwater movement because compaction and cementation during formation reduce the availability of pore space between grains (TVA 2025b). These aquifers typically have lower-to-moderate storage capacity relative to carbonate systems, although storage potential can increase with aquifer size. Pennsylvanian sandstone wells are commonly 100 to 200 feet deep, or up to 250 feet, with yields generally ranging from 5 to 50 GPM and occasionally reaching 200 GPM (TVA 2025a). Water quality can be variable, with elevated iron, dissolved solids, sulfide, or sulfate concentrations reported in some locations.

Semi-consolidated sand aquifers store groundwater within pore spaces between sand grains, often mixed with layers of silt, clay, and minor carbonate material (TVA 2025b). These systems generally provide moderate to high storage and can occur at both local and regional scales. Tertiary and Cretaceous sand aquifers are typically deeper, ranging from about 100 to more than 1,500 feet, and can produce moderate to high yields, commonly between 50 and 1,000 GPM and locally exceeding 2,000 GPM (TVA 2025a). Groundwater quality is generally suitable for use but may contain elevated iron concentrations in certain areas.

Unconsolidated sand and gravel aquifers also store groundwater in intergranular pore spaces but are usually unconfined, meaning the water table forms their upper boundary (TVA 2025b). These aquifers tend to have high storage capacity, though the presence of finer materials such as silt and clay can reduce their ability to transmit water. Quaternary alluvial aquifers are typically shallow, about 10 to 75 feet deep, or up to 100 feet, with common yields of 20 to 50 GPM and maximum yields reaching approximately 1,500 GPM (TVA 2025a). Water quality is generally suitable for use, although high iron concentrations may occur locally.

Aquifers in the TVA PSA generally correspond with the major physiographic provinces shown in Figure 3-1. In order of increasing geologic age, the primary aquifers within the PSA include the following (TVA 2025a):

- Quaternary alluvium in the floodplains of major rivers, including the Mississippi River.
- Tertiary and Cretaceous sand aquifers of the Coastal Plain Province.
- Pennsylvanian sandstone units primarily within the Cumberland Plateau section.
- Mississippian, Silurian, and Devonian carbonate rocks of the Highland Rim section.
- Ordovician carbonate rocks of the Nashville Basin section.
- Cambrian-Ordovician carbonate rocks within the Valley and Ridge Province.
- Cambrian-Precambrian metamorphic and igneous crystalline rocks of the Blue Ridge Province.

Groundwater Quality

Groundwater quality in the TVA PSA is influenced by the chemical characteristics of the aquifer materials through which groundwater moves (TVA 2025a). Precipitation that enters an aquifer typically has low concentrations of dissolved solids and is slightly acidic. As groundwater moves through the subsurface, it interacts with aquifer minerals, which can increase dissolved solids and alter water chemistry. Groundwater quality may also be affected by external sources, including chemical spills, improper waste storage, and atmospheric deposition of pollutants (TVA 2025a).

Groundwater Usage

Groundwater use in the TVA PSA is lower than surface water use but remains an important source for public supply, particularly in areas where surface water availability is limited (TVA 2025a and 2025b). In 2020, groundwater withdrawals accounted for approximately 186 million gallons per day (MGD), or about 2 percent of total water use in the Tennessee River watershed (Sharkey and Springston 2022). Groundwater use varies across the region based on aquifer productivity, water quality, and demand, with the greatest reliance occurring in West Tennessee and northern Mississippi.

Groundwater is used primarily for public supply and also supports irrigation, industrial, mining, livestock, and aquaculture uses. In 2020, groundwater withdrawals for public supply totaled approximately 122 MGD, with about two-thirds drawn from sand aquifers in the Mississippi

Embayment and Southeastern Coastal Plain (Sharkey and Springston 2022). Regionally, groundwater accounted for about 17.6 percent of public supply withdrawals and 27.2 percent of irrigation withdrawals, indicating that groundwater is proportionally more important for these uses than for overall water demand (Sharkey and Springston 2022).

Many rural areas within the TVA PSA rely on private wells and springs where public water systems are not available. Although groundwater continues to be an important water source in these areas, regional groundwater use has generally declined since the mid-1990s and reached one of its lowest reported levels in 2020 (Sharkey and Springston 2022).

3.2.2 Environmental Consequences

3.2.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, TVA would not implement the programmatic approach for reviewing and facilitating generator interconnection-related actions. This alternative would not authorize construction or change the siting or design of any facilities; therefore, it would not result in direct or indirect effects on geologic materials or groundwater use or alter resources or groundwater conditions at the programmatic level. Future generator interconnection requests and associated transmission actions could still occur, but potential geology and groundwater impacts would continue to be evaluated through TVA's existing site-specific review and approval processes, as appropriate. Without a programmatic framework, TVA's ability to process interconnection requests efficiently and consistently could be affected.

3.2.2.2 Alternative B – Action Alternative

Under the Action Alternative, TVA would implement a programmatic framework for reviewing and approving future generator interconnection-related actions within the TVA PSA. Construction activities associated with these actions could result in localized disturbance of surficial geologic materials, shallow excavation, temporary increases in erosion potential, limited bedrock disturbance, and temporary encounters with shallow groundwater. Excavation depths would be limited to approximately 15 feet for substation components and up to approximately 20 feet for transmission infrastructure. Where pilings are needed to support transmission or substation components, they would be driven into the ground and would not be expected to expose surface activities to groundwater. Pilings would be constructed of re-enforced concrete or similar materials and would not be expected to affect groundwater quality.

Indirect effects could include localized changes in runoff and infiltration patterns, increased sediment transport to nearby drainage features, and the potential for groundwater contamination from accidental releases of fuels, lubricants, concrete washout, or other construction-related materials. If groundwater is encountered during construction activities, dewatering may be required. Dewatering would be limited to the extent necessary to lower groundwater locally within the construction footprint and would be conducted in accordance with applicable federal, state, and local groundwater protection requirements. Temporary and minor groundwater impacts would be avoided or minimized through implementation of BMPs, a SWPPP, and a Spill Prevention, Control, and Countermeasure plan, as applicable.

Through engineering design, siting, and project planning, TVA would avoid karst terrain, and associated features such as sinkholes and caves, to the extent practicable. Avoiding karst areas would minimize the potential for subsurface disturbance, impacts to sensitive karst features, and alteration of groundwater flow pathways. Potential impacts would be further avoided or minimized through standard construction practices, environmental protection measures, and applicable regulatory requirements. TVA BMPs (TVA 2022) would be implemented, as appropriate, and may include erosion and sediment controls, stormwater management, restoration of disturbed areas, proper material handling and storage, and spill prevention, containment, and response procedures. Stormwater discharges would be managed in accordance with applicable NPDES permit requirements.

Operation and maintenance activities would be unlikely to affect geology or groundwater except where maintenance requires additional ground disturbance or in the event of an accidental release.

With implementation of design avoidance measures, TVA BMPs, stormwater controls, and applicable regulatory requirements, impacts on geology and groundwater under the Action Alternative would be minor. Effects would generally be localized and temporary and would occur primarily during construction. Interconnection-related actions with the potential for effects beyond the assumptions evaluated in this PEIS would require additional site-specific environmental review.

3.3 SURFACE WATER

3.3.1 Affected Environment

3.3.1.1 Regulatory Framework for Surface Water

The Federal Water Pollution Control Act, commonly known as the CWA, is the primary law affecting water quality. It establishes standards for the quality of surface waters and prohibits the discharge of pollutants from point sources unless a NPDES permit is obtained. Section 404 of the CWA further prohibits the discharge of dredged or fill material into Waters of the United States, including many wetlands, unless authorized by a permit issued by the U.S. Army Corps of Engineers (USACE). In addition, Section 401 of the CWA requires applicants for federally issued permits to obtain a state water quality certification demonstrating that proposed activities would comply with applicable water quality standards and would not result in more than de minimis degradation of state waters.

The seven states within the TVA PSA have enacted laws regulating water quality and implementing the CWA. As part of this implementation, the states classify water bodies according to their designated uses and establish water quality criteria specific to those uses. Each state has also issued an antidegradation statement identifying specific conditions for regulated actions and is designed to maintain and protect existing uses and water quality conditions.

3.3.1.2 Surface Water Resources and Water Quality

Surface water resources within the TVA PSA include streams, rivers, lakes, reservoirs, tributaries, and associated watersheds. These resources support aquatic habitat, recreation, domestic and industrial water supply, agriculture, navigation, energy generation, waste assimilation, and other designated beneficial uses (TVA 2026c). Freshwater is generally abundant throughout the region, and surface water quality across the TVA PSA is generally rated from fair to good (TVA 2026f).

The PSA includes the Tennessee River Basin; most of the Cumberland River Basin; and portions of the Ohio, lower Mississippi, Green, Mobile, Pearl, Tombigbee, and Coosa River basins and subbasins. Watersheds within the PSA are shown in Figure 3-2 and are identified by Hydrologic Unit Code (HUC) 4 (USGS 2016). Surface waters collect, store, and convey precipitation from the surrounding landscape and may be influenced by hydrologically connected groundwater, including discharge from springs and other geologic features (USGS 2019).

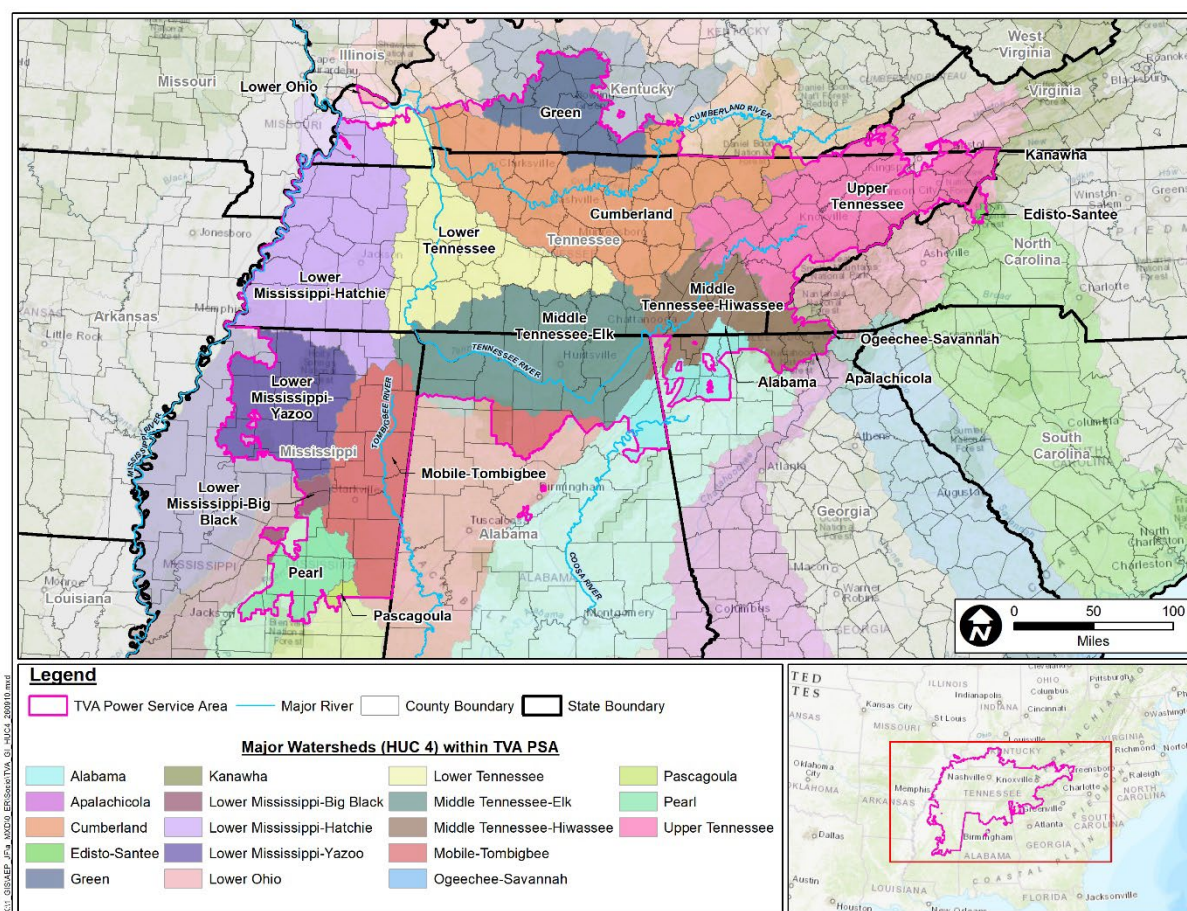


Figure 3-2. Major Watersheds (HUC 4) within the TVA PSA

Surface water quality and hydrologic conditions vary across the PSA based on land use, soil characteristics, precipitation patterns, groundwater interactions, erosion potential, and sediment transport (Anh et al. 2023). Water quality may be adversely affected by physical alterations to water bodies, increased sedimentation, nutrient enrichment, pathogen contamination, metal contamination, organic chemical pollutants, and changes to dissolved oxygen, pH, and flow regimes. These impacts are commonly associated with agricultural activities, urban development, wastewater discharges, hydrologic modifications, industrial activities, and legacy contamination sources (Tennessee Department of Environment and Conservation [TDEC] 2024a).

3.3.1.3 Major Watersheds in the TVA PSA

The following summaries provide regional context for major watersheds and subbasins within the TVA PSA where future interconnection-related actions could occur.

The Tennessee River watershed is the largest watershed in the TVA PSA and extends across portions of Tennessee, Alabama, Kentucky, Georgia, Mississippi, North Carolina, and Virginia (Figure 3-2). The Tennessee River Basin contains all except one of TVA's dams, and TVA-managed reservoirs influence flow patterns, water levels, water temperature, and aquatic conditions throughout the basin. Identified water quality concerns include contaminants in fish tissue, reduced biological integrity, low dissolved oxygen, flow modification, and thermal modification, which may contribute to impaired waters listings, fish consumption advisories, or limitations on designated uses (TDEC 2024b; Alabama Department of Environmental Management [ADEM] 2024).

TVA's system of locks, dams, and reservoirs regulates the Tennessee River and most major tributaries, supporting navigation, flood damage reduction, power generation, water supply, water quality management, and river-based recreation (TVA 2004). However, construction and operation of this system have substantially altered the physical environment, water quality, and natural daily, seasonal, and annual flow patterns of the Tennessee River and its tributaries (TVA 2026c).

TVA has implemented initiatives such as the Lake Improvement Plan, Reservoir Release Improvement Plans, and Reservoir Operations Study to reduce some of the effects of reservoir operations on aquatic habitats and organisms. Although these efforts have improved water quality and habitat conditions, the Tennessee River and its tributaries remain substantially altered by human activity (TVA 2026c).

The Cumberland River watershed drains portions of Kentucky and Tennessee and supports navigation, power generation, water supply, recreation, and aquatic life. Localized impairments are associated with bacteria, nutrients, sediment, and siltation, commonly related to agricultural runoff, cropland erosion, failing septic systems, and other nonpoint sources (KEEC 2024; TDEC 2024b).

The lower Ohio River watershed includes the Ohio River and associated tributary and backwater systems near the northern portion of the TVA PSA. Reported impairments include fish

consumption advisories related to legacy contaminants and localized pathogen, nutrient, and dissolved oxygen concerns (KEEC 2024).

The Green River watershed drains portions of Kentucky and Tennessee and includes areas influenced by karst topography, which can affect groundwater-surface water interactions and pollutant transport. Identified impairments include bacteria, nutrients, total suspended solids, and biological integrity, with common sources including agricultural, pastureland, and urban nonpoint runoff (KEEC 2024).

The Mississippi River watershed forms the western portion of the TVA PSA in Tennessee and includes water bodies influenced by municipal, industrial, and urban runoff from the Memphis area and surrounding communities. Reported impairments include low dissolved oxygen, nutrients, legacy contaminants, bacteria, sediment, and siltation (TDEC 2024b; MDEQ 2024).

The Mobile River Basin includes portions of Alabama, Georgia, Mississippi, and Tennessee and includes the Coosa, Tallapoosa, Cahaba, Black Warrior, and Tombigbee systems. Water quality conditions are influenced by forested, agricultural, and urban land uses and associated localized sources of nutrients, sediment, and other pollutants (USGS 2002).

The Pearl River Basin drains portions of Mississippi and Louisiana and includes the Pearl, Yockanookany, Strong, and Bogue Chitto Rivers and Ross Barnett Reservoir. Water quality conditions vary based on urban development, agricultural land use, hydrology, groundwater-surface water interactions, and local geologic conditions (USGS 1972).

The Tombigbee River Basin extends through portions of Mississippi and Alabama and is a major component of the Mobile River system. Water quality conditions are influenced by forested and agricultural land uses, localized urban development, navigation infrastructure, and associated nonpoint source runoff (ADEM 2025).

The Coosa River subbasin is part of the larger Alabama-Mobile River system and drains portions of Georgia, Tennessee, and Alabama. Water quality and aquatic conditions are influenced by reservoir operations, urban and agricultural runoff, shoreline development, and other watershed stressors (USGS 1997).

3.3.1.4 Surface Water Use

The TVA PSA includes much of the Tennessee River Basin, one of the most water-abundant regions in the United States. Although the basin accounts for about half of the PSA and has relatively high freshwater withdrawals per square mile, consumptive use is low because more than 95 percent of withdrawn water is returned to the system for downstream use (Sharkey and Springston 2022).

In 2020, total water withdrawals in the Tennessee River Basin averaged approximately 8,368 MGD, a 16.5 percent decrease from 2015 levels, primarily due to reduced thermoelectric withdrawals (Sharkey and Springston 2022). Surface water accounted for approximately 8,182 MGD, or 97.8 percent of total withdrawals. Return flows were estimated at 7,965 MGD, leaving

a net water demand of about 403 MGD. Surface water has remained the primary source for public supply in the basin, while total surface water withdrawals have generally declined since 2005.

Although surface water resources in the TVA PSA are generally plentiful, future climate conditions could affect water availability at local and regional scales and may require adaptive management by water-dependent sectors, including energy (EPRI and TVA 2009). More intense storm events could increase flood risk and streamflow variability, while more frequent or prolonged droughts in the Southeast could reduce water availability and affect water quality.

3.3.2 Environmental Consequences

3.3.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, TVA would not adopt the programmatic screening framework for generator interconnection-related actions. This alternative would not authorize construction or change the siting or design of any facilities; therefore, it would not result in direct or indirect effects on surface waters at the programmatic level. Future generator interconnection requests and associated transmission actions could still occur, but potential surface water impacts would continue to be evaluated through TVA's existing site-specific review and approval processes, as appropriate. Without a programmatic framework, TVA's ability to process interconnection requests efficiently and consistently could be affected.

3.3.2.2 Alternative B – Action Alternative

Under the Action Alternative, TVA would implement a programmatic framework for reviewing and approving future generator interconnection-related actions. Because the locations, designs, and construction methods for future actions are not known at this programmatic stage, potential effects on surface water resources are evaluated at a broad level and would be further considered during subsequent site-specific environmental reviews.

Construction, operation, and maintenance of future interconnection-related actions could affect surface water resources where activities occur in or near streams, rivers, reservoirs, wetlands, or other jurisdictional waters. Potential effects could include localized erosion and sedimentation, temporary increases in turbidity, stormwater runoff from disturbed areas, minor alterations to drainage patterns, temporary disturbance at stream crossings, and temporary water withdrawals where water is needed for construction activities beyond routine dust suppression or other standard practices. The extent of these effects would depend on site-specific conditions, including proximity to surface waters, topography, soil characteristics, existing land disturbance, the amount of vegetation clearing or grading required, and the timing and duration of construction.

TVA's ESC process would be used to identify surface waters and other aquatic resources that could be affected by future actions, determine whether additional water use would be required, and identify applicable avoidance, minimization, and permitting requirements. When projects are proposed on previously undisturbed sites or in areas with potential aquatic resources, field surveys and other resource evaluations would be completed, as appropriate, to

support site-specific review. TVA would seek to avoid surface water resources during project planning and design. Where impacts cannot be avoided, activities would be subject to applicable federal and state requirements, including CWA Section 401 water quality certification, Section 404 permitting, state water quality requirements, and NPDES requirements, as applicable.

Potential impacts would be avoided or minimized through TVA's standard construction practices, environmental protection measures, and applicable permit conditions. Construction activities that disturb 1 or more acres may require coverage under an NPDES construction stormwater permit. As required, a SWPPP would be prepared to identify sediment and erosion control BMPs appropriate for the action area. BMPs, including those described in *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities* (TVA 2022) and *Transmission Construction Guidelines Near Streams* (TVA 2026e), would be implemented, as appropriate. These BMPs could include erosion and sediment controls, stabilization of disturbed soils, protection of stream crossings, stormwater management, restoration of temporarily disturbed areas, and spill prevention, containment, and response procedures. Together, these measures would reduce the potential for sediment transport, pollutant discharge, and short-term water quality effects in nearby streams and other receiving waters.

With implementation of TVA's review process, standard BMPs, and applicable regulatory requirements, impacts on surface water resources under the Action Alternative would generally be temporary, localized, and limited in intensity. Interconnection-related actions with the potential for impacts beyond the assumptions evaluated in this PEIS would require additional site-specific NEPA review and appropriate avoidance and minimization measures. Therefore, impacts on surface water resources under the Action Alternative would be minor.

3.4 FLOODPLAINS

3.4.1 Affected Environment

Floodplains are relatively level areas adjacent to rivers, streams, lakes, reservoirs, and other water bodies that are subject to periodic inundation during flood events. Floodplains provide important hydrologic and ecological functions, including temporary storage and conveyance of floodwaters, reduction of downstream flood peaks, groundwater recharge, water quality improvement through sediment and nutrient retention, support for riparian vegetation, and habitat for fish and wildlife. These natural and beneficial floodplain values contribute to flood hazard reduction, watershed health, and ecosystem function (Federal Emergency Management Agency [FEMA] 2015; U.S. Department of Energy [DOE] 2026).

The area with a 1 percent annual chance of flooding is commonly referred to as the "100-year floodplain" or "Special Flood Hazard Area." The area with a 0.2 percent annual chance of flooding is commonly referred to as the "500-year floodplain." Flood hazard areas are generally identified through Flood Insurance Rate Maps (FIRMs) and the National Flood Hazard Layer (NFHL), which are developed and maintained by FEMA. Additionally, site-specific studies may

identify floodplains that are not mapped by FEMA, but that could warrant consideration by EO 11988.

Federal agencies are required to evaluate potential effects on floodplains and, where practicable, avoid, minimize, or mitigate adverse effects in accordance with EO 11988, *Floodplain Management*, and applicable federal floodplain management regulations (10 CFR 1022). These requirements are intended to reduce the risk of flood loss, minimize risks to human health and welfare, and preserve the natural and beneficial values of floodplains (EPA 1977).

The TVA PSA encompasses portions of seven southeastern states and includes an extensive network of rivers, streams, reservoirs, and associated floodplains. Major river systems include all of the Tennessee River drainage and portions of the Cumberland River drainage, Mobile River drainage (primarily the Coosa and Tombigbee Rivers), and larger eastern tributaries to the Mississippi River in Tennessee and Mississippi (Figure 3-2). Floodplains occur throughout the TVA PSA and are most extensive along the Tennessee River, major tributaries, reservoir shorelines, and broad alluvial valleys. Where available, floodplain boundaries are generally identified using FEMA FIRMs and the NFHL, supplemented by site-specific engineering or hydrologic information as needed (FEMA 2026). FEMA flood hazard mapping is the primary federal source for identifying areas subject to flood risk and supporting local floodplain management programs.

Floodplains within the TVA PSA support a range of natural and developed land uses, including forests, wetlands, agricultural lands, transportation corridors, utility infrastructure, commercial and industrial facilities, recreation areas, and residential development. These areas provide important ecosystem services by storing floodwaters, reducing erosion, maintaining channel stability, supporting groundwater recharge, improving water quality, and providing habitat connectivity for aquatic and terrestrial species. Development within floodplains could reduce natural flood storage capacity, alter hydrologic processes, increase erosion, and increase flood risks to nearby communities. Accordingly, federal agencies consider potential floodplain effects to ensure consistency with EO 11988 and applicable floodplain management requirements and to preserve natural and beneficial floodplain values where practicable.

In 1980, TVA published *Transmission Line Location in Floodplains Subclass Review* (TVA 1980), which identifies routine actions with mitigation and minimization BMPs that TVA employs when constructing transmission lines. Additionally, in 1981, TVA published *Class Review of Repetitive Actions in 100-Year Floodplain* (TVA 1981) that further identifies a broader class of routine actions undertaken by TVA, including utility lines and associated support structures, and provides additional BMPs to mitigate and minimize impacts to the natural and beneficial floodplain values.

3.4.2 Environmental Consequences

3.4.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, TVA would not adopt the programmatic screening framework for interconnection-related actions. This alternative would not authorize construction or change the siting or design of any facilities; therefore, it would not result in direct or indirect effects on floodplains at the programmatic level. Future generator interconnection requests and associated transmission actions could still occur, but potential floodplain impacts would continue to be evaluated through TVA's existing site-specific review and approval processes, as appropriate. Without a programmatic framework, TVA's ability to process interconnection requests efficiently and consistently could be affected.

3.4.2.2 Alternative B – Action Alternative

Under the Action Alternative, TVA would use the programmatic screening framework to evaluate interconnection-related actions and determine whether they are consistent with the environmental parameters analyzed in this PEIS. As a federal agency, TVA adheres to the requirements of EO 11988, which directs agencies to avoid, to the extent practicable, long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development where a practicable alternative exists. Because specific facilities and locations have not been identified at the programmatic level, potential effects on floodplains are described generally and depend on the location, design, and extent of ground disturbance associated with each future interconnection-related action.

Project components associated with future generator interconnection-related actions could be located within or near 100-year or 500-year floodplains. The 100-year floodplain would generally be the minimum floodplain of concern; however, for certain critical actions, the 500-year floodplain may be considered where even a slight chance of flooding would be too great (U.S. Water Resources Council 1978). Critical actions can include facilities producing hazardous materials (such as liquefied natural gas terminals), facilities whose occupants may be unable to evacuate quickly (such as schools and nursing homes), and facilities containing or providing essential and irreplaceable records, utilities, and/or emergency services (such as large power-generating facilities, data centers, hospitals, battery energy storage systems, or emergency operations centers).

Potential impacts from interconnection-related actions could include temporary or permanent disturbance, placement of fill, changes in ground surface elevation, construction of access roads or laydown areas, and installation of structures or supporting infrastructure. These activities could reduce flood storage capacity, alter drainage patterns, increase erosion, or affect the natural and beneficial values of floodplains if not appropriately sited, designed, or mitigated.

TVA's ESC review process would be used to identify floodplains that could be affected by future actions and to determine whether additional site-specific analysis would be required. Where practicable, project components and supporting infrastructure would be sited outside 100-year floodplains and at least one foot above the 100-year flood elevation. If floodplain involvement

could not be avoided, TVA would evaluate the interconnection-related action for consistency with EO 11988, 10 CFR 1022, applicable FEMA flood hazard mapping, state and local floodplain management requirements, and TVA's subclass review criteria for transmission line location in floodplains (TVA 1980), as appropriate. Consistent with TVA's floodplain management procedures, certain linear transmission facilities and related access improvements within the 100-year floodplain may be considered repetitive actions when they meet applicable class review or subclass review criteria and would not measurably increase flood elevations or alter flood-carrying capacity.

Implementation of applicable siting, design, avoidance, minimization, and permitting measures would reduce the potential for adverse effects on floodplains and their natural and beneficial values. Therefore, interconnection-related actions that meet the programmatic screening criteria would be expected to result in minor direct and indirect impacts on floodplains. Interconnection-related actions that do not meet the screening criteria or that have the potential for greater floodplain effects would require additional NEPA review before implementation.

3.5 WETLANDS

3.5.1 Affected Environment

Wetlands are areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation adapted for life in saturated soil conditions (40 CFR 230.3[t]). Wetlands include swamps, marshes, bogs, and similar areas and generally occur as transitional ecosystems between terrestrial and aquatic environments. Wetland determinations are based on the presence of three indicators: hydrophytic vegetation, hydric soils, and wetland hydrology (EPA 2026b; USACE 1987).

Wetlands are highly productive and biologically diverse ecosystems that provide important ecological functions and public benefits. These functions include flood storage, shoreline stabilization, water quality improvement, groundwater recharge and discharge, carbon storage, nutrient cycling, and habitat for fish, wildlife, and plants (EPA 2002; United States Fish and Wildlife Service [USFWS] 2026a; USGS 1996). Wetlands can also moderate streamflow by retaining and gradually releasing water, support aquatic and terrestrial biodiversity, and contribute to overall watershed health. EO 11990, Protection of Wetlands, directs federal agencies to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance their natural and beneficial values where practicable. Wetlands may also be regulated under federal and state requirements, including Sections 401 and 404 of the CWA.

Wetlands within the TVA PSA were characterized using the USFWS National Wetlands Inventory (NWI) dataset. NWI-mapped wetlands in the TVA PSA include palustrine, riverine, and lacustrine systems (USFWS 2025). Palustrine wetlands are nontidal wetlands dominated by trees, shrubs, persistent emergent vegetation, emergent mosses, or lichens and may include bottomland hardwood forests, shrub-scrub wetlands, beaver ponds, wet meadows, marshes, upland swamps, and bogs (Cowardin et al. 1979). Riverine and lacustrine systems are

associated with rivers, streams, reservoirs, and lakes and may include aquatic bed habitats containing floating or submerged vegetation.

Wetlands occur throughout the TVA PSA but are not evenly distributed across the landscape. They are generally more extensive in the southern and western portions of the PSA, where low-gradient landscapes, broad floodplains, reservoirs, and other surface water features provide conditions favorable for wetland development (TVA 2025a). Based on USFWS NWI data, riverine and lacustrine systems collectively account for approximately 66 percent of mapped wetlands within the TVA PSA, while palustrine forested/shrub wetlands account for approximately 31 percent and palustrine emergent wetlands account for approximately 3 percent (USFWS 2025). Because NWI data are based primarily on remote sensing and existing mapping, site-specific wetland delineations would be completed, as appropriate, during project-specific environmental review to verify wetland presence, boundaries, and jurisdictional status.

3.5.2 Environmental Consequences

3.5.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, TVA would not adopt the programmatic screening framework for interconnection-related actions. Therefore, the No Action Alternative would not directly result in wetland disturbance, wetland fill, vegetation clearing within wetlands, or changes to wetland hydrology at the programmatic level. Any future wetland effects associated with generator interconnection requests would occur only if specific interconnection-related actions proceed through separate site-specific review under TVA's standard NEPA process. Without a programmatic framework, TVA's ability to process interconnection requests efficiently and consistently could be affected.

3.5.2.2 Alternative B – Action Alternative

Under the Action Alternative, as part of its site-specific screening process, TVA would determine whether each proposed interconnection-related action is within the scope of the programmatic analysis. As part of project-specific screening with the ESC, TVA would identify wetlands within the action area, evaluate whether direct or indirect wetland impacts could occur, and determine whether the interconnection-related action would remain within the wetland-related bounding criteria evaluated in this PEIS or require additional site-specific NEPA review, permitting, consultation, or mitigation.

Wetland impacts would vary depending on the type, location, and extent of the interconnection-related action and the presence, condition, and regulatory status of wetlands in the action area. Sites containing wetlands would generally be less desirable for project implementation, and wetlands would be avoided where practicable. Unavoidable impacts on wetlands would be addressed through applicable avoidance, minimization, permitting, and mitigation requirements, including CWA Sections 401 and 404, applicable state aquatic resource requirements, EO 11990, and compensatory mitigation where required.

Direct impacts could result from dredging, clearing, grading, excavation, placement of fill, or construction of access roads, transmission structures, substations, switchyards, or construction support areas within wetland boundaries. Indirect impacts could include changes in wetland vegetation or hydrology, soil disturbance, increased erosion or sedimentation, altered surface drainage, and the introduction or spread of invasive species.

The potential for adverse wetland impacts would depend on the extent and duration of the proposed disturbance, the ecological quality and functions of the affected wetland, and the relative abundance of similar wetland resources within the watershed. The greatest potential for adverse effects would occur where new facilities, access routes, or construction work areas result in substantial disturbance to high-quality wetlands or wetland types that are limited within the watershed. Interconnection-related actions generally have a lower potential for adverse impacts when located in previously disturbed areas, affecting lower-quality wetlands, or designed to avoid and minimize wetland encroachment.

Following construction, operation and maintenance activities could result in periodic disturbance of wetlands within maintained transmission rights-of-way, access areas, or facility footprints. These disturbances could limit the establishment of woody vegetation and influence wetland community composition over time. Operational wetland-related impacts would generally be localized and confined to areas managed for transmission system reliability.

With implementation of the ESC, applicable TVA standard practices and BMPs (TVA 2022 and 2026e), avoidance and minimization measures, permit conditions, and compensatory mitigation where required, wetland impacts from interconnection-related actions that remain within the PEIS bounding criteria would generally be minor. If an interconnection-related action would exceed the bounding criteria or may affect wetlands in a manner not addressed programmatically, TVA would conduct additional site-specific environmental review and complete any required permitting, consultation, or mitigation before implementation.

3.6 AQUATIC ECOLOGY

3.6.1 Affected Environment

The TVA PSA encompasses the Tennessee River drainage and portions of the Cumberland, Ohio, Mobile, and Mississippi River systems (see also Section 3.3, Surface Waters). These river systems occur across diverse physiographic settings and support a wide range of aquatic habitats, including rivers, reservoirs, streams, tailwaters, wetlands, and riparian areas. Collectively, these habitats support diverse aquatic communities, including fish, freshwater mussels, crayfish, aquatic insects, and other benthic macroinvertebrates (TVA 2004 and 2025c). The region is recognized as globally important for freshwater biodiversity because of the diversity of freshwater fishes and invertebrates it supports (Stein et al. 2000).

Aquatic systems within the TVA PSA also support important commercial and recreational fisheries (TVA 2004). Reservoirs, rivers, and associated wetlands provide breeding, foraging, and refuge habitat for aquatic and semi-aquatic species, as well as habitat used by terrestrial wildlife during portions of their life cycles. The Tennessee River drainage is the dominant

aquatic system within the TVA PSA, and many TVA facilities are located within this watershed. Other major drainage systems within the PSA, including the Cumberland, Ohio, Mobile, and Mississippi River drainages, also support diverse aquatic communities.

Many aquatic systems in the TVA PSA have been modified by human activities, including dam construction, reservoir creation, navigation improvements, shoreline development, and changes in land use (Luo et al. 2020). Dams and reservoirs provide benefits such as power generation, navigation, flood control, water supply, and recreation; however, they also alter natural flow regimes, water residence time, sediment transport, temperature, dissolved oxygen, and habitat connectivity (Poff et al. 1997; Zhang et al. 2022). These changes influence the type, extent, and quality of aquatic habitats and can affect the composition and distribution of aquatic communities.

Reservoir habitats differ from free-flowing riverine systems. Reservoir productivity is generally supported by phytoplankton, periphyton, aquatic plants, and other organic matter sources, with productivity influenced by water-level fluctuations, residence time, depth, and stratification (Wallace et al. 1992). Mainstem reservoirs in the Tennessee River system are generally shallow, have continuous flows, and retain water for relatively short periods. These conditions typically support diverse fish communities and productive recreational and commercial fisheries. Impounded sections expanded some species' ranges in these river systems, primarily shad (*Alosa sapidissima*) and sunfishes (*Lepomis* sp.) (TVA 2025c). Good to excellent sport fisheries exist in TVA reservoirs, primarily for black bass (*Micropterus salmoides*), crappie (*Pomoxis* sp.), sauger (*Sander canadensis*), striped bass (*Morone saxatilis*), sunfish (*Centrarchidae*), and catfish (*Ictalurus* sp.) (TVA 2025c). Reservoirs also have increased shoreline and aquatic habitat used by waterbirds and other wetland species (Reitan and Thingstad 1999). Tributary reservoirs are often deeper and have longer water residence times, which can result in thermal stratification and reduced dissolved oxygen in lower water layers. Tailwaters downstream of dams may also be affected by altered flows, temperature, and dissolved oxygen conditions.

Undammed river reaches generally provide more natural flow conditions, greater habitat connectivity, and more complex aquatic habitats than impounded reaches. These areas often support higher aquatic biodiversity and may provide important habitat for sensitive, federally listed, or state-listed species (Poff et al. 1997). Benthic macroinvertebrates, freshwater mussels, and other aquatic organisms with specific habitat requirements may be less abundant or less diverse in reservoirs and tailwaters where habitat conditions are altered. Downstream from dams, aquatic habitat conditions may improve as natural reaeration occurs and temperature and dissolved oxygen conditions become more suitable for aquatic life (TVA 2025c).

Aquatic invasive species are present within the TVA region and may affect native aquatic communities. Invasive aquatic species of concern include common carp (*Cyprinus carpio*), grass carp (*Ctenopharyngodon idella*), bighead carp (*Hypophthalmichthys nobilis*), silver carp (*Hypophthalmichthys molitrix*), alewife (*Alosa pseudoharengus*), blueback herring (*Alosa aestivalis*), rusty crayfish (*Faxonius rusticus*), Asiatic clam (*Corbicula fluminea*), and zebra mussel

(*Dreissena polymorpha*). Some invasive species can affect aquatic habitat, compete with native species, or interfere with facility operations. TVA uses control measures, including chemical or warm-water treatments, at some generating facilities to manage Asiatic clams and zebra mussels where they may affect water intake systems (TVA 2026c).

3.6.1.1 TVA Aquatic Monitoring Program

TVA has conducted long-term monitoring of aquatic resources within its reservoirs and streams. TVA initiated a formal reservoir monitoring program in 1990, which was later integrated with stream monitoring, fish tissue analyses, and bacteriological studies to form the Vital Signs Monitoring Program (Carriker 1999). The Vital Signs Monitoring Program evaluates ecological conditions using indicators such as water quality, sediment characteristics, benthic macroinvertebrate communities, and fish assemblages (TVA 2025c). This monitoring provides information on aquatic resource conditions across the TVA system and supports environmental review and resource management decisions.

3.6.2 Environmental Consequences

3.6.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, TVA would not adopt the programmatic screening framework for interconnection-related actions; therefore, this alternative would not directly affect aquatic ecology at the programmatic level. Any effects to aquatic species associated with future generator interconnection requests would occur only if specific transmission actions were proposed and reviewed separately under TVA's standard NEPA process.

Without a bounded programmatic framework, TVA would not be able to use a more efficient and consistent approach for reviewing these requests. Potential impacts would continue to be identified and addressed through individual NEPA reviews, permitting, consultation, and mitigation, as appropriate.

3.6.2.2 Alternative B – Action Alternative

For interconnection-related actions that qualify for review within the programmatic framework under the Action Alternative, potential impacts on aquatic ecology would depend on the type, location, and extent of the proposed activity and the presence of streams, rivers, reservoirs, wetlands, riparian areas, or other aquatic habitats within or near the action area. Direct impacts could include temporary disturbance, displacement, injury, or mortality of aquatic organisms if work occurs in or near aquatic habitats. Indirect impacts could include increased erosion and sedimentation, increased turbidity, localized changes in water quality, and temporary modification of aquatic habitat conditions. Fish, freshwater mussels, crayfish, benthic macroinvertebrates, and other aquatic organisms could be affected by these changes. Aquatic communities that support sensitive or protected species would have greater potential for adverse impacts and would require additional site-specific review, consultation, and avoidance and minimization measures, as discussed in Section 3.9, Threatened and Endangered Species.

TVA would use the ESC process to evaluate site-specific aquatic resource conditions before determining whether a proposed interconnection-related action is appropriate for coverage

under this PEIS. This review would identify streams, wetlands, other surface waters, aquatic habitats, sensitive aquatic species, designated critical habitat, and applicable regulatory requirements. Where previously undisturbed areas or potentially sensitive aquatic resources are present, TVA would complete field surveys and other resource evaluations, as appropriate, to support project-specific review and compliance with applicable federal, state, and local requirements. Proposed interconnection-related actions with the potential for impacts beyond the scope or assumptions of this PEIS would require additional NEPA review and consultation, as appropriate.

Potential impacts on aquatic ecology would be avoided or minimized through siting, design, and implementation of TVA standard construction practices and environmental protection measures. Surface waters and sensitive aquatic habitats would be avoided to the extent practicable during project planning and design. TVA BMPs (TVA 2022 and 2026e) would be implemented as described. Applicable BMPs could include installation and maintenance of erosion and sediment controls, stabilization of disturbed soils, protection of stream crossings, stormwater management, restoration of disturbed areas, and spill prevention, containment, and response procedures. Stormwater discharges to receiving waters would be managed in accordance with applicable NPDES permit requirements and permit limits.

Because the programmatic framework would rely on established screening criteria, site-specific environmental review, applicable permitting and consultation, and the implementation of avoidance and minimization measures, impacts on aquatic ecology from interconnection-related actions covered under the Action Alternative are expected to be limited in extent and duration. Some covered actions could result in temporary habitat disturbance, short-term increases in sedimentation or turbidity, or localized disturbance of aquatic organisms; however, these effects would generally be minor when standard BMPs and project-specific measures are implemented.

3.7 TERRESTRIAL ZOOLOGY

3.7.1 Affected Environment

The TVA PSA includes a broad range of physiographic and ecological settings that support diverse terrestrial wildlife communities. As described in Section 3.8, Vegetation, the PSA encompasses multiple Level III ecoregions and includes a variety of habitat types, such as forested areas, early-successional habitats, grasslands, wetlands, riparian corridors, karst landscapes, and developed or previously disturbed lands (TVA 2025a; EPA 2025a). These habitats support numerous species of mammals, birds, reptiles, and amphibians, including both common and widespread species and species with more limited habitat requirements or restricted distributions.

Wildlife communities within the TVA PSA reflect the influence of past and ongoing land uses, including agriculture, urban and suburban development, transportation and utility corridors, reservoir development, and other hydrologic modifications (EPA 2025b; TVA 2025a and 2026c). Some wildlife species adapted to disturbed or human-modified environments, including many waterfowl, wading birds, raptors, game species, reptiles, amphibians, and small mammals, are

common throughout the PSA with stable or increasing populations (TVA 2026c). Other species, particularly those dependent on large contiguous forests, grasslands, wetlands, or specialized habitats, may be more sensitive to habitat loss, fragmentation, or disturbance. For example, bird species associated with grasslands and forest habitats have experienced notable population reductions at regional and continental scales (Rosenberg et al. 2019; North American Bird Conservation Initiative [NABCI] 2022). Karst features, including caves, are present in portions of the TVA PSA, particularly in Tennessee, Alabama, and Georgia. These features can provide specialized habitats for certain wildlife species, including cave-dependent species or cave-associated species (TVA 2025a).

TVA manages its own Regional Natural Heritage Database with support from The Nature Conservancy. The Regional Natural Heritage Database is TVA’s centralized repository of sensitive natural resource information used to support environmental review, siting, permitting, and NEPA analyses. It contains records for federally and state-listed species, rare plant communities, natural areas, ecologically significant sites, wading bird colonies, selected geologic features (such as caves and waterfalls), and other conservation resources within the TVA PSA.

Migratory birds occur throughout the TVA PSA and use a variety of habitats for nesting, foraging, migration, and overwintering. EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds* (EPA 2026c), directs federal agencies to support the conservation intent of migratory bird conventions by integrating bird conservation principles into agency activities and avoiding or minimizing adverse effects on migratory bird resources to the extent practicable. Migratory birds are also protected under the MBTA, which prohibits unauthorized take, possession, transport, sale, or purchase of migratory birds, their nests, or eggs. In addition to protection under the MBTA, bald and golden eagles are also protected under the BGEPA, which states that to kill, harass, and possess (without a permit), or sell bald and golden eagles and their parts is illegal.

Review of the USFWS Information for Planning and Consultation (IPaC) system identified 44 migratory bird species of conservation concern (BCC) that may occur within the TVA PSA (Table 3-3) (USFWS 2026b). A discussion of affected environment and consequences for threatened and endangered species can be found in Section 3.9, Threatened and Endangered Species.

Table 3-3. USFWS IPaC Review Migratory Bird Species in the TVA PSA

Common Name	Scientific Name	Possible Presence ^(a)
American golden-plover	<i>Pluvialis dominica</i>	March – November
American kestrel	<i>Falco sparverius paulus</i>	Year-round
Bachman’s sparrow	<i>Peucaea aestivalis</i>	January – September
Bald eagle	<i>Haliaeetus leucocephalus</i>	Year-round
Black skimmer	<i>Rynchops niger</i>	July – September
Black-billed cuckoo	<i>Coccyzus erythrophthalmus</i>	April – October

Common Name	Scientific Name	Possible Presence ^(a)
Black-capped chickadee	<i>Poecile atricapillus praticus</i>	Year-round
Bobolink	<i>Dolichonyx oryzivorus</i>	April – October
Brown-headed nuthatch	<i>Sitta pusilla</i>	Year-round
Canada warbler	<i>Cardellina canadensis</i>	April – September
Cerulean warbler	<i>Setophaga cerulea</i>	April – October
Chimney swift	<i>Chaetura pelagica</i>	March – October
Chuck-will's-widow	<i>Antrostomus carolinensis</i>	April – August
Coastal (Wayne's) black-throated green warbler	<i>Setophaga virens waynei</i>	March – October
Eastern whip-poor-will	<i>Antrostomus vociferus</i>	March – September
Field sparrow	<i>Spizella pusilla</i>	Year-round
Golden eagle	<i>Aquila chrysaetos</i>	September – March and July
Golden-winged warbler	<i>Vermivora chrysoptera</i>	April – October
Grasshopper sparrow	<i>Ammodramus savannarum perpallidus</i>	April – October
Gull-billed tern	<i>Gelochelidon nilotica</i>	September
Henslow's sparrow	<i>Centronyx henslowii</i>	March – November
Kentucky warbler	<i>Geothlypis formosa</i>	April – September
King rail	<i>Rallus elegans</i>	January – September
Le Conte's sparrow	<i>Ammospiza leconteii</i>	October- April
Least tern	<i>Sternula antillarum</i>	May – October
Lesser yellowlegs	<i>Tringa flavipes</i>	February – November
Little blue heron	<i>Egretta caerulea</i>	March – October
Marbled godwit	<i>Limosa fedoa</i>	April - September
Northern saw-whet owl	<i>Aegolius acadicus</i>	Year-round
Painted bunting	<i>Passerina ciris</i>	January – February and April – October
Pectoral sandpiper	<i>Calidris melanotos</i>	February – November
Prairie warbler	<i>Setophaga discolor</i>	March – October
Prothonotary warbler	<i>Protonotaria citrea</i>	March – September
Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>	Year-round
Ruddy turnstone	<i>Arenaria interpres morinella</i>	April – October
Rusty blackbird	<i>Euphagus carolinus</i>	October – April
Semipalmated sandpiper	<i>Calidris pusilla</i>	March – October
Short-billed dowitcher	<i>Limnodromus griseus</i>	April – October
Swallow-tailed kite	<i>Elanoides forficatus</i>	May – September
Whimbrel	<i>Numenius phaeopus hudsonicus</i>	April – September
Willet	<i>Tringa semipalmata</i>	April – September
Wilson's plover	<i>Charadrius wilsonia</i>	August

Common Name	Scientific Name	Possible Presence ^(a)
Wood thrush	<i>Hylocichla mustelina</i>	April – October
Yellow rail	<i>Coturnicops noveboracensis</i>	March, October – November

Notes:

(a) Possible presence of migratory bird species based on USFWS Probability of Presence Summary (USFWS 2026b).

3.7.2 Environmental Consequences

3.7.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, TVA would not adopt the programmatic screening framework for interconnection-related actions; therefore, this alternative would not directly affect terrestrial wildlife or its habitat at the programmatic level. Any effects to wildlife associated with future generator interconnection requests would occur only if specific transmission actions were proposed and reviewed separately under TVA’s standard NEPA process. Without a bounded programmatic framework, TVA would not be able to use a more efficient and consistent approach for reviewing these requests. Potential impacts would continue to be identified and addressed through individual NEPA reviews, permitting, consultation, and mitigation, as appropriate.

3.7.2.2 Alternative B – Action Alternative

Under the Action Alternative, TVA would use the programmatic screening framework described in Chapter 2 to evaluate eligible generator interconnection-related actions. Actions evaluated under this PEIS would be limited to activities that remain within defined bounding criteria in Table 2-1 and Table 2-2. Within these bounding criteria, interconnection-related actions could result in temporary or permanent effects on terrestrial wildlife and wildlife habitat. Direct impacts could include injury or mortality of less-mobile wildlife species and temporary disturbance or displacement of wildlife during vegetation clearing, grading, access road use, structure installation, conductor stringing, or other construction and maintenance activities. Indirect impacts could include habitat loss or modification, habitat fragmentation, increased edge effects, altered movement patterns, reduced habitat quality, and disturbance associated with construction noise, equipment, and human activity.

The potential for impacts would generally be greatest where actions occur in previously undisturbed or higher-quality habitats, including mature forests, grasslands, wetlands, riparian areas, karst landscapes, or other areas that provide breeding, foraging, sheltering, or migratory habitat. Wildlife movement, foraging, breeding, and sheltering behaviors could be temporarily disrupted. Forest-associated species, grassland birds, migratory birds, reptiles, amphibians, and small mammals could experience disturbance, displacement, or localized habitat alteration. Effects would generally be lower where actions occur within existing rights-of-way, previously disturbed areas, developed areas, or other locations with limited habitat value.

Because eligible actions would be limited to the bounding criteria identified in Table 2-1 and Table 2-2, the scale and intensity of impacts on terrestrial wildlife would also be limited. For example, activities would be constrained by the extent of allowable ground disturbance, vegetation removal, access requirements, and facility modifications described in Chapter 2.

These limits would reduce the potential for large-scale habitat loss or fragmentation. However, site-specific impacts could still occur where bounded activities overlap with sensitive wildlife habitats, migratory bird nesting areas, important movement corridors, or other ecologically important features.

Potential effects on migratory birds could occur if vegetation clearing, construction, or maintenance activities take place during nesting, migration, or other sensitive periods. These effects could include disturbance, displacement, or loss of nesting or foraging habitat. TVA would avoid or minimize impacts on migratory birds to the extent practicable through project planning, environmental review, and implementation of appropriate avoidance and minimization measures consistent with applicable requirements, including the MBTA and EO 13186. Potential effects on bald and golden eagles would be evaluated in accordance with the BGEPA. To the extent practicable, construction activities would occur at least 660 feet from any known active bald eagle nests; should this not be feasible, a Bald Eagle Disturbance Permit would be obtained. Should osprey nests, heronries, or other migratory bird nests occur within 660 feet of construction activities, seasonal avoidance measures would be implemented to the extent practicable. If seasonal avoidance measures are not feasible and construction must occur during the breeding/active season of osprey or other migratory BCCs, TVA would coordinate with appropriate state and federal agencies, as necessary on a site-specific basis. Because appropriate BMPs would be implemented during construction, operation, and maintenance, and because all appropriate permits would be obtained, any direct or indirect impacts to migratory bird populations are anticipated to be minor.

Potential impacts would be minimized through implementation of TVA's standard construction practices, environmental protection measures, and project-specific review through the ESC process. This process would be used to confirm that an interconnection-related action fits within the bounding criteria in Table 2-1 and Table 2-2, identify wildlife resources that could be affected, and determine whether additional surveys, agency coordination, consultation, avoidance and minimization measures, or tiered NEPA review are warranted. Activities would follow TVA BMPs (TVA 2022), including minimizing disturbance to the extent practicable, limiting impacts to designated work areas, implementing erosion and sediment controls, restoring disturbed areas, and preventing the introduction or spread of invasive species.

With implementation of TVA's ESC process, applicable BMPs, standard construction practices, and any warranted project-specific avoidance and minimization measures, impacts on terrestrial wildlife would generally be localized and short term. Some permanent habitat conversion or fragmentation could occur where new facilities, access roads, or maintained rights-of-way are required within the defined programmatic limits. However, actions with impacts that exceed the bounding criteria in Table 2-1 and Table 2-2 would not be covered by this PEIS and would require additional environmental review. Therefore, impacts on terrestrial wildlife under the Action Alternative are anticipated to be minor.

3.8 VEGETATION

3.8.1 Affected Environment

3.8.1.1 Ecoregions

This section describes existing vegetation resources within the TVA PSA that could be affected by future interconnection-related actions evaluated under this PEIS. Because specific action areas have not yet been identified, the affected environment is described at a programmatic scale using regional ecoregions, common vegetation communities, and the types of disturbed and maintained areas where future transmission facilities, access roads, workspaces, and related construction areas could occur.

Vegetation within future action areas would vary depending on location and site-specific conditions. Potential action areas could include existing transmission corridors, previously disturbed utility or transportation corridors, agricultural fields, developed or maintained lands, forested areas, shrublands, herbaceous communities, riparian areas, wetlands, and other undeveloped lands. Where generator interconnection-related actions occur within existing rights-of-way or previously disturbed areas, vegetation would generally be expected to consist of maintained herbaceous or early-successional communities, managed turf, pasture, agricultural vegetation, or volunteer woody growth. Where actions require new disturbance, vegetation could include locally common upland forests, bottomland forests, riparian vegetation, wetlands, or other natural plant communities.

Ecoregions are geographic areas defined by patterns in biotic and abiotic characteristics that influence ecosystem structure, function, quality, and integrity (EPA 2013a). These characteristics include geology, landforms, soils, vegetation, climate, land use, wildlife, and hydrology. The TVA PSA includes portions of nine Level III ecoregions identified by the EPA: Southeastern Plains, Blue Ridge, Ridge and Valley, Southwestern Appalachians, Central Appalachians, Interior Plateau, Interior River Valleys and Hills, Mississippi Alluvial Plain, and Mississippi Valley Loess Plains (EPA 2013a). These ecoregions support a broad range of vegetation communities, from bottomland hardwood and cypress swamps in the Mississippi Alluvial Plain to high-elevation balds, spruce–fir forests, and northern hardwood forests in the Blue Ridge. The diversity of terrain, soils, hydrology, climate, and land use across these ecoregions contributes to the high regional diversity of plant communities. Figure 3-3 shows the Level III ecoregions within the TVA PSA.

The Southeastern Plains ecoregion includes a mix of cropland, pasture, woodland, and forested areas, reflecting both natural and managed vegetation communities (EPA 2013b). Historically, vegetation was dominated by longleaf pine, with smaller areas of oak–hickory–pine and southern mixed forests. Vegetation patterns in this ecoregion are influenced by disturbance regimes, including fire, as well as soils derived from Cretaceous- and Tertiary-age sands, silts, and clays. These conditions support a variety of plant communities across gently rolling terrain and low-gradient stream systems.

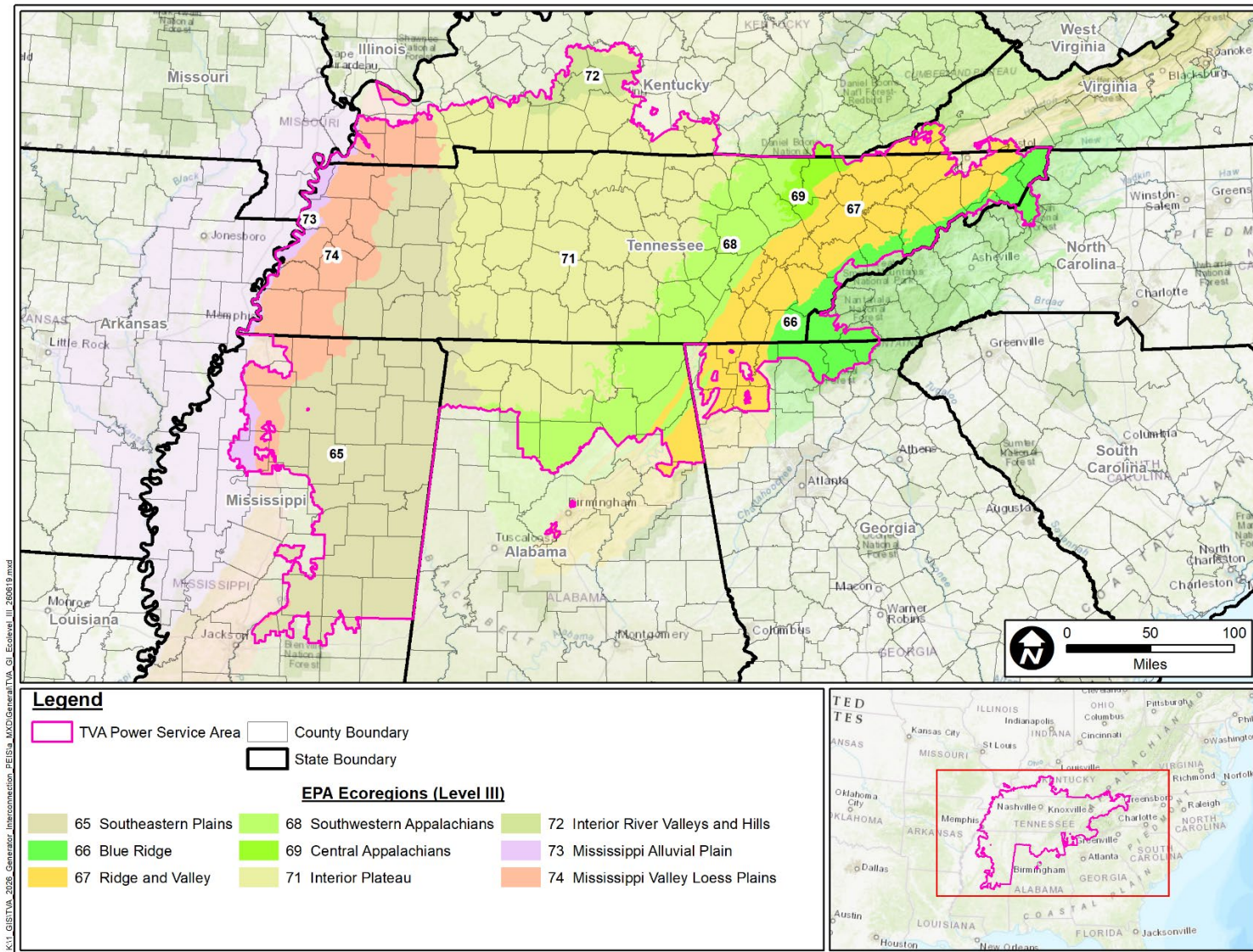


Figure 3-3. Ecoregions within the TVA PSA

The Blue Ridge ecoregion is largely forested and supports diverse plant communities associated with variations in elevation, moisture, slope, and aspect (EPA 2013b). Low- to mid-elevation areas are generally characterized by Appalachian oak forests and oak–pine communities, while more mesic areas, including sheltered coves, support diverse hardwood forests. Higher elevations support northern hardwood communities and limited spruce–fir forests. Hemlock-dominated riparian areas and shrub, grass, and heath balds also occur in localized settings. These varied plant communities contribute to one of the most floristically diverse regions in the eastern United States (EPA 2013b).

The Ridge and Valley ecoregion contains a mosaic of upland and valley vegetation communities influenced by geology, soils, and moisture availability (EPA 2013b). Upland ridges and slopes generally support oak and oak–hickory forests, while deeper and more fertile valley soils historically supported more mesic hardwood forests. Agricultural conversion has reduced forest cover in many valley areas; however, forested vegetation remains an important component of the landscape. Underlying limestone, shale, sandstone, and dolomite, as well as associated karst features, contribute to variability in plant community composition (EPA 2013b).

The Southwestern Appalachians ecoregion is characterized primarily by forest and woodland communities shaped by topography and moisture gradients (EPA 2013b). Mixed oak forests, with components of shortleaf pine, are common in upland areas, while sheltered ravines and escarpment slopes support more mesic mixed mesophytic forests. Although portions of the ecoregion have been converted to cropland and pasture or affected by localized disturbance, including coal mining, forest vegetation remains the dominant land cover (EPA 2013b).

The Central Appalachians ecoregion is dominated by extensive forest cover associated with rugged terrain, cooler climatic conditions, and relatively infertile soils (EPA 2013b). Mixed mesophytic forests are common and support high plant diversity. Appalachian oak forests and northern hardwood forests occur across uplands and higher elevations. Vegetation patterns reflect variation in soil depth, moisture, exposure, and disturbance history, including localized effects from coal mining and associated changes to forest, aquatic, and riparian communities (EPA 2013b).

The Interior Plateau ecoregion is characterized by widespread oak–hickory forests, with plant community composition influenced primarily by geology and soil conditions (EPA 2013b). Localized communities, including bluestem prairie and cedar glades, occur where thin, rocky, or drought-prone substrates limit tree establishment. Vegetation patterns are generally less controlled by elevation than in adjacent Appalachian regions and more strongly influenced by limestone, sandstone, shale, and chert-derived soils (EPA 2013b).

The Interior River Valleys and Hills ecoregion includes broad valleys, floodplains, terraces, and dissected uplands that support a mix of cropland, pasture, and forest (EPA 2013b). Poorly drained lowland areas historically supported bottomland deciduous and swamp forests, while better-drained uplands supported mixed oak and oak–hickory forests. Vegetation distribution is influenced by flooding, soil moisture, alluvial processes, and land use history (EPA 2013b).

The Mississippi Alluvial Plain ecoregion is characterized by low-gradient floodplains, terraces, oxbows, and backswamps associated with the Mississippi River and its tributaries (EPA 2013b). Historically, this ecoregion supported extensive bottomland hardwood forests, wetland forests, and associated hydrophytic vegetation. Much of the native forest cover has been converted to agriculture; however, remaining forested wetlands, riparian corridors, and managed conservation lands continue to provide important vegetation communities.

The Mississippi Valley Loess Plains ecoregion supports vegetation influenced by loess-derived soils, topography, erosion potential, and land use (EPA 2013b). Historically, upland areas to the east were dominated by oak–hickory forests with components of loblolly and shortleaf pine, while western bluff systems supported mixed and southern mesophytic forests. Current vegetation patterns reflect a mosaic of forest, cropland, and managed land, with native forest cover reduced in more arable areas and more diverse forest communities generally persisting on steep or less disturbed terrain (EPA 2013b).

3.8.1.2 Sensitive Plant Communities

Several rare or sensitive plant communities occur within the TVA PSA, although their presence within any future action area would be determined during project-specific screening. Imperiled communities include Southern Appalachian spruce–fir forests, cedar glades, grasslands, prairies and barrens, Appalachian bogs, fens and seeps, and bottomland hardwood forests. Many of these communities are restricted in distribution, occur in specialized environmental settings, or have been reduced by development, agriculture, hydrologic alteration, fire suppression, invasive species, forest management, mining, or other human activities. Future actions located near these communities would require site-specific review to determine whether avoidance, minimization, or other measures would be needed.

3.8.1.3 Vegetation Within TVA Transmission Rights-of-Way

Vegetation conditions within TVA transmission rights-of-way vary across the TVA PSA and are influenced by both ongoing maintenance activities and local environmental conditions. Routine vegetation maintenance, including mowing, tree removal, and selective herbicide application, is conducted to maintain safe and reliable operation of the transmission system. These activities affect vegetation structure, habitat type, and species composition within transmission corridors.

The quality and distribution of plant communities within rights-of-way are influenced by prior and current land use, landscape position, soils, geology, depth to bedrock, aspect, climate, invasive species, and the age of the transmission line. Older transmission rights-of-way may support higher-quality herbaceous communities than newer corridors where native herbaceous habitats were present historically and where subsequent colonization occurred from relatively weed-free native plant material after initial clearing and construction (TVA 2019).

Although some portions of existing TVA transmission rights-of-way contain important herbaceous habitat, most rights-of-way are dominated by plant species adapted to periodic disturbance. Routine maintenance activities generally maintain these corridors in an open, low-

growing vegetative condition. Depending on site-specific conditions, this maintenance can reduce woody vegetation and promote compatible herbaceous and shrub communities; however, repeated mowing, tree removal, and herbicide use may also contribute to simplified or degraded open habitat where disturbance-tolerant or invasive species become established (TVA 2019).

Transmission rights-of-way are generally compatible with herbaceous vegetation and low-growing shrubs. Incompatible vegetation includes tall-growing trees and other woody vegetation that could interfere with transmission conductors, structures, access, or the safe and reliable operation of the electric transmission system. Incompatible vegetation also includes danger trees located outside but adjacent to the right-of-way that, because of their height or proximity, could contact transmission conductors or structures if they fall. Management of incompatible vegetation is necessary to reduce reliability and safety risks associated with TVA's transmission system (TVA 2019).

3.8.1.4 Invasive Plant Species

Invasive plant species occur throughout the TVA PSA and are most commonly associated with disturbed habitats, transportation corridors, utility rights-of-way, agricultural lands, and developed areas. These species can alter native plant community composition, reduce biodiversity, and affect ecosystem functions by competing with native vegetation for resources. The introduction or spread of invasive plants is an ongoing vegetation management concern for construction, operation, and maintenance activities, particularly where ground disturbance, equipment movement, soil exposure, or vegetation clearing occurs. The U.S. Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS) Plant Protection and Quarantine (PPQ) program develops guidance and management measures to prevent the introduction and spread of invasive plants and noxious weeds and to support the protection of native and managed plant communities (USDA 2026). The program derives its authority primarily from the Plant Protection Act (7 USC §§ 7701-7786), which consolidated and superseded several earlier plant protection statutes, including major provisions of the Federal Noxious Weed Act. Additionally, certain provisions of the Federal Noxious Weed Act remain in effect and are codified as statutory notes to 7 USC §§ 2801 and 2814.

3.8.2 Environmental Consequences

3.8.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, TVA would not adopt the programmatic screening framework for interconnection-related actions; therefore, this alternative would not directly affect vegetation at the programmatic level. Any vegetation effects associated with future generator interconnection requests would occur only if specific transmission actions were proposed and reviewed separately under TVA's standard NEPA process. Without a bounded programmatic framework, TVA would not be able to use a more efficient and consistent approach for reviewing these requests. Potential impacts would continue to be identified and addressed through individual NEPA reviews, permitting, consultation, and mitigation, as appropriate.

3.8.2.2 Alternative B – Action Alternative

Under the Action Alternative, TVA would use the PEIS bounding analysis and ESC to evaluate vegetation impacts associated with future interconnection-related actions. Vegetation impacts would vary depending on the type, location, and extent of each interconnection-related action and whether the action would occur within an existing transmission corridor, previously disturbed area, maintained land, agricultural land, or an area supporting native or sensitive vegetation communities.

Within the bounds evaluated in this PEIS, vegetation disturbance could occur from construction, operation, and maintenance of new or modified transmission lines, substations, switchyards, access roads, laydown areas, and associated workspaces. For new transmission lines, the bounding analysis assumes a maximum right-of-way width of up to 250 feet, a maximum transmission line length of up to 20 miles, and up to 610 acres of right-of-way. Access roads could include up to 1.5 miles of access road per mile of transmission line, not to exceed 30 miles total. Substation-related activities could involve up to 80 acres of ground disturbance, and construction laydown areas could be up to 10 acres each, not to exceed 50 acres total. These disturbance areas represent the maximum programmatic bounds within which future actions could affect vegetation.

Direct impacts on vegetation could include clearing, mowing, grubbing, removal of trees and shrubs, grading, and conversion of existing vegetation within transmission rights-of-way, substation or switchyard footprints, access roads, laydown areas, structure work areas, pull sites, and other temporary or permanent disturbance areas. Vegetation within permanent facility footprints, such as substation pads, access roads, structure locations, or other maintained infrastructure areas, would not be reestablished and would be converted to developed, graveled, or otherwise maintained conditions. In temporary disturbance areas, vegetation would generally be stabilized and revegetated, where practicable, following construction.

Indirect impacts could include soil disturbance, increased erosion potential, changes in plant community composition, fragmentation of forested or other natural communities, and the introduction or spread of invasive plant species. Impacts would generally be greater where new clearing or ground disturbance occurs in previously undisturbed areas, forested areas, riparian areas, wetlands, or rare or sensitive plant communities. Interconnection-related actions located within existing rights-of-way, previously disturbed corridors, agricultural lands, developed areas, or other maintained lands would generally have a lower potential for adverse vegetation impacts.

During operation and maintenance, vegetation management would be required to maintain safe clearances, access, and reliable operation of transmission facilities. Vegetation management could include mowing, manual cutting, mechanical removal, selective herbicide application, removal of incompatible vegetation, and danger tree removal. These activities would maintain compatible low-growing vegetation within transmission rights-of-way and would limit the reestablishment of tall-growing woody species that could interfere with

conductors, structures, access, or transmission system reliability. Although this would result in long-term maintenance of altered vegetation communities within managed rights-of-way, these areas may continue to support herbaceous or early successional vegetation.

Vegetation impacts would be avoided or minimized through TVA’s ESC process, standard practices, routine BMPs, permit conditions, and project-specific environmental commitments. Applicable measures from TVA transmission vegetation management requirements, TVA *ROW Clearing Specifications*, and TVA BMP guidance (TVA 2019, 2022 and 2026e) would be implemented, as appropriate. These measures could include limiting vegetation clearing to the area needed for construction, operation, and maintenance; restricting equipment to designated work areas; using low ground-pressure equipment in sensitive or soft-ground areas; implementing erosion and sediment controls; protecting streams, wetlands, and other sensitive resources; stabilizing and revegetating disturbed areas; and preventing the introduction or spread of invasive species.

Prior to implementing interconnection-related actions, TVA would review the TVA Natural Heritage Database and the USFWS IPaC website during the site-specific ESC process to determine the potential for effects on any sensitive plant communities, and coordinate with appropriate agencies as required. Interconnection-related actions with the potential to introduce or spread invasive species would also be evaluated through the ESC and conducted in accordance with applicable USDA APHIS PPQ guidance. If project-specific screening identifies sensitive vegetation communities or impacts that would exceed the vegetation-related assumptions and bounding criteria evaluated in this PEIS (Table 2-1 and Table 2-2), TVA would conduct additional site-specific environmental review and identify appropriate avoidance, minimization, permitting, consultation, or mitigation measures. With implementation of TVA’s ESC process, standard practices, BMPs, and applicable avoidance and minimization measures, impacts on vegetation under the Action Alternative would generally be localized and are anticipated to be minor.

3.9 THREATENED AND ENDANGERED SPECIES

3.9.1 Affected Environment

3.9.1.1 Regulatory Framework for Threatened and Endangered Species

The ESA (16 USC §§ 1531–1543) was enacted to protect fish, wildlife, and plant species facing the risk of extinction and to conserve the ecosystems upon which they depend (USFWS 2026c). Under the ESA, a species may be listed as endangered if it is in danger of extinction throughout all or a significant portion of its range, or as threatened if it is likely to become endangered within the foreseeable future (USFWS 1973). The ESA also allows for the designation of critical habitat, which identifies specific areas that contain physical or biological features essential to the conservation of a listed species and that may require special management considerations or protection.

Section 7 of the ESA requires federal agencies to evaluate whether actions they authorize, fund, or carry out may affect federally listed species or designated critical habitat. If a proposed

federal action may affect listed species or critical habitat, the federal agency must coordinate or consult with the USFWS, as appropriate. This process is used to determine whether the action is likely to adversely affect listed species or critical habitat and to identify measures to avoid, minimize, or otherwise address potential effects (USFWS 2026c).

In addition to federal requirements, each of the seven states within the TVA PSA maintains its own regulatory framework for protecting species of concern. State classification systems and regulatory protections vary by state. Some states primarily protect species listed under the ESA, while others provide additional protections for species designated at the state level. TVA considers potential effects on state-listed species during environmental reviews, as applicable (TVA 2025a).

3.9.1.2 Federally Listed Species in the TVA PSA

Table 3-4 identifies federally protected species with the potential to occur within the TVA PSA based on information obtained from the USFWS IPaC tool (USFWS 2026b). The table includes federally listed and proposed plant and animal species identified for the TVA PSA, including 34 plants, 6 mammals, 5 birds, 6 reptiles, 2 amphibians, 17 invertebrates, 34 fish, and 60 mussels. The TVA PSA also includes 10 areas classified as designated critical habitat and one area proposed for critical habitat designation for federally listed species. Because this analysis is programmatic, the species identified in Table 3-4 include species that may occur within the broader TVA PSA. Their inclusion is not an indication that suitable habitat or species occurrences are present at any specific project site.

Table 3-4. Federally Protected Species Potentially Occurring within the TVA PSA

Common Name	Scientific Name	Federal Status
Mammals		
Carolina northern flying squirrel	<i>Glaucomys sabrinus coloratus</i>	END
Gray bat	<i>Myotis grisescens</i>	END
Indiana bat ^(a)	<i>Myotis sodalis</i>	END
Northern long-eared bat	<i>Myotis septentrionalis</i>	END
Tricolored bat	<i>Perimyotis subflavus</i>	PE
Virginia big-eared bat	<i>Corynorhinus (Plecotus) townsendii virginianus</i>	END
Birds		
Eastern black rail	<i>Laterallus jamaicensis jamaicensis</i>	THR
Piping plover	<i>Charadrius melodus</i>	THR
Red-cockaded woodpecker	<i>Dryobates borealis</i>	THR
Rufa red knot	<i>Calidris canutus rufa</i>	THR
Whooping crane	<i>Grus americana</i>	EXPN
Reptiles		
Alligator snapping turtle	<i>Macrochelys temminckii</i>	PT
Bog turtle	<i>Glyptemys muhlenbergii</i>	SAT

Common Name	Scientific Name	Federal Status
Flattened musk turtle	<i>Sternotherus depressus</i>	THR
Gopher tortoise	<i>Gopherus polyphemus</i>	THR
Pearl river map turtle	<i>Graptemys pearlensis</i>	THR
Ringed map turtle	<i>Graptemys oculifera</i>	THR
Amphibians		
Black Warrior (Sipsey Fork) waterdog ^(a)	<i>Necturus alabamensis</i>	END
Eastern hellbender	<i>Cryptobranchus alleganiensis alleganiensis</i>	PE
Snails		
Anthony's riversnail	<i>Atheurnia anthonyi</i>	END/EXPN
Armored snail	<i>Marstonia pachyta</i>	END
Interrupted (Georgia) rocksnail ^(a)	<i>Leptoxis foremani</i>	END
Oblong rocksnail	<i>Leptoxis compacta</i>	PE
Painted snake coiled forest snail	<i>Anguispira picta</i>	THR
Round rocksnail	<i>Leptoxis ampla</i>	THR
Royal marstonia (snail)	<i>Marstonia ogmorhappe</i>	END
Slender campeloma	<i>Campeloma decampi</i>	END
Insects		
Mitchell's satyr butterfly	<i>Neonympha mitchellii mitchellii</i>	END
Monarch butterfly	<i>Danaus plexippus</i>	PT
Arachnids		
Spruce-fir moss spider ^(a)	<i>Microhexura montivaga</i>	END
Crustaceans		
Alabama cave shrimp	<i>Palaemonias alabamiae</i>	END
Brawleys Fork crayfish ^(b)	<i>Cambarus williamsi</i>	PT
Kentucky cave shrimp	<i>Palaemonias ganteri</i>	END
Lee County cave isopod	<i>Lirceus usdagalun</i>	END
Nashville crayfish	<i>Orconectes shoupi</i>	END
Slenderclaw crayfish ^(a)	<i>Cambarus cracens</i>	END
Fishes		
Alabama cavefish ^(a)	<i>Speoplatyrhinus poulsoni</i>	END
Amber darter ^(a)	<i>Percina antesella</i>	END
Barrens darter	<i>Etheostoma forbesi</i>	PE
Barrens topminnow ^(b)	<i>Fundulus julisia</i>	END
Blackside dace	<i>Phoxinus cumberlandensis</i>	THR
Blue shiner	<i>Cyprinella caerulea</i>	THR
Bluemask darter	<i>Etheostoma akatulo</i>	END
Boulder darter	<i>Etheostoma wapiti</i>	END/EXPN
Cahaba shiner	<i>Notropis cahabae</i>	END

Common Name	Scientific Name	Federal Status
Cherokee darter	<i>Etheostoma scotti</i>	THR
Chucky madtom ^(a)	<i>Noturus crypticus</i>	END
Coal darter	<i>Percina brevicauda</i>	PT
Conasauga logperch ^(a)	<i>Percina jenkinsi</i>	END
Cumberland darter ^(a)	<i>Etheostoma susanae</i>	END
Duskytail darter	<i>Etheostoma percnurum</i>	END/EXPN
Etowah darter	<i>Etheostoma etowahae</i>	END
Frecklebelly madtom ^(a)	<i>Noturus munitus</i>	THR
Goldline darter	<i>Percina aurolineata</i>	THR
Laurel dace ^(a)	<i>Chrosomus saylori</i>	END
Palezone shiner	<i>Notropis albizonatus</i>	END
Pallid sturgeon	<i>Scaphirhynchus albus</i>	END
Pygmy madtom	<i>Noturus stanauli</i>	END/EXPN
Relict darter	<i>Etheostoma chienense</i>	THR
Rush darter	<i>Etheostoma phytophilum</i>	END
Sickle darter ^(b)	<i>Percina williamsi</i>	THR
Slackwater darter ^(a)	<i>Etheostoma boschungii</i>	THR
Slender chub ^(a)	<i>Erimystax cahni</i>	THR/EXPN
Smoky madtom ^(a)	<i>Noturus baileyi</i>	END/EXPN
Spotfin chub ^(a)	<i>Erimonax monachus</i>	THR/EXPN
Spring pygmy sunfish ^(a)	<i>Elassoma alabamae</i>	THR
Trispot darter ^(a)	<i>Etheostoma trisella</i>	THR
Vermilion darter	<i>Etheostoma chermocki</i>	END
Watercress darter	<i>Etheostoma nuchale</i>	END
Yellowfin madtom ^(a)	<i>Noturus flavipinnis</i>	THR/EXPN
Mussels		
Alabama hickorynut	<i>Obovaria unicolor</i>	PE
Alabama lampmussel	<i>Lampsilis virescens</i>	END/EXPN
Alabama moccasinshell ^(a)	<i>Medionidus acutissimus</i>	THR
Appalachian elktoe ^(a)	<i>Alasmidonta raveneliana</i>	END
Appalachian monkeyface (pearlymussel)	<i>Theliderma sparsa</i>	END/EXPN
Birdwing pearlymussel	<i>Lemiox rimosus</i>	END/EXPN
Black clubshell	<i>Pleurobema curtum</i>	END
Clubshell	<i>Pleurobema clava</i>	END/EXPN
Coosa moccasinshell ^(a)	<i>Medionidus parvulus</i>	END
Cracking pearlymussel	<i>Hemistena lata</i>	END/EXPN

Common Name	Scientific Name	Federal Status
Cumberland bean (pearlymussel)	<i>Villosa trabalis</i>	END/EXPN
Cumberland elktote ^(a)	<i>Alasmidonta atropurpurea</i>	END
Cumberland moccasinshell	<i>Medionidus conradicus</i>	PE
Cumberland monkeyface (pearlymussel)	<i>Theliderma intermedia</i>	END/EXPN
Cumberland pigtoe	<i>Pleuroaia gibber</i>	END
Cumberlandian combshell ^(a)	<i>Epioblasma brevidens</i>	END/EXPN
Dark pigtoe ^(a)	<i>Pleurobema furvum</i>	END
Dromedary pearlymussel	<i>Dromus dromas</i>	END/EXPN
Fanshell	<i>Cyprogenia stegaria</i>	END/EXPN
Fat pocketbook	<i>Potamilus capax</i>	END
Finelined pocketbook ^(a)	<i>Hamiota altilis</i>	THR
Finerayed pigtoe	<i>Fusconaia cuneolus</i>	END/EXPN
Fluted kidneyshell ^(a)	<i>Ptychobranhus subtentus</i>	END
Georgia pigtoe ^(a)	<i>Pleurobema hanleyianum</i>	END
Green floater ^(b)	<i>Lasmigona subviridis</i>	PT
Heavy pigtoe	<i>Pleurobema taitianum</i>	END
Inflated heelsplitter	<i>Potamilus inflatus</i>	THR
Kentucky creekshell ^(b)	<i>Leaunio ortmanni</i>	PE
Littlewing pearlymussel	<i>Pegias fabula</i>	END
Longsolid ^(a)	<i>Fusconaia subrotunda</i>	THR
Northern riffleshell	<i>Epioblasma rangiana</i>	END
Orangefoot pimpleback (pearlymussel)	<i>Plethobasus cooperianus</i>	END/EXPN
Orangenacre mucket ^(a)	<i>Hamiota perovalis</i>	THR
Ovate clubshell ^(a)	<i>Pleurobema perovatum</i>	END
Oyster mussel ^(a)	<i>Epioblasma capsaeformis</i>	END/EXPN
Pale lilliput (pearlymussel)	<i>Toxolasma cylindrellus</i>	END
Pink mucket (pearlymussel)	<i>Lampsilis abrupta</i>	END
Purple bean ^(a)	<i>Villosa perpurpurea</i>	END
Purple cat's paw (pearlymussel)	<i>Epioblasma obliquata</i>	END/EXPN
Rabbitsfoot ^(a)	<i>Quadrula cylindrica cylindrica</i>	THR
Rayed bean	<i>Villosa fabalis</i>	END
Ring pink	<i>Obovaria retusa</i>	END/EXPN
Rough pigtoe	<i>Pleurobema plenum</i>	END/EXPN
Rough rabbitsfoot ^(a)	<i>Quadrula cylindrica strigillata</i>	END
Round hickorynut ^(a)	<i>Obovaria subrotunda</i>	THR
Salamander mussel ^(b)	<i>Simpsonaias ambigua</i>	PE

Common Name	Scientific Name	Federal Status
Sheepnose mussel ^(a)	<i>Plethobasus cyphus</i>	END
Shiny pigtoe	<i>Fusconaia cor</i>	END/EXPN
Slabside pearlymussel ^(a)	<i>Pleuonaia dolabelloides</i>	END
Snuffbox mussel ^(a)	<i>Epioblasma triquetra</i>	END
Southern clubshell ^(a)	<i>Pleurobema decisum</i>	END
Southern combshell	<i>Epioblasma penita</i>	END
Southern pigtoe ^(a)	<i>Pleurobema georgianum</i>	END
Spectaclecase (mussel) ^(a)	<i>Cumberlandia monodonta</i>	END
Tan riffleshell	<i>Epioblasma florentina walkeri</i>	END
Tennessee clubshell	<i>Pleurobema oviforme</i>	PE
Tennessee pigtoe	<i>Pleuonaia barnesiana</i>	PE
Triangular kidneyshell ^(a)	<i>Ptychobranthus greenii</i>	END
White wartyback (pearlymussel)	<i>Plethobasus cicatricosus</i>	END/EXPN
Winged mapleleaf	<i>Quadrula fragosa</i>	END/EXPN
Plants		
Alabama leather flower	<i>Clematis socialis</i>	END
Alabama streak-sorus fern	<i>Thelypteris pilosa</i> var. <i>alabamensis</i>	THR
American hart's-tongue fern	<i>Asplenium scolopendrium</i> var. <i>americanum</i>	THR
Blue Ridge goldenrod	<i>Solidago spithamea</i>	THR
Braun's rockcress ^(a)	<i>Arabis perstellata</i>	END
Cumberland rosemary	<i>Conradina verticillata</i>	THR
Fleshy-fruit glade cress ^(a)	<i>Leavenworthia crassa</i>	END
Gentian pinkroot	<i>Spigelia gentianoides</i>	END
Georgia rockcress ^(a)	<i>Arabis georgiana</i>	THR
Green pitcher plant	<i>Sarracenia oreophila</i>	END
Guthrie's ground-plum	<i>Astragalus bibullatus</i>	END
Harperella	<i>Ptilimnium nodosum</i>	END
Heller's blazingstar	<i>Liatris helleri</i>	THR
Kral's water-plantain	<i>Sagittaria secundifolia</i>	THR
Large-flowered skullcap	<i>Scutellaria montana</i>	THR
Leafy prairie-clover	<i>Dalea foliosa</i>	END
Lyrate bladderpod	<i>Lesquerella lyrata</i>	THR
Mohr's Barbara's buttons	<i>Marshallia mohrii</i>	THR
Morefield's leather flower	<i>Clematis morefieldii</i>	END
Pondberry	<i>Lindera melissifolia</i>	END
Price's potato-bean	<i>Apios priceana</i>	THR
Roan Mountain bluet	<i>Hedyotis purpurea</i> var. <i>montana</i>	END

Common Name	Scientific Name	Federal Status
Rock gnome lichen	<i>Gymnoderma lineare</i>	END
Ruth's golden aster	<i>Pityopsis ruthii</i>	END
Short's bladderpod ^(a)	<i>Physaria globosa</i>	END
Small whorled pogonia	<i>Isotria medeoloides</i>	THR
Smooth coneflower	<i>Echinacea laevigata</i>	THR
Spreading avens	<i>Geum radiatum</i>	END
Spring creek bladderpod	<i>Lesquerella perforata</i>	END
Swamp pink	<i>Helonias bullata</i>	THR
Tennessee yellow-eyed grass	<i>Xyris tennesseensis</i>	END
Virginia spiraea	<i>Spiraea virginiana</i>	THR
White fringeless orchid	<i>Platanthera integrilabia</i>	THR
Whorled sunflower ^(a)	<i>Helianthus verticillatus</i>	END

Source: USFWS 2026b

Notes:

(a) Final critical habitat overlaps with the TVA PSA for these species.

(b) Proposed critical habitat overlaps with the TVA PSA for these species.

Key: END = Endangered; EXPN = Experimental Population, Nonessential; PE = Proposed Endangered; PT = Proposed Threatened; SAT= Similarity of Appearance to a Threatened Taxon; THR = Threatened.

3.9.1.3 State-Listed Species in the TVA PSA

Each of the seven states within the TVA PSA also maintains information on state-listed and other special-status species. These resources are administered by the following agencies:

- Tennessee Natural Heritage Program and Tennessee Wildlife Resources Agency
- Alabama Department of Conservation and Natural Resources
- Georgia Department of Natural Resources and Georgia Natural Heritage Program
- Office of Kentucky Nature Preserves
- Mississippi Department of Wildlife, Fisheries, and Parks Natural Heritage Program
- North Carolina Natural Heritage Program and North Carolina Wildlife Resources Commission
- Virginia Natural Heritage Program, Virginia Department of Wildlife Resources, and Virginia Department of Agriculture and Consumer Services

Based on review of these state databases and TVA's Regional Natural Heritage Database, over 1,400 state-listed or special-status species have been documented within the TVA PSA (TVA 2026c). TVA would use these database resources, as appropriate, during the site-specific ESC process to identify state-listed species that could occur in or near an action area and to determine whether additional review, coordination, surveys, or avoidance and minimization measures are needed.

3.9.1.4 Habitat for Listed Species

Habitats that support listed species within the TVA PSA are grouped into six general habitat types based on dominant ecological characteristics: aquatic, early successional, forested, karst, montane, and mature pine-savanna woodlands (TVA 2025a). These habitat types occur across a broad geographic area and support a variety of federally listed, state-listed, and other special-status species. The presence, quality, and extent of these habitats vary by location; therefore, habitat conditions would be evaluated during site-specific environmental reviews for future interconnection-related actions.

Aquatic Habitat

Aquatic habitats within the TVA PSA include wetlands, rivers, streams, floodplains, and associated riparian areas. These habitats provide breeding, foraging, dispersal, and sheltering areas for aquatic and semi-aquatic species. Federally listed species associated with aquatic habitats include several fish and mussel species, alligator snapping turtle, Black Warrior waterdog, eastern hellbender, piping plover, ringed map turtle, rufa red knot, and whooping crane (TVA 2025a). Wetland abundance and distribution vary across the TVA PSA, with fewer wetlands generally occurring in steeper Appalachian areas and more extensive wetland and floodplain systems occurring in western portions of the region and bottomland hardwood systems (TVA 2025a).

Early-Successional Habitat

Early-successional habitats include grasslands, shrublands, old fields, maintained rights-of-way, and other open or disturbed areas. These habitats develop following natural or human-caused disturbance, such as fire, timber harvest, agricultural abandonment, or vegetation management (TVA 2025a). Early-successional habitats provide food, cover, and breeding areas for numerous terrestrial species, including birds, mammals, reptiles, amphibians, invertebrates, and plants (TVA 2025a). Federally listed plant species associated with these habitats include Alabama leather flower, Mohr's Barbara's buttons, and whorled sunflower, which may occur in prairie openings, and Price's potato-bean and green pitcher plant, which may occur in rights-of-way or other open habitats (TVA 2025a). The monarch butterfly also depends on early-successional habitats that support milkweed and nectar-producing plants (TVA 2025a).

Forested Habitat

Forested habitats in the TVA PSA include hardwood forests, mixed pine–hardwood forests, and forested riparian areas (TVA 2025a). These habitats support diverse plant and wildlife communities and provide important ecological functions, including wildlife movement corridors, erosion control, shading of aquatic resources, and habitat connectivity. Interior forest habitat also provides important nesting and foraging habitat for neotropical migrant birds, many of which are sensitive to forest fragmentation, edge effects, and reductions in contiguous forest cover. Forested habitats are common in the Appalachian Mountains, Cumberland Plateau, and other portions of the TVA PSA. Federally listed bat species, including Indiana bat, northern long-eared bat, and tricolored bat, may use forested areas for roosting, foraging, and

travel corridors, particularly where suitable roost trees, forage edges, and openings are present (TVA 2025a).

Karst Habitat

Karst habitats include areas underlain by limestone or other soluble bedrock and may contain caves, sinkholes, underground streams, springs, and cedar glades. These systems occur in portions of Tennessee, Alabama, and Georgia and support specialized biological communities adapted to unique soil, hydrologic, and microclimate conditions (TVA 2025a). Caves and related karst features provide roosting or hibernation habitat for federally listed bats, including gray bat and Virginia big-eared bat, and may also be used by Indiana bat, northern long-eared bat, and tricolored bat during hibernation (TVA 2025a). Karst-associated plant communities, including limestone cedar glades, may support federally listed plants such as fleshy-fruit glade cress (TVA 2025a).

Montane Habitat

Montane habitats within the TVA PSA are primarily associated with the southern Appalachian Mountains and other high-elevation areas. Steep terrain, cooler and wetter climatic conditions, high-elevation forests, and specialized plant communities characterize these habitats. Montane habitats provide important refuge for species adapted to cool, moist environments and limited geographic ranges. Federally listed species associated with montane habitats include bog turtle, which uses montane wetlands, and Carolina northern flying squirrel, which relies on high-elevation spruce–fir forests (TVA 2025a). Other species, such as painted snake coiled forest snail and spruce–fir moss spider, are associated with mesic cliffs, exposed rock, moss-covered substrates, and other specialized microhabitats (TVA 2025a).

Mature Pine-Savanna Woodlands

Mature pine-savanna woodlands are characterized by open pine canopies, herbaceous understories, and disturbance regimes such as periodic fire. These habitats support fire-adapted plant and wildlife communities and provide habitat for species that depend on open, frequently maintained pine systems (TVA 2025a). Federally listed species associated with mature pine-savanna woodlands include gopher tortoise, which uses open understories for burrowing and foraging, and red-cockaded woodpecker, which relies on mature pine stands for nesting and foraging (TVA 2025a). Suitable habitat for some species, particularly red-cockaded woodpecker, is limited within the TVA PSA and is generally associated with actively managed lands (TVA 2025a).

3.9.2 Environmental Consequences

3.9.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, TVA would not adopt the programmatic screening framework for interconnection-related actions; therefore, this alternative would not directly affect threatened and endangered species or critical habitat at the programmatic level. Any effects to federally or state-listed species or other protected species associated with future generator interconnection requests would occur only if specific transmission actions were proposed and

reviewed separately under TVA’s standard NEPA process. Without a bounded programmatic framework, TVA would not be able to use a more efficient and consistent approach for reviewing these requests. Potential impacts would continue to be identified and addressed through individual NEPA reviews, permitting, consultation, and mitigation, as appropriate.

3.9.2.2 Alternative B – Action Alternative

Potential impacts to threatened and endangered species would depend on the type, location, scale, and design of each interconnection-related action. As described in Chapter 2, future actions would be evaluated against the bounding parameters identified in Table 2-1 and Table 2-2. Actions that fall within those bounds would be covered by this programmatic analysis. Actions that exceed the bounding criteria or could result in effects not analyzed in this PEIS would require additional site-specific NEPA review. Federally and state-listed species, migratory birds, bald and golden eagles, and other protected species would be evaluated through the ESC.

For actions within the bounding parameters, potential direct effects could include injury or mortality of individual listed species. Potential indirect effects could include temporary displacement, habitat loss or modification, habitat fragmentation, increased erosion and sedimentation, and degradation of aquatic or terrestrial habitats. Species potentially affected would depend on the location, habitat conditions, and species occurrences associated with each future action and could include federally listed and state-listed animals and plants within the TVA PSA where suitable habitat is present.

The potential for adverse effects would be greatest where future actions occur in previously undisturbed areas that support listed species, suitable habitat, or designated critical habitat. The bounding parameters in Table 2-1 and Table 2-2 would help limit the range of actions covered by this programmatic review by defining the types and extent of activities that may proceed under the program. Actions located in previously disturbed areas or in areas where suitable habitat is absent or limited would generally have a lower potential for adverse effects. Conversely, actions that would involve greater ground disturbance, substantial vegetation clearing, work in or near aquatic resources, or activities near known occurrences of listed species or designated critical habitat could have a greater potential for effects and may require additional review, surveys, consultation, or project-specific NEPA documentation.

Potential effects would be avoided, minimized, or reduced through TVA’s site-specific environmental review process, including use of the ESC, applicable BMPs, and coordination or consultation with resource agencies, as appropriate. The ESC process would be used to confirm whether an interconnection-related action is consistent with the bounding criteria in Table 2-1 and Table 2-2 and would identify listed species, designated critical habitat, and other sensitive biological resources that could be affected. During the ESC process, TVA would review the TVA Natural Heritage Database and the USFWS IPaC website to determine the potential presence of state- or federally protected species and designated critical habitat and would coordinate with appropriate agencies, as required. The ESC would also determine whether additional surveys, avoidance measures, minimization measures, or agency consultation are needed. For greenfield

sites, the ESC review would evaluate whether appropriate ecological surveys and species-specific presence/absence surveys have been completed, as appropriate. The review would also consider the extent of tree clearing and whether tree removal could affect suitable habitat for listed species.

For actions with the potential to impact federally listed bats, TVA has committed to implementing specific conservation measures in accordance with TVA's ESA Section 7 Programmatic Bat Consultation (TVA 2024c). A terrestrial zoologist would review bat records near each action area, complete necessary surveys, and identify any conservation measures required for the site-specific activities, such as seasonal restrictions on tree clearing and avoiding effects on potentially suitable roost trees, caves, waterbodies, sinkholes, buildings, and bridges. With implementation of these conservation measures, interconnection-related actions would result in minimal impacts to gray bat, Indiana bat, and northern long-eared bat. TVA updated their ESA Section 7 Programmatic Bat Consultation with the *Reinitiation of the Programmatic Biological Assessment for Evaluation of the Impacts of Tennessee Valley Authority's Routine Actions on Federally Listed Bats to include Tricolored Bat*. In response, USFWS issued a Conference Opinion concluding that with the implementation of minimization measures, TVA's routine actions, considered collectively and including those that would be implemented under the Action Alternative, are not likely to jeopardize the continued existence of tricolored bat (USFWS 2024).

Activities would also follow applicable TVA BMPs (TVA 2022). Projects would comply with the ESA and applicable state regulations. Because interconnection-related actions would be designed and scheduled to avoid or minimize impacts on federally and state-listed species, the Action Alternative is not likely to adversely affect these species or their critical habitats. The Action Alternative would result in minimal to minor impacts to federally or state-listed plant species. Actions that exceed the bounding criteria or could result in effects not addressed in this analysis would be subject to additional site-specific environmental review before implementation.

3.10 AIR QUALITY AND CLIMATE CHANGE

3.10.1 Affected Environment

3.10.1.1 Air Quality

The EPA regulates air pollutants and airborne emissions under the Clean Air Act (CAA) (42 USC § 7401 et seq.). The CAA establishes a national framework for protecting air quality by regulating emissions from stationary sources, such as industrial facilities and power plants, and mobile sources, such as motor vehicles and construction equipment. The CAA requires EPA to establish National Ambient Air Quality Standards (NAAQS) and requires states to develop State Implementation Plans to attain and maintain those standards. This is primarily accomplished through permitting programs that establish limits for emissions of air pollutants, including volatile organic compounds (VOCs). The CAA also requires EPA to regulate emissions of hazardous air pollutants.

NAAQS have been established for six criteria air pollutants: carbon monoxide (CO), nitrogen dioxide, ozone, particulate matter (PM), sulfur dioxide (SO₂), and lead. Primary standards are intended to protect public health, including sensitive populations, while secondary standards are intended to protect public welfare, including visibility, vegetation, crops, soils, and materials (EPA 2025c). EPA also regulates hazardous air pollutants (EPA 2025d), which may be emitted from mobile, stationary, and indoor sources (EPA 2025e). Under the CAA Amendments of 1990, geographic areas are designated based on whether they meet the NAAQS. Areas may be classified as attainment or unclassifiable, meaning that air quality meets or is treated as meeting the applicable standard, or as nonattainment, meaning that air quality does not meet one or more standards (EPA 2025f). As described in TVA's 2026 IRP FEIS, the TVA PSA is generally designated as attainment or unclassifiable for the NAAQS, except for a small SO₂ nonattainment area in part of Sullivan County, Tennessee (TVA 2026c).

VOCs are emitted as gases from a variety of products and activities, including petroleum fuels, hydraulic fluids, solvents, coatings, dry-cleaning agents, and some industrial processes (EPA 2026d). Although VOCs are not criteria pollutants, they are important precursors to ground-level ozone. In the TVA PSA, VOCs originate from both natural and human-related sources, including vegetation, motor vehicles, and some industrial activities (TVA 2026g).

3.10.1.2 Greenhouse Gases

Greenhouse gases (GHGs) are atmospheric gases that absorb and reradiate heat, contributing to the natural greenhouse effect that helps regulate Earth's climate. Human activities, particularly fossil fuel combustion and certain industrial, agricultural, and land use practices, have increased atmospheric concentrations of GHGs, including carbon dioxide (CO₂), methane, nitrous oxide, and fluorinated gases (EPA 2025g). Increased GHG concentrations contribute to observed changes in global and regional climate conditions, including changes in temperature, precipitation patterns, and the frequency or intensity of some extreme weather events (Walsh et al. 2014a; USGCRP 2023).

GHGs differ in their ability to trap heat and in the length of time they remain in the atmosphere. To allow comparison across gases, emissions are commonly expressed as carbon dioxide-equivalent (CO₂e), which reflects each gas's global warming potential relative to CO₂ (EPA 2025g). Carbon dioxide is the primary GHG emitted by the electric power sector, largely from the combustion of fossil fuels. Other GHGs associated with electric generation and transmission systems include methane emissions from fuel production and delivery systems and sulfur hexafluoride (SF₆), which is used in some gas-insulated electrical equipment and has a high global warming potential (40 CFR 98) (Walsh et al. 2014b).

In the United States, GHG emissions are generated by multiple sectors, including the electric power, transportation, industrial, commercial, residential, and agricultural sectors (EPA 2025h). Within the TVA PSA, climate-related trends are generally consistent with broader southeastern U.S. projections, including warmer average temperatures, changes in seasonal precipitation patterns, and increased potential for extreme heat events (USGCRP 2017 and 2023). These

trends may affect natural resources, infrastructure, energy demand, and communities throughout the region.

TVA has reported substantial reductions in CO₂ emissions from its power system since 1995, primarily due to changes in its generation portfolio, including the retirement of coal-fired generation and increased reliance on lower- or non-emitting generation sources, such as nuclear, natural gas, and renewable resources (TVA 2026c and 2026h). These systemwide changes provide regional context for evaluating potential GHG emissions associated with future interconnection-related actions.

3.10.2 Environmental Consequences

3.10.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, TVA would not establish a programmatic bounding analysis or ESC for interconnection-related actions and would continue to evaluate each request through project-specific NEPA review. Because this alternative would not authorize construction, operation, or maintenance activities, it would have no direct effect on air quality or climate change at the programmatic level. However, continued reliance on individual reviews could result in minor indirect effects by limiting TVA's ability to process interconnection requests efficiently and consistently. Air quality and GHG impacts associated with future interconnection actions would remain project-specific and would be evaluated in separate NEPA reviews, as appropriate.

3.10.2.2 Alternative B – Action Alternative

Under the Action Alternative, TVA would use the programmatic bounding analysis and ESC to support review of interconnection-related actions. Construction-related effects would generally result from ground disturbance, vehicle and equipment use, and material handling. Activities such as clearing, grading, excavation, and travel on unpaved roads could generate fugitive dust. Equipment used during the construction phase would include pickup trucks, dump trucks, concrete trucks, feller-bunchers, bulldozers, excavators, graders, piledrivers, augers, rollers, and other common equipment and machinery used for clearing and grading (Table 2-1). Emissions from gasoline- and diesel-powered construction vehicles and equipment could include criteria pollutants, precursor pollutants, and greenhouse gases, including CO, nitrogen oxides, PM, SO₂, VOCs, and CO₂. Construction of transmission facilities could also involve limited potential releases of SF₆ associated with installing or handling gas-insulated electrical equipment.

Construction-related emissions would be temporary, localized, and limited by the bounding conditions described in Table 2-1 and Table 2-2. Fugitive dust and equipment emissions would be minimized through standard BMPs, such as watering exposed surfaces, stabilizing disturbed areas, limiting vehicle speeds on unpaved roads, minimizing idling, maintaining equipment in proper working condition, and temporarily suspending dust-generating activities during high-wind conditions when practicable. Proper handling and filling procedures for SF₆-containing equipment would reduce the potential for releases. TVA would also use appropriate equipment specifications, leak detection, and maintenance practices for gas-insulated electrical equipment. Because these emissions would be short term, dispersed, and controlled through

BMPs and equipment management practices, they would not be expected to affect NAAQS attainment status or materially change regional GHG conditions. With implementation of these measures, construction-related effects on air quality would be minor, temporary, and localized and would not be expected to result in a noticeable increase in GHG emissions.

Operation and maintenance activities could generate intermittent emissions from maintenance vehicles and equipment used to inspect facilities, conduct repairs, access substations, and manage vegetation within transmission rights-of-way. These activities could result in localized fugitive dust and combustion-related emissions. Because operation and maintenance activities would be periodic and limited in duration and extent, associated air quality and greenhouse gas effects would be negligible to minor.

Overall, under the Action Alternative, direct effects on air quality and GHG emissions from future interconnection-related actions would be minor, temporary, and localized during construction and negligible to minor during operation and maintenance. Because future actions would remain subject to applicable bounding conditions, BMPs, and project-specific review where needed, the Action Alternative would not be expected to result in substantial indirect effects on air quality or greenhouse gas emissions.

3.11 TRANSPORTATION AND NAVIGATION

3.11.1 Affected Environment

Transportation infrastructure within the TVA PSA includes an extensive network of federal, state, and local roads; bridges; regional airports; rail lines; navigable waterways; marinas; boat ramps; and ports. Public roads are managed by state departments of transportation and other state resource agencies, county highway departments, and municipal public works or road departments. Rail service within the TVA PSA is provided by large regional and national rail operators: Union Pacific Railroad and Burlington Northern Santa Fe Railway in the western portion of the PSA, Norfolk Southern Railway in the eastern portion of the PSA, and CSX Transportation throughout portions of the PSA. Several short-line and local railroads also operate within the PSA.

Commercial barge traffic occurs on major navigable waterways in and near the TVA PSA, including the Mississippi River, Ohio River, Tennessee River, and Tennessee-Tombigbee Waterway. TVA works with the USACE and the U.S. Coast Guard to support management of navigation on the Tennessee River system. Public waterways are also used for recreational boating and other water-based activities.

Interconnection-related actions would generally rely on existing public roadway networks for construction access, worker commuting, delivery of equipment and materials, and removal or placement of borrow and spoil materials. Depending on the location and scale of a future action, existing rail or barge facilities could also be used where available and practicable. This programmatic assessment does not consider the construction or improvement of rail or barge facilities or other transportation infrastructure, apart from temporary or permanent access roads described in Section 2.2.5.

3.11.2 Environmental Consequences

3.11.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, TVA would not establish the bounded programmatic approach for evaluating future interconnection-related actions within the TVA PSA. Because the No Action Alternative would not authorize specific construction activities or physical changes, there would be no direct impacts on transportation or navigation resources at the programmatic level.

Future interconnection requests could still proceed under existing TVA processes and would be evaluated through separate, project-specific environmental reviews, as appropriate. Transportation and navigation impacts associated with those future actions would depend on the location, scale, construction methods, workforce needs, material delivery requirements, and proximity to existing road, rail, port, or waterway resources. Therefore, the No Action Alternative would not result in direct programmatic effects on transportation or navigation; however, it would not provide the same programmatic framework for consistent evaluation of transportation and navigation effects from future interconnection-related actions.

3.11.2.2 Alternative B – Action Alternative

Under the Action Alternative, interconnection-related actions could result in temporary, localized increases in transportation activity during construction. These activities could include worker commuting, delivery of equipment and transmission structures, transport of construction materials, movement of borrow material, and disposal or relocation of spoil material. The magnitude of transportation effects would vary by project depending on site location, project scale, construction duration, access conditions, haul routes, and the capacity of the existing transportation network.

As identified in Table 2-1 and Table 2-2, the maximum construction scenario considered for this programmatic analysis could require up to approximately 1,000 construction workers and could extend for up to 4 years. Assuming one worker per commuting vehicle, worker travel could result in up to approximately 1,000 inbound vehicle trips and 1,000 outbound vehicle trips per day, or approximately 2,000 daily commuter trips. In addition, up to approximately 200 trucks per day could be required to support off-site borrow and spoil disposal, resulting in up to approximately 400 truck trips per day. Assuming a 10-hour workday, this would equate to approximately 20 trucks per hour associated with borrow and spoil hauling. These estimates represent a conservative programmatic scenario for larger-scale actions; smaller projects would generally require fewer workers, fewer truck trips, and shorter construction durations.

Construction-related traffic could temporarily increase traffic volumes on local roadways near a future action area. The relative effect of that increase would depend on existing average annual daily traffic, roadway capacity, road condition, intersection operations, and the distribution of trips across the surrounding transportation network. In rural areas, temporary construction traffic would result in minor increases to traffic volumes, as rural roads generally experience low annual average daily traffic volumes and maintain excess available capacity. In suburban areas, effects could vary depending on existing traffic levels, roadway configuration, school or

commuter traffic patterns, and the concentration of construction access routes. In urban areas, construction traffic would typically represent a smaller proportion of existing traffic volumes but could contribute to localized congestion during peak travel periods or near construction access points.

Where warranted based on the scale or location of a future project, TVA would evaluate transportation conditions during tiered, project-specific environmental review. For larger actions or actions involving substantial truck traffic or oversized equipment deliveries, TVA would develop a transportation management plan or similar project-specific measures to identify appropriate haul routes, coordinate delivery timing, manage construction access, reduce conflicts with local traffic, and maintain safe movement of vehicles and equipment. Standard construction BMPs and mitigation measures would also be used to minimize temporary traffic delays, roadway wear, safety concerns, and access conflicts.

Existing rail or barge facilities could be used for delivery of materials or equipment where such facilities are available, practicable, and appropriate for a project-specific location. Use of rail or barge transportation would be expected to occur within existing transportation and navigation systems and would generally be scheduled to avoid or minimize conflicts with existing rail operations, commercial navigation, recreational boating, and other public waterway uses. No new rail or barge infrastructure would be required under the Action Alternative. Therefore, impacts on rail and navigation resources would generally be limited to temporary and localized use of existing facilities, if used, and are not expected to interfere substantially with existing usages.

If a proposed transmission line would cross navigable waters, TVA would identify applicable authorization requirements during project-specific review and would obtain any required approvals before construction. Such authorizations could include a USACE Section 10 permit under the Rivers and Harbors Act, where applicable.

Operation and maintenance of future interconnection-related facilities would generate substantially less traffic than construction. Once construction is complete, temporary increases in worker commuting, material delivery, and borrow or spoil hauling would cease, and transportation conditions would generally return to preconstruction levels. Routine operation and maintenance activities would require periodic vehicle access but would not be expected to measurably affect regional transportation systems or navigation resources.

Overall, transportation effects under the Action Alternative would be primarily construction-related, temporary, and localized. With the use of existing transportation infrastructure, project-specific transportation planning where warranted, and implementation of appropriate BMPs or mitigation measures, adverse impacts on transportation and navigation resources would be minor.

3.12 NOISE

3.12.1 Affected Environment

Noise is unwanted or unwelcome sound, usually caused by human activity and added to the natural acoustic setting of a locale. It is further defined as sound that disrupts normal activities or diminishes the quality of the environment. Community response to noise depends on the intensity of the sound source, its duration, the proximity of noise-sensitive land uses, and the time of day the noise occurs. For instance, higher sensitivities to noise would be expected during the quieter overnight periods at noise-sensitive receptors such as residences.

Sound is measured in logarithmic units called decibels (dB). Given that the human ear cannot perceive all pitches or frequencies of sound, noise measurements are typically weighted to correspond to the limits of human hearing. This adjusted unit of measure is known as the A-weighted decibel (dBA), which filters out sound in frequencies above and below human hearing. A noise level change of 3 dBA or less is barely perceptible to average human hearing. However, a 5 dBA change in noise level is clearly noticeable. The noise level associated with a 10 dBA change is perceived as being twice as loud; whereas the noise level associated with a 20 dBA change is considered to be four times as loud and would therefore represent a “dramatic change” in loudness.

To account for sound fluctuations, environmental noise is commonly described in terms of the equivalent sound level. The equivalent sound level is the constant noise level that conveys the same noise energy as the actual varying instantaneous sounds over a given period. Fluctuating levels of continuous, background, and/or intermittent noise heard over a specific period are averaged as if they had been a steady sound. The day-night sound level (L_{dn}), expressed in dBA, is the 24-hour average noise level with a 10-dBA correction penalty for the hours between 10 p.m. and 7 a.m. to account for the increased sensitivity of people to noises that occur at night. Typical background day-night noise levels for rural areas are anticipated to range between an L_{dn} of 35 and 50 dB, whereas higher-density residential and urban areas background noise levels range from 43 dB to 72 dB (EPA 1974). Common indoor and outdoor noise levels are shown in Figure 3-4.

3.12.1.1 Noise Regulations

The Noise Control Act of 1972, along with its subsequent amendments (Quiet Communities Act of 1978, USC 42 4901-4918), delegates authority to the states to regulate environmental noise and directs government agencies to comply with local community noise statutes and regulations. Many local noise ordinances are qualitative, such as prohibiting excessive noise or noise that results in a public nuisance. TVA would comply with applicable portions of the Noise Control Act where it does not otherwise conflict with federal standards or regulations that control federal facilities.

Common Outdoor Noises	Sound Pressure Levels (dB)	Common Indoor Noises
	110	Rock Band at 5 m (16.4 ft)
Jet Flyover at 300 m (984.3 ft)		
	100	
Gas Lawn Mower at 1 m (3.3 ft)		Inside Subway Train (New York)
	90	
Diesel Truck at 15 m (49.2 ft)		Food Blender at 1 m (3.3 ft)
	80	Garbage Disposal at 1 m (3.3 ft)
		Shouting at 1 m (3.3 ft)
Gas Lawn Mower at 30 m (98.4 ft)	70	Vacuum Cleaner at 3 m (9.8 ft)
Commercial Area		Normal Speech at 1 m (3.3 ft)
	60	Large Business Office
		Dishwasher Next Room
Quiet Urban Daytime	50	
Quiet Urban Nighttime	40	Small Theater, Large Conference Room
Quiet Suburban Nighttime		Library
	30	
Quiet Rural Nighttime		Bedroom at Night
		Concert Hall (Background)
	20	
		Broadcast and Recording Studio
	10	
		Threshold of Hearing
	0	

Source: FHWA 2018

Key: dB = decibels; ft. = feet; m = meters

Figure 3-4. Common Indoor and Outdoor Noise Levels

Some counties and other local governments within the TVA PSA may implement noise regulations through local ordinances or zoning requirements. These regulations may include qualitative standards, such as prohibitions on excessive noise or public nuisance conditions, or quantitative sound-level limits that vary by land use, time of day, or measurement location. Where applicable, TVA would review and consider local noise requirements during project-specific environmental review and would comply with applicable requirements where they do not otherwise conflict with federal standards or regulations that control federal facilities.

There is considerable variation in individual response to noise. Noise that one person would consider mildly annoying, another person may consider highly annoying or not annoying at all. The EPA noise guideline recommends an Ldn of 55 dBA, which is sufficient to protect the public from the effect of broadband environmental noise in typical outdoor and residential areas. These levels are not regulatory goals but are “intentionally conservative to protect the most sensitive portion of the American population” with “an additional margin of safety” (EPA 1974). The U.S. Department of Housing and Urban Development (HUD) considers an Ldn of 65 dBA or less to be compatible with residential areas (HUD 1985).

3.12.1.2 Background Noise Levels

Typical background day-night noise levels for rural areas are anticipated to range between an Ldn of 35 and 50 dB, whereas higher-density residential and urban areas background noise levels range from 43 dB to 72 dB (EPA 1974). To account for sound fluctuations, environmental noise is commonly described in terms of the equivalent sound level (Leq). The Leq value, expressed in dBA, is the energy averaged, A-weighted sound level for the time period of interest. The Ldn is the 24-hour equivalent sound level, which incorporates a 10-dBA correction penalty for the hours between 10 p.m. and 7 a.m., to account for the increased sensitivity of people to sounds that occur at night.

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

Community noise refers to outdoor noise near a community. A continuous source of noise is rare for long periods and is typically not a characteristic of community noise. Typical background day/night noise levels for rural areas range between 35 dBA and 50 dBA, whereas higher-density residential and urban areas background noise levels range from 43 dBA to 72 dBA (EPA 1974). Background noise levels greater than 65 dBA can interfere with normal conversation, watching television, using a telephone, listening to the radio, and sleeping.

3.12.1.3 Noise Receptors

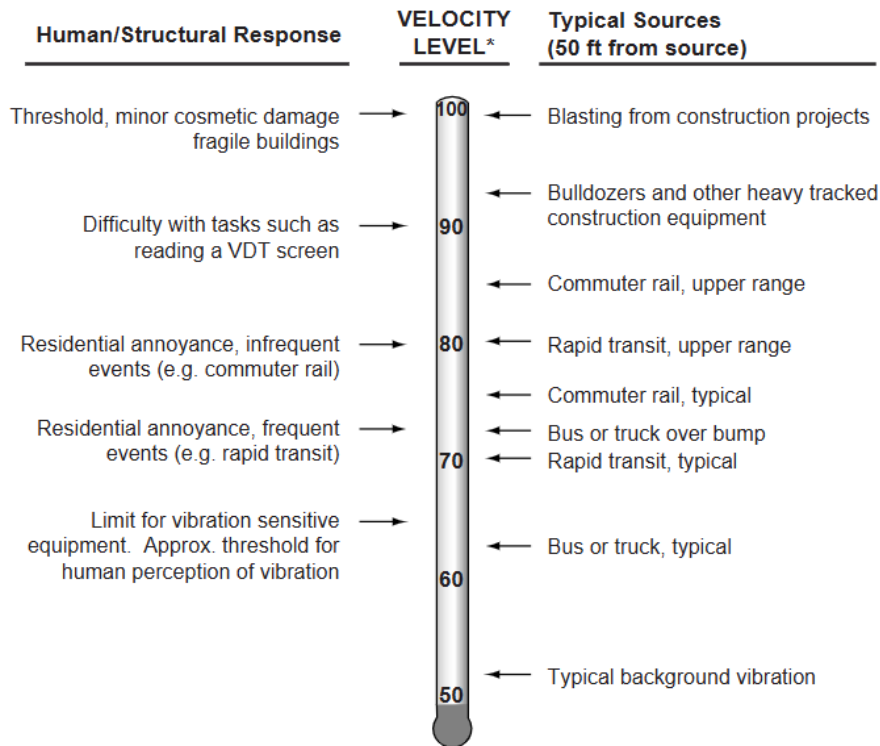
Sensitive noise receptors include residences or other developed sites where frequent human use occurs, such as churches, parks, schools, recreational areas, and other community facilities. The types and locations of sensitive noise receptors near action areas would vary depending on the setting, surrounding land uses, and proximity of nearby development. In general, receptors could include residences, public recreation areas, campgrounds, boat ramps, trails, playgrounds, picnic areas, or other locations where people may be regularly present. The distance from action areas to the nearest sensitive receptors would vary by project location and would be considered during site-specific environmental review.

3.12.1.4 Vibration

Construction and demolition activities, including the operation of heavy machinery, construction-related vehicles, and blasting, can create ground vibration. There are three primary types of receivers that can be adversely affected by ground vibration: people, structures, and equipment. Ground vibrations and ground noise can cause annoyance to people who live or work near sources of vibration. Additionally, if the vibration amplitudes are high enough, there is the possibility of physical and cosmetic damage to structures and the possibility of interference with the functioning of sensitive machinery. The length of time and strength of vibration varies with the equipment used. For example, the vibration from blasting has a high amplitude and short duration, whereas vibration from grading or highway traffic is lower in amplitude but longer in duration (Caltrans 2020).

During construction of interconnection-related facilities, most of the vibration sources would consist of equipment that produces continuous vibration, including excavation equipment, tracked vehicles, and heavy machinery operation. However, single-impact vibration sources such as blasting may also be used during excavation of the upper reservoir and power tunnel.

The Federal Transit Administration (FTA) developed a noise and vibration impact assessment manual for estimating vibrations generated by common transportation and construction sources, possible damage levels, and dampening distances. Figure 3-5 presents typical levels of ground-borne vibration at 50 feet for a variety of common transportation and construction equipment.



* RMS Vibration Velocity Level in VdB relative to 10^{-6} inches/second

Figure 3-5. Typical Levels of Ground-Borne Vibration

At 50 feet from the source, community annoyance begins at a velocity level of 70 vibration decibels (VdB) for frequent events. Damage to structures occurs at 100 VdB for one-time activities such as blasting operations (FTA 2018).

3.12.1.5 Alternative B – Action Alternative

Under the Action Alternative, noise impacts would occur primarily during construction of interconnection-related actions. Construction activities could generate noise from an increase in local roadway traffic and use of equipment such as pickup trucks, dump trucks, concrete trucks, feller-bunchers, bulldozers, excavators, graders, piledrivers, augers, rollers, and blasting equipment. Typical construction equipment noise levels are expected to be 85 dBA or less at 50 feet (Federal Highway Administration [FHWA] 2016). Based on straight-line noise attenuation, noise produced from this typical construction equipment would attenuate to 65 dBA or less at 500 feet. Receptors within 500 feet of construction areas would have the potential to experience periods of very loud (65 to 85 dBA) noise during construction. While this is notably higher than typical ambient noise levels, it illustrates a temporary, worst-case scenario in which construction equipment is operated within 500 feet of a noise receptor. Furthermore, construction equipment typically does not operate at maximum levels continuously; actual noise levels are generally expected to be lower than those described above and may be further reduced by vegetation, topography, and the use of modern, well-maintained equipment, mufflers, and hydraulic systems. Construction noise would typically be limited to daytime hours and would be limited to the duration of construction.

In addition to typical construction equipment, periodic rock blasting may be required during the construction period for some interconnection-related actions. Blasting may produce noise levels that reach up to 126 dBA (Washington State Department of Transportation 2020). Due to the isolated nature of blasting events, the noise produced by the explosion and from the collapse of rock is not a continuous, background, or intermittent noise that would contribute to typical noise levels. An isolated explosive blast event may be equivalent to a thunderclap at the source but would be temporary and short-term. Blasting would be managed through project-specific controls, which may include a blasting plan, scheduling restrictions, and notifications to local officials, emergency responders, and nearby businesses and residents, as appropriate. Blasting activities would generally be infrequent, short term, and limited to specific construction phases and locations; therefore, they would not contribute to long-term noise increases at sensitive receptors. Although blasting could result in noticeable short-term noise impacts near active work areas, these impacts would be localized and limited in duration.

Ground vibration could also occur during construction, particularly from blasting, excavation, or other heavy equipment operation. Vibration levels would depend on the construction method, equipment type, distance to nearby structures, and local geologic conditions. As shown in Figure 3-5, structural damage may occur at 100 VdB at 50 feet from the source for isolated activities such as blasting (FTA 2018). As noted in Table 2-2, blasting would not occur within 500 feet of residences or other structures. Therefore, vibration-related impacts may result in temporary annoyance to nearby residents but would not cause structural damage.

Potential sources of operational noise associated with interconnection-related actions may include substations, transmission lines, switching equipment, transformers, voltage-regulation equipment, circuit breakers, and periodic inspection, repair, and maintenance activities. Under certain wet weather conditions, substations and high-voltage transmission lines may produce audible low-volume hissing, crackling, or humming sounds from corona discharge, which occurs when air electrically breaks down into charged particles. Under normal conditions, corona-generated noise is typically not audible; during rain, it would likely be indistinguishable from background noise. During moist, nonrainy conditions, such as heavy fog, corona noise could cause a minor increase in background noise near energized facilities, up to approximately 61 dBA. However, because these conditions would be intermittent and noise levels would decrease with distance, corona noise would not be expected to cause perceptible changes in noise levels at nearby sensitive receptors. Transformers, voltage-regulation equipment, circuit breakers, switches, and other electrical equipment may also generate operational noise, which is generally localized. Transformers typically operate in self-cooled mode, though cooling fans or similar equipment may operate intermittently during high-load or extreme-temperature conditions. Where fans are used, they typically generate noise levels of approximately 85 dBA at 3 feet, which would attenuate to levels below 55 dBA at approximately 100 feet from the source. Thus, fan noise would not generally be audible over background noise at nearby noise receptors.

Occasionally, a loud impulse noise is produced when a breaker is tripped due to excessive current, high voltage, low voltage, low frequency, or other less common problems. When such problems occur, the circuit breaker opens to disconnect part of the system, and the flow of current is interrupted. The noise from the breaker is expected to last a fraction of a second and range from 96 to 105 dBA at a distance of 50 feet. Breaker noise may be audible to nearby residents and other sensitive noise receptors, however, because of the infrequent occurrence, impacts from breaker noise would be minor.

In addition, the operation and maintenance of transmission infrastructure can result in periodic noise related to line maintenance and vegetation management. Equipment used for right-of-way maintenance may include chainsaws, skidders, bulldozers, tractors, and low ground-pressure feller-bunchers, which could produce noise levels similar to those produced during the construction phase. However, maintenance activities would be intermittent and short-lived, and therefore, noise impacts would be minor.

Overall, construction-related noise and vibration impacts under the Action Alternative would be temporary, localized, and generally limited to active construction periods. Noise impacts from the operation of interconnection-related actions would be minor, as the occasional corona discharge and fan cooling would result in only slight increases to background noise levels, and audible breaker noise and maintenance activities would be infrequent and short-lived. Therefore, noise and vibration impacts from interconnection-related actions under the Action Alternative would be minor.

3.13 VISUAL IMPACTS

3.13.1 Affected Environment

Visual resources are the visible physical, biological, and human-made features that contribute to the character, scenic quality, and visual setting of a place. These resources include natural landforms, vegetation, water features, agricultural lands, developed areas, transportation corridors, utility infrastructure, and other elements that influence how residents, visitors, and other viewers perceive a landscape. The perceived quality of visual resources can vary depending on the setting, viewer expectations, viewing distance, duration of views, and the degree to which existing development or natural features screen or frame the viewshed.

For this programmatic analysis, visual resources within the TVA PSA are evaluated in relation to the classifications and interconnection-related actions described in Chapter 2. The classification criteria used for this analysis are adapted from the U.S. Forest Service scenery management system and TVA planning methods. The assessment also incorporates terminology and concepts from *Landscape Aesthetics: A Handbook for Scenery Management*, Agriculture Handbook Number 701 (USFS 1995), including scenic attractiveness, scenic integrity, and visibility.

The visual landscape of an area is shaped by the combination of natural and human-made features that define landscape character, including scenic attractiveness, integrity, and visibility. Scenic attractiveness is a measure of scenic quality based on the perceived forms, colors, textures, and composition of the landscape. Scenic integrity is a measure of the degree to which the existing landscape appears visually unified and intact relative to its natural or established character. Areas with limited human modification and a high degree of visual unity generally have higher scenic integrity, while areas with substantial urban, suburban, industrial, transportation, or utility development generally have lower scenic integrity because human-made features are already prominent components of the viewshed.

Scenic visibility may be described in terms of foreground, middleground, and background views. Foreground views generally occur within 0.5 miles of the observer, where individual objects and details are readily distinguishable. Middleground views generally occur from 0.5 to 4 miles from the observer, where individual features remain visible but tend to merge into broader patterns. Background views generally occur from 4 to 10 miles from the observer, where colors and details are less discernible unless features are large, isolated, or visually contrasting. Potential visual effects are generally greatest where new features would be visible in the foreground or would introduce substantial contrast with the existing landscape character.

In this visual impact assessment, sensitive receptors may include scenic vistas, scenic highways, public lands, parks and recreation areas, residential viewers, schools, community facilities, and other public viewpoints located within the viewshed of interconnection-related actions. The sensitivity of these receptors would depend on viewing distance, duration and frequency of views, viewer expectations, existing visual conditions, and the degree to which vegetation, topography, development, or other intervening features screen or frame views. Because the presence and visibility of sensitive receptors would vary by location, potential effects on these receptors would be evaluated during site-specific review, as appropriate.

The affected environment for visual resources includes areas where interconnection-related actions could occur, including temporary and permanent work areas, access routes, rights-of-way, substations, and other associated facilities, as well as the surrounding landscape from which these actions could be visible. Foreground features would vary depending on site conditions and land use. As discussed in Section 3.1, major land uses within the TVA PSA include forested land, agricultural land, rural residential areas, developed urban and suburban areas, industrial areas, transportation corridors, and existing utility corridors. As a result, site-specific action areas may include a mix of natural features, such as forests, fields, and rolling terrain, and human-made features, such as roads, commercial and residential development, substations, transmission lines, and maintained rights-of-way.

Existing transmission corridors typically consist of cleared rights-of-way containing transmission structures, conductors, access roads, and maintained vegetation. These corridors may be visually prominent in open agricultural areas, at road crossings, and from nearby residences or public viewpoints; however, in forested or rolling terrain, intervening vegetation and landforms may partially screen views of these features. In areas where transmission corridors, substations, roads, or other developed features are already present, the visual sensitivity of the affected environment would generally be lower because utility or developed features are established components of the landscape. In less developed or visually intact settings, the introduction of new transmission infrastructure, access roads, or cleared rights-of-way could result in greater visual contrast and a greater potential to reduce scenic integrity.

Views of interconnection-related action areas would generally be most apparent in the foreground (i.e., within a half mile) in all directions. Visibility may be reduced where vegetation, local topography, existing development, or other intervening features provide screening.

3.13.2 Environmental Consequences

3.13.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, TVA would not establish a programmatic bounding analysis and ESC to review interconnection-related actions. TVA would continue to use the standard project-specific NEPA process to evaluate interconnection-related actions. Therefore, there would be no direct effects on visual resources at the programmatic level. However, the No Action Alternative could indirectly affect TVA's ability to process interconnection requests efficiently and consistently. Impacts on visual resources from future interconnection actions would remain project-specific and would be evaluated in separate NEPA reviews.

3.13.2.2 Alternative B – Action Alternative

Under the Action Alternative, interconnection-related actions could result in short-term and long-term impacts on visual resources depending on the type, scale, location, and visibility of the action; the existing landscape character; and the presence of sensitive visual receptors.

Short-term visual effects could occur during construction, installation, modification, or maintenance activities. These effects would result from the temporary presence of construction equipment, vehicles, materials, cleared or disturbed ground, and work crews. Construction

crews would generally be mobile and would move along the right-of-way or work area as activities progress, limiting the duration of visual disturbance at any one location. Short-term effects would generally be localized to the immediate vicinity of the action area and would be reduced after construction is complete and disturbed areas are stabilized, restored, or revegetated in accordance with applicable TVA BMPs (TVA 2022). Because these effects would be temporary and localized, short-term visual impacts would generally be minor.

Interconnection-related actions could also result in visual effects if they require vegetation clearing, access road construction or improvement, installation or modification of transmission structures, substation construction or expansion, or other temporary or permanent site modifications. The degree of effect would vary based on the existing landscape character and the level of visual contrast introduced by the action. Effects would generally be greater where tree clearing, new right-of-way, new aboveground infrastructure, or new access roads would be introduced into relatively undeveloped or visually intact settings. Effects would generally be lower where actions would occur within or adjacent to existing utility corridors, transportation rights-of-way, substations, industrial areas, or other developed settings where human-made features are already prominent components of the viewshed.

Long-term visual effects could result from visible alterations associated with new or modified interconnection infrastructure, including new rights-of-way, access roads, substations, transmission structures, conductors, maintained vegetation zones, or other aboveground facilities. As detailed in Table 2-1, transmission and substation features are anticipated to reach a maximum height of 150 feet. Typical transmission structures would consist of either self-supporting galvanized, laced-steel structures, H-frame steel-poles, or steel, single- or double-pole structures (see Figure 2-1 and Figure 2-2). The most visible long-term changes would generally occur where woody vegetation is removed or where new aboveground infrastructure introduces contrasting forms, lines, colors, or textures into the existing landscape. These changes could be visible from nearby residences, roads, natural areas, parks, or other public viewpoints, particularly within foreground views. Through siting and project planning, TVA would ensure that interconnection-related actions are not constructed within the foreground viewshed (0.5 mile) of a national scenic or historic trail, national heritage area, wild and scenic river, or national scenic highway or byway, where visual setting and visitor experience contribute to the scenic, recreational, historic, and/or cultural value of these designated resources.

Where interconnection-related actions would be located within or parallel to existing transmission corridors, transportation corridors, substations, or other developed areas, visual effects would generally be reduced because the action would modify or expand an existing developed feature rather than introduce a new visual element into an otherwise less developed landscape.

If a new substation were constructed as part of an interconnection-related action, security lighting could increase localized nighttime illumination. Such lighting could result in a slight reduction in dark sky conditions in the immediate area. However, TVA routinely designs substation lighting to minimize off-site light spill and upward illumination. As described in TVA's

Substation Lighting Guidelines (TVA 2026e), substation lighting would be designed to cast light downward, minimize emissions above the horizontal plane, and accommodate concerns of nearby residents. New substation lighting would also be expected to comply with applicable Illuminating Engineering Society of North America and American National Standards Institute guidance (TVA 2026e). Therefore, any increase in nighttime lighting would generally be localized and would not be expected to substantially affect dark sky conditions or result in more than minor visual effects.

Existing human-made features within many portions of the TVA PSA would increase the ability of the landscape to absorb some additional visual change associated with interconnection-related actions. However, in areas with higher scenic integrity or more sensitive public views, interconnection-related actions could reduce the visual unity of the landscape, particularly in the foreground. Changes in the middleground and background would generally be less pronounced because transmission-related features would typically be less visually dominant at greater distances and may be screened by topography, vegetation, or existing development.

Based on the programmatic nature of this analysis, visual impacts from the Action Alternative would generally range from low to moderate and would be greatest in the foreground of site-specific action areas. At this distance, scenic integrity could be reduced where new or modified utility infrastructure, cleared or maintained corridors, access improvements, or other permanent modifications become prominent features in the landscape. Changes in the middleground and background would generally be less pronounced because interconnection-related alterations would be less visually dominant at greater distances and may be screened by topography, vegetation, or existing development. The potential for greater effects would be considered during subsequent site-specific review; as noted in Section 3.14, if interconnection-related actions are located within or near a natural area, park, or recreation area, TVA would coordinate with the appropriate managing agency to identify measures to avoid or minimize impacts, including visual impacts, as appropriate. Overall, with implementation of TVA's standard design practices, BMPs, and site-specific review when required, visual impacts from interconnected-related actions are generally expected to be low to moderate.

3.14 NATURAL AREAS, PARKS, AND RECREATION

3.14.1 Affected Environment

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

Parks, managed areas, and ecologically significant sites are typically managed for one or more of the following objectives (TVA 2026c):

- **Recreation Areas:** Managed for outdoor recreation or open space. Examples include national, state, and local parks and recreation areas; reservoirs owned or managed by

TVA or others; picnic and camping areas; trails and greenways; and TVA small wild areas.

- **Species/Habitat Protection:** Areas with endangered or threatened plants or animals, unique natural habitats, or habitats for valued fish or wildlife populations. Examples include national and state wildlife refuges, mussel sanctuaries, TVA habitat protection areas, and nature preserves.
- **Resource Production/Harvest:** Lands managed for forest product production, hunting, and fishing. Examples include national and state forests, state game lands, wildlife management areas (WMAs), and national and state fish hatcheries.
- **Scientific/Educational Resources:** Lands protected for scientific research and education. Examples include biosphere reserves, research natural areas, environmental education areas, TVA ecological study areas, and federal research parks.
- **Historic Resources:** Lands containing significant historic resources. Examples include national battlefields and military parks, state historic sites, and state archaeological areas.
- **Scenic Resources:** Areas with exceptional scenic qualities or views. Examples include national and state scenic trails, scenic areas, wild and scenic rivers, and wilderness areas.
- **Agricultural Resources:** Lands with significant local agricultural production and open space value, often in areas where suburban development is increasing. Examples include working family farms protected by conservation easements.

Numerous parks, managed areas, and ecologically significant sites occur throughout the TVA PSA across all physiographic regions, but they are most concentrated in the Blue Ridge and Mississippi Alluvial Plain physiographic regions (TVA 2026c). Individual ecologically significant areas range in size from a few acres to thousands of acres. Many areas cross state boundaries or are managed cooperatively by multiple agencies.

TVA transmission line rights-of-way cross seven National Park Service units, nine National Forests, six National Wildlife Refuges, and numerous state WMAs, state parks, and local parks (TVA 2019). Tennessee contains numerous managed and natural areas, including lands managed by TDEC and Tennessee Wildlife Resources Agency. These resources include state parks, state natural areas, WMAs, natural areas, recreation lands, and other conservation properties that support public recreation, habitat protection, environmental education, hunting, fishing, hiking, paddling, and other outdoor uses. Several Tennessee-managed areas are associated with or occur near TVA reservoirs, dam reservations, transmission corridors, and other TVA-managed lands, reflecting the close relationship between public recreation, conservation lands, and TVA's water and power infrastructure throughout the state.

In Alabama, the Alabama Department of Conservation and Natural Resources manages public recreation areas, including WMAs, special opportunity hunting areas, state parks, public fishing lakes, and Forever Wildlands. In Kentucky, the Office of Kentucky Nature Preserves manages

and operates natural areas, which include state natural areas that support fishing, paddling, and other outdoor recreation, as well as heritage lands with environmental education centers and outdoor recreation areas.

Mississippi, Georgia, North Carolina, and Virginia also contain managed and natural areas within the TVA PSA. The Mississippi Department of Wildlife, Fisheries, and Parks; Georgia Department of Natural Resources; North Carolina Division of Parks and Recreation, North Carolina Wildlife Resources Commission, North Carolina Department of Natural and Cultural Resources; Virginia Department of Conservation and Recreation; and Virginia Department of Wildlife Resources manage these resources. Managed and natural areas may occur on or are adjacent to or near TVA transmission corridors, generation-related infrastructure, or areas where future interconnection-related actions could reasonably be proposed.

3.14.2 Environmental Consequences

3.14.2.1 Alternative A – The No Action Alternative

Under the No Action Alternative, TVA would not establish a programmatic bounding analysis and ESC for reviewing interconnection-related actions. TVA would continue to evaluate proposed interconnection-related actions through its existing project-specific NEPA process. Because the No Action Alternative would not authorize construction, operation, or maintenance activities at the programmatic level, there would be no direct effects on natural areas, parks, or recreation resources. However, the No Action Alternative could indirectly affect TVA's ability to process interconnection requests efficiently and consistently.

3.14.2.2 Alternative B – Action Alternative

Under the Action Alternative, TVA would use the programmatic bounding analysis and ESC to support review of future interconnection-related actions. As part of that review, TVA would determine whether natural areas, parks, recreation resources, or other managed areas occur on or near (i.e., within 0.1 miles) the area potentially affected by a proposed interconnection action. These resources could include ecologically significant sites; federal, state, or local park lands; national or state forests; wilderness, scenic, or WMAs; national scenic and historic trails; wild and scenic rivers; Nationwide Rivers Inventory streams; Land and Water Conservation Fund-assisted sites; and other recreation or conservation lands.

Potential effects on natural areas, parks, and recreation resources would generally be association with construction activities. Such effects could include temporary increases in noise, construction traffic, fugitive dust, visual disturbance, and localized access delays near construction entrances, laydown areas, or haul routes. These effects would be most likely where proposed interconnection-related activities are adjacent to, visible from, or require temporary access near public parks, trails, natural areas, WMAs, or other recreation settings. Construction activities could temporarily reduce the quality of the recreation setting or user experience; however, these effects would be short term and localized.

Direct impacts to natural areas, parks, and recreation resources would generally be avoided or minimized through siting, design, and by implementing applicable BMPs and environmental

commitments identified during site-specific review. If a proposed interconnection-related action would require vegetation clearing, access, laydown areas, or other ground disturbance within or immediately adjacent to a managed area, TVA would evaluate the affected resource and, as appropriate, coordinate with the managing agency or landowner to avoid or minimize adverse effects. Operation and maintenance effects would generally be limited to intermittent vehicle access, inspections, vegetation management, and maintenance of interconnection facilities. These activities would be localized and would not be expected to substantially affect the availability, function, or use of nearby natural areas, parks, or recreation resources. Permanent visual changes could occur where new poles, lines, substations, or associated equipment are visible from recreation areas, trails, or scenic settings. However, these changes would typically occur in areas with existing utility, transportation, or developed land uses and would not be expected to preclude continued recreational use or substantially alter the important attributes of affected resources. Effects on natural areas, parks, and recreation under the Action Alternative would depend on the location and design of future interconnection-related actions and the extent to which those actions occur near sensitive recreation or managed areas. Because site-specific review would be used to identify nearby resources and apply avoidance or minimization measures, effects would generally be temporary, localized, and not expected to destabilize or substantially alter the recreational, ecological, scenic, or conservation values of affected areas. Accordingly, impacts to natural areas, parks, and recreation under the Action Alternative would generally be minor.

3.15 CULTURAL RESOURCES

3.15.1 Affected Environment

Cultural resources include precontact and historic archaeological sites, districts, buildings, structures, objects, and places associated with important historical events, even where physical evidence of those events may no longer be present. Historic architectural resources are also considered cultural resources and generally include standing structures, such as houses, barns, dams, or power plants that are at least 50 years old and may be eligible for listing in the National Register of Historic Places (NRHP). Cultural resources are considered historic properties when they are listed in, or eligible for listing in, the NRHP, which is maintained by the National Park Service.

Eligibility for listing in the NRHP is based on the Secretary of the Interior's criteria for evaluation (36 CFR 60.4). To be eligible, a property must retain integrity of location, design, setting, materials, workmanship, feeling, and association, and meet one or more of the following criteria:

- Criterion A: Association with events that have made a significant contribution to the broad patterns of history.
- Criterion B: Association with the lives of persons significant in the past.
- Criterion C: Embodiment of distinctive characteristics of a type, period, or method of construction; representation of the work of a master; possession of high artistic values;

or representation of a significant and distinguishable entity whose components may lack individual distinction.

- Criterion D: Potential to yield information important in prehistory or history.

3.15.1.1 Regulatory Framework for Cultural Resources

Federal agencies, including TVA, are required to consider effects on historic properties, primarily under the NHPA (16 USC §§ 470 et seq.). Other applicable laws include the Archaeological and Historic Preservation Act (16 USC §§ 469- 469c), the Archaeological Resources Protection Act (16 USC §§ 470aa-470mm), the Native American Graves Protection and Repatriation Act (25 USC §§ 3001- 3013), and the American Indian Religious Freedom Act (42 USC § 1996).

Section 106 of the NHPA requires federal agencies to identify historic properties, assess potential effects, and consult with the appropriate SHPOs, Tribal Historic Preservation Officers (THPOs), federally recognized tribes, and other consulting parties. Section 110 establishes broader federal responsibilities for identifying, protecting, and managing historic properties as part of agency programs.

TVA implements cultural resource reviews through PAs and consultation procedures developed with the Advisory Council on Historic Preservation, SHPOs, THPOs, and federally recognized tribes. These agreements provide standardized processes for routine undertakings and support consistent consideration of archaeological and historic architectural resources.

3.15.1.2 Archaeological Resources

Lands within the TVA PSA contain a long and diverse archaeological record reflecting thousands of years of human occupation, including Paleo-Indian, Archaic, Woodland, Mississippian, and historic-period resources. Archaeological sites may include habitation areas, mounds, artifact scatters, cemeteries, and other deposits that provide information about past lifeways, settlement, trade, subsistence, and cultural change.

For over 80 years, TVA has been actively engaged in identifying and evaluating archaeological resources on TVA lands, easements, and project areas. Archaeological investigations are conducted, as appropriate, to support Section 106 compliance before ground-disturbing activities are approved or implemented (TVA 2026c).

TVA maintains cultural resource records to support project planning and resource management, and TVA's cultural resources staff manage more than 12,500 archaeological sites across the PSA (TVA 2026i). Archaeological resources are typically identified through Phase I archaeological surveys conducted to support compliance with Section 106 of the NHPA. TVA has completed numerous archaeological surveys along reservoir shorelines, within reservoirs, and on power plant reservations, and some TVA transmission line corridors have also been surveyed. When an interconnection-related action could affect archaeological resources, TVA generally seeks to avoid or minimize effects through siting, design changes, or BMPs. If adverse

effects cannot be avoided, mitigation is developed in consultation with SHPOs, THPOs, federally recognized tribes, and other consulting parties (TVA 2026c).

3.15.1.3 Historic Architectural Resources

Historic architectural resources include buildings, structures, objects, sites, and districts that are generally at least 50 years old or are exceptionally significant. Within TVA's PSA, these resources may include residences, barns, public buildings, corporate facilities, recreation facilities, dams, and generating plants that are listed in or eligible for listing in the NRHP.

Many TVA-owned or managed facilities are historic-age, and some retain sufficient integrity to qualify as historic properties. TVA continues to balance preservation of historic character-defining features with safe, reliable operation and modernization of its facilities.

TVA maintains and updates inventories of historic architectural resources to support Section 106 reviews and long-term management of historic properties. Transmission assets are addressed through separate programmatic efforts and agreements (TVA 2026c).

3.15.1.4 Traditional Cultural Properties

Traditional Cultural Properties and cultural landscapes are places associated with cultural practices, beliefs, events, or values important to a living community. These resources may include mound sites, Trail of Tears segments, stacked stone features, sacred sites, and other locations identified through consultation. TVA does not disclose sensitive information regarding sacred sites or Traditional Cultural Properties identified by consulting tribes (TVA 2026c).

3.15.2 Environmental Consequences

Potential effects on cultural resources would depend on the type, location, and extent of each interconnection-related action. Effects could occur where construction or operation would physically affect historic properties, or where an action would alter the setting, feeling, or association that contributes to a historic property's significance through changes in its viewshed. Because individual interconnection-related actions could occur throughout TVA's PSA, the presence and sensitivity of cultural resources would vary by project location.

3.15.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, TVA would continue to use its standard NEPA process to review interconnection-related actions. This alternative would not authorize any specific construction or ground-disturbing activities and, therefore, would not result in direct effects on cultural or historic resources at the programmatic level. However, continued reliance on the existing review process could indirectly affect TVA's ability to process interconnection requests efficiently and consistently. Potential effects from future interconnection-related actions would remain project-specific and would continue to be evaluated through separate NEPA and Section 106 reviews, as appropriate.

3.15.2.2 Alternative B – Action Alternative

Under the Action Alternative, construction of new transmission lines, substations, access roads, and laydown areas could involve physical and visual effects with the potential to adversely affect NRHP-eligible or NRHP-listed archaeological resources or other historic properties. Because these interconnection-related actions could occur anywhere within the TVA PSA, archaeological sites, historic structures, historic districts, or other cultural resources may be present within or near future action areas.

As described in Table 2-1, construction could require up to approximately 610 acres of ground disturbance for transmission line right-of-way and an additional 80 acres for substation development. Potential effects on archaeological resources could include ground disturbance resulting in the destruction of artifacts, features, or soils containing archaeological materials; loss of archaeological data; and damage associated with clearing, grading, excavation, erosion, compaction, and the temporary use of laydown areas. Actions located in or within the viewshed of NRHP-eligible or NRHP-listed historic architectural resources and districts could affect the characteristics that contribute to a property's NRHP eligibility, including setting, feeling, and association.

In 2019, TVA established a PA with SHPOs, the Advisory Council on Historic Preservation, and federally recognized tribes within the TVA PSA. The PA establishes a programmatic process for complying with Section 106 of the NHPA, identifies roles and responsibilities, and specifies undertakings that are exempt from further Section 106 review. Additionally, in 2023, TVA established a PA with the Tennessee SHPO and Advisory Council on Historic Preservation regarding operation of existing transmission assets. The PA establishes programmatic processes for complying with Section 106 of the NHPA specific to TVA historic transmission assets in Tennessee.

For states where TVA does not have an executed PA, or for undertakings not covered by an existing PA, TVA would conduct site-specific Section 106 reviews to identify historic properties, assess effects, and resolve any adverse effects. If an interconnection-related action has the potential to adversely affect cultural or historic resources, TVA would consult with the appropriate SHPO, tribes, and other consulting parties to determine appropriate avoidance, minimization, or mitigation measures. Mitigation depends on factors such as prior survey coverage, the nature and integrity of identified resources, and the scope of the proposed undertaking.

Any adverse effects on cultural or historic resources resulting from the Action Alternative would be mitigated pursuant to the PAs or site-specific Section 106 review, as appropriate, such that there would be no significant impact to cultural or historic resources.

3.16 HAZARDOUS MATERIALS AND SOLID AND HAZARDOUS WASTE

3.16.1 Affected Environment

3.16.1.1 Solid Waste

Solid waste includes a broad range of discarded materials, including refuse, sanitary waste, contaminated environmental media, scrap metal, nonhazardous wastewater treatment plant sludge, nonhazardous air pollution control waste, nonhazardous industrial waste, and other solid, liquid, or contained gaseous materials. Solid waste is regulated under the RCRA Subtitle D and implementing regulations administered by the EPA. States are responsible for ensuring that federal solid waste requirements are met and may establish more stringent requirements.

Some states also regulate special wastes, which may include sludges, bulky wastes, pesticide wastes, industrial wastes, combustion wastes, friable asbestos, and certain hazardous wastes exempted from RCRA Subtitle C requirements. If generated, any of these wastes would be managed and disposed of in accordance with applicable federal and state requirements.

Solid wastes associated with TVA's generator interconnection processes could include demolition debris, oily debris, packaging materials, scrap lumber, and domestic waste. TVA has incorporated waste minimization measures into its procedures to reduce the volume and toxicity of waste generated. These measures include reuse and recycling, substitution of less hazardous materials where practicable, and chemical traffic control (TVA 2026c)

3.16.1.2 Hazardous Material

Hazardous materials are regulated under several federal statutes and implementing regulations, including Occupational Safety and Health Administration (OSHA) standards, the Emergency Planning and Community Right-to-Know Act (EPCRA), RCRA, the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, and the Toxic Substances Control Act.

EPCRA regulations are codified at 40 CFR Parts 355, 370, and 372. Under 40 CFR 355, facilities with extremely hazardous substances present above applicable threshold planning quantities are required to provide information to the State Emergency Response Commission, Local Emergency Planning Committee, and local fire department (EPA 2025i). Inventory reporting also is required for facilities with extremely hazardous substances above applicable threshold planning quantities or more than 10,000 pounds of any OSHA-regulated hazardous material. EPCRA also requires reporting for certain releases and discharges of toxic chemicals (EPA 2025j).

RCRA regulations define hazardous waste and establish a "cradle-to-grave" management system for the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA Subtitle C establishes requirements for hazardous waste management and includes separate regulatory provisions for certain waste streams. For example, used oil is regulated as hazardous waste if disposed of but is subject to separate used oil management standards if recycled. RCRA also establishes requirements for generators, transporters, processors, and

burners of recycled used oil (EPA 2025k). Universal waste is a subset of hazardous wastes that are widely generated and include batteries, pesticides, mercury-containing equipment, lamps, and aerosol cans. Universal wastes may be managed under the hazardous waste regulations or under streamlined universal waste requirements, as applicable (EPA 2025l).

3.16.2 Environmental Consequences

3.16.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, TVA would not establish a programmatic bounding analysis and ESC to review interconnection-related actions. TVA would continue to use the standard project-specific NEPA process to evaluate interconnection-related actions. Therefore, there would be no direct impacts on solid waste and hazardous materials at the programmatic level, but it could indirectly affect TVA's ability to process interconnection requests efficiently and consistently. Impacts from future interconnection actions on solid waste and hazardous material would remain project-specific and would be evaluated in separate NEPA reviews.

3.16.2.2 Alternative B – Action Alternative

Under the Action Alternative, TVA would use the programmatic bounding analysis and ESC to review interconnection-related actions. Construction and operation of transmission lines, substations, and associated facilities under future interconnection projects could result in minor increases in solid waste generation and the use or management of hazardous materials. Typical construction-related solid wastes could include cleared vegetation, demolition debris, oily debris, packaging materials, scrap lumber, excess spoil, and domestic waste.

As described in Section 2.2.6, construction waste, excess spoil, packaging materials, and other materials would be reused, recycled, managed, or disposed of in accordance with applicable federal, state, and local requirements; TVA procedures; and project-specific environmental commitments. Hazardous materials used during construction, including fuels, oils, and lubricants, and other equipment-related materials, would be handled using appropriate spill prevention, containment, storage, and response measures.

Construction equipment used for interconnection-related actions could include dump trucks, concrete trucks, feller-bunchers, bulldozers, excavators, graders, piledrivers, augers, rollers, cranes, and similar equipment, as well as trucks used to transport personnel and materials (Table 2-1). This equipment would require fuel and lubricants, which would be managed in accordance with applicable requirements and BMPs. Equipment refueling and maintenance activities would occur in designated areas, as appropriate, and vehicles and machinery would be maintained to reduce the potential for leaks, spills, or releases. Therefore, impacts associated with the use of fuels, oils, lubricants, or other hazardous materials during construction would be minor.

During operation and maintenance, transmission rights-of-way and substation facilities are not expected to be substantial sources of solid waste or hazardous materials. Routine operation and maintenance activities could generate small quantities of nonhazardous waste and regulated materials, such as personal protective equipment, paint, oils and lubricants, spent

resins, desiccants, batteries, and domestic waste. These materials would be minimized, reused, or recycled where practicable, and managed or disposed of at appropriately permitted facilities in accordance with applicable federal, state, and local requirements.

Under the Action Alternative, solid waste and hazardous materials would be addressed through applicable BMPs, TVA procedures, regulatory requirements, and project-specific commitments, as applicable. Interconnection-related actions that would not fall within the scope of the programmatic analysis, or that could result in impacts beyond the assumptions evaluated in this PEIS, would require additional site-specific review and consultation, as appropriate. Therefore, impacts related to solid waste and hazardous materials under the Action Alternative would be minor.

3.17 UTILITIES AND SERVICE SYSTEMS

3.17.1 Affected Environment

Public utilities and service systems provide essential services throughout the TVA PSA, including electricity, natural gas, potable water, telecommunications, wastewater treatment, and solid waste management. These systems are operated by a combination of federal, state, local, municipal, cooperative, and private entities and are subject to applicable design, operating, permitting, and service requirements.

TVA is the nation's largest public power provider and supplies electricity to a seven-state service area that includes portions of Tennessee, Alabama, Mississippi, Kentucky, Georgia, North Carolina, and Virginia. TVA's generation portfolio includes hydroelectric, natural gas, renewable energy, coal, and nuclear facilities. Electricity generated by these facilities is delivered through TVA's transmission system, which includes approximately 16,000 miles of transmission lines and serves 153 local power companies and directly served customers across the TVA PSA (TVA 2025d and 2026j).

Utility and service systems within the TVA PSA vary by location and are generally more developed in urban and suburban areas than in rural or undeveloped areas. Electric distribution service is typically provided by local power companies that purchase power from TVA. Municipal systems, public utility districts, water authorities, or private utility providers generally provide water and wastewater services. In rural areas, smaller local systems or private wells may supply potable water and septic systems or other on-site treatment systems may serve wastewater needs. Natural gas, telecommunications, broadband, and solid waste services are provided by local governments, cooperatives, or private companies, depending on availability and local infrastructure.

Existing utility corridors, transmission lines, substations, roads, and developed rights-of-way are common throughout portions of the TVA PSA. However, the availability and capacity of utility and service systems vary by site. Future interconnection-related actions may occur in areas with existing utility access or in locations where temporary or limited utility support would be needed during construction. Site-specific reviews would identify existing utility providers,

assess the availability and capacity of nearby systems, and determine whether coordination, temporary services, or minor utility adjustments would be needed.

3.17.2 Environmental Consequences

3.17.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, TVA would not establish a programmatic bounding analysis and ESC to support review of interconnection-related actions. TVA would continue to evaluate these actions through its existing project-specific NEPA review process. Because the No Action Alternative would not authorize or require construction, operation, or maintenance of new interconnection-related transmission facilities at the programmatic level, it would not result in direct impacts on utility or service systems. Any effects on utilities and service systems associated with future interconnection-related actions would remain project-specific and would be evaluated in separate NEPA reviews, as appropriate. However, continued reliance on only project-specific reviews could limit TVA's ability to process interconnection requests efficiently and consistently across the TVA PSA.

3.17.2.2 Alternative B – Action Alternative

Under the Action Alternative, impacts on utilities and service systems would vary depending on the location, scale, and construction requirements of each future interconnection-related action. Construction of transmission lines, substations, and related facilities could temporarily increase demand for local utilities and services. Construction activities may require electricity for temporary facilities and equipment, water for dust suppression and other construction needs, and sanitary services for construction personnel.

Section 2.1.2.1 describes typical construction activities and facility requirements for interconnection-related transmission projects. Where electrical, water, and wastewater service is available, temporary construction-related demands would generally be accommodated through connections to existing systems. In areas where these services are not available, temporary or portable electricity, water, and sanitary facilities could be used. Potable water use for construction and maintenance would be limited to and is typically expected to be less than 50 gallons per day. TVA would coordinate with existing electricity, natural gas, water, and wastewater providers before construction, as needed, to minimize service disruptions and avoid or reduce impacts on existing utility systems. Therefore, construction-related impacts on utilities and service systems would be minor.

Operation and maintenance of transmission lines, substations, and related facilities would require periodic access for inspections, testing, equipment replacement, vegetation and grounds maintenance, stormwater and oil containment maintenance, access road maintenance, and other activities needed to maintain reliable operation. These activities would place limited ongoing demand on utility and service systems. As a result, operation and maintenance impacts on utilities and service systems would be minor.

Overall, implementation of the Action Alternative would support more efficient and consistent review of interconnection-related actions under TVA's transmission processes for projects that

meet applicable process requirements and fall within the bounded criteria evaluated in this PEIS. Site-specific reviews prepared in accordance with the ESC would identify utility availability, service requirements, and any needed coordination with local providers. Interconnection-related actions with the potential to affect utilities or service systems beyond the assumptions evaluated in this PEIS would require additional site-specific review and consultation, as appropriate.

Based on the limited and temporary nature of construction-related utility demands, the availability of temporary or existing utility services, and the limited ongoing utility needs during operation and maintenance, overall impacts on utilities and service systems under the Action Alternative would be minor.

3.18 SAFETY

3.18.1 Affected Environment

3.18.1.1 General Public and Occupational Health and Safety

Public health and safety considerations for interconnection-related actions include worker safety, public access and exposure to construction areas, traffic safety, emergency response, electric and magnetic fields (EMFs), lightning protection, and the structural integrity of transmission facilities. These considerations would vary by the type, location, and scale of a future interconnection-related action but would generally be addressed through compliance with applicable federal and state safety requirements, the NESC, and TVA safety procedures.

Workplace safety is regulated primarily under the Occupational Safety and Health Act and implementing regulations administered by OSHA. General industry standards are provided in 29 CFR 1910, and construction-related standards are provided in 29 CFR 1926. State occupational safety and health programs may also apply where approved by OSHA, including state programs in Tennessee and Kentucky. In Alabama, federal OSHA requirements apply to private-sector workplaces.

TVA maintains a safety-conscious work environment that emphasizes hazard awareness, prevention, training, and implementation of BMPs. TVA and its authorized contractors implement safety practices, training, administrative controls, and other measures to reduce or avoid occupational hazards associated with construction, operation, and maintenance activities (TVA 2026c). Site-specific health and safety procedures would be developed, as appropriate, for future interconnection-related actions. Measures to protect public health and safety may also include compliance with applicable requirements related to emergency management, environmental health, drinking water, wastewater, pollutant discharges, air emissions, hazardous waste management, spill prevention and response, and remedial actions. These requirements would be evaluated and implemented, as applicable, during subsequent project-specific reviews and approvals.

3.18.1.2 Electric and Magnetic Fields

Transmission lines, substations, and other electrical facilities generate EMFs. Electric fields are produced by voltage, while magnetic fields are produced by electric current. EMF strength depends on facility design, current load, and distance from energized equipment or conductors (National Institute of Environmental Health Sciences 2002; National Cancer Institute 2026). EMFs attenuate rapidly with distance and are generally reduced to background levels near the edge of a transmission right-of-way or similar facility boundary.

Under certain conditions, EMFs can induce charges or currents in nearby conducting objects, which may result in perceptible shocks if the object is not properly grounded. TVA designs, constructs, and maintains transmission facilities consistent with applicable safety standards to reduce the potential for such effects.

Although public concern has been expressed regarding potential health effects from long-term EMF exposure, scientific review panels have generally concluded that available evidence does not establish a cause-and-effect relationship between EMF exposure and adverse health outcomes (e.g., American Medical Association 1994; National Research Council 1997; National Institute of Environmental Health Sciences 1999). Research continues regarding reported statistical associations between magnetic field exposure and rare childhood leukemia.

3.18.2 Environmental Consequences

3.18.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, TVA would not establish a programmatic bounding analysis and ESC to review interconnection-related actions. TVA would continue to evaluate interconnection-related requests using its existing project-specific NEPA review process. Because the No Action Alternative would not authorize construction, operation, or maintenance of any interconnection-related facility at the programmatic level, it would not result in direct effects on public health or safety.

Potential public health and safety effects associated with future interconnection-related actions would continue to be evaluated during separate project-specific reviews. These effects would depend on the type, location, and scale of the interconnection-related action and the proximity of construction or operational activities to workers, residences, roadways, public access areas, and other sensitive receptors. The No Action Alternative could result in less consistency and efficiency in identifying and applying environmental constraints and safety-related considerations across future reviews. However, TVA would continue to require compliance with applicable federal, state, and local health and safety requirements and TVA procedures.

3.18.2.2 Alternative B – Action Alternative

Construction

Under the Action Alternative, construction-related public health and safety effects from future interconnection-related actions could include temporary exposure of workers or the public to construction equipment, active work areas, traffic disruptions, noise, fugitive dust, debris,

waste materials, and potential spills or releases of hazardous substances. The likelihood and magnitude of these effects would vary depending on site conditions, construction methods, duration of work, traffic routes, and proximity to residences, businesses, roadways, public access areas, and emergency response facilities.

TVA and its authorized contractors would implement applicable safety requirements, site-specific health and safety procedures, and BMPs to reduce risks to workers and the public. These measures may include the following:

- Worker safety orientations.
- Hazard identification and control procedures.
- Use of personal protective equipment.
- Equipment guarding.
- Lockout/tagout procedures.
- Emergency shutdown procedures.
- Good housekeeping practices.
- Regular safety inspections.
- Spill prevention and response measures.
- Traffic control procedures.
- Controlled access to active work areas through fencing, signage, barriers, or other means, as appropriate.

Waste materials generated during construction would be managed in accordance with applicable federal, state, and local requirements.

Potential public health and safety hazards could result from increased traffic on roadways during construction-related activities. Residents and commuters along roadways used by construction-related traffic may experience delays due to increased traffic volumes. As described in Section 3.11, Transportation and Navigation, where construction activities would involve substantial equipment or materials deliveries, increased truck traffic, lane closures, or work near public roadways, TVA would evaluate the need for traffic control or transportation planning during subsequent project-specific review. Emergency response considerations, including access for fire, law enforcement, medical, and other emergency responders, would also be evaluated as appropriate based on the location and nature of the interconnection-related action.

With implementation of applicable regulatory requirements, TVA procedures, and site-specific BMPs, construction-related impacts on public health and safety would generally be temporary and localized. For actions that remain within the programmatic bounds established for the Action Alternative, construction-related impacts on public health and safety would be minor.

Operation and Maintenance

Operation and maintenance of interconnection-related facilities could result in long-term public health and safety considerations associated with energized equipment, EMFs, lightning protection, structural integrity of transmission facilities, site access, vegetation management, routine inspections, and maintenance activities. These effects would depend on the type and configuration of facilities, voltage, load, proximity to the public, and surrounding land uses.

Potential exposure to energized equipment would be minimized through facility design, compliance with applicable electrical safety standards, and restrictions on unauthorized access. Transmission lines, substations, and related facilities would be designed, constructed, operated, and maintained in accordance with applicable safety requirements, including NESC provisions and TVA design standards. TVA would also continue to inspect and maintain facilities to identify and address safety concerns.

Electric and Magnetic Fields

Transmission lines, substations, and other electrical facilities would generate EMFs. Electric fields are produced by voltage, while magnetic fields are produced by electric current. EMF strength depends on facility design, current load, and distance from energized equipment or conductors. EMFs attenuate rapidly with distance and are generally reduced to background levels near the edge of a transmission right-of-way or similar facility boundary (National Institute of Environmental Health Sciences 2002; NCI 2025).

EMFs can induce charges or currents in nearby conducting objects, which may result in perceptible shocks if the object is not properly grounded. Transmission lines would be designed to minimize the potential for such shocks, in part by maintaining sufficient clearance between conductors and objects on the ground. Stationary conducting objects such as metal fences, pipelines, and highway guardrails that are near enough to transmission lines to develop a charge, typically within the right-of-way, would be grounded by TVA to prevent them from becoming a source of shocks.

As discussed in Section 3.12, Noise, under certain weather conditions, high-voltage transmission lines may produce an audible low-volume hissing or crackling noise. This noise is generated by 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; however, because of distance and dissipation of noise emissions, resulting noise levels would be expected to remain well below levels that could interfere with speech. Corona is not associated with 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 those devices came within the influence of low-frequency, high-energy workplace exposure. However, older devices and designs have generally been replaced with designs and shielding that prevent potential 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 potentially interfere (Journal of the American Medical Association 2007).

Research conducted on the effects of EMFs on animal and plant behavior, growth, breeding, development, reproduction, and production in laboratory and environmental settings has not reported adverse effects from low-energy power frequency fields (World Health Organization [WHO] 2026). Effects associated with ungrounded metallic objects, static charge accumulation, and discharges in dairy facilities have been found when 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 regarding the potential for adverse health effects related to long-term exposure to EMFs. A few studies have raised questions about cancer and reproductive effects based on biological responses observed in cells or animals or on associations between surrogate measures of power line fields and certain types of cancer. Research has been ongoing for several decades; however, the consensus of scientific panels reviewing this research is that the evidence does not establish a cause-and-effect relationship between EMFs and adverse health outcomes (e.g., American Medical Association 1994; National Research Council 1997; National Institute of Environmental Health Sciences 2002; National Cancer Institute 2026). Some research continues on the statistical association between magnetic field exposure and a rare form of childhood leukemia known as acute lymphocytic leukemia. A review by the World Health Organization concluded that this association is very weak and that there is inadequate evidence to support any other type of excess cancer risk associated with exposure to EMFs (International Association for Research on Cancer 2002).

TVA follows medical and health research related to EMFs, along with media coverage and reports that may not have been peer reviewed by scientists or medical personnel. 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 transmission lines. Statistical studies of overall populations and increased use of low-frequency electric power have found no associations (WHO 2007).

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 humans or animals. There are no scientifically or medically defined safe or unsafe field strengths for low-frequency, low-

energy power substation or line fields (American Medical Association 1994; DOE 1996; National Institute of Environmental Health Sciences 1999).

Although no federal standards exist for maximum EMF field strengths for transmission lines, two states, New York and Florida, have such regulations. Florida's regulation is the more restrictive of the two, with field levels limited to 200 milligauss at the edge of the right-of-way for lines of 230-kV and higher and 150 milligauss at the edge of the right-of-way for lines of 230-kV and lower.

For future interconnection-related actions, expected magnetic field strengths at the edge of the right-of-way would be evaluated, as appropriate, during subsequent project-specific review. Because EMF strength attenuates rapidly with distance from transmission facilities and is usually equal to local ambient levels at or near the edge of the right-of-way, public exposure to EMFs would be minimal. Therefore, EMF-related impacts would be minor.

Lightning Strike Hazard

TVA transmission lines are built with overhead ground wires that direct lightning strikes into the ground for dissipation. Thus, a safety zone is created under the ground wires at the top of structures and along the line, for at least the width of the right-of-way. The NESC is followed when installing, repairing, or upgrading TVA lines or equipment. Transmission line structures are well grounded, and the conductors are insulated from the structure. Therefore, touching a structure supporting a transmission line poses no inherent shock hazard.

Transmission Structure Stability

TVA transmission lines are designed to meet standards specified by the NESC. TVA designs transmission lines such that a risk analysis of seismic hazards specifically for transmission line construction is not necessary. The NESC states that, as long as the design meets the wind and ice loading conditions that would create the most effect on the line, the transmission line would provide sufficient capacity to withstand seismic loading.

Self-supporting, galvanized, laced-steel structures and steel, single-pole and H-frame structures, like those shown in Figure 2-1 and Figure 2-2, could be used for interconnection-related actions. These structures have demonstrated a good 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, TVA transmission structures are examined visually at least once a year; thus, proposed structures would not be expected to pose a significant physical danger. For this reason, TVA does not typically construct barricades or fences around structures.

Because transmission structures would be designed, constructed, operated, and maintained in a manner that reduces shock hazards and hazards from lightning strikes, wind, ice, and seismic events, impacts to public health and safety during long-term operation and maintenance would be minor.

Overall, implementation of the Action Alternative would support more consistent identification of public health and safety constraints and application of appropriate avoidance, minimization, and safety measures during future project-specific reviews. With compliance with applicable requirements and implementation of site-specific BMPs, the Action Alternative would be expected to result in minor impacts on public health and safety.

3.19 SOCIOECONOMICS

3.19.1 Affected Environment

TVA's generator interconnection-related actions evaluated in this PEIS could occur throughout the TVA PSA. For purposes of this programmatic analysis, the study area for socioeconomics includes the 181 counties and two independent cities within the seven-state TVA PSA, including all counties in Tennessee and portions of Alabama, Georgia, Kentucky, Mississippi, North Carolina, and Virginia. As appropriate for project-specific reviews, smaller geographic areas may be used to evaluate localized socioeconomic conditions, such as metropolitan statistical areas, counties, municipalities, rural or urban areas, or census tracts (TVA 2026c).

Socioeconomic conditions within the study area were characterized using the most recent available U.S. Census Bureau (USCB) data, including 2020 Decennial Census counts (USCB 2020) for total population and race and ethnicity characteristics, and 2018-2022 American Community Survey 5-year estimates (USCB 2022) for other demographic and economic indicators. Regional population, employment, income, and minority population characteristics are incorporated by reference from TVA's 2026 IRP FEIS (TVA 2026c).

3.19.2 Environmental Consequences

3.19.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, TVA would not implement the programmatic bounding analysis or ESC for generator interconnection-related actions. TVA would continue to evaluate interconnection-related actions through the standard project-specific NEPA process. Because the No Action Alternative would not authorize construction, operation, or maintenance activities at the programmatic level, it would not result in direct effects on socioeconomic conditions.

Future interconnection-related actions could still occur under the No Action Alternative, and any associated socioeconomic effects would be identified and evaluated during separate project-specific NEPA reviews, as appropriate. The No Action Alternative could affect the efficiency and consistency of TVA's environmental review process for interconnection requests; however, it would not be expected to result in measurable changes to population, employment, income, community services, or other socioeconomic conditions within the PSA.

3.19.2.2 Alternative B – Action Alternative

Under the Action Alternative, interconnection-related actions could include construction, operation, and maintenance of facilities needed to connect generating resources to the TVA transmission system. Construction activities could require temporary work crews of up to 1,000

workers, though workforce needs would vary based on project size, schedule, and site-specific requirements. In most cases, construction labor would be expected to come from the existing regional labor force, although some specialized workers could come from outside the immediate area. Because construction employment would be temporary and dispersed across the PSA, interconnection-related actions would not be expected to result in substantial changes to local or regional population, housing demand, employment, income, or other demographic or economic conditions.

Following construction, operation and maintenance activities would generally require limited and intermittent staffing. These activities would not be expected to induce population growth or create sustained demand for housing, public services, or community facilities. Therefore, impacts on local employment, income, and demographic conditions would be expected to be minor. Because generator interconnection-related actions could occur throughout the TVA PSA, some project activities could be located in or near minority populations, low-income populations, or areas with community resources or culturally important sites. Project-specific reviews would use the ESC and applicable siting criteria to identify whether an action would remain within the scope of this PEIS or whether additional NEPA review would be required. TVA would also apply applicable BMPs and minimization measures to reduce potential construction-related effects such as noise, dust, visual disturbance, air emissions, and potential releases to water resources.

Direct impacts to community facilities or services occur if a facility was displaced or if access to the facility was restricted. Eligible interconnection-related actions that meet the ESC criteria would not be expected to displace community facilities or substantially alter access to schools, churches, healthcare facilities, emergency services, or other community resources. Indirect effects on community services could occur if a project resulted in population growth or increased demand for public services. Because interconnection-related actions would be temporary, limited in workforce requirements, and not expected to result in population growth, increased demand for community services would not be anticipated. Emergency response services could be needed in the event of an incident during construction, operation, or maintenance; however, such needs would be temporary and would not be expected to affect the long-term capacity or delivery of local services.

For this programmatic analysis, the ESC criteria, siting considerations, and bounding conditions for construction, operation, and maintenance activities provide the basis for evaluating socioeconomic effects. Interconnection-related actions that meet these criteria would not be expected to result in substantial adverse effects on population, employment, income, housing, community services, or community facilities. Therefore, socioeconomic impacts under the Action Alternative would be expected to be negligible to minor. Projects that do not meet the ESC criteria or that have the potential for socioeconomic effects outside the scope of this PEIS would require additional project-specific NEPA review.

3.20 UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS

Unavoidable adverse impacts are adverse effects on the natural and human environment that would remain after implementation of practicable avoidance, minimization, mitigation measures, and BMPs. As described in Chapter 2, implementation of the Action Alternative would involve construction, operation, and maintenance of interconnection facilities and associated infrastructure. Although impacts would be reduced through siting, design, environmental commitments, permit conditions, mitigation measures, and BMPs, some adverse effects could not be fully avoided.

The following unavoidable adverse impacts could occur under the Action Alternative:

- Clearing, grading, construction, operation, and maintenance of interconnection facilities could disturb vegetation and wildlife habitat and could result in the permanent or temporary loss or conversion of some habitat.
- Interconnection-related actions could require the permanent conversion, alteration, or fill of limited areas of aquatic resources, including wetlands, ponds, streams, or other waters, where avoidance is not practicable.
- Construction equipment, vehicle use, land disturbance, and any burning of cleared vegetation could generate short-term air emissions, including fugitive dust and combustion-related emissions.
- New or modified interconnection facilities, including substations, switching stations, transmission structures, access roads, and associated infrastructure, could result in localized, long-term visual changes to the existing landscape.

These effects would be expected to be minor to moderate depending on final facility locations, existing site conditions, resource sensitivity, and the extent of ground disturbance. Mitigation measures and BMPs would reduce the magnitude, duration, and extent of these impacts, but would not eliminate all adverse effects associated with implementation of the Action Alternative.

3.21 RELATIONSHIP OF SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

Implementation of the Action Alternative would result in the short-term use of land, construction materials, labor, equipment, and energy to construct interconnection facilities and associated infrastructure. Construction-related activities could temporarily disturb existing land uses, vegetation, soils, wildlife habitat, aquatic resources, and nearby human communities. These disturbances would generally be localized and would occur primarily during site preparation, construction, and restoration activities.

Some land would be committed to electrical system needs for the foreseeable future. Interconnection-related actions and requirements could include new or modified transmission structures, substations, switching stations, access roads, laydown areas, and associated infrastructure. In some locations, existing land uses such as pasture, agriculture, or forested land could be converted to utility-related use. Agricultural uses could continue where they are

compatible with the safe operation and maintenance of interconnection facilities. However, areas requiring long-term vegetation management would not be available for forest production or mature forest habitat for the duration of facility operation. The Action Alternative would involve a tradeoff between the short-term use of local resources and the long-term productivity of the affected environment. Long-term reductions in productivity could occur where land is permanently converted to interconnection facilities or where vegetation management changes existing habitat conditions. These effects would be expected to be minor at the local and regional scale because the overall amount of land affected would be limited relative to available surrounding land uses and habitat types.

3.22 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Irreversible commitments of resources are commitments that cannot be reversed, such as the use or consumption of nonrenewable construction materials or energy resources. Irretrievable commitments are commitments of resources that are unavailable for other uses for a period of time but could potentially be restored or recovered in the future.

Implementation of the Action Alternative would require an irreversible and irretrievable commitment of materials, energy, labor, and land during construction, operation, and maintenance of interconnection facilities. Construction materials could include concrete, aggregate, steel, conductor, ceramic insulators, equipment components, and other materials needed for new or modified transmission structures, substations, switching stations, access roads, laydown areas, and associated infrastructure. Some materials, such as concrete, aggregate, and ceramic components, would be irreversibly committed once used. Other materials, including metals used in equipment, conductors, and supporting steel structures, could be recovered or recycled after the facilities are retired or removed.

Land used for interconnection facilities would represent an irretrievable commitment for as long as the facilities remain in service. During that period, on-site resources such as wildlife habitat, forest resources, agricultural land, soils, and aquatic resources could be temporarily or permanently unavailable for other uses. Following retirement or removal of facilities, some areas could be restored or returned to prior or similar land uses, depending on facility type, site conditions, regulatory requirements, and future operational needs.

Because major interconnection facilities are expected to remain in operation for several decades, these commitments would be long term. However, the extent of irreversible and irretrievable resource commitments would be limited by the final design, siting decisions, implementation of BMPs, compliance with permit conditions, and restoration or reclamation of temporarily disturbed areas.

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Appendix A – Environmental Screening Checklist

Environmental Screening Checklist

The goal of this Environmental Screening Checklist is to support NEPA compliance by programmatically evaluating proposed generator interconnection-related actions for new and existing transmission, including actions associated with Large Generator Interconnection Procedures, Small Generator Interconnection Procedures, and Expedited Resource Addition Studies. This Environmental Screening Checklist collects project-specific information to determine whether an interconnection-related action falls within the bounding parameters identified in Tables 2-1 and 2-2 of the Generator Interconnection Programmatic Environmental Impact Statement (PEIS).

A Tennessee Valley Authority (TVA) National Environmental Policy Act (NEPA) Specialist/Environmental Program Manager will complete this checklist well before construction activities begin, in accordance with TVA's legal and policy requirements associated with this program. The NEPA Specialist and Environmental Program Manager will ensure that TVA subject matter experts document input for their respective resource categories for final environmental review and site approval.

TVA NEPA Specialist (name): _____

TVA Environmental Program Manager (name): _____

Proposed Project Name/Address (or lat/long): _____

If the answer to any question below is *YES*, additional environmental review by TVA may be required.

If TVA determines that the proposed project could affect sensitive resources or exceed the bounded parameters evaluated in the PEIS, the proposed project could be subject to site-specific environmental review consistent with TVA NEPA procedures.

Facility Attributes – Substation	
☐ Yes ☐ No	Would the land requirements exceed the following thresholds: • Substation: 80 acres • Laydown area: 50 acres Project area acreage: _____
☐ Yes ☐ No	Would substation capacity exceed 500-kilovolts (kV)?
☐ Yes ☐ No	Would any substation structures exceed 150 feet in height?
☐ Yes ☐ No	Would the potable water requirement exceed 50 gallons per day?
☐ Yes ☐ No	Would the project require stormwater management systems or permits beyond those assumed in the PEIS?

Facility Attributes – Transmission Line (New or Existing)	
☐ Yes ☐ No	Would the land requirements exceed the following thresholds: • Transmission line right-of-way: 610 acres, based on 20 miles in length and 250 feet in width • Laydown area: 50 acres Project area acreage: _____
☐ Yes ☐ No	Would the transmission line right-of-way width exceed 250 feet?
☐ Yes ☐ No	Would the transmission line right-of-way length exceed 20 miles?
☐ Yes ☐ No	Would transmission structures exceed 150 feet in height?
☐ Yes ☐ No	Would transmission line capacity exceed 500 kV?
☐ Yes ☐ No	Would new access roads exceed 30 miles, based on 1.5 miles of new access road per mile of transmission line right-of-way?
General	
☐ Yes ☐ No	Would the duration of construction exceed 4 years?
☐ Yes ☐ No	Would construction occur during nighttime hours?
☐ Yes ☐ No	Would excavation activities exceed 20 feet in depth?
☐ Yes ☐ No	Would construction activities have temporary water needs beyond those associated with dust suppression or other standard best management practices (BMPs)?
Human Environment	
☐ Yes ☐ No	Would the construction workforce exceed 1,000 workers?
☐ Yes ☐ No	Would construction activities include blasting? If yes, confirm that there are no residential, commercial, or public buildings or structures within 500 feet of blasting location(s).
☐ Yes ☐ No	Would construction activities displace or impede access to community facilities?
☐ Yes ☐ No	Would structures be located within the foreground viewshed (within 0.5 mile) of a national scenic or historic trail, national heritage area, wild and scenic river, or national scenic highway or byway? Note: Datasets and mapping tools for national visual resources provided in Attachment 1.

Transportation	
☐ Yes ☐ No	Would construction require more than 100 vehicles (including workforce vehicles, deliveries, and equipment) to arrive or depart from a single location during the peak traffic hour? If yes, further analysis of transportation impacts is required.
☐ Yes ☐ No	Would the rate of off-site spoil or borrow transport exceed 200 truckloads per day, including borrow and spoil combined? If yes, further analysis of transportation impacts is required.
☐ Yes ☐ No	Would construction require new or additional transportation infrastructure, such as construction of or upgrades to rail, barge, or other facilities?
☐ Yes ☐ No	Would waste, spoil, or other solid waste be disposed of at an unpermitted facility or require construction of a new landfill?
☐ Yes ☐ No	Would acquisition of borrow material require use of an unpermitted facility or development of a new borrow site?
Natural Resources	
☐ Yes ☐ No	Would the project directly affect managed areas, natural areas, and/or parks within 0.1 mile? If yes, coordination and approval from managing agency and/or jurisdiction is required. Note: Datasets and mapping tools for national parks and natural areas provided in Attachment 1; TVA's Regional Natural Heritage Database and state and local resources should also be reviewed.
☐ Yes ☐ No	Would development of the site directly or indirectly disturb federally and/or state-listed species, vegetation, aquatic biota, or habitat? If yes, site-specific surveys and coordination with the U.S. Fish and Wildlife Service and/or the applicable state agency may be required.
☐ Yes ☐ No	Would removal of trees with a trunk diameter greater than 3 inches at breast height be necessary? If yes, identify the number of trees or acres of trees that would be cleared: _____ trees/acres
☐ Yes ☐ No ☐ NA	Would tree clearing occur outside the winter clearing window (approximately October 15 through March 31, or May 1 through July 15 in some areas of Mississippi)? If yes, requires authorization under TVA's ESA Section 7 Bat Programmatic Bat Consultation or site-specific consultation with the U.S. Fish and Wildlife Service.
☐ Yes ☐ No	Would development of the site result in impacts to caves, sinkholes, buildings, or bridges?

☐ Yes ☐ No	Would development of the site require filling wetlands or streams, altering wetlands, streams, or streamside management zones, or otherwise affecting these resources? If yes, coordination and approval may be required under applicable regulations implementing Sections 401 and 404 of the Clean Water Act, applicable state regulations, and/or Executive Order 11990.
☐ Yes ☐ No	Would any project-related development, including laydown areas, fill, structures, buildings, or other activities, be located within the Federal Emergency Management Agency (FEMA) 100-year floodplain (or within the 500-year floodplain for critical actions); below the 100-year flood elevation; or within a floodplain not mapped by FEMA, but that could warrant consideration by EO 11988? If yes, a No Practicable Alternative Analysis is required.
☐ Yes ☐ No	Would the project result in permanent conversion of prime, unique, or important farmland to nonagricultural use? If yes, consultation with the Natural Resources Conservation Service and completion of a Farmland Conversion Impact Rating form are required. Note: Prime farmland mapping instructions and potential exclusions from Natural Resources Conservation Service consultation provided in Attachment 1.
☐ Yes ☐ No	Would vegetation management deviate from TVA's <i>A Guide for Environmental Protection and Best Management Practices for TVA Construction and Maintenance Activities</i> and <i>Right-of-Way Clearing Specifications</i>?
Cultural and Historic Resources	
☐ Yes ☐ No	Has the project been reviewed in accordance with TVA's system-wide Section 106 Programmatic Agreement and the statewide Transmission Assets Programmatic Agreement for the State of Tennessee (as applicable)?
☐ Yes ☐ No ☐ NA	Has consultation occurred with the appropriate SHPO(s) and federally recognized tribes in compliance with Section 106 of the National Historic Preservation Act and TVA's system-wide Section 106 Programmatic Agreement?
Bounding Parameters	
☐ Yes ☐ No	Would any characteristics of the proposed interconnection-related action exceed the bounding parameters and values identified in Tables 2-1 and 2-2 of the PEIS?
Reasonably Foreseeable Future Actions	
☐ Yes ☐ No	Are other actions underway or proposed that, together with the potential effects of constructing and operating the proposed project, could result in a notable collective effect on the natural or human environment?

TVA subject matter experts reviewed the material presented in this checklist. Documentation of their review is attached.

In accordance with NEPA, TVA must evaluate and document whether the proposed interconnection-related action described in this checklist is already covered by an existing NEPA review. The following questions document TVA's evaluation of the four criteria used to make that determination.

Determination of NEPA Adequacy	
☐ Yes ☐ No	Is the site-specific proposed action within the scope of the proposed action analyzed in the TVA Generator Interconnection PEIS Study? If no, describe:
☐ Yes ☐ No	Are there new circumstances or information related to site-specific environmental concerns that would substantially change the analysis in the TVA Generator Interconnection PEIS Study? If yes, describe:
☐ Yes ☐ No	Would the site-specific proposed action result in effects that were not addressed in the TVA Generator Interconnection PEIS Study? If yes, describe:
☐ Yes ☐ No	Is additional site-specific NEPA review required? If yes, explain:

Based on the evaluation documented herein, TVA has determined that the proposed site-specific action is within the scope of the TVA Generator Interconnection PEIS study. The site-specific proposed action does not involve substantial changes, significant new circumstances, or new information relevant to environmental concerns that would require supplemental analysis. Environmental impacts associated with the site-specific proposed action would be minor to moderate and are bounded by the conclusions of the Final PEIS study. This form documents TVA's NEPA adequacy determination for the proposed site-specific action.

 NAME

 Manager, NEPA Compliance
 Tennessee Valley Authority

 Date Signed

Environmental Screening Checklist

Attachment 1 - Resources and Supporting Documentation

Datasets and Mapping Tools for National Parks, Natural, and Heritage Areas

Statutory Authority	Website
National Park System (54 USC 100101 et seq. and 36 CFR 1.1 et seq.):	https://irma.nps.gov/DataStore/Reference/Profile/2319003
National Scenic and Historic Trails (16 USC 1241–1251):	https://www.nps.gov/subjects/nationaltrailssystem/maps.htm
Wild & Scenic Rivers (16 USC 1271–1287):	https://irma.nps.gov/DataStore/Reference/Profile/2243882
Nationwide Rivers Inventory (16 USC 1276(d)):	https://irma.nps.gov/DataStore/Reference/Profile/2305275
Land and Water Conservation Fund (54 USC 200305(f)(3) and 36 CFR 59.3):	https://lwcf.tplgis.org/mappast/
National Natural Landmarks (54 USC 100101 et seq. and 36 CFR 62.1 et seq.):	https://www.nps.gov/subjects/nnlandmarks/nation.htm
National Heritage Areas (54 USC 120101–120104):	https://irma.nps.gov/DataStore/Reference/Profile/2309803
Historic Properties Included on the National Register (54 USC 306108 and 36 CFR 800.1 et seq.) including National Historic Landmarks (54 USC 306107):	https://irma.nps.gov/DataStore/Reference/Profile/2305746

Key: CFR = Code of Federal Regulations; USC = U.S. Code

Prime Farmland Mapping and NRCS Consultation Resources

To determine if there are Prime Farmland soils present within the project area:

1. Navigate to the USDA NRCS Web Soil Survey at <https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>
2. Under the **Area of Interest (AOI)** tab, define the AOI by importing a shapefile or using the “Define AOI by Polygon” drawing tool
3. Under the **Soil Data Explorer** tab, select the **Suitabilities and Limitations for Use** tab
4. From the vertical menu, expand the **Land Classifications** section, and then select **Farmland Classification**
5. Click “View Rating” button to generate a table with acreage of each soil unit within the AOI, as well as its farmland classification rating.

Permanent conversion of Prime Farmland soil(s) typically requires consultation with the NRCS under the Farmland Protection Policy Act (FPPA). Projects on land already in urban development or within an existing right-of-way purchased on or before August 4, 1984, are not subject to FPPA. See Subpart B of the [Part 523 – Farmland Protection Policy Act Manual](#) for a complete list of lands and activities covered by and exempt from FPPA.

Consultation is completed via the [Form AD-1006](#) or [Form NRCS-CPA-106 for Corridor Type Projects](#)

Appendix B – Scoping

Appendix B – Scoping

On July 14, 2026, the Tennessee Valley Authority (TVA) initiated scoping for this Programmatic Environmental Impact Statement (PEIS) by publishing a Notice of Intent in the *Federal Register*. The notice announced TVA’s intent to prepare a PEIS evaluating, at a programmatic level, the potential environmental effects of transmission system actions needed to support generator interconnection requests across the TVA Power Service Area (PSA). TVA requested comments from agencies, federally recognized tribes, stakeholders, and members of the public on the proposed programmatic approach, the range of interconnection-related actions to be evaluated, and the environmental resources and issues that should be considered. The scoping comment period closed on August 14, 2026.

TVA received scoping comments from the National Park Service (NPS) and the U.S. Environmental Protection Agency (EPA) and considered these comments in developing the Draft PEIS. NPS requested that the PEIS consider potential effects to National Park System units, national scenic and historic trails, visual resources, recreation resources, cultural landscapes, and other resources managed or protected by NPS. NPS also recommended early coordination when future interconnection-related actions could affect NPS-administered lands, trail corridors, viewsheds, or other resources of concern. EPA recommended that the PEIS clearly describe the purpose and need, alternatives, environmental screening process, and criteria that would determine whether future actions are covered by the programmatic analysis or require additional site-specific National Environmental Policy Act (NEPA) review. EPA also emphasized the need to evaluate and avoid, minimize, or mitigate potential effects to water resources, wetlands, floodplains, air quality, climate change, protected species, environmental justice or socioeconomic resources, and other sensitive environmental resources, and to identify applicable permitting and consultation requirements.

From: [Pate, Haigler \(Dusty\)](#)
To: [Smith, Elizabeth](#)
Cc: [Booker, Dawn](#); [nepa](#)
Subject: NPS Input – TVA Generator Interconnection Programmatic EIS
Date: Monday, August 10, 2026 10:35:57 AM
Attachments: [Outlook icon - red.png](#)

You don't often get email from haigler_pate@nps.gov. [Learn why this is important](#)

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

Dear Ms. Smith,

The National Park Service (NPS) appreciates the opportunity to provide input on the Tennessee Valley Authority’s (TVA) Notice of Intent (NOI) to prepare a Generator Interconnection Programmatic Environmental Impact Statement (PEIS). As noted in the NOI, TVA intends to establish a bounded framework using tools such as an Environmental Screening Checklist (ESC) to streamline tiered, site-specific review for interconnection-driven transmission activities – including lines, substations, switchyards, communications, and access – across TVA’s service area.

TVA’s service area includes multiple National Park System units, National Scenic and Historic Trails, Wild and Scenic Rivers, rivers on the Nationwide Rivers Inventory, Land and Water Conservation Fund assistance sites, National Natural Landmarks, National Heritage Areas, and National Register properties, including National Historic Landmarks. Because these resources fall within the NPS's jurisdiction or areas of special expertise, they should be considered when establishing the PEIS bounding criteria and associated screening tools for tiered project review. To support consistent application of the PEIS and facilitate efficient tiered review, the NPS recommends incorporating the following statutory authorities, resource datasets, and mapping tools into the PEIS bounding criteria and the ESC.

- National Park System (54 U.S.C. § 100101 et seq. and 36 CFR § 1.1 et seq.):

<https://irma.nps.gov/DataStore/Reference/Profile/2319003>

- National Scenic and Historic Trails (16 U.S.C. §§ 1241–1251):

<https://www.nps.gov/subjects/nationaltrailssystem/maps.htm>

- Wild & Scenic Rivers (16 U.S.C. §§ 1271–1287):

<https://irma.nps.gov/DataStore/Reference/Profile/2243882>

- Nationwide Rivers Inventory (16 U.S.C. § 1276(d)):

<https://irma.nps.gov/DataStore/Reference/Profile/2305275>

- Land and Water Conservation Fund (54 U.S.C. § 200305(f)(3) and 36 CFR § 59.3):

<https://lwcf.tplgis.org/mappast/>

National Natural Landmarks (54 U.S.C. § 100101 et seq. and 36 CFR § 62.1 et seq.):

<https://www.nps.gov/subjects/nnlandmarks/nation.htm>

- National Heritage Areas (54 U.S.C. §§ 120101–120104):

<https://irma.nps.gov/DataStore/Reference/Profile/2309803>

- Historic Properties Included on the National Register (54 U.S.C. § 306108 and 36 CFR § 800.1 et seq.) including National Historic Landmarks (54 U.S.C. § 306107):

<https://irma.nps.gov/DataStore/Reference/Profile/2305746>

We support TVA's programmatic approach to enable predictable, consistent NEPA review and timely tiering for site-specific actions. While NPS is not requesting cooperating agency status for the PEIS, we welcome continued coordination throughout development of the PEIS and are available to assist TVA in refining the ESC, screening criteria, and treatment of resources within the NPS's jurisdiction or areas of special expertise. Please feel free to contact me with questions.

Sincerely,

Haigler "Dusty" Pate

Energy Specialist

National Park Service

Department of the Interior Region 2: South Atlantic-Gulf

[Planning & Compliance Division](#)

404-772-0637 cell





REGION 4

ATLANTA, GA 30303

August 11, 2026

Ms. Elizabeth Smith
NEPA Specialist
Tennessee Valley Authority
400 West Summit Hill Drive, WT 11B
Knoxville, TN 37902

Re: Tennessee Valley Authority Generator Interconnection Programmatic Environmental Impact Statement

Dear Ms. Smith:

The U.S. Environmental Protection Agency reviewed the Notice of Intent (NOI) to Prepare a Programmatic Environmental Impact Statement (PEIS) for Generator Interconnection in accordance with Section 309 of the Clean Air Act and Section 102(2)(C) of the National Environmental Policy Act. The Tennessee Valley Authority (TVA) will prepare the PEIS to evaluate the impacts associated with interconnection driven transmission actions under TVA's procedures for Large Generator Interconnection Procedures, Small Generator Interconnection Procedures, and Expedited Resource Addition Study.

According to the NOI, "TVA's generator interconnection processes have experienced a substantial increase in volume as electricity demand accelerates due to population growth and industrial development." The PEIS will evaluate typical impacts associated with interconnection driven transmission actions such as new construction, modification, operation, and maintenance of transmission lines, substations, switchyards, communication systems, access roads, and underground components. Under the No Action Alternative, project specific NEPA reviews will be conducted for all individual interconnection driven transmission actions.

Based on our review of the scoping notice, the EPA has no additional scoping comments. We appreciate the opportunity to comment on the TVA's NOI and look forward to reviewing the draft PEIS. If you have any questions, please contact Kristina Bowen, at 404-562-8399 or bowen.kristina@epa.gov.

Sincerely,

**NTALE
KAJUMBA**

Digitally signed by
NTALE KAJUMBA
Date: 2026.08.11
11:09:21 -04'00'

Ntale Kajumba
NEPA Manager

Appendix C – List of Preparers

Appendix C – List of Preparers

NEPA PROJECT MANAGEMENT

Elizabeth Smith (TVA)

Education: B.A. Environmental Studies
Project Role: NEPA Specialist
Experience: 17 years in NEPA compliance

Carol Butler Freeman (TVA)

Education: M.S. Geological Science, M.S. Space Studies, B.S. Geology
Project Role: NEPA Specialist
Experience: 18 years in NEPA compliance

Rebecca Porath (WSP)

Education: M.S. and B.S. Wildlife and Fisheries Sciences
Project Role: WSP Project Director
Experience: 25 years of experience in NEPA and ecological studies

Natalie Reiss (WSP)

Education: B.A. Biology
Project Role: WSP Project Manager
Experience: 12 years of experience in NEPA analysis and documentation

Erin Alsop (WSP)

Education: B.S. Environmental Science
Project Role: WSP Deputy Project Manager
Experience: 9 years of experience in NEPA analysis and documentation

OTHER CONTRIBUTORS

Joe Melton (TVA)

Education: B.S. Environmental Science
Project Role: Sr. Environmental Project Manager
Experience: 21 years in Environmental Permitting and NEPA Compliance

Kevin Guffey (TVA)

Education: M.B.A. and B.S. Business Administration
Project Role: Sr. Project Manager
Experience: 17 years in Project Management and Commercial Construction

Cory Chapman (TVA)

Education: B.S. Wildlife and Fisheries Science
Project Role: Biological Compliance
Experience: 9 years of experience in field ecology, NEPA, and WOTUS and ESA

Maria Aguirre (TVA)

Education: B.S. Environmental Science
Project Role: Biological Compliance
Experience: 5 years in biological field studies, 4 years in NEPA and ESA Section 7 consultation

Zach Buecker (TVA)

Education: B.S. Biology, PWS, QHP
Project Role: Surface Water
Experience: 16 years of experience with wetland/stream assessments, wetland/stream regulations, NEPA and CWA compliance

Guy Thomas Zimmerman, PE (TVA)

Education: M.S. Environmental Engineering, Water Resources; B.S. Civil Engineering
Project Role: Floodplains and Flood Risk
Experience: 18 years water resources, civil, and environmental engineering including 13 years in River Management and 1 year in Floodplains and Flood Risk

Sarah Bailey (WSP)

Education: M.F.A., B.A. English and Comparative Literature
Project Role: Technical Editor
Experience: 10 years editing experience, 5 years technical, scientific, and NEPA editing experience

Jonathan Bourdeau (WSP)

Education: M.S. Management Science, B.S. Forest Resources
Project Role: Floodplains and Wetlands
Experience: 29 years in environmental permitting and NEPA analysis

Andrea Johnston (WSP)

Education: B.S. Environmental Science
Project Role: Geology and Groundwater, Aquatic Ecology, Terrestrial Zoology, Vegetation, and Threatened and Endangered Species
Experience: 4 years of experience in NEPA analysis and scientific studies

Leah Stephens (WSP)

Education: B.A. Environmental Studies
Project Role: Noise, Visual, Natural Areas, Parks, and Recreation, Socioeconomics, Safety, Unavoidable Adverse Impacts, Relationship of Short Term Uses to Long-Term Productivity, and Irreversible and Irrecoverable Commitments of Resources
Experience: 6 years of experience in NEPA analysis and documentation

David Tamsky (WSP)

Education: B.A. Environmental Studies

Project Role: Land Use and Prime Farmland, Air Quality and Climate Change, Transportation and Navigation, Cultural Resources, Hazardous Materials and Solid and Hazardous Waste, and Utilities and Service Systems.

Experience: 3 years of experience in NEPA documentation and environmental consulting

Appendix D – Symbols, Acronyms, and Abbreviations

Appendix D – Symbols, Acronyms, and Abbreviations

APHIS	Animal and Plant Health Inspection Service
BCC	Birds of Conservation Concern
BGEPA	Bald and Golden Eagle Protection Act
CAA	Clean Air Act
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CO₂	Carbon Dioxide
CO₂e	Carbon Dioxide-Equivalent
CWA	Clean Water Act
dB	Decibels
dBA	A-weighted decibel
EA	Environmental Assessment
EMF	Electric and Magnetic Field
EO	Executive Order
EPA	United States Environmental Protection Agency
EPCRA	Emergency Planning and Community Right to Know Act
ERAS	Expedited Resource Addition Study
ESA	Endangered Species Act
ESC	Environmental Screening Checklist
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act
GHG	Greenhouse Gas
GPM	Gallons per minute
HUC	Hydrologic Unit Code
HUD	Housing and Urban Development
IPaC	Information for Planning and Consultation
IRP	Integrated Resource Plan
kV	Kilovolt
Ldn	day-night sound level
Leq	equivalent sound level

LGIP	Large Generator Interconnection Procedures
MBTA	Migratory Bird Treaty Act
MGD	Million gallons per day
MW	Megawatts
NAAQS	National Ambient Air Quality Standards
NABCI	North American Bird Conservation Initiative
NEPA	National Environmental Policy Acts
NESC	National Electrical Safety Code
NFHL	National Flood Hazard Layer
NHPA	National Historic Preservation Act
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
OSHA	Occupational Safety and Health Administration
PA	Programmatic Agreement
PEIS	Programmatic Environmental Impact Statement
PM	Particulate Matter
PSA	Power Service Area
RCRA	Resource Conservation and Recovery Act
SDWA	Safe Drinking Water Act
SGIP	Small Generator Interconnection Procedures
SF₆	Sulfur Hexafluoride
SMZ	Streamside management zones
SO₂	Sulfur Dioxide
SWPPP	Stormwater Pollution Prevention Plan
TDEC	Tennessee Department Environmental Conservation
THPO	Tribal Historic Preservation Officers
TVA	Tennessee Valley Authority
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VdB	vibration decibels
VOC	Volatile Organic Compound

WHO	World Health Organization
WMA	wildlife management area