Appendix G – Protected Species and Habitat Evaluation Report (2025)

Protected Species and Habitat Assessment Report

Tennessee Valley Authority

Project reference: Watts Bar Nuclear Plant

November 2025

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Quality information

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1. Management Summary

1.1 Scope of Work and Objectives

AECOM Technical Services, Inc. (AECOM) ecologists conducted reconnaissance level surveys to document state and federally protected terrestrial flora and fauna species and to evaluate suitable habitat within the Watts Bar Nuclear Plant (WBN) property. Field ecologists recorded observations of protected species or signs of their presence, including sightings, signs, calls, tracks, scat, nests, cavities, burrows, and probable habitat observed for protected species. The assessment focused on species listed by the United States (U.S.) Fish and Wildlife Service (USFWS) under the Endangered Species Act of 1973 (ESA), as amended, as well as species proposed for federal listing, Tennessee state-listed species, and bird species protected under the Migratory Bird Treaty Act of 1918 (MBTA). In support of this evaluation, AECOM performed a desktop review of the Tennessee Valley Authority (TVA) Natural Heritage Database (NHD), the USFWS Information for Planning and Consultation (IPaC) system, and relevant literature sources to identify species with potential to occur on or near the site. Field assessments were then conducted to characterize existing habitats and evaluate their potential to support listed species or designated critical habitat. No species-specific presence/absence surveys were included in this phase.

At TVA's request, AECOM also performed a habitat-based assessment for federally listed bat species in forested areas of the WBN site. Following TVA guidance, surveys did not include mist netting or acoustic monitoring efforts. Instead, AECOM evaluated and documented habitat characteristics and identified potential roosting features within forested areas of the site. This included identifying mature trees suitable for summer roosting, dead trees, and the presence/characterization of karst structures, rock outcrops, and/or suitable culverts (minimum length of 23 feet).

1.2 Methods Overview

AECOM employed a combination of desktop review, geographic information system (GIS)-based mapping, and on-site habitat reconnaissance conducted from October 6th to October 13th, 2025. Data sources included the TVA NHD, USFWS IPaC, Tennessee Department of Environment and Conservation (TDEC) resources, and publicly available aerial and topographic datasets. Field surveys were completed by qualified ecologists using the ArcGIS Field Maps application and sub-meter global positioning system (GPS) (Trimble DA2 GNSS) to record vegetation communities, habitat boundaries, and protected-species indicators. Observations were georeferenced, photographed, and cataloged for subsequent analysis and inclusion in this report.

1.3 Key Findings

The reconnaissance survey identified a range of terrestrial and aquatic habitats across the 994.65-acre WBN property, including mature and mixed hardwood forests, hay and pasture fields, herbaceous and woody wetlands, and open-water features. These habitats collectively provide potential foraging and roosting habitat for federally listed bat species (gray bat *Myotis grisescens*, northern long-eared bat *Myotis septentrionalis*, and tricolored bat *Perimyotis subflavus*) and limited suitable habitat for other listed species such as the whooping crane (*Grus americana*) and monarch butterfly (*Danaus plexippus*).

No federally or state-listed plant species were observed during the October 2025 field effort. Several habitat areas were determined to provide moderate to high potential for use by listed bat species, while other vegetative communities - such as hay/pasture fields and developed zones -were characterized as low-quality or unsuitable. The information compiled herein provides the basis for the "Affected Environment" sections of TVA's Site Environmental Assessment for the WBN License Renewal Project.

2. Introduction

The TVA operates the WBN Units 1 and 2, in Rhea County, Tennessee, consistent with its broad responsibilities for the natural and social well-being of the Tennessee Valley Region as charged under the TVA Act of 1933. WBN is located on a 1,700-acre tract on the northern end of Chickamauga Reservoir about 8 miles from Spring City, Tennessee. It is adjacent to the TVA Watts Bar Dam Reservation at Tennessee River Mile (TRM) 528 on the western shore of Chickamauga Reservoir. WBN consists of two Westinghouse pressurized water reactors (PWRs) and associated turbine generators that collectively supply approximately 2,300 Megawatts Electric (MWe) of electric power to the TVA transmission and distribution system. Producing approximately 1,150 MW per unit, Watts Bar typically generates nearly 19,000 Gigawatt hours per year, or enough to power 1.3 million homes. WBN Unit 1 began commercial operation in May 1996, followed by Unit 2 in October 2016.

In 1998, Secretary of Energy Bill Richardson announced that commercial light water reactors (CLWR) would be the primary supply sources for tritium for national security purposes. The U.S. Department of Energy's (DOE) National Nuclear Security Administration completed an Environmental Impact Statement (EIS) for the Production of Tritium in a Commercial Light Water Reactor with TVA as a cooperating agency in 1999. This EIS analyzed production of tritium in TVA reactors using tritium-producing burnable absorber rods (TPBARs). In May 1999, the DOE published a Record of Decision announcing the decision to enter into an agreement with TVA to produce tritium in the Watts Bar Unit 1 reactor and Sequoyah Units 1 and 2 reactors. TVA published its Record of Decision in 2000. This necessitated TVA apply for and receive an amended license from the Nuclear Regulatory Commission (NRC) for Watts Bar Unit 1. In 2001 and 2017, TVA filed an application with NRC to amend the Watts Bar Unit 1 and Unit 2, respectfully, operating license to allow irradiation of TPBARs in the reactor cores each fuel cycle. The maximum number of TPBARs to be produced at Watts Bar has varied over time with TVA applying for an NRC license amendment each time. Most recently in April 2024, the NRC approved license amendment allows up to 2,496 TPBARs at each Watts Bar unit.

2.1 Project Description and Site Location

The WBN Unit 1 license currently expires on February 7, 2036, and Unit 2 on October 21, 2055. To continue to provide low-cost reliable power to the TVA grid and beyond, and tritium production for DOE, the Units 1 and 2 NRC licenses must be renewed for another 20 years. TVA plans to submit this LRA to the NRC by November 2026 requesting an additional 20 years of operation of WBN Units 1 and 2. Pursuant to the requirements of National Environmental Policy Act (NEPA), TVA is preparing this SEA to discuss the environmental impacts of a WBN Units 1 and 2 license extension. With the receipt of license renewal from NRC, TVA proposes to maintain and operate WBN Unit 1 until 2056 and Unit 2 until 2075.

No transmission system upgrades are expected to be needed to support the license renewal. The license renewal program may require maintenance actions or refurbishment to WBN to maintain consistency with the current licensing basis, as well as NRC and TVA requirements. The WBN License Renewal Project will utilize NUREG-1555, Supplement 1, Revision 2, Standard Review Plans for Environmental Reviews for Nuclear Power Plants, Operating License Renewal Final Report, August 2024 to determine appropriate license renewal aging management requirements for the structures, systems, and components. To date, no major modifications or component replacements have been identified for the WBN License Renewal Project as being required for WBN Unit 1 to operate until 2056 and Unit 2 to operate until 2075. Based on the Electric Power Research Institute Report 1021115 (EPRI 2011), plant improvements including intake structures, buried piping, and large external tanks would be expected for continued operation from 40 to 60 years. During the development of the WBN License Renewal Application (LRA), should modifications or replacements/improvements be identified, these will be communicated to the TVA NEPA staff for inclusion in the TVA Site Environmental Assessment (SEA).

2.2 Project Footprint

The project site is located south of Watts Bar Highway and north of the Tennessee River within the located within the Decatur, Tennessee U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle map (USGS, 2022) and is approximately 994.65 acres (**Appendix A**, Figure 1). The site is currently used for nuclear power plant operations. Topographically, the site exhibits gentle and steep slopes that rise toward a central high point and slope downward toward the perimeter and adjacent low-lying areas along the Tennessee River and Yellow Creek which runs outside of the project sites western boundary.

Facilities are present across the property with the main operational plant facility located on the eastern half of the project site (**Appendix A**, Figure 2). The remaining project site consists of undeveloped areas, fallow fields, and maintained fields. Site access is available from Morrison Lane and Nuclear Plant Road. The surrounding areas consist of undeveloped forested land or agricultural fields.

2.3 Regulatory Context

This assessment was conducted in accordance with the requirements of the ESA (16 U.S.C. 1531 et seq.), the MBTA (16 U.S.C. 703–711), and the Bald and Golden Eagle Protection Act of 1940 (BGEPA; 16 U.S.C. 668–668c). The work also complies with TVA's Biological Compliance Center (BCC) Guidelines (2025) and other applicable federal and state environmental regulations.

The assessment supports TVA's obligations under the NEPA (42 U.S.C. 4321 et seq.) to evaluate potential effects of federal actions on biological resources. Data generated from this study will inform the Affected Environment and Environmental Consequences sections of TVA SEA prepared for the WBN License Renewal Project.

2.4 Scope Limitations

AECOM's services were performed using reasonable care and diligence consistent with accepted scientific and professional standards for ecological field investigations. The findings, interpretations, and conclusions presented in this report are based on information available at the time of the field surveys and desktop reviews.

AECOM is not responsible for conditions or impacts resulting from information that was concealed, withheld, or not fully disclosed at the time the work was conducted. Field assessments represent conditions observed during October 2025 and may not reflect seasonal or longer-term variations in habitat, hydrology, or species presence. Future changes in land use, climate, or site management may alter existing conditions and the applicability of these findings.

3. Methods

3.1 Survey Approach

Background research of relevant published and online information sources was conducted prior to field surveys to identify potential ecological resources within the Study Area. Sources included USGS topographic maps, National Wetland Inventory maps, and US Department of Agriculture (USDA) - Natural Resources Conservation Service (NRCS) soil survey maps of the counties (**Appendix A,** Figures 3, 4, and 5). Prior to visiting the Study Area, ecologists reviewed the USFWS IPaC database and the TDEC and TVA NHD. More specifically, all state or federally listed, federally protected, or candidate for listing terrestrial animal species found within 3 miles of the Study Area and all federally listed, federally protected, or candidate for federal listing terrestrial animal species found within the county in which the project occurs were reviewed for this report. All species descriptions were prepared using the Tennessee Wildlife Resources Agency (TWRA) website, NatureServe Explorer, USFWS website, and USDA-NRCS Plants database.

Field surveys to assess and document the presence of ecological resources, such as habitat/land use within the Study Area's boundaries, protected species and their habitats, and other ecological resources were conducted using approved methodologies.

AECOM used this information to evaluate the potential for sensitive environmental features at the site and to develop a preliminary vegetation community and wildlife habitat map of the Study Area. The results of the desktop study are summarized in **Section 4** of this report.

3.2 Data Collection

The approved team of AECOM biologists conducted a vegetation community and wildlife habitat survey October 6 to 13, 2025 (Field Notes are contained in **Appendix B**). These surveys confirmed and supplemented the preliminary inventory created during the desktop study. These surveys also provided the basis for planning the level of effort required and the location of individual habitats for potential protected species within the Study Area.

The habitat survey methodology consisted of systematic foot surveys providing 100 percent visual coverage of all vegetated portions of the site during which field personnel recorded plant species encountered and documented the presence and extent of vegetation communities and locations of significant natural communities within the Project Site. Plant species were inventoried to the extent possible by shrubs, trees, and grasses that showed readily identifiable field characteristics (i.e., bark, growth formation, leaf retention, leaves, buds, inflorescence); vegetation communities were qualitatively characterized in terms of dominant plant species, invasive species, and the presence of human disturbance.

Vegetative communities were mapped in the field using aerial imagery of the Study Area. Subsequently, GIS databases and basemaps were used within the ArcGIS FieldMaps application for field mapping and data collection. Separate GIS layers were developed via aerial imagery for each vegetation community and significant natural communities and overlain on basemaps. AECOM biologists verified these communities in the field by evaluating land conditions and comparing the field boundaries of these areas with those developed.

AECOM biologists conducted field surveys for wildlife habitats and species in conjunction with the vegetation community surveys. AECOM documented the presence of significant habitat features, including cavities, snags, and other habitat features within the Study Area. All wildlife species and/or wildlife signs observed while moving through the site were recorded. Descriptions of these observations are in **Section 4** of this report and depicted in **Appendix A,** Figures 6 and 7. Additionally, **Section 4** lists wildlife species expected to occur at the site based on vegetation and habitat characteristics, documented habitat/wildlife use relationships, and knowledge of the region.

As part of the listed species evaluation, literature reviews, database searches, and field assessments of the project site were conducted to assess the potential occurrence of listed and protected species and/or presence of federally designated critical habitat. No species-specific surveys will be conducted during this phase. A review of TVA's NHD will be conducted and the potential for the site to contain habitat suitable to support populations of these species will be evaluated during this survey.

3.2.1 Mapping

AECOM mapped all habitats using a sub-meter GPS device, Trimble DA2 GNSS Receiver, in conjunction with the Environmental Systems Research Institute, Inc (ESRI) FieldMaps application. The GPS data was imported into ESRI ArcPro GIS software, where the data was reviewed, edited for quality and accuracy, and compiled in a format suitable for transfer and use. The GPS was programmed to record points with a minimum of four satellites and an accuracy no greater than 3 meters. Habitat assessment points were delineated by collecting GPS points at representative locations within all representative habitat types located within the Study Area. These points were then projected onto georeferenced aerial images to create maps used to illustrate the location and size of all habitat types present for incorporation into the habitat assessment report, photologs, and future use in agency consultations, permit applications, and plans.

3.2.2 Photographs

Photographs are the visual documentation of site conditions as they existed during the field surveys. Representative photos were taken at all habitat assessment locations and protected species survey locations. A minimum of one photo was taken, unless the area was large and required additional representation. A photographic log representing all site conditions is provided in **Appendix C**.

3.3 Bat Habitat

TVA requested that AECOM conduct seasonally appropriate presence/absence surveys for federally listed bat species in forested areas within the WBN site. Discussions with TVA indicate that these efforts are not to include mist netting or acoustic monitoring efforts. Instead, AECOM will evaluate and document habitat characteristics and identify potential roosting features within forested areas of the site. This will include identifying mature trees suitable for summer roosting, dead trees, and the presence/characterization of karst structures, rock outcrops, and/or suitable culverts.

Following USFWS and TVA guidelines, all culverts 3-feet in diameter or greater and 23 feet in length were visually inspected for signs of use by bats. Culverts were photographed from the outside to show the general construction and are provided in **Appendix C**, and USFWS Bat Habitat Assessment Forms are provided in **Appendix D**.

4. Affected Environment

4.1 Threatened and Endangered Species

Species discussed in this section include those protected under the federal ESA, State regulations, the BGEPA, and the MBTA.

TVA's Natural Heritage Database was reviewed for plant species within 5 miles and terrestrial animal species within 3 miles of the Project Site. The USFWS's IPaC project planning tool was also reviewed to identify federally listed species with potential to occur on the Project Site. Results of these queries are provided in **Appendix E**, summarized in Table 1, and discussed in further detail throughout this section. In total, the TVA NHD and IPaC indicated seven federally listed or protected species and 51 additional species of conservation concern with state ranks or statuses with the potential to occur on the Project Site.

Each species identified through the IPaC report, and the TVA NHD was evaluated based on habitat requirements and the likelihood of occurrence within the Project Site. Following these queries, qualified biological professionals conducted habitat surveys for threatened and endangered species in October 2025.

Table 1. Federally and State-listed or Protected Species potentially occurring on the Project Site

Common Name	Scientific Name	Federal Status[1]	State Status[2]	TVA NHD Status[3]	Likelihood of Occurrence
Mammals					
Gray Bat	*Myotis grisescens*	E	SP	S2	Moderate
Little Brown Bat	*Myotis lucifugus*	---	SP	S3	Moderate
Northern Long-eared Bat	*Myotis septentrionalis*	E	SP	S1S2	Moderate
Tricolored Bat	*Perimyotis subflavus*	PE	SP	S2S3	Moderate
Meadow Jumping Mouse	*Zapus hudsonius*	PS	SP	S4	Low
Birds					
Whooping Crane	*Grus americana*	EXPN	---	---	Low
Bald Eagle	*Haliaeetus leucocephalus*	DL	---	---	Moderate
Osprey	*Pandion haliaetus*	---	---	S3B	High
Amphibians					
Eastern Hellbender	*Cryptobranchus alleganiensis alleganiensis*	PE	SP	S2S3	None
Insects					
Monarch Butterfly	*Danaus plexippus*	PT	---	---	High
Plants					
Spreading Rockcress	*Arabis patens*	---	SP	S1	Low
Spreading False foxglove	*Aureolaria patula*	---	SP	S3	None
Northern Bush-honeysuckle	*Diervilla lonicera*	---	SP	S2	None
Slender Blazing-star	*Liatris cylindracea*	---	SP	S2	None
Prairie Goldenrod	*Oligoneuron album*	---	SP	S1S2	None

Source: **Appendix E** (IPaC 2025 and TVA Regional Natural Heritage Database [NHD] 2025)
[1]Federal Status: Endangered (E), Threatened (T), Candidate (C), Proposed endangered (PE), Proposed threatened (PT), Experimental population, Essential (EXPE), Experimental population, Non-essential (EXPN), Down Listed (DL), Under Review (UR), Partial Status (PS)
[2]State Status: Partial Status Mussels (PSM), State Protected (SP)

Common Name	Scientific Name	Federal Status[1]	State Status[2]	TVA NHD Status[3]	Likelihood of Occurrence

[3] TVA NHD Status (State Rank): Critically imperiled (S1), Imperiled (S2), Vulnerable (S3), Apparently Secure (S4), Rank of breeding population (S#B), Range of ranks because the exact rarity of the element is uncertain (S#S#)

4.1.1 Federally Listed Species

Review of the TVA NHD and IPaC indicated that seven federal listed terrestrial animal species have reported occurrences within 3 miles of the Watts Bar site in Rhea County, Tennessee (TVA 2025). This includes two federally listed threatened and endangered species, one species proposed for endangered status, and one species proposed for threatened status, one species listed as experimental population, non-essential status, and one species listed as partial status (**Table 1**).

4.1.1.1 Mammals

Three federally listed bat species were identified as potentially occurring on the Project Site. Habitat surveys identified suitable summer foraging and roosting habitat for all three federally listed bat species (i.e., gray bat, northern long-eared bat, tricolored bat).

Gray bats roost in caves year-round and migrate between summer and winter roosts during spring and fall (Brady et al. 1982, TVA 2025). Bats disperse over bodies of water at dusk where they forage for insects emerging from the surface of the water (Tuttle 1976). Foraging habitat and sources of drinking water exist over streams, channels and wetlands on WBN property and over the Tennessee River.

The northern long-eared bat (NLEB) predominantly overwinters in large hibernacula such as caves, abandoned mines, and cave-like structures. During the fall and spring, they utilize entrances of caves and the surrounding forested areas for swarming and staging. In the summer, NLEB bats roost individually or in colonies beneath exfoliating bark or in crevices of both live and dead trees (typically greater than 3 inches in diameter). NLEBs are thought to be more opportunistic in roost site selection. This species also roosts in abandoned buildings and under bridges. NLEB emerge at dusk to forage below the canopy of mature forests on hillsides and near roads, and occasionally over forest clearings and along riparian areas (USFWS 2014).

The tricolored bat (TCB) was proposed for listing as endangered under the ESA in September 2022 (87 FR 56373; September 14, 2022). These bats hibernate in caves, mines, and rock crevices during winter. TCBs in Tennessee prefer cave entrances from early August to late October and are the most common bat in the state that occurs year-round. During the spring, summer, and fall, the TCB utilizes forested habitats, where it roosts in live and recently dead deciduous trees, primarily among leaves, and occasionally in human structures. In the southern and northern portions of the range, TCBs will also roost in Spanish moss (*Tillandsia usneoides*) and lichen, respectively. It forages around forest edges and over waterways.

Meadow jumping mouse prefer open-grassy fields, but also use hayfields, shrubby fields, fence rows, and edges of woods. They are frequently found in moist areas or near water. Meadow jumping mouse are uncommon and are “Deemed in Need of Management” by both TWRA and TDEC. They are one of two mice in Tennessee that hibernate. After increasing body weight in the preceding months, they dig a hole in a dirt mound and build a nest in October and emerge in late April or May.

4.1.1.2 Birds

One federally listed bird species, the whooping crane, has potential to occur on the Project Site. Whooping cranes typically forage in marshes, lakes, ponds, rivers, wet meadows, pastures, and agricultural areas. A small portion of the Project Site (0.56%) is herbaceous wetlands which could potentially provide suitable foraging habitat for the whooping crane. However, due to the small amount of suitable foraging habitats within the Project Site, the probability of occurrence of the species is considered low.

4.1.1.3 Amphibians

The eastern hellbender has been proposed for listing as endangered under the ESA. This species is North America's largest salamander and lives in shallow streams and rivers with clean, well oxygenated, swift flowing waters. They can be found under large flat rocks and are very sensitive to sedimentation. None of the streams within the Project Site exhibited the characteristics necessary to constitute hellbender habitat. Due to a lack of habitat, there is no likelihood that the species will occur within the Project Site.

4.1.1.4 Insects

The monarch butterfly has been proposed for listing as threatened under the ESA. It is a highly migratory species, with eastern United States populations overwintering in Mexico. Monarch populations typically return to the eastern United States in April (Davis and Howard 2005). Monarch butterflies migrate through Tennessee in the fall, generally from mid-September to mid-October. Summer breeding habitat requires milkweed plant species, on which adults exclusively lay eggs for larvae to develop and feed on. The hay fields within the WBN property include several species of wildflowers and other flowering plants that provide suitable foraging habitat for adult monarchs. During the field review, adult monarch butterflies were observed feeding on hairy white oldfield asters (*Symphyotrichum pilosum*) within mapped wetland W105.

4.1.2 State-Listed Species

TVA keeps a Regional Natural Heritage Database for its sites with designations defining the status of the species in the state, which are also included in **Table 1**. Critically imperiled species (S1) are either extremely rare (five or fewer occurrences, very few remaining individuals or acres) or are especially vulnerable to extirpation. Imperiled species (S2) are rare, have a restricted range, very few populations (20 or fewer), steep declines, or are otherwise vulnerable to extirpation. Vulnerable species (S3) are rare or uncommon in Alabama and at moderate risk of extirpation due to a restricted range, relatively few populations (100 or fewer), recent and widespread declines, or other factors. Apparently Secure species (S4) may be uncommon, but not rare. Secure species (S5) are common, widespread, and abundant in the state. Presumed Extirpated species (SX) are species or a community that is believed to be extirpated from Tennessee and has not been located despite intensive searches of historical sites and other appropriate habitats, with virtually no likelihood that it would be rediscovered.

A qualified biologist performed a desktop analysis to assess the existence of additional state-listed species in the Study Area that are not federally protected. State-listed species encompass those within Hydrologic Unit Code (HUCs) that the aquatic resources within the Study Area drain to, as well as all species listed for Rhea County, Tennessee. Information on state-listed species was sourced from the TVA NHD. Six state-protected species are reported by the TVA NHD for the Project Site, comprising of one mammal and five plant species.

4.1.2.1 Mammals

Only one terrestrial animal species that is state-protected—which is "Under Review" federally—has the potential to occur within the Project Site, little brown bat (*Myotis lucifugus*). Male little brown bats are solitary or live in colonies of up to 20 individuals, during the summer using rocky crevices, hollow trees, loose bark or under shingles or siding of buildings. Female little brown bats live in nursery colonies in the spring and summer, which may be in cliff crevices, hollow trees, under loose tree bark or in undisturbed parts of buildings such as attics. Little brown bats hibernate in limestone caves during the winter.

4.1.2.2 Plants

State protected plant species (**Table 2**) with low or no potential to occur on the Project Site include spreading rockcress, spreading false-foxglove, northern bush-honeysuckle, slender blazing-start, and prairie goldenrod.

Table 2. State Protected Plant Species with Potential to Occur on the Project Site

Common Name	Suitable Habitat	Likelihood of Occurrence
Spreading Rockcress	Grow on or near shady, often mesic, rock outcrops of limestone that are found along rivers, but can also be found growing on slopes and stream banks, in seepages, and in floodplain forests.	Low
Spreading False foxglove	Steep limestone bluffs in the shade of rather open stands of mixed hardwoods.	None
Northern Bush-honeysuckle	Dry, rocky woodlands and thickets and sandy sites	None
Slender Blazing-star	Dry, open situations, in either limey or acid, sandy or rocky soils as well as in open woods, prairie remnants, dunes, and bluffs.	None
Prairie Goldenrod	Dry, calcareous prairies and open woods.	None

4.1.3 Migratory Bird Treaty and Bald and Gold Eagle Act

The MBTA (16 U.S.C. 703-711) requires the protection of migratory birds by prohibiting the take of birds, feathers, eggs, and nests. Actions must be taken to avoid or minimize impacts to migratory birds and to prevent or abate the detrimental alteration of the environment for the benefit of migratory birds under the terms of a valid permit issued pursuant to federal regulations by the USFWS. Typically, if active nests of bird species protected by the MBTA are identified, the USFWS recommends avoiding tree clearing or nest removal until at least the peak of the nesting season has passed or until the nest is abandoned.

The BGEPA (16 U.S.C. 668-668c) prohibits, except under certain specified conditions, the take, possession, and commerce of bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*), including their parts (i.e., feathers), nests, or eggs. The BGEPA defines “take” of an eagle as “to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest, or disturb,” and further defines “disturb” as “to agitate or bother a bald or golden eagle to a degree that causes or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior,” (50 CFR 22.6). The act includes protections for previously used nests during any time when the eagles are not present if as a result of human-induced alterations, upon the eagle’s return, such alterations disturb the eagle to such a level that interferes with or interrupts its normal breeding, feeding, or sheltering habits, and causes injury, death, or nest abandonment.

Suitable habitat for migratory birds is located throughout the Project Site. Notably, various types of wetlands, streams, and surface waters were mapped within the Project Site where suitable habitat exists for nesting migratory birds. The IPAC report identified 11 Birds of Conservation Concern (BiCC) with the potential to occur on the Project Site. BiCCs are defined as “migratory and non-migratory bird species (beyond those already designated as federally threatened or endangered) that represent [the USFWS’s] highest conservation priorities.” (USFWS 2021). **Table 3** identifies BiCCs that have potential to occur in the Project Site along with each species breeding season (**Appendix E**).

Table 3. BiCCs with the Potential to Occur at or near the Project Site

Common Name	Scientific Name	Breeding Season*
Bobolink	*Dolichonyx oryzivorus*	May 20 – July 31
Chimney Swift	*Chaetura pelagica*	March 15 – August 25
Chuck-will’s-widow	*Antrostomus carolinensis*	May 10 – July 10
Eastern Whip-poor-will	*Antrostomuc vociferus*	May 1 – August 20

Common Name	Scientific Name	Breeding Season*
Golden-winged Warbler	*Vermivora chrysoptera*	May 1 – July 20
Kentucky Warbler	*Geothlypsis Formosa*	April 20 – August 20
Prairie Warbler	*Setophaga discolor*	May 1 – July 31
Prothonotary Warbler	*Protonotaria citrea*	April 1 – July 31
Red-headed Woodpecker	*Melanerpes erythrocephalus*	May 10 – September 10
Rusty Blackbird	*Euphagus carolinus*	Breeds elsewhere
Wood Thrush	*Hylocichla mustelina*	May 10 – August 31

Bald eagles are associated with larger mature trees capable of supporting their massive nests. These are usually found near larger waterways where the eagles forage (USFWS 2007). The TVA's NHD recorded three bald eagle nests within a 3-mile radius of the Project site. There are various instances of open water habitat within the Project Site, indicating that the areas may provide suitable habitat for bald eagles. The Tennessee River abuts the southern and eastern sides of the Project Site, providing foraging habitat. Osprey and other raptures were observed during the field reviews in October 2025, but no bald eagles were observed.

4.2 Species Observations

4.2.1 Mammals

Mammals likely to occur include the white-tailed deer (*Odocoileus virginianus*), coyote (*Canis latrans*), raccoon (*Procyon lotor*), gray squirrel (*Sciurus carolinensis*), and cotton mouse (*Peromyscus gossypinus*). Common bat species likely to occur are the eastern red bat (*Lasiurus borealis*), big brown bat (*Eptesicus fuscus*), evening bat (*Nycticeius humeralis*), Seminole bat (*Lasiurus seminolus*), and southeastern bat (*Myotis austroriparius*).

4.2.2 Birds

Birds likely to occur on the Project Site include songbirds, birds of prey, and game birds. Songbirds that commonly occur in these habitat types include the American crow (*Corvus brachyrhynchos*), northern cardinal (*Cardinalis cardinalis*), tufted titmouse (*Baeolophus bicolor*), brown thrasher (*Toxostoma rufum*), northern mockingbird (*Mimus polyglottos*), and Carolina wren (*Thryothorus ludovicianus*). Birds of prey expected in these habitats include the red-tailed hawk (*Buteo jamaicensis*), ospreys (*Pandion* haliaetus), Cooper's hawk (*Accipiter cooperii*), and turkey vulture (*Cathartes aura*). Game birds likely to occur include the wild turkey (*Meleagris gallopavo*), bobwhite (*Colinus virginianus),* and mourning dove (*Zenaida macroura*). Migratory birds of conservation concern are discussed in **Section 4.1.3**.

The TVA NHD (TVA, 2025a) indicated there were multiple instances of colonial wading bird colonies, heron rookeries, and active osprey nests within the Project Site. Throughout the site, osprey platforms were observed adjacent to lakes and ponds. These osprey platforms were mapped and are shown in **Appendix A,** Figure 6**.** AECOM biologists walked the entirety of the project site during the October 2025 field survey. No active osprey nests, active wading bird colonies, or active heron rookeries were observed within or adjacent to the survey limits at the time of the site visit. While earlier draft datasets referenced colony locations within three miles of the project footprint, none were active or detectable during the on-site field assessment.

4.2.3 Reptiles and amphibians

Reptiles and amphibians likely to occur on the Project Site include the box turtle (*Terrapene carolina*), eastern garter snake (*Thamnophis sirtalis*), black racer (*Coluber constrictor*), fence lizard (*Sceloporus undulatus*), northern cricket frog (*Acris crepitans crepitans*), upland chorus frog (*Pseudacris triseriata feriarum),* and American toad (*Bufo americanus*).

4.3 Habitat Assessment

A desktop review and subsequent field habitat assessments conducted in October 2025, were respectively used to characterize potential habitat types within the 994.65-acre Project Site. Field surveys utilized the National Land Cover Database Classification System to classify habitats into major categories and are described in **Table 4**. Within the Project Site, 14 habitat cover classes were mapped. Of these habitats, 10 can be classified as vegetative communities (i.e., areas which do not include developed areas).

GPS points were recorded at areas where notable shifts in habitat occurred – such as changes in hydrology, topography or vegetative cover alterations. Each of these distinct areas was classified into one or more of 14 habitat types. The habitat types encompassed open water, stream, woody and emergent herbaceous wetlands, ditch, hay/pasture, barren land, developed, deciduous forests, evergreen forest, shrub/scrub, and herbaceous. Additional data, including dominant plant species within each area and habitat suitability for any listed threatened and endangered species, were also recorded and are shown in **Table 4**.

Table 4. Delineated Vegetative Communities within the Project Site

Community Type	Description/Species Present	Area in Acres	Percent of Study Area
Deciduous Forest	Tree and sapling layer consists of tulip poplar (*Liriodendron tulipifera*), American sycamore (*Platanus occidentalis*), white oak (*Quercus alba*), sweetgum (*Liquidambar styraciflua*), red maple (*Acer rubrum*), and hackberry (*Celtis occidentalis*). The majority of trees within this community are within the range of 3-15 inches in diameter at breast height (DBH). The shrub layer consists of blackberry, black cherry (*Prunus serotina*), eastern red cedar (*Juniperus virginiana*), American hophornbeam (*Ostrya virginiana*), and ironwood (*Carpinus caroliniana*). Woody vine species present include greenbrier (*Smilax rotundifolia*) and poison ivy (*Toxicodendron radicans*).	304.12	30.58
Developed, Open Space	Comprised of a mixture of constructed materials, but mostly vegetation in the form of lawn grass surrounding the buildings.	36.64	3.48
Developed, Low Intensity	Comprised of smaller buildings pertaining to the plant's operations.	58.92	5.92
Developed, Medium Intensity	Comprised of smaller buildings and office spaces pertaining to the plant's operations.	119.12	11.98
Developed, High Intensity	Comprised of larger developed areas where majority of the employees work. Impervious surfaces account for 8 to 100% of the total cover.	136.37	13.71
Barren Land (Rock/Sand/ Clay)	In general, this community is an area of thin soil, sand or rocks. Vegetation, if present, is more widely spaced.	8.64	0.87
Evergreen Forest	Predominately pine species such as loblolly pine (*Pinus taeda*) and short leaf pine (*Pinus echinata*) with eastern red cedar, blackberry, broomsedge, and greenbrier interspersed. The majority of trees within this community are in the range of 3-15 inches DBH.	44.96	4.52

Community Type	Description/Species Present	Area in Acres	Percent of Study Area
Mixed Forest	Tree and sapling layer consists of water oak (*Quercus nigra*), cherry bark oak, tulip poplar, sweetgum, American beech (*Fagus grandifolia*), shagbark hickory, loblolly pine, and eastern cottonwood (*Populus deltoides*). Shrub layer consists of blackberry, eastern red cedar, ironwood, and sweetgum. Woody vine species consisted of greenbrier, muscadine (*Vitus rotundifolia*) and poison ivy. The majority of trees within this community are in the range of 3-15 inches DBH.	39.27	3.95
Shrub/Scrub Wetland	Dominated by dense thickets of short woody vegetation. Vegetation consists of buttonbush, willow, and cottonwood.	2.98	0.30
Herbaceous	Consists of non-woody vegetation, such as woolgrass (*Scirpus cyperinus*), asters (*Symphyotrichum* sp.), tall goldenrod (*Solidago altissima*), and redtop panicgrass (*Coleataenia rigidula*).	2.50	0.25
Hay/Pasture	Predominately composed of perennial grasses, legumes, and forbs, such as tall fescue (*Festuca arundinacea*) and orchard grass (*Dactylis glomerata*).	192.00	19.30
Woody Wetlands	Primarily dominated by cottonwoods, (*Populus* sp.), ash (*Fraxinus* sp.), and black willow (*Salix nigra*). Other tree species observed included American sycamore, sweetgum, and tulip poplar.	21.15	2.13
Emergent Herbaceous Wetlands	Primarily characterized by non-woody plants such as grasses, reeds, and rushes that grow rooted in saturated soil or shallow water. Species within this community type included cattail (*Typha* sp.), bulrushes, and other grasses.	5.57	0.56
Water	Consists of various sized natural and man-made ponds.	24.43	2.46
Total		**994.65**	**100**

The Project Site is primarily dominated by deciduous forests and hay/pasture lands. Forested regions are largely composed of deciduous hardwood stands. These forested zones are distributed throughout the Project Site and serve important ecological functions, such as forming riparian buffers along the mapped streams and wetlands. In addition to forested and hay/pasture lands, the Project Site also includes developed low, medium, and high-density buildings and structures, which are a part of the Nuclear Plant operations, as well as diverse wetland types. These include forested deciduous wetland areas, emergent herbaceous wetlands, ever green forests, and barren lands.

Based on field habitat assessments and vegetative community data collected in October 2025, forested areas were generally of early to mid-successional age and exhibited evidence of historical disturbance, including selective logging, off-road gravel road maintenance, and edge clearing. The average diameter at breast height (DBH) of dominant canopy trees in intact forest patches ranged from 3 to 15 inches, which is below typical old-growth thresholds for eastern hardwood systems (less than or equal to 20 in DBH and multi-cohort structure). No invasive plant species were observed and noted during the field review.

The forested zones which provide riparian buffers along the streams and wetlands can be described as suitable habitat for various federally and state protected species, such as the gray bat, NLEB, TCB, and the little brown bat. The mapped herbaceous wetland areas within the Project Site could provide suitable foraging habitat for the federally protected whooping crane. Additionally, monarch butterflies were observed through the herbaceous wetlands and hay/pasture vegetative communities.

No globally imperiled plant communities were documented, and no protected plant species were noted during the field review.

4.4 Bat Habitat

Three federally listed bat species were identified as potentially occurring on the Project Site. Habitat surveys identified suitable summer foraging and roosting habitat for all three federally listed bat species (i.e., gray bat, NLEB, TCB). Suitable summer foraging and roosting habitat was identified throughout the Project Site and is categorized as low, medium, and high quality, as described in **Table 5**. These areas are shown including mapped snags and suitable culverts observed throughout the Project Site in **Appendix A,** Figure 7.

Table 5. Bat Summer Habitat Quality on the Project Site

Summer Habitat Quality	Description	Acreage
Low Quality	Scrub/shrub areas, and forest areas with small immature trees less than 3 inches DBH. These areas do not provide suitable roosting habitat but may be utilized for foraging.	203.05
Medium Quality	Deciduous, mixed forest, and evergreen forest areas where most trees are 3-15 inches DBH. These areas represent marginal roosting and foraging habitat.	388.35
High Quality	Deciduous forests, deciduous wetlands, and mixed forest areas with large trees (>15 inches DBH), an open understory, and nearby access to water. These areas represent high quality foraging and roosting habitat.	51.15

Additionally, several road overpasses and box culverts occur within or adjacent to the Project Site, which may provide sufficient overwintering habitat for several listed bat species. While no caves were found within the Project Site, the Meigs County Cave appeared within the TVA's NHD search to be located within a 3-mile radius of the Project Site.

Both NLEB and TCB inhabit a wide variety of forested/wooded habitats where they roost, forage, and travel. They may also traverse habitats adjacent and interspersed with forest habitat, such as emergent wetlands and field edges, but are predominantly found in forest/wooded habitat. This includes forests and woodlots containing potential roosts. Potential roosts are defined by live trees and/or snags that have a DBH greater than 3 inches that has exfoliating bark, cracks, crevices, and/or cavities. During the field reviews, AECOM biologists mapped snags which met the abovementioned criteria which were found within suitable habitats. These mapped snags are shown within **Appendix A,** Figure 7.

Many bat species will take advantage of cracks, crevices, voids, and other openings within structures. According to USFWS Guidelines, culverts with entrances between 2 to 4 feet may be suitable for the NLEB and the TCB and are designs that create artificial "cave-like" environments where conditions are generally stable, thus allowing bats to use for extended periods of torpor, particularly in areas where natural cave-like habitats may be limited. Various culverts were mapped and observed during the field reviews and are shown within **Appendix A,** Figure 7. Field data forms completed during the bat habitat assessment can be found in **Appendix D**.

5. Conclusions

The reconnaissance-level surveys and desktop analyses conducted in October 2025 identified a diversity of terrestrial and aquatic habitats within the approximately 994.66-acre WBN property. These include mixed deciduous and evergreen forest stands, hay and pasture fields, herbaceous and woody wetlands, and multiple open-water features associated with the Tennessee River and adjacent drainage systems.

Habitat evaluations indicate that the site supports a moderate to high potential for use by several federally listed bat species—including the gray bat, NLEB, and TCB—for roosting and foraging. Riparian forests, mature hardwood stands, and culverts of sufficient dimensions provide features suitable for seasonal use by these species. No caves or karst openings were identified within the project footprint, though one known cave occurs within three miles of the site per the TVA NHD.

The site also contains limited areas of suitable foraging habitat for other federally or state-protected species, such as the whooping crane within the herbaceous wetlands and the monarch butterfly within hay and fallow field communities that support milkweed and flowering forbs. No federally or state-listed plant species were observed during the survey.

Overall, the Project Site is dominated by previously disturbed or managed vegetation communities, with protected-species habitat primarily confined to remnant forested and riparian areas. These findings provide an inventory and baseline characterization of biological resources within the project footprint.

This report is intended to inform the “Affected Environment” sections of TVA’s forthcoming SEA for the WBN License Renewal Project. It does not include impact analysis or effect determinations under the Endangered Species Act or other federal statutes. Any future evaluation of potential project impacts or mitigation measures will be conducted within the context of the NEPA environmental review and agency consultation processes.

6. References

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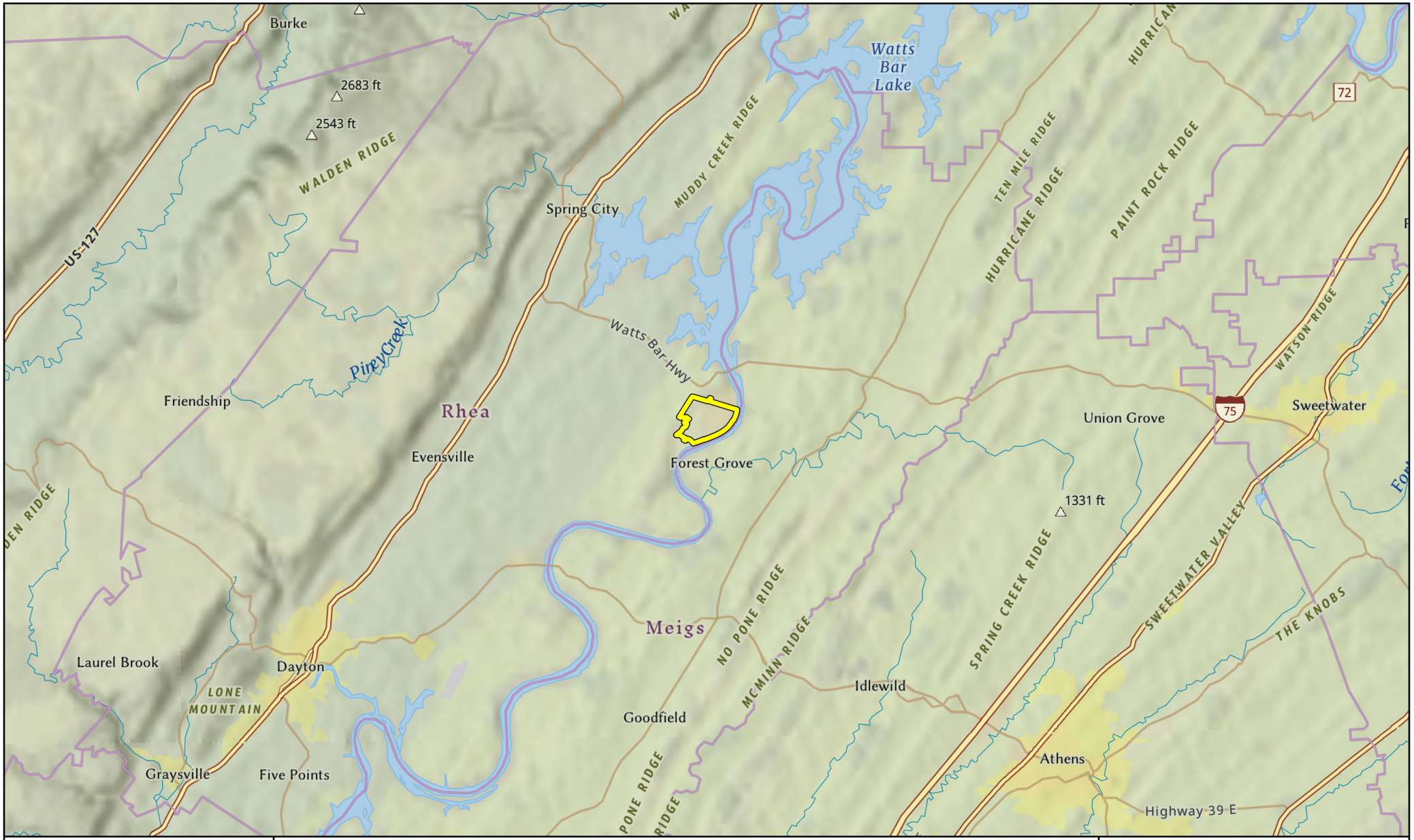
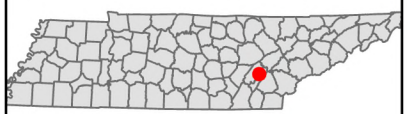
Appendix A
Figures





Project Location
Rhea County, TN

Legend

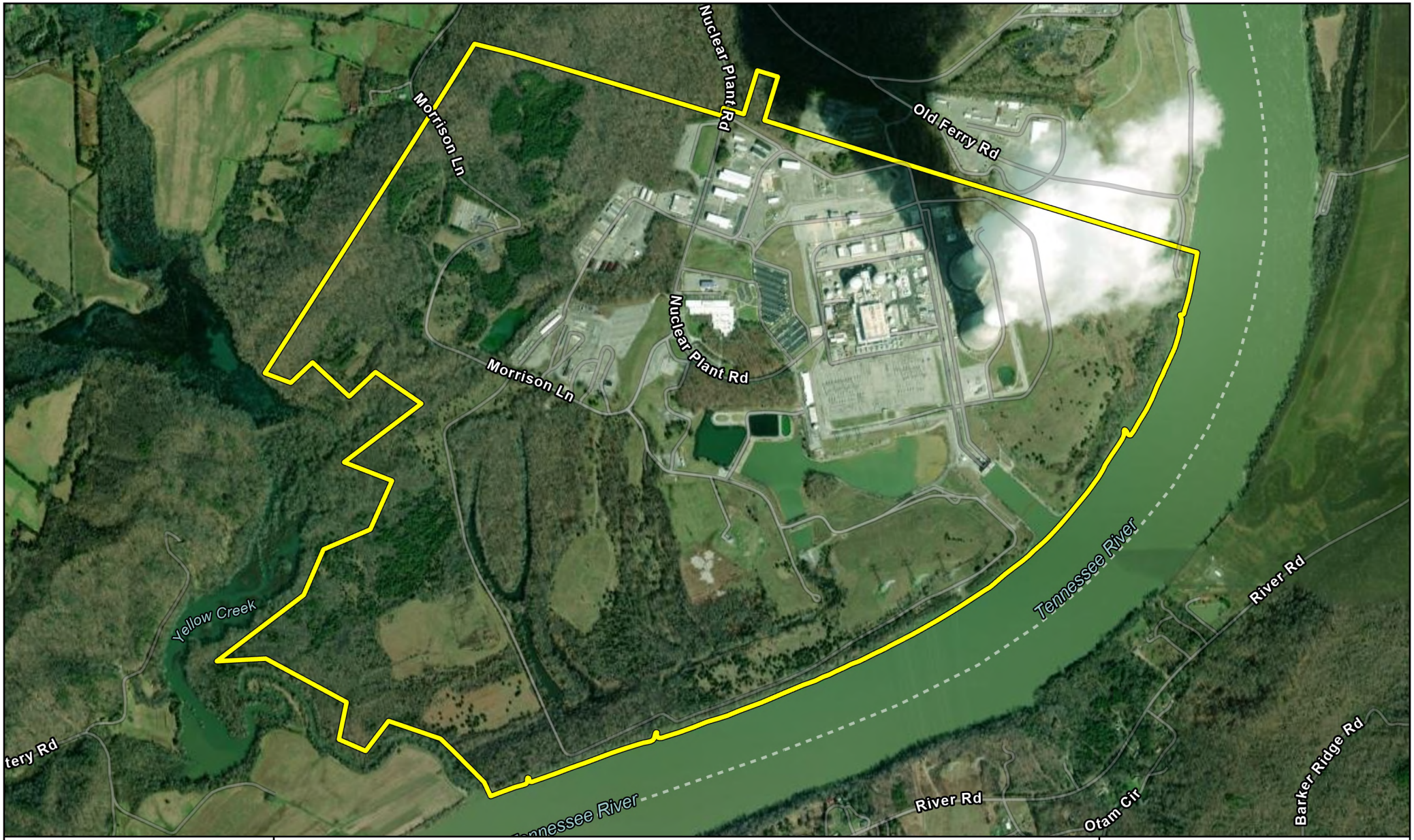
Site Boundary

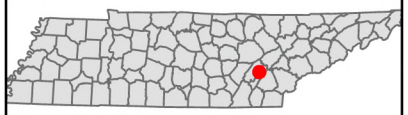
0 2.5 5 Miles

Source: ESRI
Site Center Point 35.601547°, -84.791003°

Figure 1
Project Location Map

Watts Bar
Nuclear Site





Project Location
Rhea County, TN

Legend

Site Boundary

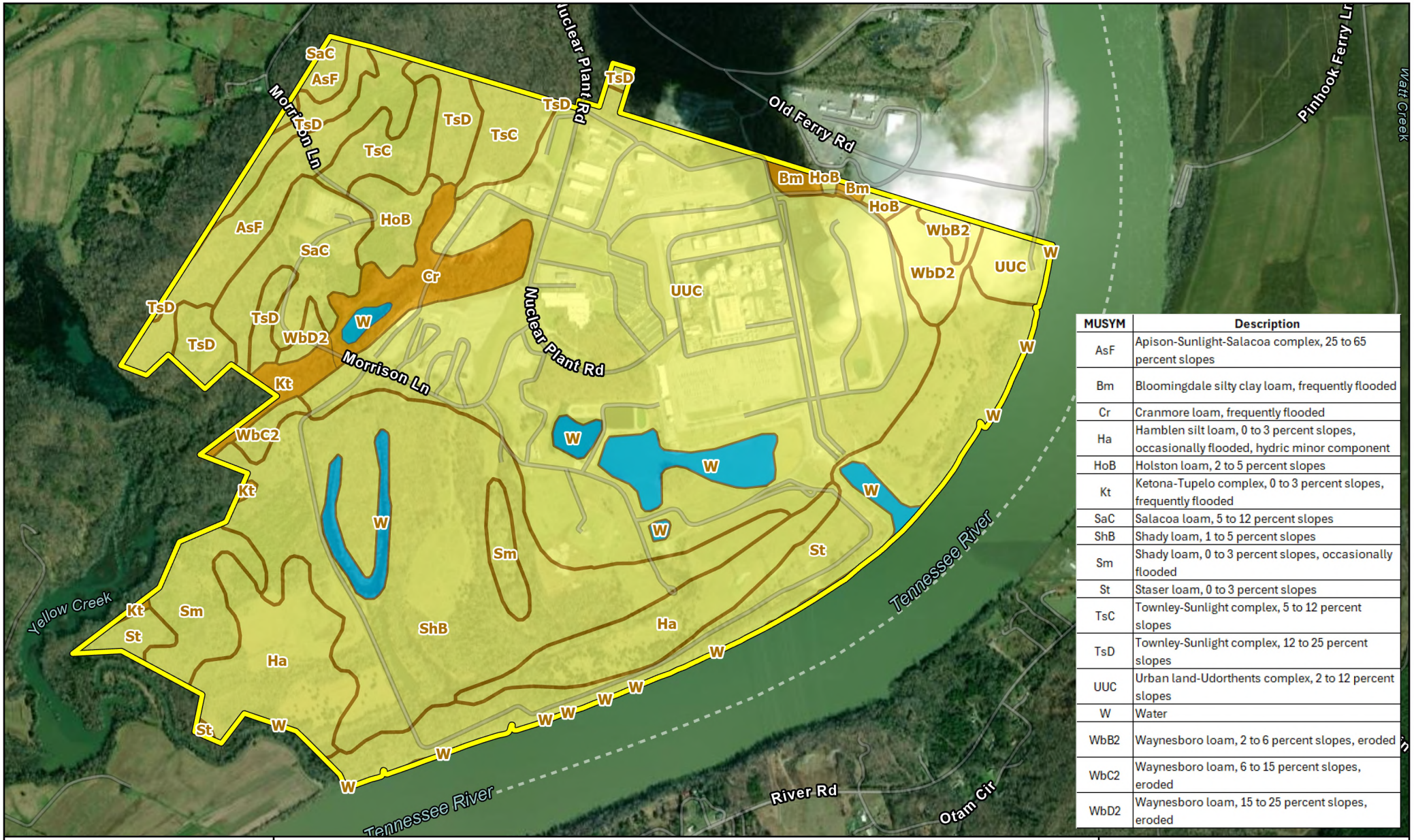
0 1,000 2,000 Feet

N

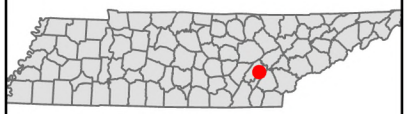
Source: ESRI
Site Center Point 35.601547°, -84.791003°

Figure 2
Aerial Imagery
Map of Project Area

Watts Bar
Nuclear Site



MUSYM	Description
AsF	Apison-Sunlight-Salacoa complex, 25 to 65 percent slopes
Bm	Bloomingdale silty clay loam, frequently flooded
Cr	Cranmore loam, frequently flooded
Ha	Hamblen silt loam, 0 to 3 percent slopes, occasionally flooded, hydric minor component
HoB	Holston loam, 2 to 5 percent slopes
Kt	Ketona-Tupelo complex, 0 to 3 percent slopes, frequently flooded
SaC	Salacoa loam, 5 to 12 percent slopes
ShB	Shady loam, 1 to 5 percent slopes
Sm	Shady loam, 0 to 3 percent slopes, occasionally flooded
St	Staser loam, 0 to 3 percent slopes
TsC	Townley-Sunlight complex, 5 to 12 percent slopes
TsD	Townley-Sunlight complex, 12 to 25 percent slopes
UUC	Urban land-Udorthents complex, 2 to 12 percent slopes
W	Water
WbB2	Waynesboro loam, 2 to 6 percent slopes, eroded
WbC2	Waynesboro loam, 6 to 15 percent slopes, eroded
WbD2	Waynesboro loam, 15 to 25 percent slopes, eroded



Project Location
Rhea County, TN

Legend

- Site Boundary
- Soil
- Hydric Soil
- Water

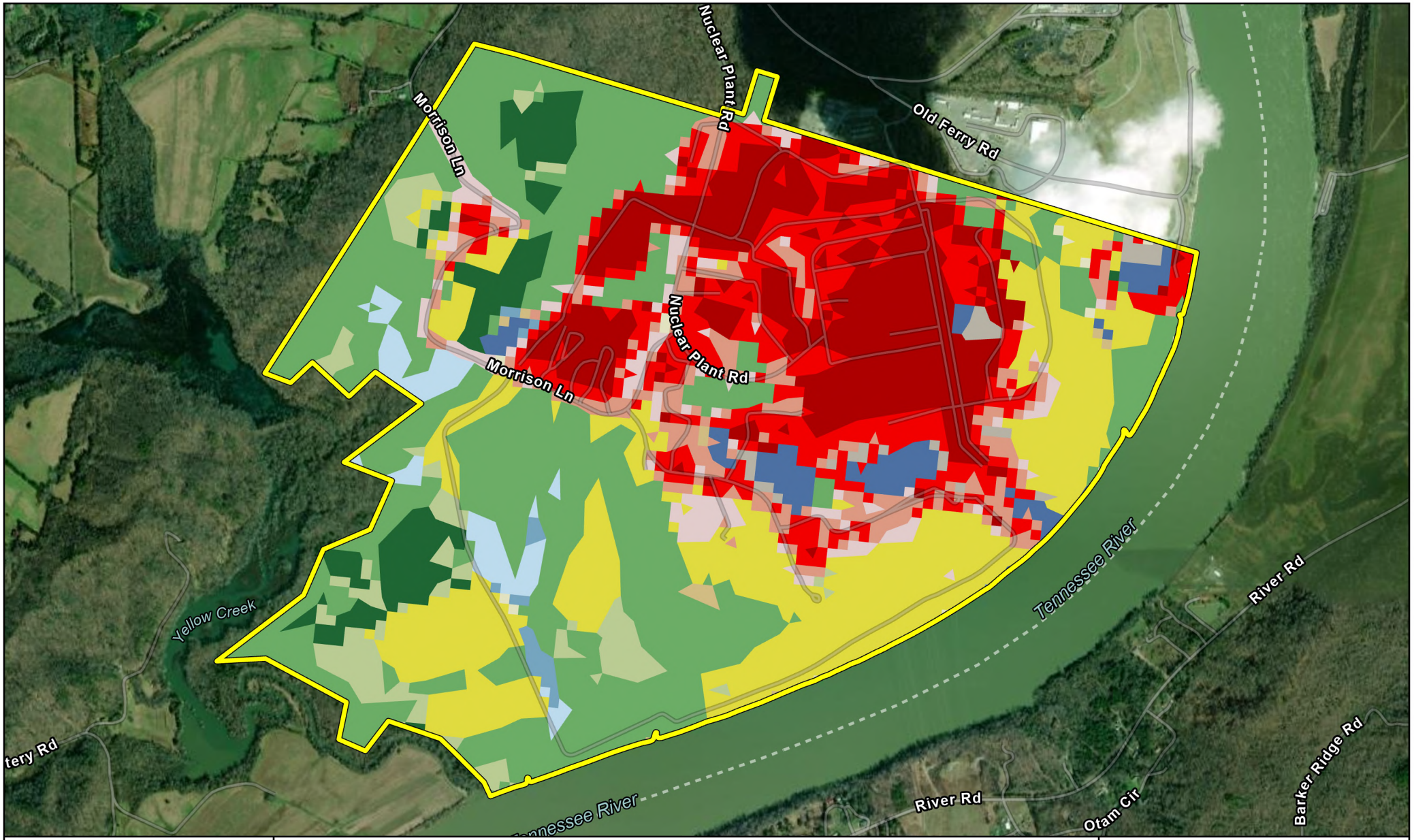
0 1,000 2,000 Feet

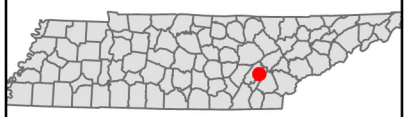
N

Source: ESRI, SSURGO
Site Center Point 35.601547°, -84.791003°

Figure 3
USDA NRCS Soils Map of Project Area

Watts Bar
Nuclear Site





Project Location
Rhea County, TN

Legend

- Site Boundary
- Water
- Developed, Open Space
- Developed, Low Intensity
- Developed, Medium Intensity
- Developed, High Intensity
- Barren Land (Rock/Sand/Clay)
- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Shrub/Scrub
- Herbaceous
- Hay/ Pasture
- Woody Wetlands
- Emergent Herbaceous Wetlands

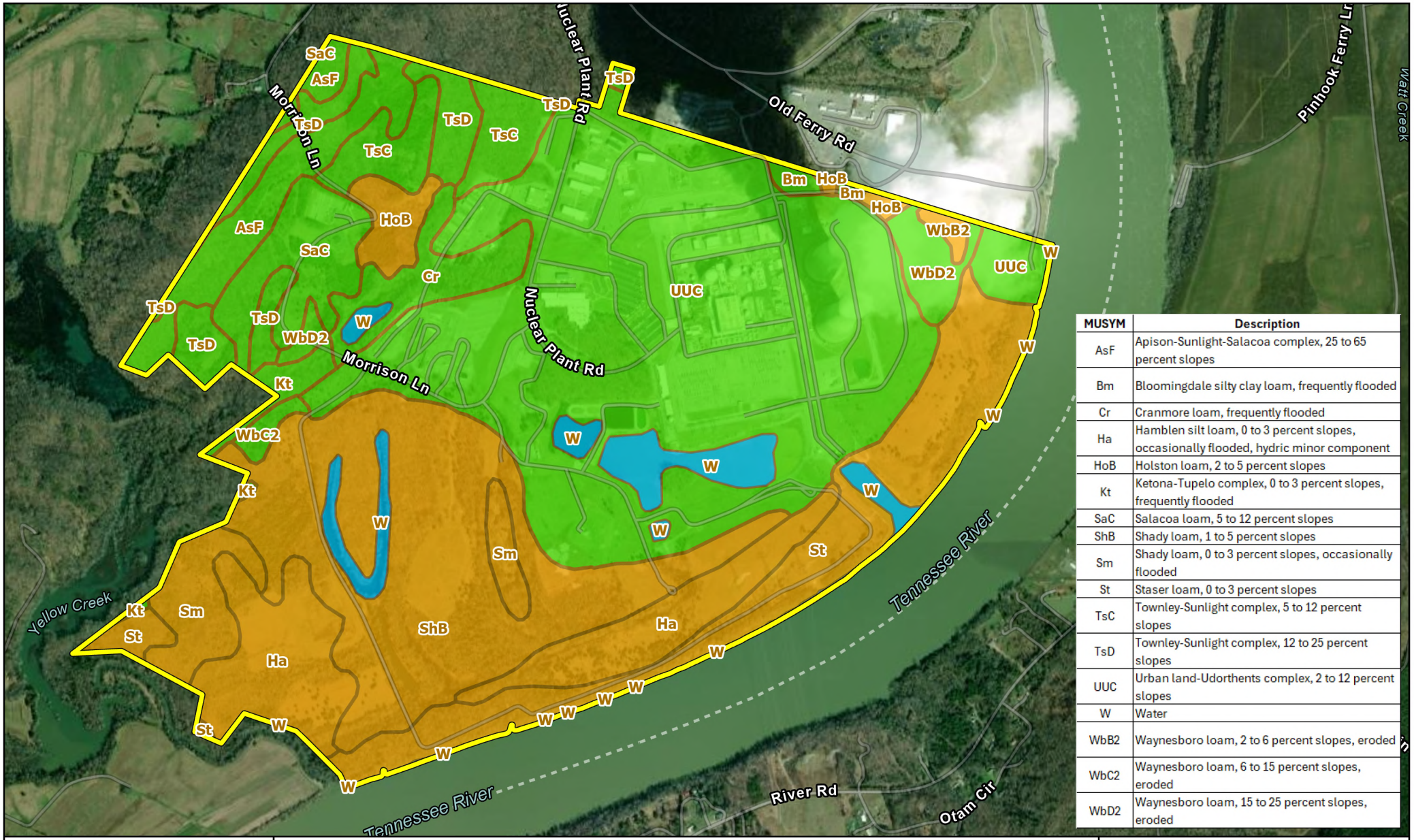
0 1,000 2,000 Feet

N

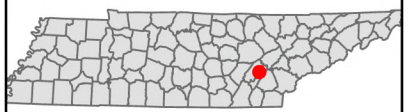
Source: ESRI, LULC 2021
Site Center Point 35.601547°, -84.791003°

Figure 4
Land Cover within the Project Site

Watts Bar
Nuclear Site



MUSYM	Description
AsF	Apison-Sunlight-Salacoa complex, 25 to 65 percent slopes
Bm	Bloomingdale silty clay loam, frequently flooded
Cr	Cranmore loam, frequently flooded
Ha	Hamblen silt loam, 0 to 3 percent slopes, occasionally flooded, hydric minor component
HoB	Holston loam, 2 to 5 percent slopes
Kt	Ketona-Tupelo complex, 0 to 3 percent slopes, frequently flooded
SaC	Salacoa loam, 5 to 12 percent slopes
ShB	Shady loam, 1 to 5 percent slopes
Sm	Shady loam, 0 to 3 percent slopes, occasionally flooded
St	Staser loam, 0 to 3 percent slopes
TsC	Townley-Sunlight complex, 5 to 12 percent slopes
TsD	Townley-Sunlight complex, 12 to 25 percent slopes
UUC	Urban land-Udorthents complex, 2 to 12 percent slopes
W	Water
WbB2	Waynesboro loam, 2 to 6 percent slopes, eroded
WbC2	Waynesboro loam, 6 to 15 percent slopes, eroded
WbD2	Waynesboro loam, 15 to 25 percent slopes, eroded



Project Location
Rhea County, TN

Legend

- Site Boundary
- All areas are prime farmland
- Not prime farmland
- Water

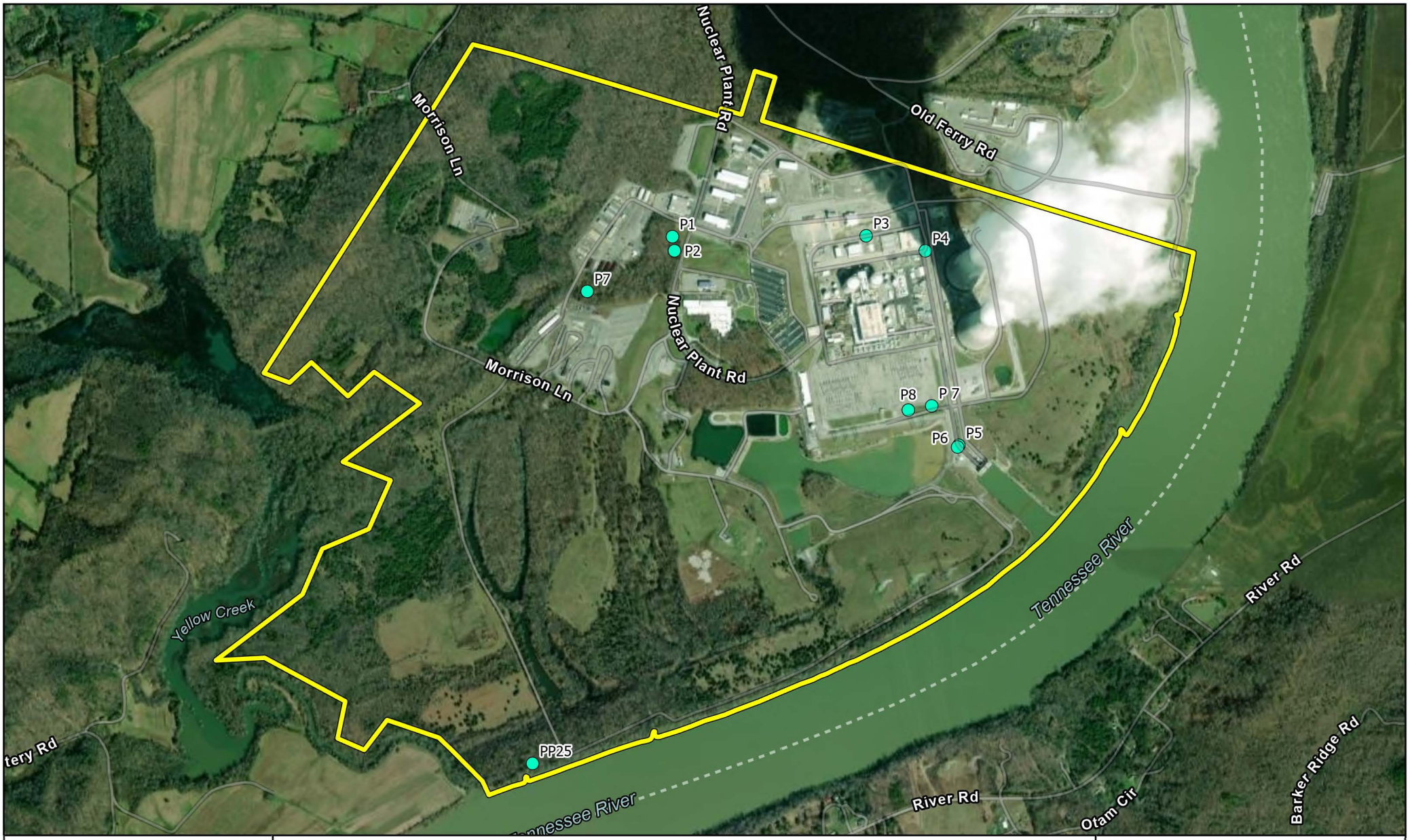
0 1,000 2,000 Feet

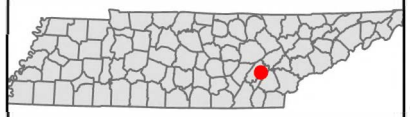
N

Source: ESRI, SSURGO
Site Center Point 35.601547°, -84.791003°

Figure 5
Prime Farmland within the Project Site

Watts Bar
Nuclear Site





Project Location
Rhea County, TN

Legend

Site Boundary

Protected area

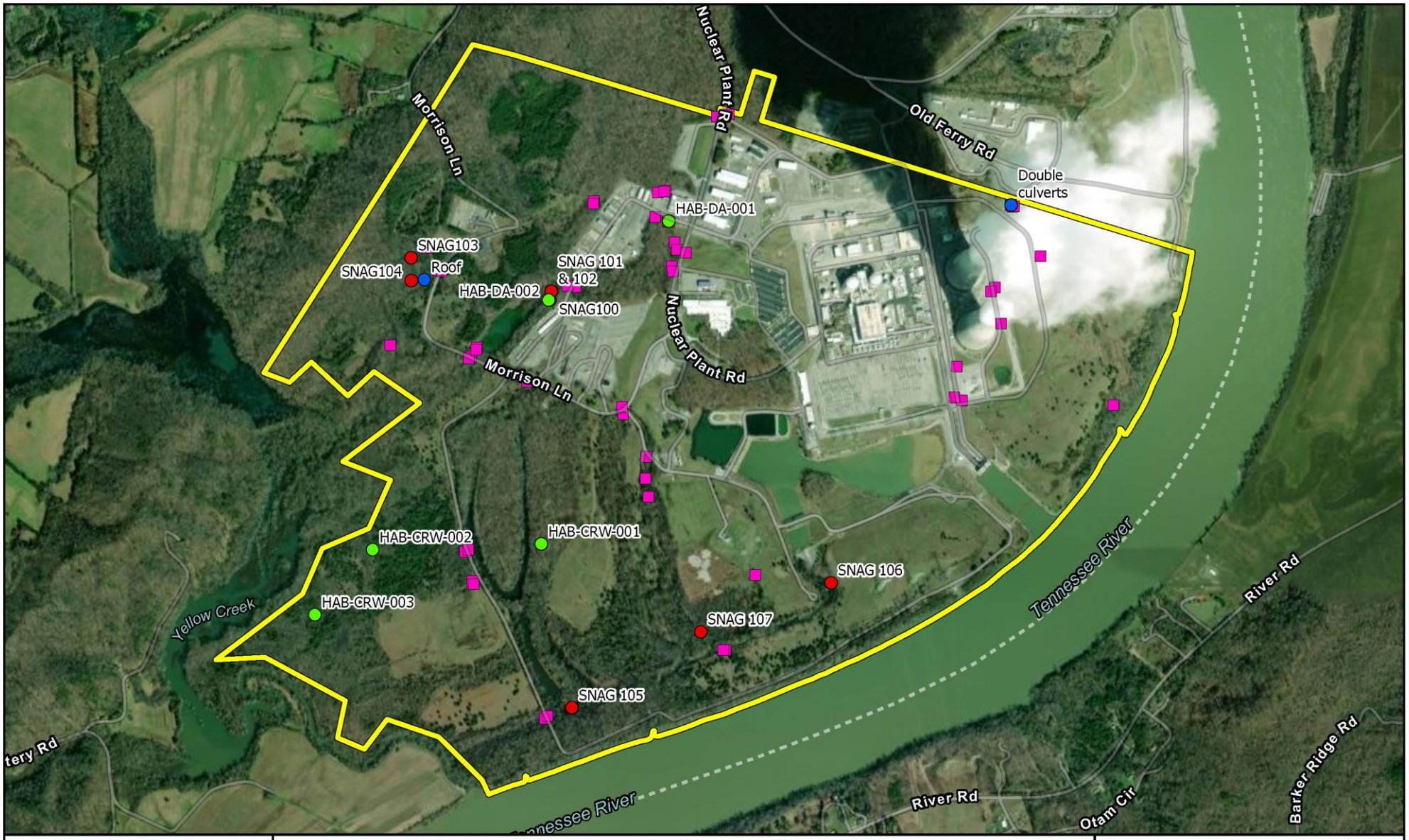
0 1,000 2,000 Feet

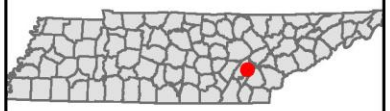
N

Source: ESRI, AECOM
Site Center Point 35.601547°, -84.791003°

Figure 6
Mapped Osprey Platforms within the Project Site

Watts Bar Nuclear Site





Project Location
Rhea County, TN

Legend

- Site Boundary
- Snag
- Bat Habitat
- Bat Habitat Assessment Point
- Culvert

0 1,000 2,000 Feet

N

Source: ESRI, AECOM
Site Center Point 35.601547°, -84.791003°

Figure 7
Mapped Suitable Snags for Bats within the Project Site

Watts Bar Nuclear Site

Appendix B
Field Notes

HDI

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	(2)	(3)
2. Sinuous channel	0	1	2	(3)
3. In-channel structure: riffle-pool sequences	0	1	(2)	3
4. Sorting of soil textures or other substrate	0	(1)	(2)	3
5. Active/relic floodplain	0	(0.5)	1	1.5
6. Depositional bars or benches	(0)	1	2	3
7. Braided channel	(0)	1	2	3
8. Recent alluvial deposits	(0)	0.5	1	1.5
9. Natural levees	(0)	1	2	3
10. Headcuts	0	(1)	2	3
11. Grade controls	0	(0.5)	1	1.5
12. Natural valley or drainageway	0	0.5	(1)	1.5
13. At least second order channel on existing USGS or NRCS map	(0)	1	2	3

B. Hydrology (Subtotal =)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	(0)	1	2	(3)
15. Water in channel and >48 hours since sig. rain	(0)	1	2	(3)
16. Leaf litter in channel	1.5	(1)	0.5	(0)
17. Sediment on plants or on debris	(0)	0.5	(1)	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	(1)	1.5
19. Hydric soils in channel bed or sides of channel	No = (0)		Yes = (1.5)	

C. Biology (Subtotal =)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel bed [1]	3	(2)	1	(0)
21. Rooted plants in the thalweg [1]	3	2	(1)	(0)
22. Crayfish in stream (exclude in floodplain)	(0)	1	2	3
23. Bivalves/mussels	(0)	1	2	3
24. Amphibians	(0)	0.5	1	1.5
25. Macrobenthos (record type & abundance)	(0)	1	2	3
26. Filamentous algae; periphyton	(0)	1	2	3
27. Iron oxidizing bacteria/fungus	(0)	(0.5)	1	1.5
28. Wetland plants in channel bed [2]	(0)	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 10.25

~~WWC~~

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

HD2

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	Absent	Weak	Moderate	Strong	
1. Continuous bed and bank	0	1	2	(3)	3
2. Sinuous channel	0	1	(2)	3	2
3. In-channel structure: riffle-pool sequences	0	1	(2)	3	2
4. Sorting of soil textures or other substrate	0	1	(2)	3	2
5. Active/relic floodplain	0	(0.5)	1	1.5	0,5
6. Depositional bars or benches	0	1	(2)	3	2
7. Braided channel	(0)	1	2	3	0
8. Recent alluvial deposits	0	0.5	(1)	1.5	1
9. Natural levees	0	1	(2)	3	2
10. Headcuts	0	1	(2)	3	2
11. Grade controls	0	0.5	(1)	1.5	1
12. Natural valley or drainageway	0	(0.5)	1	1.5	0.5
13. At least second order channel on existing USGS or NRCS map	0	(1)	2	3	1

B. Hydrology (Subtotal =)	Absent	Weak	Moderate	Strong	
14. Subsurface flow/discharge into channel	0	1	(2)	3	2
15. Water in channel and >48 hours since sig. rain	0	1	2	(3)	3
16. Leaf litter in channel	1.5	1	(0.5)	0	0.5
17. Sediment on plants or on debris	0	0.5	(1)	1.5	1
18. Organic debris lines or piles (wrack lines)	0	0.5	(1)	1.5	1
19. Hydric soils in channel bed or sides of channel	No = 0		(Yes) = 1.5		1,5

C. Biology (Subtotal =)	Absent	Weak	Moderate	Strong	
20. Fibrous roots in channel bed [1]	3	(2)	1	0	2
21. Rooted plants in the thalweg [1]	(3)	2	1	0	3
22. Crayfish in stream (exclude in floodplain)	0	(1)	2	3	1
23. Bivalves/mussels	(0)	1	2	3	0
24. Amphibians	(0)	0.5	1	1.5	0
25. Macrobenthos (record type & abundance)	(0)	(1)	2	3	0
26. Filamentous algae; periphyton	0	(1)	2	3	1
27. Iron oxidizing bacteria/fungus	0	(0.5)	1	1.5	0,5
28. Wetland plants in channel bed [2]	(0)	0.5	1	1.5	0

[1] Focus is on the presence of terrestrial plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 37,5 Perennial

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

HD3

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	Absent	Weak	Moderate	Strong	
1. Continuous bed and bank	0	1	2	(3)	3
2. Sinuous channel	0	1	2	(3)	3
3. In-channel structure: riffle-pool sequences	0	1	(2)	3	2
4. Sorting of soil textures or other substrate	0	1	(2)	3	2
5. Active/relic floodplain	0	(0.5)	1	1.5	0.5
6. Depositional bars or benches	0	(1)	2	3	1
7. Braided channel	(0)	1	2	3	0
8. Recent alluvial deposits	0	(0.5)	1	1.5	0.5
9. Natural levees	(0)	1	2	3	0
10. Headcuts	(0)	1	2	3	0
11. Grade controls	0	(0.5)	1	1.5	0.5
12. Natural valley or drainageway	(0)	0.5	1	1.5	0
13. At least second order channel on existing USGS or NRCS map	(0)	1	2	3	0

12.5

B. Hydrology (Subtotal =)	Absent	Weak	Moderate	Strong	
14. Subsurface flow/discharge into channel	(0)	1	2	3	0
15. Water in channel and >48 hours since sig. rain	0	(1)	2	3	1
16. Leaf litter in channel	1.5	1	0.5	(0)	0
17. Sediment on plants or on debris	0	(0.5)	1	1.5	0.5
18. Organic debris lines or piles (wrack lines)	0	0.5	(1)	1.5	1
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = (1.5)		1.5

4

C. Biology (Subtotal =)	Absent	Weak	Moderate	Strong	
20. Fibrous roots in channel bed [1]	3	(2)	(1)	(0)	1
21. Rooted plants in the thalweg [1]	3	2	1	(0)	0
22. Crayfish in stream (exclude in floodplain)	(0)	1	2	3	0
23. Bivalves/mussels	(0)	1	2	3	0
24. Amphibians	(0)	0.5	1	1.5	0
25. Macrobenthos (record type & abundance)	(0)	1	2	3	0
26. Filamentous algae; periphyton	(0)	1	2	3	0
27. Iron oxidizing bacteria/fungus	(0)	0.5	1	1.5	0
28. Wetland plants in channel bed [2]	(0)	0.5	1	1.5	0

1

[1] Focus is on the presence of terrestrial plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 17.5 (WWC)

Under Normal Conditions, Watercourse is a ~~Wet Weather~~ Conveyance if Secondary Indicator Score < 19 points

Notes :

HD4

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	0	1	2	3

B. Hydrology (Subtotal =)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. Biology (Subtotal =)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28. Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 2.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

HPS

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	Absent	Weak	Moderate	Strong	
1. Continuous bed and bank	0	1	2	(3)	3
2. Sinuous channel	0	1	2	(3)	3
3. In-channel structure: riffle-pool sequences	0	1	2	(3)	3
4. Sorting of soil textures or other substrate	0	1	2	(3)	3
5. Active/relic floodplain	0	0.5	(1)	1.5	1
6. Depositional bars or benches	0	1	2	(3)	3
7. Braided channel	0	1	2	3	
8. Recent alluvial deposits	0	0.5	(1)	1.5	1
9. Natural levees	0	1	2	3	0.5
10. Headcuts	(0)	1	2	3	
11. Grade controls	(0)	0.5	1	1.5	
12. Natural valley or drainageway	0	(0.5)	1	1.5	0.5
13. At least second order channel on existing USGS or NRCS map	0	(1)	2	3	1
					19

B. Hydrology (Subtotal =)	Absent	Weak	Moderate	Strong	
14. Subsurface flow/discharge into channel	0	1	(2)	3	2
15. Water in channel and >48 hours since sig. rain	0	1	2	(3)	3
16. Leaf litter in channel	1.5	(1)	0.5	0	1
17. Sediment on plants or on debris	0	0.5	(1)	1.5	1
18. Organic debris lines or piles (wrack lines)	0	0.5	(1)	1.5	
19. Hydric soils in channel bed or sides of channel	No = 0		(Yes) = 1.5		1.5
					7.5

C. Biology (Subtotal =)	Absent	Weak	Moderate	Strong	
20. Fibrous roots in channel bed [1]	(3)	2	1	0	3
21. Rooted plants in the thalweg [1]	3	(2)	1	0	2
22. Crayfish in stream (exclude in floodplain)	0	(1)	2	3	1
23. Bivalves/mussels	(0)	1	2	3	
24. Amphibians	0	(0.5)	1	1.5	0.5
25. Macrobenthos (record type & abundance)	0	(1)	2	3	1
26. Filamentous algae; periphyton	0	1	(2)	3	2
27. Iron oxidizing bacteria/fungus	(0)	0.5	1	1.5	0
28. Wetland plants in channel bed [2]	(0)	0.5	1	1.5	0
					9.5

[1] Focus is on the presence of terrestrial plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 36

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : water striders, riffle beetles

HD6

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	Absent	Weak	Moderate	Strong	
1. Continuous bed and bank	0	1	2	(3)	3
2. Sinuous channel	0	1	(2)	3	2
3. In-channel structure: riffle-pool sequences	0	1	2	(3)	3
4. Sorting of soil textures or other substrate	0	1	2	(3)	3
5. Active/relic floodplain	0	0.5	(1)	1.5	1
6. Depositional bars or benches	0	1	2	(3)	3
7. Braided channel	(0)	1	2	3	1
8. Recent alluvial deposits	0	0.5	(1)	1.5	1
9. Natural levees	(0)	1	2	3	/
10. Headcuts	0	(1)	2	3	1
11. Grade controls	0	(0.5)	1	1.5	.5
12. Natural valley or drainageway	0	(0.5)	1	1.5	.5
13. At least second order channel on existing USGS or NRCS map	0	(1)	2	3	1
					20

B. Hydrology (Subtotal =)	Absent	Weak	Moderate	Strong	
14. Subsurface flow/discharge into channel	0	1	(2)	3	2
15. Water in channel and >48 hours since sig. rain	0	1	2	(3)	3
16. Leaf litter in channel	1.5	(1)	0.5	0	1
17. Sediment on plants or on debris	0	0.5	(1)	1.5	1
18. Organic debris lines or piles (wrack lines)	0	0.5	(1)	1.5	1
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = (1.5)		1.5
					9.5

C. Biology (Subtotal =)	Absent	Weak	Moderate	Strong	
20. Fibrous roots in channel bed [1]	3	(2)	1	0	2
21. Rooted plants in the thalweg [1]	(3)	2	1	0	3
22. Crayfish in stream (exclude in floodplain)	(0)	1	2	3	/
23. Bivalves/mussels	(0)	1	2	3	/
24. Amphibians	(0)	0.5	1	1.5	/
25. Macrobenthos (record type & abundance)	(0)	1	2	3	/
26. Filamentous algae; periphyton	0	1	(2)	3	2
27. Iron oxidizing bacteria/fungus	0	(0.5)	1	1.5	0.5
28. Wetland plants in channel bed [2]	(0)	0.5	1	1.5	/
					7.5

[1] Focus is on the presence of terrestrial plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 37

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

HD7

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	(2)	3
2. Sinuous channel	0	1	(2)	3
3. In-channel structure: riffle-pool sequences	0	1	(2)	3
4. Sorting of soil textures or other substrate	0	1	(2)	3
5. Active/relic floodplain	0	(0.5)	1	1.5
6. Depositional bars or benches	0	(1)	2	3
7. Braided channel	(0)	1	2	3
8. Recent alluvial deposits	0	0.5	(1)	1.5
9. Natural levees	(0)	1	2	3
10. Headcuts	0	1	(0)	3
11. Grade controls	0	0.5	(1)	1.5
12. Natural valley or drainageway	(0)	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	(0)	1	2	3

B. Hydrology (Subtotal =)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	(1)	2	3
15. Water in channel and >48 hours since sig. rain	0	(1)	2	3
16. Leaf litter in channel	1.5	1	(0.5)	0
17. Sediment on plants or on debris	0	(0.5)	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	(1)	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = (1.5)	

C. Biology (Subtotal =)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel bed [1]	3	2	(1)	0
21. Rooted plants in the thalweg [1]	3	(2)	(1)	0
22. Crayfish in stream (exclude in floodplain)	(0)	1	2	3
23. Bivalves/mussels	(0)	1	2	3
24. Amphibians	(0)	0.5	1	1.5
25. Macrobenthos (record type & abundance)	(0)	1	2	3
26. Filamentous algae; periphyton	0	(1)	2	3
27. Iron oxidizing bacteria/fungus	0	(0.5)	1	1.5
28. Wetland plants in channel bed [2]	0	0.5	(1)	1.5

[1] Focus is on the presence of terrestrial plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 23.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

#DS

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	(3)
2. Sinuous channel	0	(1)	2	3
3. In-channel structure: riffle-pool sequences	0	1	(2)	3
4. Sorting of soil textures or other substrate	0	1	(2)	3
5. Active/relic floodplain	0	(0.5)	1	1.5
6. Depositional bars or benches	0	1	(2)	3
7. Braided channel	(0)	1	2	3
8. Recent alluvial deposits	0	(0.5)	1	1.5
9. Natural levees	(0)	1	2	3
10. Headcuts	(0)	1	2	3
11. Grade controls	(0)	0.5	1	1.5
12. Natural valley or drainageway	(0)	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	(0)	1	2	3

3 1 2 2 0.5 2 1.5 1 1 1 1 1 11

B. Hydrology (Subtotal =)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	(1)	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	(3)
16. Leaf litter in channel	1.5	(1)	0.5	0
17. Sediment on plants or on debris	0	0.5	(1)	1.5
18. Organic debris lines or piles (wrack lines)	0	(0.5)	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = (1.5)	

1 3 1 1 0.5 1.5 8

C. Biology (Subtotal =)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel bed [1]	3	(2)	1	0
21. Rooted plants in the thalweg [1]	3	(2)	1	0
22. Crayfish in stream (exclude in floodplain)	(0)	1	2	3
23. Bivalves/mussels	(0)	1	2	3
24. Amphibians	(0)	0.5	1	1.5
25. Macrobenthos (record type & abundance)	(0)	1	2	3
26. Filamentous algae; periphyton	~~0~~	(1)	2	3
27. Iron oxidizing bacteria/fungus	(0)	0.5	1	1.5
28. Wetland plants in channel bed [2]	(0)	0.5	1	1.5

2 2 1 1 1 1 1 0.5 1 5.5

[1] Focus is on the presence of terrestrial plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 24.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : Culvert Outfall

AD9

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	Absent	Weak	Moderate	Strong	
1. Continuous bed and bank	0	1	(2)	3	2
2. Sinuous channel	0	(1)	2	3	1
3. In-channel structure: riffle-pool sequences	0	(1)	2	3	1
4. Sorting of soil textures or other substrate	0	(1)	2	3	1
5. Active/relic floodplain	0	(0.5)	1	1.5	0.5
6. Depositional bars or benches	0	(1)	2	3	1
7. Braided channel	(0)	1	2	3	—
8. Recent alluvial deposits	0	(0.5)	1	1.5	0.5
9. Natural levees	(0)	1	2	3	—
10. Headcuts	0	(1)	2	3	1
11. Grade controls	0	(0.5)	1	1.5	0.5
12. Natural valley or drainageway	0	(0.5)	1	1.5	0.5
13. At least second order channel on existing USGS or NRCS map	(0)	1	2	3	—

9

B. Hydrology (Subtotal =)	Absent	Weak	Moderate	Strong	
14. Subsurface flow/discharge into channel	0	(1)	2	3	1
15. Water in channel and >48 hours since sig. rain	(0)	1	2	3	—
16. Leaf litter in channel	1.5	(1)	0.5	0	1
17. Sediment on plants or on debris	0	(0.5)	1	1.5	0.5
18. Organic debris lines or piles (wrack lines)	0	(0.5)	1	1.5	0.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = (1.5)		1.5

4.5

C. Biology (Subtotal =)	Absent	Weak	Moderate	Strong	
20. Fibrous roots in channel bed [1]	3	(2)	1	0	2
21. Rooted plants in the thalweg [1]	3	(2)	1	0	2
22. Crayfish in stream (exclude in floodplain)	(0)	1	2	3	—
23. Bivalves/mussels	(0)	1	2	3	—
24. Amphibians	(0)	0.5	1	1.5	—
25. Macrobenthos (record type & abundance)	(0)	1	2	3	—
26. Filamentous algae; periphyton	(0)	1	2	3	—
27. Iron oxidizing bacteria/fungus	(0)	0.5	1	1.5	—
28. Wetland plants in channel bed [2]	(0)	0.5	1	1.5	—

[1] Focus is on the presence of terrestrial plants. [2] Focus is on the presence of aquatic or wetland plants.

4

Total Points = 17.5 WWC

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

HDM

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal =)	Absent	Weak	Moderate	Strong	
1. Continuous bed and bank	0	1	(2)	3	2
2. Sinuous channel	0	1	(2)	3	2
3. In-channel structure: riffle-pool sequences	0	(1)	2	3	1
4. Sorting of soil textures or other substrate	(0)	1	2	3	0
5. Active/relic floodplain	0	(0.5)	1	1.5	0.5
6. Depositional bars or benches	(0)	1	2	3	0
7. Braided channel	(0)	1	2	3	0
8. Recent alluvial deposits	0	(0.5)	1	1.5	0.5
9. Natural levees	(0)	1	2	3	0
10. Headcuts	0	(1)	2	3	1
11. Grade controls	0	(0.5)	1	1.5	0.5
12. Natural valley or drainageway	0	(0.5)	1	1.5	0.5
13. At least second order channel on existing USGS or NRCS map	(0)	1	2	3	0

B. Hydrology (Subtotal =)	Absent	Weak	Moderate	Strong	
14. Subsurface flow/discharge into channel	(0)	1	2	3	0
15. Water in channel and >48 hours since sig. rain	0	(1)	2	3	1
16. Leaf litter in channel	1.5	~~0.5~~	(0.5)	0	0.5
17. Sediment on plants or on debris	0	0.5	(1)	1.5	1
18. Organic debris lines or piles (wrack lines)	0	0.5	(1)	1.5	1
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = (1.5)		1.5

5

C. Biology (Subtotal =)	Absent	Weak	Moderate	Strong	
20. Fibrous roots in channel bed [1]	3	2	(1)	0	1
21. Rooted plants in the thalweg [1]	3	2	(1)	0	1
22. Crayfish in stream (exclude in floodplain)	(0)	1	2	3	0
23. Bivalves/mussels	(0)	1	2	3	0
24. Amphibians	(0)	0.5	1	1.5	0
25. Macrobenthos (record type & abundance)	(0)	1	2	3	0
26. Filamentous algae; periphyton	(0)	1	2	3	0
27. Iron oxidizing bacteria/fungus	(0)	0.5	1	1.5	0
28. Wetland plants in channel bed [2]	(0)	0.5	1	1.5	0

[1] Focus is on the presence of terrestrial plants. [2] Focus is on the presence of aquatic or wetland plants.

2

Total Points = 15

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

HD 11

1-3
2-2
3-2
4-2
5-3
6-2
7-0
8-1
9-0
10-1
11-0.5
12-1
13-1
14-2
15-3
16-1
17-1.5
18-1.5
19-1.5
20-2
21-2
22-1
23-0
24-0
25-0
26-0
27-0
28-

HD 12

1-3
2-2
3-1
4-2
5-1
6-1
7-0
8-0.5
9-1
10-1
11-0.5
12-1
13-1
14-0
15-1
16-0.5
17-1
18-1
19-1.5
20-1
21-2
22-0
23 0
24 0
25 0
26 0
27 0

HD 13 - Need on GIS

1-2
2-3
3-2
4-2
5-1
6-1
7-0
8-0
9-0
10-0
11-0.5
12-0.5
13-0
14-0
15-0
16-0.5
17-0.5
18-0.5
19-0
20-1
21-1
22 0
23
24
25
26
27
28

16.5

HD 14

1-3
2-3
3-3
4-3
5-2
6-3
7-0.5
8-1
9-0
10-0
11-0.5
12-1
13-1
14-1
15-3
16-0.5
17-1
18-1
19-1.5
20-2
21-0.5
22-0
23-0
24-0
25-0
26-0
27-0
28-0

HD 15

1-3
2-3
3-3
4-3
5-1.5
6-2
7-0
8-1
9-1
10-1
11-0.5
12-1.5
13-2
14-1
15-3
16-0.5
17-0.5
18-0.5
19-1.5
20-2
21-3
22-0
23-0
24-0
25-0
26-0
27-0
28-0

N. 16 Stream

HD 16

1-3
2-2
3-2
4-3
5-0
6-0
7-0
8-0
9-0
10-2
11-1.5
12-1.5
13-0/15
14-0
15-1
16-0.5
17-0
18-1
19-1.5
20-1
21-2
22-0
23-0
24-0
25-0
26-0
27-0
28-

HD17

1-3
2-2
3-2
4-3
5-0
6-0
7-0
8-0
9-0
10-2
11-1.5
12-1.5
13-0
14-0
15-1
16-0.5
17-0
18-1
19-1.5
20-1
21-2
22-0
23-0
24-0
25-0
26-0
27-0
28-0

HD20

1-2
2-2
3-2
4-1
5-0
6-.5
7-0
8-.5
9-0
10-1
11-1
12-1
13-0
14-3
15-3
16-1
17-1
18-
19-1.5
20-2
21-1
22-0
23-0
24-0
25-0
26-0
27-8
28-

HD18

1-2
2-2
3-2
4-1
5-0
6-0.5
7-0
8-0.5
9-0
10-1
11-1
12-1
13-0
14-3
15-3
16-0.5
17-1
18-1
19-1.5
20-1
21-1
22-0
23-0
24-0
25-0
26-0
27-0
28-1

HD21-

1-1
2-1
3-1
4-1
5-0
6-0
7-0
8-0
9-0
10-1
11-0.5
12-0.5
13-0
14-0
15-0
16-0
17-0.5
18-0.5
19-0
20-0
21-0
22-0
23-0
24-0
25-0
26-0
27-0
28-0

HD19

1-2
2-2
3-2
4-1
5-0
6-.5
7-0
8-.5
9-0
10-1
11-1
12-1
13-0
14-3
15-3
16-1
17-1
18-1
19-1.5
20-2
21-1
22-0
23-0
24-0
25-0
26-0
27-0
28-0

HD22 - Bower Pond

1-2
2-2
3-2
4-2
5-0.5
6-0.5
7-0
8-0
9-0
10-2
11-1
12-0.5
13-1
14-1
15-2
16-1
17-1.5
18-1.5
19-1.5
20-1
21-1
22-0
23-0
24-0
25-0
26-0
27-0
28-0

HD23

1-3
2-2
3-2
4-1
5-1
6-1
7-0
8-0
9-0
10-1
11-0.5
12-0
13-0

14-1
15-3
16-1
17-1.5
18-1
19-1.5

20-3
21-2
22-0
23-0
24-0
25-0
26-0
27-0
28-0

HD25 & 26

1-3
2-1
3-1
4-3
5-2
6-0
7-0
8-0.5
9-0
10-1
11-0.5
12-1
13-0

14-0
15-0
16-0.5
17-0.5
18-0.5
19-0
20-0

20-1
21-1
22-0
23-0
24-0
25-0
26-0
27-0
28-0
29-0

HD24

1-1
2-2
3-1
4-1
5-0.5
6-0
7-0
8-0
9-0
10-2
11-1
12-1
13-0

14-0
15-0
16-0
17-0.5
18-1
19-0

20 0
21 0
22 0
23 0
24 0
25 0
26 0
27 0
28 0

HD27 Check all 13's

1-3
2-3
3-3
4-3
5-1.5
6-2
7-0
8-1
9-0
10-0
11-1
12-1
13-1

14-2
15-3
16-1
17-1
18-1.5
19-1.5

20-3
21-3
22-
23-
24-
25-
26-
27-
28-

Assume

Watts Bar Nuclear Site
October 7th 2025
Checked in with Jennifer on site.
Starting on Wooded
DA, KM, HP, CAW

With Wooded area

Culvert 1
Stream 1 orig Matting from
Culvert 1.

Noting centerline of stream due to
size and gps accuracy limits.

drawn = 36 in x 9in Flags 1-9

Stream Notes
Silt, gravel, cobble
Water flowing
Some undercut banks
Fish (Minnows, Chubs)
Algae, iron oxidized bacteria

Flags drawn 8 in x 11in
9-

Stream 2
OHWM 64 in x 9 in
originates from culvert
gravel, cobble silt
Flowing water pools < 5 in
Algae, Iron oxidizing bacteria

culvert 5, in front of culvert they
poured gravel and concrete
within PA
culvert 7 goes to culvert 6 goes
to creek unnamed

Stream 3 OHWM

Stream 4 originates from culvert and
intersects Stream 1.
OHWM = 4 in x 8 in
Substrates = gravel, sand, silt
leaves

S1-77 OHWM = [illegible] in x 12 in
72

S-005 OHWM 42 x 18 in

10-9-2025
Watts Bar nuclear plant
Crew: KLM
8:30am

Stream S006 originates from culvert
under nuclear plant road
OHWM = 30 in x 9 in

Stream S007 originates from outside
of study area has baseflow
OHWM = 24 in x 5 in
Downstream of intersection of [illegible]
OHWM 32 in x 8 in

Stream S008 OHWM at Flag 21
= 36 in x 10 in
OHWM at Flag 46 = 24 in x 7 in
OHWM at Flag 60 = 36 in x 8 in

Stream Channel dissapears into wetland
between 65 and 66.

10-10-2025
Starting at larger wetland area close to
road and river

Hana and Daniela team
WP3-19 removed, connect to
W-004, we took data point to prairie

W004-274 connects to WP3-18

WP3-20 connect to W004-275

W-004-280 connects to WP4-1

10-11-2025

E-004 channel 3ft x 8in

S-004 channel = 3.2m x ~~7m~~ 7m
Some moist spots in channel

10-12-2025
W006-[illegible] tie into W102-4
31

Delete W102-3

W102-2 ties into W006-32

First Bat habitat point
Hab-CRW-001

	Canopy	Midstory	Understory
% exfoliating Bark	15%	5%	0%
Closure/Density	60%	35%	5%

Dominant species of mature trees
White oak, Beech, Red oak,

Size	3-5	9-15	15+
Comp Live trees	30%	50%	70%

No of Suitable Snags 8.

Woods n/c and open Suitable for bats

Hab-CAW-002

	Canopy	Mid	Under
Density	10%	25%	65%
% Trees with exfoliating bark	0%	0%	0%

Dominant Species Sweetgum / willow oak, eastern red cedar

Size Comp Live Trees 70% small 25% medium 5% large

1 Suitable snag Woods are dense

9/5

50%

15%

20%

open Twitch

mid under

25% 65%

0% 0%

willow oak

red cedar

small

large

woods and dense

E-Edb

OHwm = 48 x 5M filled with artificial cobble / some sand LT mm mode draining ditch.

Hab-CRW-003

	Canopy	mid	under
Closure/ Density	10%	20%	30%
% Trees exfoliating Bark	0%	0%	0%

Dormant Species of mature trees

Sweetgum, cedar

Size Comp of Live trees

3-8	8-15	15
30%	50%	5%
45	50	

No Twitch Frogs Rate in the Rain

woods are dense with immature trees and few suitable saplings very dense understory

TVA Field Notes – Team Daniela/Hanna

S100 Vegetation:

- Sycamore
- Red maple
- Dogwood
- Red cedar

S100-2L - 6ft water

S101-about 9 feet wide

Culvert 15- 4 feet wide - bat habitat

s101-5 - 6feet wide

S101-14 - 18 feet wide with a small rock island where grass is growing

S101-18: 9feet wide

S102-1: 4feet

E102 meets S103 (2 feet wide at S103-1)

E102 2 feet, no water flow, veg growth

E104 - 2ft wide, 0.5 in of water

FP100 - groundhog holes everywhere

P100- red cedar

- Sweet gum
- Cattail
- Red maple

S104 4.5 feet

S105 2 feet

S106 - 6 feet wide

S106-20 1/2 inch of water

E112 - 1.5-2ft wide

S106-37 - 2 feet wide

Tennessee River TOB (20 feet Deep)

- 28 feet wide

S107 - 5 feet wide - intermittent

E116 - 1.5-2ft wide

E117 - 1 foot wide, connects from E116 back to E116

E118-feeds into E116 - about 2 feet wide

Animal observations:

- Coyote scat
- Beaver prints
- Deer sightings, scat, and tracks

Appendix C
Geo-referenced Photographs

AECOM		Photographic Log
Client: **Tennessee Valley Authority (TVA)**	**Site Location:** **Watts Bar Nuclear Plant, Spring City TN**	**Project No.** **60742655**

Feature No. Snag 100	**Date:** 10/08/2025
Description: Representative photograph of Snag 100. Large cavities and crevices were found on the snag.	

Feature No. Snag 101	**Date:** 10/08/2025
Description: Representative photograph of Snag 101. Large cavities and crevices were found on the snag.	

AECOM

Photographic Log

Client:	Site Location:	Project No.
Tennessee Valley Authority (TVA)	Watts Bar Nuclear Plant, Spring City TN	60742655

Feature No.	Date:
Snag 102	10/08/2025

Description:

Representative photograph of Snag 102. Large cavities and crevices were found on the snag.

Feature No.	Date:
Snag 103	10/08/2025

Description:

Representative photograph of Snag 103. Large cavities and crevices were found on the snag.

AECOM		Photographic Log
Client: **Tennessee Valley Authority (TVA)**	**Site Location:** **Watts Bar Nuclear Plant, Spring City TN**	**Project No.** **60742655**

Feature No. Snag 104	**Date:** 10/09/2025
Description: Representative photograph of Snag 104. Large cavities were found on the snag.	

Feature No. Snag 105	**Date:** 10/09/2025
Description: Representative photograph of Snag 105. Large cavities and crevices were found on the snag.	

AECOM

Photographic Log

Client:	Site Location:	Project No.
Tennessee Valley Authority (TVA)	Watts Bar Nuclear Plant, Spring City TN	60742655

Feature No.	Date:
Snag 106	10/10/2025

Description:

Representative photograph of Snag 106. Large cavities and crevices were found on the snag.

Feature No.	Date:
Snag 107	10/10/2025

Description:

Representative photograph of Snag 107. Large cavities were found on the snag.

AECOM		Photographic Log
Client: **Tennessee Valley Authority (TVA)**	**Site Location:** **Watts Bar Nuclear Plant, Spring City TN**	**Project No.** **60742655**

Feature No. Snag 108	**Date:** 10/11/2025
Description: Representative photograph of Snag 108. Large cavities were found on the snag.	

Feature No. Bat Habitat (BH)	**Date:** 10/07/2025
Description: Representative photograph of bat habitat. Large cavities were found on the snag.	

Photographic Log

Client:	Site Location:	Project No.
Tennessee Valley Authority (TVA)	Watts Bar Nuclear Plant, Spring City TN	60742655

Feature No.	Date:
WWC BH	10/08/2025

Description:

Representative photograph of bat habitat through a WWC.

Feature No.	Date:
WWC BH	10/09/2025

Description:

Representative photograph of bat habitat through a WWC across from snag 103.

AECOM		Photographic Log
Client: **Tennessee Valley Authority (TVA)**	**Site Location:** **Watts Bar Nuclear Plant, Spring City TN**	**Project No.** **60742655**

Feature No. BH	**Date:** 10/09/2025
Description: Representative photograph of open bat habitat.	

Feature No. BH	**Date:** 10/09/2025
Description: Representative photograph of open bat habitat near Pond-100.	

AECOM		Photographic Log
Client: Tennessee Valley Authority (TVA)	**Site Location:** Watts Bar Nuclear Plant, Spring City TN	**Project No.** 60742655

Feature No. BH	**Date:** 10/12/2025
Description: Representative photograph of bat habitat.	

Feature No. Culvert 1	**Date:** 10/07/2025
Description: Representative photograph of a culvert that is suitable BH.	

AECOM		Photographic Log
Client: **Tennessee Valley Authority (TVA)**	**Site Location:** **Watts Bar Nuclear Plant, Spring City TN**	**Project No.** **60742655**

Feature No. Culvert 3	**Date:** 10/10/2025
Description: Representative photograph of a culvert that is suitable BH.	

Feature No. Culvert 10	**Date:** 10/07/2025
Description: Representative photograph of a culvert that is suitable BH.	

AECOM		Photographic Log
Client: **Tennessee Valley Authority (TVA)**	**Site Location:** **Watts Bar Nuclear Plant, Spring City TN**	**Project No.** **60742655**

Feature No. Culvert 11	**Date:** 10/07/2025
Description: Representative photograph of a culvert that is suitable BH.	

Feature No. Culvert 12	**Date:** 10/08/2025
Description: Representative photograph of a culvert that is suitable BH.	

AECOM

Photographic Log

Client:	Site Location:	Project No.
Tennessee Valley Authority (TVA)	Watts Bar Nuclear Plant, Spring City TN	60742655

Feature No.	Date:
Culvert 15	10/08/2025

Description:

Representative photograph of a culvert that is suitable BH.

Feature No.	Date:
Culvert	10/08/2025

Description:

Representative photograph of a culvert that is suitable BH in S-102.

AECOM

Photographic Log

Client:	Site Location:	Project No.
Tennessee Valley Authority (TVA)	Watts Bar Nuclear Plant, Spring City TN	60742655

Feature No.	Date:
Culvert 18	10/09/2025

Description:

Representative photograph of a culvert that is suitable BH.

Feature No.	Date:
Culvert	10/10/2025

Description:

Representative photograph of a culvert that is suitable BH in W104.

AECOM		Photographic Log
Client: **Tennessee Valley Authority (TVA)**	**Site Location:** **Watts Bar Nuclear Plant, Spring City TN**	**Project No.** **60742655**

Feature No. Culvert	**Date:** 10/11/2025
Description: Representative photograph of a culvert that is suitable BH.	

Feature No. Culvert	**Date:** 10/11/2025
Description: Representative photograph of a culvert that is suitable BH.	

Appendix D
USFWS Bat Habitat Assessment Forms

U.S. Fish and Wildlife Service

Bat Summer / Year-Round Habitat Assessment

PROJECT & SURVEY INFORMATION

Project Name: Watts Bar NP - TVA

IPaC Consultation Code (if applicable): _____

Project Proponent's Name (e.g., client/company/institution): Tennessee Valley Authority (TVA)

Project Location: State(s): Tennessee

County(s): Rhea

Latitude: 35.5960715°

Longitude: -84.8003970

REQUIRED: Attach or provide links to Google Earth® KMZ files (preferred) and/or shapefiles (mapping must show project boundaries, impacted forest habitat (if known), and sampling sites if assessing discrete habitats at multiple sites in a project area)

Files are attached: Yes ☑ No ☐

File Links: _____

Is suitable habitat present (or assumed present) for any of the following bat species?

☑ Indiana Bat (MYSO) ☑ Northern Long-eared Bat (MYSE) ☑ Tricolored Bat (PESU)

PROJECT AREA

Project	Total Acres	Forest Acres		Open Acres
	995	409		238
Proposed Tree Removal (Acres)	Completely Cleared	Partially Cleared	Preserved Acres (No Clearing)	
	N/A	N/A	N/A	

VEGETATION COVER TYPES

Pre-Project	Post-Project
N/A	N/A

LANDSCAPE WITHIN 5-MILE RADIUS

Flight corridors to other forested areas?
Yes, the area is connected to other forested areas along the Tennessee River.
Describe Adjacent Properties (e.g., forested, grassland, commercial or residential development, water sources)
Majority of the land is either 2nd growth forest, pasture, and farmland. There are water sources rang

SAMPLE SITE DESCRIPTION(S) (attach additional sheets if necessary. A single sheet can be used for multiple sites if same habitat)

Sample Site No.(s)

WATER RESOURCES AT SAMPLE SITE

Stream Type (# and length)	Ephemeral	Intermittent	Perennial

Pools/Ponds (# and size)	1 (P101)	Open and accessible to bats?
		Yes

Wetlands (approx. acres)	Permanent	Seasonal
		1 (W-006)

Describe existing condition of water sources:
Large oxbow lake (P101) and a large PEM/PFO wetland (w-006)

FOREST RESOURCES AT SAMPLE SITE

Closure or Density	Canopy (>50')	Midstory (20-50')	Understory (<20')
	60	35	5
% Trees w/ Exfoliating Bark	15	5	0

Dominant Species of Mature Trees	White oak (Quercus alba), beech (Fagus grandifolia), red oak (Quercus rubra)

Size Composition of Live Trees %	Small (3-8 in DBH)	Med (9-15 in DBH)	Large (>15in DBH)
	30	50	20

No. of suitable snags	8

Standing dead trees with exfoliating bark, cracks, crevices, or hollows.
Snags without these characteristics are not considered suitable

ADDITIONAL COMMENTS

The woods are nice and open, suitable for bats.

Photographic Documentation: Habitat shots at edge and interior from multiple locations, understory/midstory/canopy; examples of potential suitable snags and live trees, water sources et.

HAB-CRW-002

U.S. Fish and Wildlife Service

Bat Summer / Year-Round Habitat Assessment

PROJECT & SURVEY INFORMATION

Project Name: Watts Bar NP - TVA

IPaC Consultation Code (if applicable): _____

Project Proponent's Name (e.g., client/company/institution): Tennessee Valley Authority (TVA)

Project Location: State(s): Tennessee

County(s): Rhea

Latitude: 35.595973°

Longitude: -84.806037°

REQUIRED: Attach or provide links to Google Earth® KMZ files (preferred) and/or shapefiles (mapping must show project boundaries, impacted forest habitat (if known), and sampling sites if assessing discrete habitats at multiple sites in a project area)

Files are attached: Yes ☑ No ☐

File Links: _____

Is suitable habitat present (or assumed present) for any of the following bat species?

☐ Indiana Bat (MYSO) ☐ Northern Long-eared Bat (MYSE) ☑ Tricolored Bat (PESU)

PROJECT AREA

	Total Acres	Forest Acres		Open Acres
Project	995	409		238
Proposed Tree Removal (Acres)	Completely Cleared	Partially Cleared	Preserved Acres (No Clearing)	
	N/A	N/A	N/A	

VEGETATION COVER TYPES

Pre-Project	Post-Project
N/A	N/A

LANDSCAPE WITHIN 5-MILE RADIUS

Flight corridors to other forested areas?
Yes, the area is connected to other forested areas along the Tennessee River.
Describe Adjacent Properties (e.g., forested, grassland, commercial or residential development, water sources)
Majority of the land is either 2nd growth forest, pasture, and farmland. There are water sources rang

SAMPLE SITE DESCRIPTION(S) (attach additional sheets if necessary. A single sheet can be used for multiple sites if same habitat)

Sample Site No.(s)

WATER RESOURCES AT SAMPLE SITE

Stream Type (# and length)	Ephemeral	Intermittent	Perennial
	2 (E010, E006)		

Pools/Ponds (# and size)	N/A	Open and accessible to bats?
		No

Wetlands (approx. acres)	Permanent	Seasonal
	N/A	N/A

Describe existing condition of water sources:
Ephemeral channels within drier area of woods. Yellow Creek is outside of Project Area.

FOREST RESOURCES AT SAMPLE SITE

Closure or Density	Canopy (>50')	Midstory (20-50')	Understory (<20')
	10	25	65
% Trees w/ Exfoliating Bark	0	0	0

Dominant Species of Mature Trees	Sweetgum (Liquidambar styraciflua), willow oak (Quercus phellos), red cedar

Size Composition of Live Trees %	Small (3-8 in DBH)	Med (9-15 in DBH)	Large (>15in DBH)
	70	25	5

No. of suitable snags	1

Standing dead trees with exfoliating bark, cracks, crevices, or hollows.
Snags without these characteristics are not considered suitable

ADDITIONAL COMMENTS

Woods are comprised of smaller saplings, dense, not very suitable for bats.

Photographic Documentation: Habitat shots at edge and interior from multiple locations, understory/midstory/canopy; examples of potential suitable snags and live trees, water sources et.

U.S. Fish and Wildlife Service

Bat Summer / Year-Round Habitat Assessment

PROJECT & SURVEY INFORMATION

Project Name: Watts Bar NP - TVA

IPaC Consultation Code (if applicable): _____

Project Proponent's Name (e.g., client/company/institution): Tennessee Valley Authority (TVA)

Project Location: State(s): Tennessee

County(s): Rhea

Latitude: 35.594217°

Longitude: -84.807995°

REQUIRED: Attach or provide links to Google Earth® KMZ files (preferred) and/or shapefiles (mapping must show project boundaries, impacted forest habitat (if known), and sampling sites if assessing discrete habitats at multiple sites in a project area)

Files are attached: Yes ☑ No ☐

File Links: _____

Is suitable habitat present (or assumed present) for any of the following bat species?

☐ Indiana Bat (MYSO) ☐ Northern Long-eared Bat (MYSE) ☑ Tricolored Bat (PESU)

PROJECT AREA

Project	Total Acres	Forest Acres		Open Acres
	995	409		238
Proposed Tree Removal (Acres)	Completely Cleared	Partially Cleared	Preserved Acres (No Clearing)	
	N/A	N/A	N/A	

VEGETATION COVER TYPES

Pre-Project	Post-Project
N/A	N/A

LANDSCAPE WITHIN 5-MILE RADIUS

Flight corridors to other forested areas?
Yes, the area is connected to other forested areas along the Tennessee River.
Describe Adjacent Properties (e.g., forested, grassland, commercial or residential development, water sources)
Majority of the land is either 2nd growth forest, pasture, and farmland. There are water sources rang

SAMPLE SITE DESCRIPTION(S) (attach additional sheets if necessary. A single sheet can be used for multiple sites if same habitat)

Sample Site No.(s)

WATER RESOURCES AT SAMPLE SITE

Stream Type (# and length)	Ephemeral	Intermittent	Perennial
	N/A	N/A	N/A

Pools/Ponds (# and size)	N/A	Open and accessible to bats?
		N/A

Wetlands (approx. acres)	Permanent	Seasonal
	N/A	N/A

Describe existing condition of water sources:
None within project area, however yellow creek is just outside the project area boundary.

FOREST RESOURCES AT SAMPLE SITE

Closure or Density	Canopy (>50')	Midstory (20-50')	Understory (<20')
	10	60	30
% Trees w/ Exfoliating Bark	0	0	0

Dominant Species of Mature Trees	Sweetgum, red cedar

Size Composition of Live Trees %	Small (3-8 in DBH)	Med (9-15 in DBH)	Large (>15in DBH)
	45	50	5

No. of suitable snags	0

Standing dead trees with exfoliating bark, cracks, crevices, or hollows.
Snags without these characteristics are not considered suitable

ADDITIONAL COMMENTS

Woods are dense with immature trees, few to no suitable snags observed.

Photographic Documentation: Habitat shots at edge and interior from multiple locations, understory/midstory/canopy; examples of potential suitable snags and live trees, water sources et.

U.S. Fish and Wildlife Service

Bat Summer / Year-Round Habitat Assessment

PROJECT & SURVEY INFORMATION

Project Name: Watts Bar NP - TVA

IPaC Consultation Code (if applicable): _____

Project Proponent's Name (e.g., client/company/institution): Tennessee Valley Authoritiy

Project Location: State(s): Tennessee

County(s): Rhea

Latitude: 35.604834

Longitude: -84.795996

REQUIRED: Attach or provide links to Google Earth® KMZ files (preferred) and/or shapefiles (mapping must show project boundaries, impacted forest habitat (if known), and sampling sites if assessing discrete habitats at multiple sites in a project area)

Files are attached: Yes ☑ No ☐

File Links: _____

Is suitable habitat present (or assumed present) for any of the following bat species?

☐ Indiana Bat (MYSO) ☑ Northern Long-eared Bat (MYSE) ☑ Tricolored Bat (PESU)

PROJECT AREA

	Total Acres	Forest Acres		Open Acres
Project	995	409		238
Proposed Tree Removal (Acres)	Completely Cleared	Partially Cleared	Preserved Acres (No Clearing)	
	N/A	N/A	N/A	

VEGETATION COVER TYPES

Pre-Project	Post-Project
N/A	N/A

LANDSCAPE WITHIN 5-MILE RADIUS

Flight corridors to other forested areas?
Yes, the area is connected to other forested areas along the Tennessee River.
Describe Adjacent Properties (e.g., forested, grassland, commercial or residential development, water sources)
Majority of the land is either 2nd growth forest, pasture, and farmland. There are water sources rang

SAMPLE SITE DESCRIPTION(S) (attach additional sheets if necessary. A single sheet can be used for multiple sites if same habitat)

Sample Site No.(s)
Sample Site 1 (Deciduous Forest near high density developed)

WATER RESOURCES AT SAMPLE SITE

Stream Type (# and length)	Ephemeral	Intermittent	Perennial
			S001; 2387.03 ft

Pools/Ponds (# and size)		Open and accessible to bats?
		Yes

Wetlands (approx. acres)	Permanent	Seasonal
	0.16	

Describe existing condition of water sources:
Water sources appear to be operating adequately and were observed to be flowing at the time of the

FOREST RESOURCES AT SAMPLE SITE

Closure or Density	Canopy (>50')	Midstory (20-50')	Understory (<20')
	20	60	20
% Trees w/ Exfoliating Bark	5	5	0

Dominant Species of Mature Trees	White oak (Quercus alba), tulip poplar (Liriodendron tulipifera), sweetgum (Liq

Size Composition of Live Trees %	Small (3-8 in DBH)	Med (9-15 in DBH)	Large (>15in DBH)
	30	50	20

No. of suitable snags	2

Standing dead trees with exfoliating bark, cracks, crevices, or hollows.
Snags without these characteristics are not considered suitable

ADDITIONAL COMMENTS

Photographic Documentation: Habitat shots at edge and interior from multiple locations, understory/midstory/canopy; examples of potential suitable snags and live trees, water sources et.

U.S. Fish and Wildlife Service

Bat Summer / Year-Round Habitat Assessment

PROJECT & SURVEY INFORMATION

Project Name: Watts Bar NP - TVA IPaC Consultation Code (if applicable): _____

Project Proponent's Name (e.g., client/company/institution): Tennessee Valley Authoritiy

Project Location: State(s): Tennessee County(s): Rhea

Latitude: 35.602719 Longitude: -84.800047

REQUIRED: Attach or provide links to Google Earth® KMZ files (preferred) and/or shapefiles (mapping must show project boundaries, impacted forest habitat (if known), and sampling sites if assessing discrete habitats at multiple sites in a project area)

Files are attached: Yes ☑ No ☐

File Links: _____

Is suitable habitat present (or assumed present) for any of the following bat species?

☐ Indiana Bat (MYSO) ☑ Northern Long-eared Bat (MYSE) ☑ Tricolored Bat (PESU)

PROJECT AREA

	Total Acres	Forest Acres		Open Acres
Project	995	409		238
Proposed Tree Removal (Acres)	Completely Cleared	Partially Cleared	Preserved Acres (No Clearing)	
	N/A	N/A	N/A	

VEGETATION COVER TYPES

Pre-Project	Post-Project
N/A	N/A

LANDSCAPE WITHIN 5-MILE RADIUS

Flight corridors to other forested areas?
Yes, the area is connected to other forested areas along the Tennessee River.
Describe Adjacent Properties (e.g., forested, grassland, commercial or residential development, water sources)
Majority of the land is either 2nd growth forest, pasture, and farmland. There are water sources rang

SAMPLE SITE DESCRIPTION(S) (attach additional sheets if necessary. A single sheet can be used for multiple sites if same habitat)

Sample Site No.(s)
Sample Site 100 (Deciduous Forest abutting road)

WATER RESOURCES AT SAMPLE SITE

Stream Type (# and length)	Ephemeral	Intermittent	Perennial
			S100; 603.78 ft

Pools/Ponds (# and size)		Open and accessible to bats?
		Yes

Wetlands (approx. acres)	Permanent	Seasonal
	1.90 acres	

Describe existing condition of water sources:
Water sources appear to be operating adequately and were observed to be flowing at the time of the

FOREST RESOURCES AT SAMPLE SITE

Closure or Density	Canopy (>50')	Midstory (20-50')	Understory (<20')
	30	50	20
% Trees w/ Exfoliating Bark	2	2	0

Dominant Species of Mature Trees	White oak (Quercus alba), tulip poplar (Liriodendron tulipifera), sweetgum (Liq

Size Composition of Live Trees %	Small (3-8 in DBH)	Med (9-15 in DBH)	Large (>15in DBH)
	30	50	20

No. of suitable snags	2

Standing dead trees with exfoliating bark, cracks, crevices, or hollows.
Snags without these characteristics are not considered suitable

ADDITIONAL COMMENTS

Photographic Documentation: Habitat shots at edge and interior from multiple locations, understory/midstory/canopy; examples of potential suitable snags and live trees, water sources et.

Appendix E
Species Screening Lists

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Tennessee Ecological Services Field Office
446 Neal Street
Cookeville, TN 38501-4027
Phone: (931) 528-6481 Fax: (931) 528-7075

In Reply Refer To: 10/27/2025 15:43:09 UTC
Project Code: 2025-0085749
Project Name: 2025-9 Watts Bar Nuclear Unit 1 License Renewal SEIS

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological

evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts, see https://www.fws.gov/program/migratory-bird-permit/what-we-do.

It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures, see https://www.fws.gov/library/collections/threats-birds.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/partner/council-conservation-migratory-birds.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

- Bald & Golden Eagles
- Migratory Birds
- Wetlands

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Tennessee Ecological Services Field Office
446 Neal Street
Cookeville, TN 38501-4027
(931) 528-6481

PROJECT SUMMARY

Project Code: 2025-0085749
Project Name: 2025-9 Watts Bar Nuclear Unit 1 License Renewal SEIS
Project Type: Power Gen - Nuclear
Project Description: The current NRC operating license for WBN Unit 1 will expire on February 7, 2036. WBN's current baseload generation supports future forecasted baseload power needs, as outlined in the TVA's 2025 Integrated Resource Plan (IRP), by helping to maintain grid stability and generating capacity for TVA's generation portfolio mix. The purpose of the proposed action is to continue to generate baseload power at the WBN site for another 20 years between 2036 and 2076 through obtaining a license renewal from the Nuclear Regulatory Commission. Renewal of the current operating license is needed to allow WBN Unit 1 to continue supplying approximately 1,500 MWe capacity of safe, clean, reliable, and cost-effective baseload power for an additional 20 years.

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@35.59981065,-84.79264011989537,14z

Counties: Rhea County, Tennessee

ENDANGERED SPECIES ACT SPECIES

There is a total of 7 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Gray Bat *Myotis grisescens* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6329	Endangered
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Endangered
Tricolored Bat *Perimyotis subflavus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

BIRDS

NAME	STATUS
Whooping Crane *Grus americana* Population: U.S.A. (AL, AR, CO, FL, GA, ID, IL, IN, IA, KY, LA, MI, MN, MS, MO, NC, NM, OH, SC, TN, UT, VA, WI, WV, western half of WY) No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/758	Experimental Population, Non-Essential

CLAMS

NAME	STATUS
Longsolid *Fusconaia subrotunda* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9880	Threatened
Pink Mucket (pearlymussel) *Lampsilis abrupta* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7829	Endangered

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9743	Proposed Threatened

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

BALD & GOLDEN EAGLES

Bald and Golden Eagles are protected under the Bald and Golden Eagle Protection Act [2] and the Migratory Bird Treaty Act (MBTA) [1]. Any person or organization who plans or conducts activities that may result in impacts to Bald or Golden Eagles, or their habitats, should follow appropriate regulations and consider implementing appropriate avoidance and minimization measures, as described in the various links on this page.

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1. The Bald and Golden Eagle Protection Act of 1940.
2. The Migratory Birds Treaty Act of 1918.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

There are Bald Eagles and/or Golden Eagles in your project area.

Measures for Proactively Minimizing Eagle Impacts
For information on how to best avoid and minimize disturbance to nesting bald eagles, please review the National Bald Eagle Management Guidelines. You may employ the timing and activity-specific distance recommendations in this document when designing your project/ activity to avoid and minimize eagle impacts. For bald eagle information specific to Alaska, please refer to Bald Eagle Nesting and Sensitivity to Human Activity.

The FWS does not currently have guidelines for avoiding and minimizing disturbance to nesting Golden Eagles. For site-specific recommendations regarding nesting Golden Eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

If disturbance or take of eagles cannot be avoided, an incidental take permit may be available to authorize any take that results from, but is not the purpose of, an otherwise lawful activity. For assistance making this determination for Bald Eagles, visit the Do I Need A Permit Tool. For assistance making this determination for golden eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

Ensure Your Eagle List is Accurate and Complete
If your project area is in a poorly surveyed area in IPaC, your list may not be complete and you may need to rely on other resources to determine what species may be present (e.g. your local FWS field office, state surveys, your own surveys). Please review the Supplemental Information on Migratory Birds and Eagles, to help you properly interpret the report for your specified location, including determining if there is sufficient data to ensure your list is accurate.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to bald or golden eagles on your list, see the "Probability of Presence Summary" below to see when these bald or golden eagles are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Sep 1 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (▪)

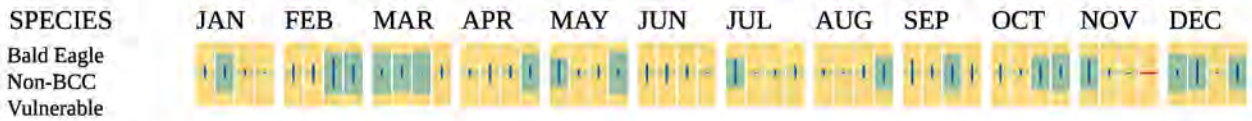
Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (▪)
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

▪ probability of presence ▪ breeding season | survey effort – no data



Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds

- Nationwide avoidance and minimization measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

MIGRATORY BIRDS

The Migratory Bird Treaty Act (MBTA) [1] prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service (Service).

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1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the "Probability of Presence Summary" below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Sep 1 to Aug 31
Bobolink *Dolichonyx oryzivorus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9454	Breeds May 20 to Jul 31
Chimney Swift *Chaetura pelagica* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9406	Breeds Mar 15 to Aug 25
Chuck-will's-widow *Antrostomus carolinensis* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9604	Breeds May 10 to Jul 10

NAME	BREEDING SEASON
Eastern Whip-poor-will *Antrostomus vociferus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10678	Breeds May 1 to Aug 20
Golden-winged Warbler *Vermivora chrysoptera* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8745	Breeds May 1 to Jul 20
Kentucky Warbler *Geothlypis formosa* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9443	Breeds Apr 20 to Aug 20
Prairie Warbler *Setophaga discolor* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9513	Breeds May 1 to Jul 31
Prothonotary Warbler *Protonotaria citrea* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9439	Breeds Apr 1 to Jul 31
Red-headed Woodpecker *Melanerpes erythrocephalus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9398	Breeds May 10 to Sep 10
Rusty Blackbird *Euphagus carolinus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9478	Breeds elsewhere
Wood Thrush *Hylocichla mustelina* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9431	Breeds May 10 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

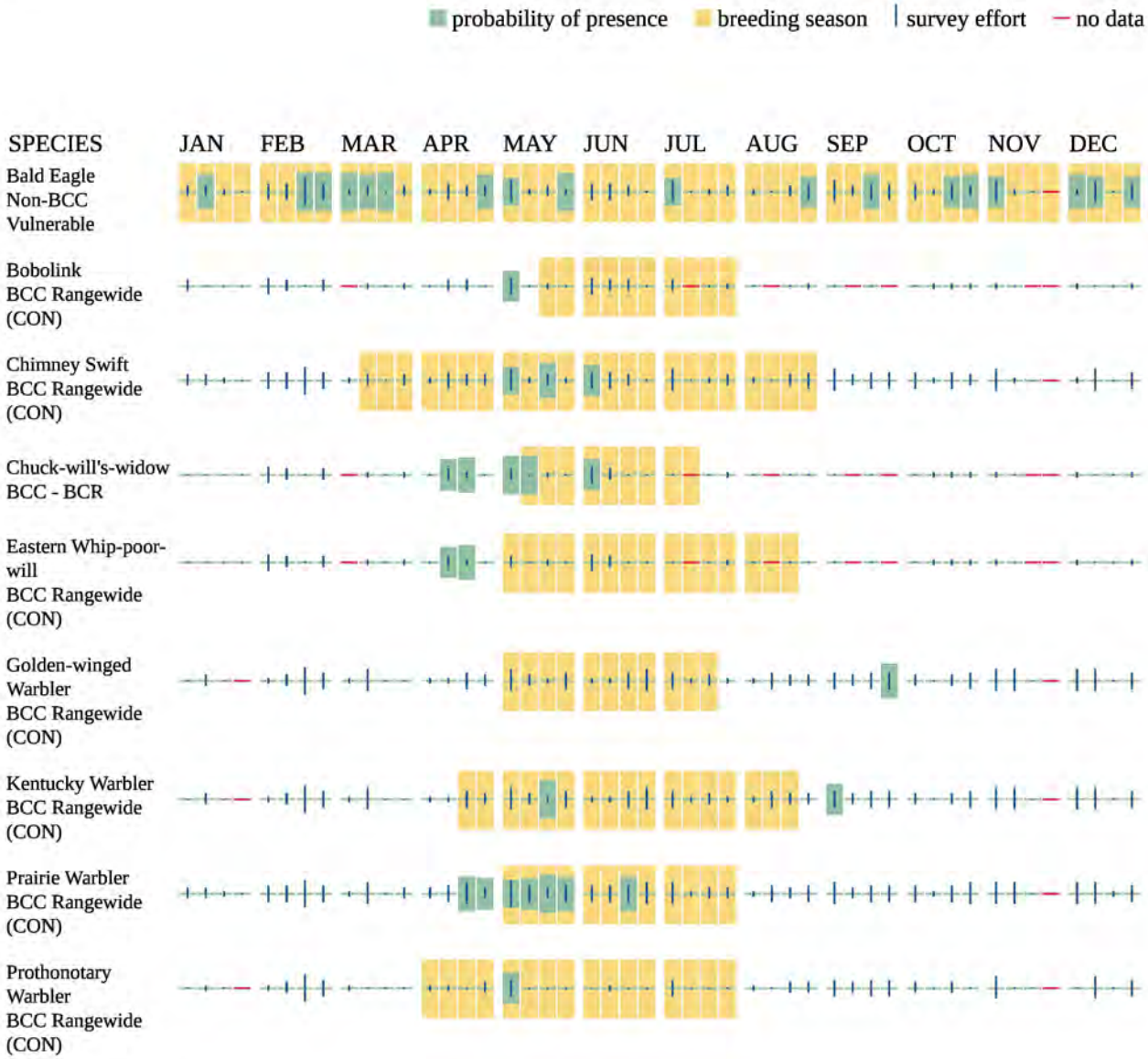
Probability of Presence (■)

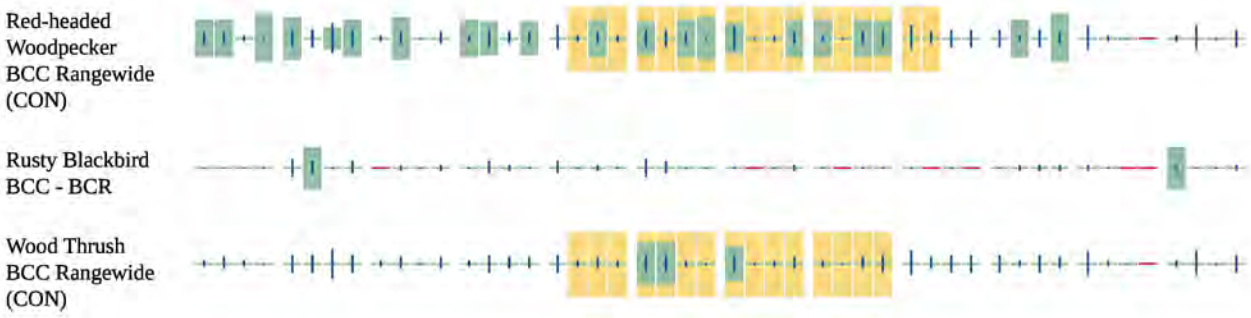
Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (▪)
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (–)
A week is marked as having no data if there were no survey events for that week.





Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

WETLANDS

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

LAKE

- L2UBH
- L2UBHh
- L1UBHh

FRESHWATER POND

- PUBHh
- PUBHx

FRESHWATER FORESTED/SHRUB WETLAND

- PFO1/EM1Ch
- PFO1A
- PFO1Ch

FRESHWATER EMERGENT WETLAND

- PEM1Fh

RIVERINE

- R5UBH

IPAC USER CONTACT INFORMATION

Agency: Tennessee Valley Authority
Name: Sara McLaughlin-Johnson
Address: 106 Tri-City Business Park
City: Johnson City
State: TN
Zip: 37615
Email sjmclaughlin@tva.gov
Phone: 9014385421

TVA Natural Heritage database queried by jhterrel on 10/01/2025 for the TVA ESCS Activity 46371
Watts Bar Nuclear Unit 1 License Renewal SEIS Mod 1

Records of state- and federally-listed Aquatic Animals points located within the HUC boundary of Biological Project Area, OBJECTID 144962

Scientific Name	Common Name	EO Rank (2*)	State	State Rank (3*)	State Status (4*)	Federal Status (4*)
Acipenser fulvescens	Lake Sturgeon	E - Verified extant (viability not assessed)	TN	S1	E	
Carpiodes velifer	Highfin Carpsucker	E - Verified extant (viability not assessed)	TN	S2S3	D	
Chrosomus saylori	Laurel Dace	E - Verified extant (viability not assessed)	TN	S1	E	E
Cyprogenia stegaria	Fanshell	E - Verified extant (viability not assessed)	TN	S1	E	E, XN
Dromus dromas	Dromedary Pearlymussel	H? - Possibly historical	TN	S1	E	E, XN
Fusconaia cor	Shiny Pigtoe Pearlymussel	H - Historical	TN	S1	E	E, XN
Fusconaia subrotunda	Longsolid	Not ranked	TN	S3		T
Lampsilis abrupta	Pink Mucket	E - Verified extant (viability not assessed)	TN	S2	E	E
Percina tanasi	Snail Darter	H? - Possibly historical	TN	S2S3	T	DL
Plethobasus cooperianus	Orange-foot Pimpleback	H? - Possibly historical	TN	S1	E	E, XN
Plethobasus cyphyus	Sheepnose	E - Verified extant (viability not assessed)	TN	S2S3	E	E
Pleurobema cordatum	Ohio Pigtoe	Not ranked	TN			
Pleurobema oviforme	Tennessee Clubshell	H - Historical	TN	S2S3		PE
Pleurobema plenum	Rough Pigtoe	H? - Possibly historical	TN	S1	E	E, XN
Pleurobema sintoxia	Pyramid Pigtoe	H? - Possibly historical	TN	S1S2		

Records of state- and federally-listed Plants and Champion Trees points located within a 5 Mile radius search of Biological Project Area, OBJECTID 144962

Scientific Name	Common Name	EO Rank (2*)	State	State Rank (3*)	State Status (4*)	Federal Status (4*)
Arabis patens	Spreading Rockcress	E - Verified extant (viability not assessed)	TN	S1	E	
Aureolaria patula	Spreading False-foxglove	H? - Possibly historical	TN	S3	S	
Diervilla lonicera	Northern Bush-honeysuckle	E - Verified extant (viability not assessed)	TN	S2	T	
Liatris cylindracea	Slender Blazing-star	H? - Possibly historical	TN	S2	T	
Oligoneuron album	Prairie Goldenrod	H? - Possibly historical	TN	S1S2	E	

Records of Caves points located within a 3 Mile radius search of Biological Project Area, OBJECTID 144962

Scientific Name	Common Name	EO Rank (2*)	State	State Rank (3*)	State Status (4*)	Federal Status (4*)
TN Meigs County Cave	A cave	Not ranked	TN			

Records of Terrestrial Animals points located within a 3 Mile radius search of Biological Project Area, OBJECTID 144962

Scientific Name	Common Name	EO Rank (2*)	State	State Rank (3*)	State Status (4*)	Federal Status (4*)
Colonial Wading Bird Colony	Colonial Wading Bird Colony	E - Verified extant (viability not assessed)	TN	SNR		
Colonial Wading Bird Colony	Colonial Wading Bird Colony	E - Verified extant (viability not assessed)	TN	SNR		
Colonial Wading Bird Colony	Colonial Wading Bird Colony	E - Verified extant (viability not assessed)	TN	SNR		
Colonial Wading Bird Colony	Colonial Wading Bird Colony	E - Verified extant (viability not assessed)	TN	SNR		
Colonial Wading Bird Colony	Colonial Wading Bird Colony	E - Verified extant (viability not assessed)	TN	SNR		
Colonial Wading Bird Colony	Colonial Wading Bird Colony	H? - Possibly historical	TN	SNR		
Colonial Wading Bird Colony	Colonial Wading Bird Colony	E - Verified extant (viability not assessed)	TN	SNR		
Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	H? - Possibly historical	TN			E, PE
Haliaeetus leucocephalus	Bald Eagle	E - Verified extant (viability not assessed)	TN			DL
Haliaeetus leucocephalus	Bald Eagle	E - Verified extant (viability not assessed)	TN			DL
Haliaeetus leucocephalus	Bald Eagle	E - Verified extant (viability not assessed)	TN			DL
Myotis grisescens	Gray Bat	AC - Excellent, good, or fair estimated viability	TN	S2	E	E
Myotis lucifugus	Little Brown Bat		TN	S3	T	UR
Myotis septentrionalis	Northern Long-eared Bat		TN	S1S2	T	E
Pandion haliaetus	Osprey	Not ranked	TN	S3B		
Pandion haliaetus	Osprey	E - Verified extant (viability not assessed)	TN	S3B		
Pandion haliaetus	Osprey	Not ranked	TN	S3B		
Pandion haliaetus	Osprey	Not ranked	TN	S3B		
Pandion haliaetus	Osprey	E - Verified extant (viability not assessed)	TN	S3B		
Pandion haliaetus	Osprey	B - Good estimated viability	TN	S3B		
Pandion haliaetus	Osprey	Not ranked	TN	S3B		
Pandion haliaetus	Osprey	A - Excellent estimated viability	TN	S3B		
Pandion haliaetus	Osprey	E - Verified extant (viability not assessed)	TN	S3B		

Scientific Name	Common Name	EO Rank (2*)	State	State Rank (3*)	State Status (4*)	Federal Status (4*)
Pandion haliaetus	Osprey	Not ranked	TN	S3B		
Pandion haliaetus	Osprey	E - Verified extant (viability not assessed)	TN	S3B		
Pandion haliaetus	Osprey	H? - Possibly historical	TN	S3B		
Pandion haliaetus	Osprey	B - Good estimated viability	TN	S3B		
Pandion haliaetus	Osprey	E - Verified extant (viability not assessed)	TN	S3B		
Pandion haliaetus	Osprey	E - Verified extant (viability not assessed)	TN	S3B		
Pandion haliaetus	Osprey	E - Verified extant (viability not assessed)	TN	S3B		
Pandion haliaetus	Osprey	E - Verified extant (viability not assessed)	TN	S3B		
Pandion haliaetus	Osprey	E - Verified extant (viability not assessed)	TN	S3B		
Pandion haliaetus	Osprey	E - Verified extant (viability not assessed)	TN	S3B		
Pandion haliaetus	Osprey	E - Verified extant (viability not assessed)	TN	S3B		
Pandion haliaetus	Osprey	E - Verified extant (viability not assessed)	TN	S3B		
Pandion haliaetus	Osprey	E - Verified extant (viability not assessed)	TN	S3B		
Pandion haliaetus	Osprey	E - Verified extant (viability not assessed)	TN	S3B		
Pandion haliaetus	Osprey	E - Verified extant (viability not assessed)	TN	S3B		
Pandion haliaetus	Osprey	E - Verified extant (viability not assessed)	TN	S3B		
Pandion haliaetus	Osprey	E - Verified extant (viability not assessed)	TN	S3B		
Pandion haliaetus	Osprey	E - Verified extant (viability not assessed)	TN	S3B		
Pandion haliaetus	Osprey	E - Verified extant (viability not assessed)	TN	S3B		
Pandion haliaetus	Osprey	E - Verified extant (viability not assessed)	TN	S3B		
Pandion haliaetus	Osprey	E - Verified extant (viability not assessed)	TN	S3B		
Pandion haliaetus	Osprey	A - Excellent estimated viability	TN	S3B		
Pandion haliaetus	Osprey	E - Verified extant (viability not assessed)	TN	S3B		
Perimyotis subflavus	Tricolored Bat		TN	S2S3	T	PE
Zapus hudsonius	Meadow Jumping Mouse	AC - Excellent, good, or fair estimated viability	TN	S4		PS

Records of Heritage Natural Areas points located within a 3 Mile radius search of Biological Project Area, OBJECTID 144962

MA Name	MA Type	MA Unit Code	State	Acres	Status	Key ID No
CHICKAMAUGA RESERVOIR STATE MUSSEL SANCTUARY	SXX		TN	1374.15	Final	Y
CHICKAMAUGA SHORELINE TVA HABITAT PROTECTION AREA	FTVHP		TN	54.42	Final	Y
CHICKAMAUGA WILDLIFE MANAGEMENT AREA	WL		TN	3489.25	Final	Y
EAVES BLUFF TVA HABITAT PROTECTION AREA	FTVHP		TN	3.68	Final	Y
EVES CAVE	CV		TN	4.38		Y
MEIGS COUNTY PARK	LMGPK		TN	242.73	Final	Y
WATTS BAR COAL GENERATING FACILITY	RV		TN	168.54	Final	Y
WATTS BAR FOSSIL PLANT	FTVRV		TN	168.53	Final	Y
WATTS BAR NUCLEAR GENERATING FACILITY	FTVRV		TN	872.18	Final	Y
WATTS BAR STATE WILDLIFE MANAGEMENT AREA			TN	1247.32		Y
YUCHI WILDLFE MANAGEMENT AREA	WM		TN	2364.5		Y
YUCHI WILDLIFE REFUGE	IPIPR		TN	2364.5	Final	Y

1* Source: TVA Regional Natural Heritage Database; USFWS Information for Planning and Consultation (IPaC) resource list (https://ecos.fws.gov/ipac/) -If Relevant

2* EO = Element Occurrence; Common ranks: A= Excellent est. viability/ecol. Integrity; B= Good est. viability/ecol. Integrity; C= Fair est. viability/ecol. Integrity; E= Verified extant (viability/ecological integrity not assessed); H= Historical; X= Extirpated; NR= Not ranked. See Heritage Data Viewer Handbook for more ranks.

3* State Ranks: S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable; S4 = Apparently Secure; S5 = Secure; SX = Presumed Extirpated. See Heritage Data Viewer Handbook for more ranks.

4* Status Codes: D= Deemed in Need of Management; DM= Delisted, still being monitored; E= Endangered; LE= Listed Endangered; LT= Listed Threatened; C= Candidate; PS= Partial Status; T= Threatened; E-P= Endangered/Possibly Extirp.; E-PT= Endangered/Proposed Threatened; RARE= Rare; SLNS= State listed, no status; S= Special Concern; S-P= Special Concern/Possibly Extirp.; S-CE= Special Concern/Commerc. Exploited; T-CE= Threatened/Commerc. Exploited

5* See Heritage Data Viewer Handbook for full scope of Natural Areas as well as definitions of Natural Area types and units.

Records of federally-listed Aquatic Animals points located within Rhea, TN county for Biological Project Area, OBJECTID 144962 (Count: 7)

Scientific Name	Common Name	EO Rank (2*)	State	County	Federal Status (3*)
Chrosomus saylori	Laurel Dace	E - Verified extant (viability not assessed)	TN	RHEA	E
Cyprogenia stegaria	Fanshell	E - Verified extant (viability not assessed)	TN	RHEA	E, XN
Lampsilis abrupta	Pink Mucket	E - Verified extant (viability not assessed)	TN	RHEA	E
Plethobasus cooperianus	Orange-foot Pimpleback	H? - Possibly historical	TN	RHEA	E, XN
Plethobasus cyphyus	Sheepnose	E - Verified extant (viability not assessed)	TN	RHEA	E
Pleurobema oviforme	Tennessee Clubshell	H - Historical	TN	RHEA	PE
Pleurobema plenum	Rough Pigtoe	H? - Possibly historical	TN	RHEA	E, XN

Records of federally-listed Plants and Champion Trees points located within Rhea, TN county for Biological Project Area, OBJECTID 144962 (Count: 1)

Scientific Name	Common Name	EO Rank (2*)	State	County	Federal Status (3*)
Spiraea virginiana	Virginia Spiraea	BD - Good, fair, or poor estimated viability	TN	RHEA	T

Records of federally-listed Terrestrial Animals points located within Rhea, TN county for Biological Project Area, OBJECTID 144962 (Count: 4)

Scientific Name	Common Name	EO Rank (2*)	State	County	Federal Status (3*)
Haliaeetus leucocephalus	Bald Eagle	AC - Excellent, good, or fair estimated viability	TN	RHEA	DL
Myotis grisescens	Gray Bat	AC - Excellent, good, or fair estimated viability	TN	RHEA	E
Myotis septentrionalis	Northern Long-eared Bat	E - Verified extant (viability not assessed)	TN	RHEA	E
Zapus hudsonius	Meadow Jumping Mouse	AC - Excellent, good, or fair estimated viability	TN	RHEA	PS

1* Source: TVA Regional Natural Heritage Database; USFWS Information for Planning and Consultation (IPaC) resource list (https://ecos.fws.gov/ipac/) -If Relevant

2* EO = Element Occurrence; Common ranks: A= Excellent est. viability/ecol. Integrity; B= Good est. viability/ecol. Integrity; C= Fair est. viability/ecol. Integrity; E= Verified extant (viability/ecological integrity not assessed); H= Historical; X= Extirpated; NR= Not ranked. See Heritage Data Viewer Handbook for more ranks.

3* Status Codes: D= Deemed in Need of Management; DM= Delisted, still being monitored; E= Endangered; LE= Listed Endangered; LT= Listed Threatened; C=Candidate; PS= Partial Status; T= Threatened; E-P= Endangered/Possibly Extirp.; E-PT= Endangered/Proposed Threatened; RARE= Rare; SLNS= State listed, no status; S= Special Concern; S-P= Special Concern/Possibly Extirp.; S-CE= Special Concern/Commerc. Exploited; T-CE= Threatened/Commerc. Exploited

Appendix F
GIS Metadata & Shapefile Documentation

Appendix G
Investigators and Qualifications

AECOM

Laary J. Cushman

Project Management Senior Manager, Environmental Planning and Permitting (EPP)

Education
ABD (PhD) Biology, Clemson University, 2026

M.S. Plant & Environmental Sciences
Clemson University, 2015

B.S. Biology/Technical Writing,
USC-Aiken, 1998

Professional History
2025 – Present
Project Management Senior Manager at AECOM
Environmental Planning and Permitting (EPP)

2023–2024
Water and Land Solutions, LLC
Senior Environmental Scientist

2004 – 2023
Cushman Consulting Group, LLC
Principal Scientist & Owner

2001 – 2004
Qore, Inc.
Senior Scientist

2000 – 2001
SC Department of Health and Environmental Control
Environmental Health Manager

1998 – 1999
General Physics Corporation
Environmental Scientist & Technical Writer

Mr. Cushman brings over 27 years of experience in environmental science and infrastructure planning, with demonstrated expertise in remote-access fieldwork, rugged terrain logistics, and sensitive habitat support. He provides senior-level technical oversight and hands-on support for environmental field operations, including stream and wetland delineations, threatened and endangered species surveys, watershed planning, and NEPA assessments. His work routinely involves challenging environments of steep terrain, dense vegetation, and biological hazards.

He is proficient in off-road vehicle (ORV/UTV) navigation, remote data collection using Trimble GPS, ArcGIS FieldMaps, and Avenza Maps, and implementing field safety protocols for heat exposure and wildlife encounters. Mr. Cushman specializes in leading multidisciplinary teams on multimillion-dollar projects, ensuring regulatory compliance, ecological integrity, and efficient execution under difficult site conditions—particularly within the Appalachian foothills, gulf coast, and coastal plain watersheds of the Southeastern U.S.

At Water and Land Solutions, LLC, Mr. Cushman led the preparation, management, and compliance of Mitigation Banking Instruments (MBIs), ensuring alignment with federal regulations. He supervised teams across various disciplines, overseeing documentation, reporting, fieldwork, and subcontractor performance, and managing NEPA Environmental Assessments, endangered species surveys, wetland delineations, and Phase I Environmental Site Assessments (ESAs). Additionally, he mentored junior staff in ecological assessments, hydrological modeling, and innovative monitoring approaches, while personally managing multimillion-dollar project budgets within a $45 million MBI portfolio.

As founder and Principal Scientist of Cushman Consulting Group, LLC (2004–2023), he directed over 250 projects specializing in wetland delineations and permitting, endangered species surveys and management plans, Phase I Environmental Site Assessments, Federal Regulatory Risk Assessments,

US EPA Brownfields program support, compliance with USDA and NRCS reporting and funding requirements, and Voluntary Cleanup Contracts (VCCs), cultivating strong relationships with regulatory agencies and clients.

From 2020 to 2024 he also served as Associate Professor at Anderson University, developing environmental science and biology curricula that integrated GIS, eDNA, and ecological monitoring technologies. His role included the management of a 178-acre nature preserve and securing $288,000+ in grants for educational and restoration initiatives. He also served as Interim Curator of the CLEMS Herbarium at Clemson University in 2015, overseeing collections management, specimen processing, and supporting regional research needs.

Mr. Cushman's career includes earlier roles at the SC Department of Environmental Services where he was responsible for watershed management, environmental permitting, interagency coordination, regulatory compliance inspections, and safe drinking water, as outlined under sections 401, 402, and 403 of the Clean Water Act. As an Environmental Scientist and Technical Writer at General Physics Corp, Inc., he managed RCRA/CERCLA projects at the Savannah River Site, assessing various facilities and authoring decision documents.

Mr. Cushman holds an M.S. in Plant & Environmental Sciences from Clemson University and is a Ph.D. Candidate in Biological Sciences. His academic expertise spans risk modeling, field and lab data analysis, bioinformatics, population/conservation genetics, advanced GIS modeling, and sustainability initiatives. He also holds certification through the Taxonomic Certification Program supported by the Society for Freshwater Science, with demonstrated proficiency in identifying aquatic macroinvertebrates to the genus level.

Detailed Project Experience

Black Mountain Center for Research and Technology, NC Chamber of Commerce, Buncombe County, NC
Mr. Cushman performed and supervised comprehensive environmental and cultural resource services to support the development of the Black Mountain Commerce Park and Research Site under the NC Department of Commerce Certified Sites program. He conducted wetland delineations, endangered species surveys, and supervised cultural resource (archaeological) assessments, preparing submittals for the U.S. Army Corps of Engineers (USACE), the North Carolina Department of Environmental Quality (NCDEQ), and the North Carolina State Historic Preservation Office (NC SHPO).
His scope of work included drafting narratives for wetland delineations and endangered species evaluations, overseeing Phase I and Phase II archaeological investigations, reviewing Phase I ESA's, and coordinating with state and federal agencies to obtain the necessary permits authorizing construction. By compiling final documentation into a single NC Certified Sites program report, Mr. Cushman facilitated the successful certification of the site and ensured regulatory compliance across all environmental and cultural resource requirements.

Catawba-Wateree Hydroelectric FERC Relicensing Project, Duke Energy
Catawba River Basin, NC & SC
Mr. Cushman contributed to Duke Energy's Catawba-Wateree Hydroelectric Relicensing process by conducting key wetland delineations, wildlife habitat assessments, and water quality evaluations to satisfy Federal Energy Regulatory Commission (FERC) requirements and Clean Water Act (CWA) Sections 401 and 404. Through field reconnaissance, desktop analyses, and interagency coordination, he identified regulated waters, documented ecosystem functions, investigated the presence and absence of threatened and endangered species habitats, and compiled supporting reports and narratives for the Final Environmental Impact Statement (FEIS). His efforts ensured that proposed activities adhered to U.S. Army Corps of Engineers (USACE) and North Carolina Department of Environmental Quality (NCDEQ) standards. By integrating hydrologic and ecological considerations, Mr. Cushman helped shape a Comprehensive Relicensing Agreement (CRA) establishing a 40-year license term, balancing hydropower generation with environmental stewardship and securing the necessary regulatory approvals.

Newberry County Airport (EOE), SC, Runway Development Alternatives Analysis and Environmental Assessment
Conducted initial scoping and fieldwork to support the environmental assessment for proposed runway development alternatives at Newberry County Airport (EOE). Evaluated potential environmental constraints and regulatory considerations to guide project planning and compliance with NEPA. Field assessments focused on wetlands, hydrology, wildlife habitats, and surrounding land use to identify potential impacts on natural resources. Assessed development alternatives for feasibility, considering airspace constraints, land use compatibility, and mitigation requirements. Coordinated with FAA, SCDHEC, and local stakeholders to align environmental review with federal, state, and local regulations. Identified key impact areas, including water resources, noise, socioeconomics, and cultural resources, to inform decision-making and ensure regulatory compliance.

Tennessee Valley Authority (TVA) Groundwater Corrective Action PEA
Supported preparation of a Programmatic Environmental Assessment (PEA) to assess groundwater corrective actions needed to address groundwater protection exceedances at TVA fossil sites across the Tennessee Valley. The PEA evaluated five alternatives: No Action, In Situ Treatment Technologies, Ex Situ Treatment Technologies, Monitored Natural Attenuation, and Combination of Corrective Actions. Analysis covered 17 resource areas including air quality, aquatic ecology, groundwater, surface water, and environmental justice. Coordinated environmental review requirements under NEPA while ensuring alignment with federal CCR Rule standards and state regulatory frameworks in Tennessee, Alabama, and Kentucky.

Mitigation Banking Instruments, Southeastern US
For multiple mitigation banks, Mr. Cushman provided critical leadership and technical expertise in the development and implementation of Mitigation Banking Instruments (MBIs) across various watersheds, ensuring alignment with regulatory requirements under the Clean Water Act (CWA) Section 404 and the National Environmental Policy Act (NEPA). His work involved conducting baseline environmental assessments, including wetland delineations, hydrology evaluations, soil profiling, and vegetation surveys, to establish site conditions and identify opportunities for ecological restoration and enhancement.
Using GIS-based desktop analyses, Mr. Cushman evaluated hydrology, land use, and ecological constraints, followed by extensive field reconnaissance to verify findings and confirm site suitability. He oversaw the preparation of environmental documentation required to meet NEPA compliance, such as Environmental Assessments (EA) or relevant technical reports that analyzed potential impacts to wetlands, water resources, and habitats. These efforts were integral to ensuring that restoration plans addressed both direct and cumulative impacts in accordance with NEPA standards.
Mr. Cushman developed hydrological monitoring plans to measure seasonal water fluctuations and validate the feasibility of proposed restoration strategies.
Restoration plans targeted hydrological reconnection, wetland and stream enhancements, native vegetation planting, erosion control, and habitat improvements.
Functional assessment tools, such as the Hydrogeomorphic Method (HGM), were used to quantify ecological uplift and calculate credit generation potential to offset impacts to aquatic resources.
His responsibilities also included preparing and submitting CWA permit applications, which featured comprehensive site maps, baseline environmental conditions, and detailed mitigation strategies. Mr. Cushman ensured these submissions aligned with NEPA's environmental review process by incorporating findings that demonstrated ecological benefits while mitigating adverse impacts. He further developed long-term adaptive management and maintenance plans, including invasive species control, hydrological monitoring protocols, and reporting requirements to support regulatory compliance.
The mitigation banks Mr. Cushman directly supported include: **Catawba Mitigation Bank** – Catawba River Watershed, South Carolina, C**ooper River Mitigation Bank** – Charleston County, South Carolina, **R&M Plantation Mitigation Bank** – Berkeley County, South Carolina, and **Jumping Jay Mitigation Bank** – Rome, Georgia.
Mr. Cushman’s leadership ensured that all projects adhered to NEPA standards, USACE guidelines, and state regulatory frameworks. His work not only facilitated regulatory approvals but also maximized ecological uplift and long-term sustainability, advancing

wetland conservation and restoration goals across the region.

Scout Motors/Project Connect Mitigation Plan, Blythewood, SC
Mr. Cushman reviewed and finalized mitigation plans for the 1,620-acre Scout Motors electric vehicle manufacturing facility in Blythewood Industrial Park. He assessed the Draft Environmental Impact Statement (DEIS) and Permittee-Responsible Mitigation Plan (PRMP) to ensure compliance with Clean Water Act Sections 401/404 and South Carolina DHEC water quality standards and combined multiple documents into a finalized comprehensive report for submittal to the SC Dept of Commerce. The project addressed significant impacts to 73.637 acres of wetlands, 38.219 acres of ponds, and 38,152 linear feet of tributaries. Mr. Cushman refined mitigation strategies, drafted MBI permits, and developed supporting documents for the PRMP, aligning with sustainable development goals and regulatory requirements to advance project approvals.

Garnett Tract Permittee-Responsible Mitigation Project, Lower Savannah River Watershed, SC
Mr. Cushman served as Senior Project Manager for the development and agency approval of a 664-acre mitigation plan supporting the RiverPort development. Initial responsibilities included reviewing and editing the Environmental Impact Statement (EIS), Clean Water Act permit applications, and Threatened and Endangered Species Surveys. This Permittee-Responsible Mitigation Project (PRMP) addressed compensatory mitigation requirements while preserving critical habitats within the Lower Savannah River watershed.
Mr. Cushman played a pivotal role in designing habitat protection measures for the frosted flatwoods salamander, a federally endangered species. He developed long-term management protocols, including prescribed fire regimes to maintain ecosystem health and resilience. His coordination with surveyors, forestry contractors, and conservation specialists ensured timely and effective implementation of all project phases.

Piedmont Natural Gas Line 201, Greenville County, SC
Mr. Cushman led environmental permitting and siting assessment for a 17-mile natural gas pipeline corridor, managing interdisciplinary teams and coordinating with regulatory agencies. The project successfully balanced infrastructure needs with environmental protection requirements through optimized route selection.
He directed comprehensive environmental constraints analysis, developing innovative GIS modeling methodology for protected species assessment. His team created predictive habitat models integrating multiple ecological datasets, assessed 78 acres of diverse habitats across multiple jurisdictions, and identified 21 potential protected species locations requiring consultation. Through strategic planning, critical habitat was protected by relocating the pipeline to the existing SC Highway 290 corridor.

Starr-Iva Waterline Upgrades, Starr, SC
Mr. Cushman led the environmental evaluation and permitting process for the proposed 44,500-linear-foot (8.5-mile) right-of-way associated with the Starr-Iva waterline upgrades. This project, funded under the SC Rural Development, Rural Utilities Service's Water and Environmental Programs loan and grant initiatives, required compliance with the National Environmental Policy Act (NEPA).
As part of the project, Mr. Cushman conducted detailed assessments to identify potential environmental impacts, including effects on wetlands, protected species, and other ecological resources. He coordinated with local, state, and federal agencies to ensure adherence to NEPA requirements and to streamline the permitting process. The evaluation also addressed land use considerations, hydrology, and any necessary mitigation measures to minimize environmental disruption.
The project maintained compliance with regulatory standards, securing the approvals needed to advance critical water infrastructure improvements for the community. This work supported sustainable development goals while addressing the region's essential utility needs.

Anderson County Textile Mills Revitalization Initiative, Anderson County, South Carolina
As Project Manager and Technical Lead, Mr. Cushman directed a comprehensive environmental assessment

and revitalization planning program for three historic textile mills. This effort supported economic redevelopment while balancing environmental preservation and regulatory compliance. He coordinated extensively with stakeholders, including Anderson County Economic Development, the City of Anderson Planning Department, South Carolina DHEC, and EPA Region IV, to secure Brownfields funding and facilitate redevelopment efforts. He also coordinated the preparation of NEPA Environmental Assessment (EA) documentation for grant applications to both the EPA and HUD, supporting site cleanup and revitalization efforts.
In his technical leadership role, Mr. Cushman conducted Phase I/II Environmental Site Assessments, developed site investigation strategies, and coordinated multi-media sampling programs. He managed risk assessments, prepared remedial planning documents, and participated in redevelopment feasibility analyses. Throughout the project, he successfully navigated complex regulatory frameworks, including CERCLA/Brownfields requirements, State Voluntary Cleanup Programs, local development regulations, and historic preservation guidelines.
Mr. Cushman also facilitated stakeholder engagement by working with property owners, developers, local businesses, community organizations, and environmental contractors. His effective grant management resulted in the successful acquisition of Brownfields Assessment Grant funding and coordination of matching funds. These efforts led to the identification of viable reuse options, developer recruitment assistance, and significant contributions to local economic growth initiatives.

R-Area Acid/Caustic Basin (RAACB) Record of Decision, Savannah River Site, Aiken, SC
At the Department of Energy's Savannah River Site, Mr. Cushman led a multi-stakeholder environmental investigation and decision-making process for a RCRA/CERCLA unit. As Project Manager and Lead Author for the Record of Decision, he conducted field investigations and technical evaluations across multiple disciplines while coordinating with federal and state agencies to reach consensus on a remedial approach. He developed and implemented a comprehensive investigation strategy that included soil sampling, groundwater monitoring, and conceptual site model development. Deliverables included Work Plans, Risk Assessments, Site Investigation Reports, Statements of Basis/Proposed Plans, and the Final Record of Decision. He ensured strict compliance with DOE nuclear facility requirements while maintaining radiation protection and industrial hygiene controls.
The project successfully integrated regulatory frameworks, including RCRA Corrective Action, CERCLA, Clean Water Act, and state environmental regulations. Mr. Cushman's management of stakeholder engagement and regulatory coordination established precedents for similar facilities and achieved zero safety incidents throughout the project duration.

R-Area Reactor Seepage Basins (RARSB), Savannah River Site, Aiken, SC
Mr. Cushman contributed to the development of the Record of Decision (ROD) for the R-Area Reactor Seepage Basins and 108-4R Overflow Basin Operable Unit at the Department of Energy's Savannah River Site. His responsibilities included preparing technical content on the nature and extent of contamination, evaluating remedial alternatives in accordance with CERCLA and RCRA, and coordinating with stakeholders—such as DOE, US Environmental Protection Agency (EPA), and South Carolina Department of Health and Environmental Control (SCDHEC)—to finalize the selected remedy. By integrating field data, risk assessments, and regulatory requirements into the ROD, Mr. Cushman helped establish a long-term solution involving containment measures, institutional controls, and ongoing monitoring to protect human health and the environment.

Daniela Alviz

Ecologist III

Education
B.S. Environmental Studies, Florida International University, 2019
B.S. Interdisciplinary Studies (Focus on Engineering), Florida International University, 2019
M.S. Conservation & Biodiversity Use, Pontificia Javeriana, Bogota, Colombia, Present

Years of experience
6 years

Location
Orlando, FL

Training and certifications
Operations and Emergency Response (HAZWOPER), 29 CFR 1910.120
Wetland Delineation, Briggs Lab, 2022
American Red Cross CPR/AED/First Aid certification
GIS Certificate
Mine Safety and Health Administration (MSHA) Part 48b
Florida Stormwater, Erosion, and Sedimentation Control Inspector Certification

Areas of expertise
Wetland Delineation
Due Diligence
Wetland botany
Acoustic Bat Surveys
Kaleidoscope Software
T&E Species Surveys
Tree Surveys
TVA Wetland Rapid Assessment Method data forms.
Gopher Tortoise Permitting
Environmental permitting (Federal & State)
Environmental Assessments (EA)

Professional history

Daniela Alviz has extensive experience in research, regulations, and project-based experience in ecology, wetland restoration, botany (wetland, aquatic, and upland), herpetology, and conservation biology in the southeastern United States. Her project experience includes site assessment, threatened and endangered species surveys, and delineation of wetlands and surface waters federal and state rules., plant, bird, and herp identification, along with the environmental permitting that is a result of site findings. Additional experiences include aquatic and upland invasive plant management for the states of Florida, Alabama, Georgia and Mississippi, Gopher tortoise surveying and bucket trapping, and reptile tracking, capturing, euthanizing, and necropsying.

Selected project experience

*Experience with previous employers

Keystone Heights Airport, Federal Aviation Administration, Clay County, FL
Lead ecologist responsible for conducting wetland and threatened and endangered species surveys within the project boundary. Ecologist responsible for drafting the biological assessment and environmental assessment (EA) for the field findings. Lastly, provided planning, deployment, data processing, and reporting for an acoustic bat survey targeting tricolored bats.

Urban Grid, Spring Valley NEPA, Spring Valley, AL
Team lead for team of ecologists who conducted the wetland delineation and wildlife survey of a proposed 399-acre addition to the ongoing Spring Valley II Solar Project. Wetland surveys were conducted in accordance with USACE and Tennessee Valley Authority (TVA) regulatory guidelines (i.e., TVA Wetland Rapid Assessment Method data forms, USACE wetland delineation data forms.),

Space Florida/U.S. Space Force Near Term Wharf Environmental Assessment, Brevard County, FL
Lead ecologist responsible for conducting wetland and threatened and endangered species surveys within the project boundary. Also responsible for drafting the biological assessment and environmental assessment (EA) for the terrestrial portion of the project boundaries.

U.S. National Railroad Passenger Corporation/Amtrak, Sanford, Florida
Assisted with environmental permitting for the conversion of an open cut swale (open ditch) to culvert drainage pipe at Amtrak's station in Sanford, Florida.

U.S. National Railroad Passenger Corporation/Amtrak, Sanford, Florida
Assisted with providing federal and state environmental permitting services for a track expansion project.

City of Titusville, Fire Training Tower Tree Survey, Titusville, Florida
Lead field ecologist responsible for conducting a tree survey based on the City of Titusville Tree Ordinances for Tree Removal. Also responsible for analyzing the collected data and creating a technical report of the findings.

City of Kissimmee, Lancaster Ranch Park Phase II, Kissimmee, Florida
Ecologist responsible for planning and conducting wetland delineations for formal wetland determinations with the South Florida Water Management District and the jurisdictional determination from the U.S. Army Corp of Engineers. Additionally, provided planning and data collection assistance for tricolored and Florida bonneted bat acoustic surveys.

Orange Utilities Commission, St. Cloud West - Illahaw Tract, Osceola County, FL
Ecologist conducted a windshield survey for a new routing study. Surveys included threatened and endangered species, critical habitats, and wetlands. Assisted in writing the routing study report for the client to include all possibilities of environmental permitting based on the proposed activities.

Polk County, NE Polk Minor Projects, Florida
Lead ecologist responsible for planning and conducting extensive sand skink surveys, other threatened and

endangered species surveys, and wetland delineation alongside team members. Assisted with providing an environmental report outlining survey findings and possible environmental permitting necessary.

Confidential Owner, Formal Wetland Determination and Approved Jurisdiction Determination on Kennedy Still Lands for PCS Phosphate Mine Reclamation, Hamilton County, FL
Ecologist responsible for delineation of jurisdictional wetland boundaries on the approximately 1,616-acre Kennedy Still site in accordance with the rules of Florida Department of Environmental Protection (FDEP), Chapter 62-340, FAC. and the United States Corps of Engineers' (USACE) procedures outlined in the 1987 Corps of Engineers Wetland Delineation Manual and the associated Regional Supplement to the Army Corps of Engineers Wetlands Delineation Manual for the Atlantic and Gulf Coastal Plain.

Duke Energy Business Services, Duke SECO Industrial Loop 69kV Siting, Selma, Florida.
Scientist who played a crucial role in supporting the execution of route surveys and was instrumental in developing a comprehensive siting survey report. This report encapsulated the findings and insights derived from the surveys, providing valuable information to the client to inform their decision-making process.

Orange County Board of County Commissioners, Horizon West Regional Park, Orlando, Florida.
Ecologist conducted gopher tortoise wildlife surveys, relocations, excavations, and bucket trappings to support the development of a vision and implementation plan for a 220-acre regional park.

Orlando Utilities Commission, Taft to Convention Center Transmission Reconductor, Orlando, Florida.
Ecologist conducted wetland delineation, report writing, and environmental permitting application drafting to support the Orlando Utilities Commission (OUC) for the upcoming 230 kV 7-15 (25-26) 30 Transmission Reconductor, Taft to Convention Center in Orange County, Florida.

Adapture Solar Development LLC., Environmental Support for Proposed Solar Project, Spain, GA. Scientist responsible for leading one of two teams conducting wetland delineation and jurisdictional determinations. Delineation was conducted based on USACE and Georgia Department of Natural Resources Environmental Protection Division regulations.

Confidential Owner, WSA 2023 Water Level Monitoring, White Springs, FL.
Wetland scientist assisted in conducting monthly well monitoring surveys for the client, which included an annual report analyzing the data collected for the client.

Confidential Owner, Zeus Cable Landing Permit Feasibility Study, Orlando, Florida. Scientist who assisted in drafting a permit feasibility study report concerning the landing of cables off the coast of Spain. Contributions were pivotal in evaluating the feasibility of the project, ensuring all regulatory and environmental considerations were meticulously addressed to support the client's objectives.

Lake Nona Wetland Delineation and Wildlife Surveys (including Bald Eagle Nests and Gopher Tortoise Surveys) in Orange and Osceola Counties, FL. Scientist responsible for planning, leading, and completing various gopher tortoise surveys through Central East Florida. Responsible for assisting in the completion of gopher tortoise relocation (on-site and offsite) applications through the FWC Permitting website. Responsible for planning and assisting with the trapping and relocation of approved FWC Gopher Tortoise Permits under an FWC Authorized Gopher Tortoise Agent.

St. Lucie County Board of County Commissioners, Environmental Support for Airport Tailwind Drive Extension, Port St. Lucie, FL.
Ecologist conducted gopher tortoise wetland surveys, applied for gopher tortoise permits, bucket trapping, and relocated as part of the extension of Tailwind Drive at the Treasure Coast International Airport in St. Lucie, Florida. These services were carried out within the framework of a multi-year task order contract.

City of Titusville, Environmental Support for Barna Elevated Storage Tank Demolition, Titusville, FL. Scientist led the team in conducting gopher tortoise surveys for relocation and assisted with bucket trapping for gopher tortoise relocations in support of the storage tank demolition.

Naval Submarine Base Kings Bay, Wetland Mitigation Monitoring, Kings Bay, GA. Scientist responsible for helping create a baseline monitoring for a recently graded tidal wetland with newly planted seedlings for mitigation. Post-survey, the Army Corps of Engineer requires a baseline monitoring report showing the findings from the data collected on site, including percent cover on mapped transects and photo-documentation station photo logs.

Space Florida, Formal Wetland Delineation for Launch and Landing Facility Block 6 at the John F. Kennedy Space Center, Brevard County, FL. Scientist responsible for helping to delineate the landward extent of jurisdictional wetlands and other surface waters. Jurisdictional wetlands and surface waters are being delineated in accordance with state wetland delineation methodologies defined in Chapter 62-340.300(2), Florida Administrative Code. The delineation will be reviewed by the St Johns River Water Management District (SJRWMD) and once approved, the formal determination is a legally binding determination of the landward extent (boundaries) of wetlands and other surface waters.

Adapture Solar Development LLC., Frisco and Magnolia Energy Center, Monroe County, MS. Part of a team of scientists who conducted the wetland delineation and wildlife survey of two potential solar energy centers totaling approximately 1900 acres. Wetland surveys with conducted in accordance with USACE and Tennessee Valley Authority (TVA) regulatory guidelines.

National Park Service Big Cypress National Preserve Hydrologic Restoration Master Plan, Collier County, FL. Scientist responsible in aiding the completion of the wetland statement of findings including calculations related to the Uniform Mitigation Assessment Method.

***Confidential Company's Distribution and Transmission Sites, Environmental Assessments and Permitting, Central Florida.** Staff scientist for various Environmental Assessments (EA) for replacement, installation and upgrades to existing alignments and installation of new alignments. Conducted wetland delineations; threatened and endangered species assessments and surveys; and processed and tracked applications for state and federal environmental permits, including archeological/historical coordination with the State Historic Preservation Office and Tribal Historic Preservation Office when required.

***Confidential Limestone Mine, Remediation and Restoration, Crystal River, FL.** Assisted with the ongoing planning, monitoring, and maintenance of FDEP and USACOE wetland mitigation projects on the mine site, including the creation of a 14-acre avian refuge island, restoration of a pine flatwoods system post-logging, and the planning of a 44-acre marsh system within reclaimed mined areas. Provide on an on-going basis environmental compliance services including annual environmental monitoring reports and environmental permit compliance visits with regulatory staff.

***Confidential Client, Florida bonneted bats survey, North Port, FL.** Served as staff scientist to conduct endangered and protected species monitoring for Florida bonneted bats (sunset roost visual survey) and Florida scrub-jays (call and listen back during the day).

***National Park Service, Wetland Restoration for Everglades National Park's Hole-in-the-Donut Mitigation Bank, Homestead, FL.** Served as Biological Science Technician for the mitigation bank with roles including plant community monitoring data collection, treatment of invasive species, creation of GIS and spatial vegetation maps from data collected from visual monitoring and GPS data (Garmin, Trimble), and the analysis of monitoring data in relation to the success of the restored sections to send to the mitigation bank permitting entities (USACE, FDEP).

***Florida Fish and Wildlife Conservation Commission (FWC), Southeast Florida Aquatic and Upland Invasive Plant Manager, Southeastern FL.** Served as manager for FWC's southeast region invasive plant management (IPM) division. Roles included: monitoring and surveying upland and aquatic native and invasive plants in state-owned lands and surface waters; hydrology monitoring after herbicide treatments, leading presentations and public meetings related to invasive plant management plans; submitting herbicide treatment plans for regional waters to IPM leaders for comment and approval, Plant surveys were conducted on airboat, outboard boats, UTVs, ATVs, Swamp buggees, and truck. Maps and vegetation monitoring was done with GIS, Google Earth, GPS units (Garmin), and wildlife trail cameras.

***FWC Annual Fish Survey, Okeechobee, Palm Beach, and St. Lucie Counties, FL.** Assisted FWC's Fisheries division with their annual fish monitoring and health survey. The data was collected through electroshock and catch-and-release at various designated points within state-owned lakes and rivers. The fish were identified, counted, and released within a specified period.

***United States Geological Survey (USGS) Invasive Reptile Research within Everglades National Park, Homestead, FL.** Served as an intern biological science technician for USGS's Burmese python and Argentine black and white Tegu research projects including: (Scout Snake Project) capturing male snakes for radio transmitter implant, tracking the project snakes, and taking biometric data; nighttime road cruising to capture Burmese pythons under the Authorized Agent program; Tegu camera trapping: processing camera's captured images and identifying wildlife species within the images, checking and resetting the cage traps, capturing any trapped tegus, euthanizing the captured tegus; reptile necropsies for biometric data collection.

***National Park Service, Surface Water Quality Monitoring for Everglades National Park, Homestead, FL.** Activities included surface water sampling and chemical analysis of Florida Bay and connecting brackish water canals and rivers. Sampling activities also included sediments for chemical analysis, grain size distribution, turbidity monitoring and nutrients.

Cameron Wyse

Biologist II

Education
BS / Biology /
University of Louisville

Years of Experience
With AECOM: 4
With Other Firms: 1.5

Licenses / Registrations
Wetland delineation certified

Summary

Mr. Wyse is an Environmental Scientist in AECOM's Charleston, South Carolina office. He has worked in AECOM's Environmental Consulting group since June of 2021.

Mr. Wyse's experience includes assisting with and conducting wetland delineation and biological studies throughout the Ohio river valley region and surrounding states (Ohio, Indiana, Illinois, Kentucky, Michigan, West Virginia, Pennsylvania). After 2 years of working out of the Cincinnati, Ohio office he transferred to the Charleston, South Carolina office. Since joining the Southeast region group, he has worked on various projects in Mississippi, Alabama, South Carolina, North Carolina, Georgia California, and Virginia. He has 4 years of experience in wetland delineation on various projects including proposed pipelines, power transmission lines, wind turbine farms, solar farms, and nuclear sites.

Core responsibilities include habitat assessments, stream and wetland delineations in various states using the following data sheets: (Stream forms-QHEI, HHEI, KY RBP, NCDWQ, Wetland forms-USACE, ORAM, MIRAM, TRAM). Generating wetland reports from previously completed field work. Completing AJD/PJD requests and submitting for corps approval. Conducting background desktop reviews for various types of projects. A summary of work experiences and projects completed with current project work and experience with previous employers has been provided below.

Summary Project Experience

*TVA Specific Work-Alabama

Field personnel responsible for habitat assessments and stream/wetland delineations at the proposed Spring Valley II solar site near Muscle Shoals Alabama. Post field work responsibilities included GIS data quality assessment and quality control (QA/QC) on field data, as well as preparing the habitat assessment reports and wetland delineation report.

Solar Projects – Alabama, Georgia, Indiana, Illinois, and Mississippi
Field personnel responsible for stream and wetland delineations and assessment, habitat assessments, GIS data quality assessment and quality control (QA/QC), and ecological report preparation to be utilized for design avoidance of sensitive ecological resources and waterway and construction permitting.

Electric Transmission Projects– Indiana, Kentucky, North Carolina, and Ohio
Field personnel responsible for stream and wetland delineation and assessment, habitat assessments, GIS data quality assessment and quality control (QA/QC), ecological report and AJD/PJD preparation.

Natural Gas Pipelines – Ohio, West Virginia & Kentucky
Conducts wetland presence/absence assessments and delineations for proposed natural gas pipeline projects. Mr. Wyse assists with the reporting, threatened and endangered species clearance, and Clean Water Act permitting.

Ohio Department of Transportation Projects – Ohio
Assisting in mussel recon surveys as well as stream and wetland delineations to support ODOT projects throughout the state of Ohio. Generating reports and assisting with permitting for Bridge and road resurfacing projects.

Nuclear Power Plants–Illinois
Field personnel responsible for stream and wetland delineations and assessment, habitat assessments, GIS data quality assessment and quality control (QA/QC), and ecological report preparation.

Critical line/ tidal wetland delineations– South Carolina, and Virginia
Field personnel responsible for assisting in critical line delineations and mean high tide determinations in support of various projects.

Construction Monitor- Ohio, and North Carolina
Responsible for performing post construction revegetation monitoring and reporting on an upgraded transmission line in Southeastern Ohio. Eagle monitor for the shutdown/restoration phase of the Atlantic Coast Pipeline project in North Carolina. Responsible for determining raptor presence in the area and monitoring field crews as they worked.

Herpetology Survey-Illinois
Implemented both a coverboard survey and an auditory survey to establish the baseline presence of herp species (amphibians and reptiles) at a site in Illinois prior to restoration efforts. Field personnel responsible for gathering the data during the field visits as well as generating reports with the data to assist with future restoration decisions at the site.

FEMA and USACE-California
Field personnel responsible for nesting bird surveys in support of the clean up efforts for the Palisades and Eaton fire areas in Los Angeles California.

Kate Melanson, PhD

Ecologist III

Education

- PhD, Ecology and Evolutionary Biology (EEB), University of California Santa Cruz (UCSC), 2018
- MA, EEB, UCSC, 2015
- BA, Biology, Oberlin College, 2012

Years of Experience

- With AECOM: 2 years
- In Government: 3 years
- In Research: 9 years

Trainings and Certifications

- US EPA Watershed Academy Water Quality Standards Course (2022)
- California Environmental Quality Act (CEQA) Training (2019)
- OSHA 24-hour HAZWOPER Certified (2017)
- Scientific Diver (AAUS) (2014)

AECOM Professional Development

- AECOM Sustainable Legacies Academy ESG Embedded (2025)
- AECOM Accelerate Career Development (2024)

Areas of Expertise

- Environmental Impact Statements (Biological and Natural Resources)
- Agency Consultations (NOAA) and Permitting
- Environment, Society and Governance (ESG)
- Marine and Coastal Ecology
- Science Policy and Communication

Professional Affiliations

- National Association of Environmental Professionals
- American Association for the Advancement of Science (AAAS)

Awards and Honors

Competitive Fellowships: AAAS Science and Technology Policy Fellow (2020-2022); California Sea Grant State Policy Fellow (2019-2020)

Scholarships and Grants: Wells Fargo Coastal Sustainability Fellow (2017);

Summary

Kate Melanson, Ph.D., is an ecologist with a background in research, science policy, and science communication. She has experience with creating deliverables for interagency groups, congressional reports, and has internal knowledge of both state and federal government. Her environmental consultation experience includes National Environmental Policy Act (NEPA) compliance with subject matter expertise for natural resources, especially coastal, marine, and biological subject matters. Her experience also includes work on environmental impact statements, scoping reports, public comment organization, agency consultation letters, permitting planning, and administrative record keeping, all of which concern creating client-facing deliverables on time and on task. Kate's experience covers multiple sectors including oil and gas, solar, telecommunications, and more. In all projects, Kate continually applies her knowledge of the Endangered Species Act (ESA), Marine Mammal Protection Act (MMPA), Migratory Birds Treaty Act (MBTA), Coastal Zone Management Act (CZMA), NEPA, and the Clean Water Act (CWA). Her field work experience spans fresh to saltwater bounds, and includes biodiversity surveys, habitat restoration, long-term monitoring, and other sampling work and methods.

Field Experience

Black Abalone Recovery. Channel Islands, California. (2014-2018) Conducted primary research on conservation, disease ecology, climate change, and policy and sustainability after a disease event depleted a large amount of the black abalone population in the Channel Islands, off the coast of Santa Barbara California. Established population size sampling and habitat evaluation. Performed rigorous statistical analyses to find patterns to inform future conservation and restoration efforts. Planned week-long research trips, with multiple legs, to remote locations as well military and air-force bases, solving logistical, security, and paperwork issues.

Partnership for the Interdisciplinary Study of Coastal Oceans (PISCO). California. (2014-2018) Performed physically demanding long-term monitoring surveys in the intertidal zone on a schedule dictated by the tide schedule, sometimes working at 2:30 am on multiple days to collect data, or backpacking 19 miles with research equipment to get to remote sites. Part of a west-coast network that recorded biodiversity data for multiple uses. Required extensive knowledge of invertebrate and algal species identification.

Endangered Species Emergency Response. Big Sur, California. (2016) Participated in experimental out-planting of endangered species (black abalone) and emergency recovery efforts at landslides throughout California, transplanting of individuals to available sites with suitable habitat.

Sea Star Wasting Sampling. California. (2013-2015) Assisted in counting affected organisms in the intertidal zone and taking samples of individuals exhibiting wasting disease to be sent to labs across the world.

Elephant Seal Weaner Weighing. Ano Nuevo, California. (2014) Helped to perform weight assessments on recently weaned elephant seals to help determine nutrients gained and examine adult female and male behavior. Assisted in tagging, weighing and blood samples.

Sea Turtle Monitoring Program. Sanibel Captiva Conservation Foundation. Sanibel, Florida. (2013) Volunteered to monitor and mark sea turtle nests, crawls, and hatchings along the beaches of Sanibel and Captiva Island.

Sea Turtle Research and Conservation Program. Mote Marine Laboratory. Sarasota, Florida. (2012) As a research intern, monitored and marked turtle nests along 35 miles of Florida's west coast. Excavated and recorded the state of turtle nests for research purposes. Performed data entry and organizational tasks in lab.

West Nile Virus Disease Ecology. Oberlin, Ohio (2011) As part of a college course, designed and conducted an original research project on potential West Nile Virus carrier mosquito, *Culex*

Seymour Marine Discovery Center Grant (2014)

Awards: Pacifica Beach Coalition Star of the Sea Award (2018); Editor of Biology category winning Science Dance Your Ph.D. video contest (2017); Honda Scholar Athlete Award (2012)

Additional Training

Leadership and Management:

- Introduction to Program Evaluation
- Navigating Difficult Confrontations Workshop
- NOAA Planning and Facilitating Collaborative Meetings Training
- Community Engagement Training
- Alda Center's Women in STEM Leadership Program (WiSLP)
- UC, Santa Cruz Graduate Student Leadership Certificate Program

Communication:

- Story Collider workshop
- Story District: Storytelling 101
- COMPASS Science Communication Training
- AAAS Science Communication Training

Policy and Governance:

- Government Affairs Institute at Georgetown University's Executive-Legislation Branch Relations
- Policy Analysis, Implementation, and Evaluation
- Helping Science Inform Policy Workshop

Publications

Crandall, et al. *Best practices: social research methods to inform biological conservation*. Australasian Journal of Environmental Management. January 2018.

pipiens' preference of blood meal between bird species, in a lab setting after capturing birds using mist nets.

Loxahatchee River District WildePine Ecological Lab. Jupiter, Florida (2010-2011) Collected data on kayaks and snorkeling to map sea grasses in the Loxahatchee River and Intracoastal waterway determine what areas sea grasses grew and help track the health of the river. Also took water quality readings at various locations using Secchi disks, hydrolab equipment, turbidity, pH, and other chemical readings and measurements. Participated in oyster reef restoration projects, creating settling areas to be monitored and oyster spat counted to track success in the restoration of the watershed.

Grey squirrel call monitoring. Oberlin, Ohio (2011) As part of a college course, designed and executed an experiment in which grey squirrel response level was measured in relation to allopatric and sympatric species alarm calls.

Sea Turtle Monitoring. D.B. Ecological. Palm Beach, Florida (2010) Recorded number of sea turtle crawls, nests and false crawls for state records and conservation purposes, needing to identify different species markers. Examined nests for hatchling mortality and survival.

Loggerhead MarineLife Center. Juno Beach, Florida (2007-2008) Assisted in rehabilitation work for sea turtles, weighing, feeding and help administer medicines. Lead tours and helped act as docent for visitors of the center.

Teaching Field Experience

Lead Marine Botany Lab Instructor. Santa Cruz, California. (2015-2018) Weekly algal collection in precarious habitat requiring extensive identification. Created practical examinations, designed laboratory lesson plans, and gave lectures, in addition to being responsible for grading and multiple field assignments.

California Ecology and Conservation Instructor. California. (2018) Led students during immersive field course, including a 50-day University of California campus-wide course requiring constant travel in addition to helping students write research papers, do research projects, and gain practical field experience in multiple ecosystems, including deserts, intertidal, temperate rainforest, and oak-dominated shrub habitats. Was able to learn identification along with students to assist in sampling, including night-time bee and scorpion counts.

Field Ecology Mini-Course. California. (2016-2017) Taught first-year and transfer students with no experience in field courses, camping and hiking, to do rapid research projects in different environments, completing many projects on small mammals and capturing species.

Field Ecology Semester. Cosica, France. (2014) One of two teaching assistants during a month-long class abroad in Corsica, France performing marine research, including creating trusting relationships to perform studies while scuba divining. Scientific diving certification allowed Kate to go into the field and help students with projects such as fish tagging, sea grass bed health evaluation, and octopus capture for prey studies.

Hanna Panagrossi
Ecologist I

Education
B.A. Environmental Studies and Animal Studies, Minor in Coastal Management
Eckerd College, 2024

Years of experience
1.5 years

Location
Tampa, FL

Training and certifications
USACE Permitting
American Red Cross CPR/AED/ certification
Mine Safety and Health Administration Part 48b
Florida Stormwater, Erosion, and Sedimentation Control Inspector (FSESCI) Certification
FWC- Scoping a Burrowing Owl
FWC- Excavating a Burrowing Owl

Areas of expertise
Wetland Delineation
T&E Species Surveys
Gopher Tortoise Surveys/Permitting
Environmental Permitting (Federal & State)
Report Writing

Professional history

Hanna Panagrossi has experience in regulations and field surveys in ecology, wetland restoration, botany (wetland, aquatic, and upland), and species identification in California, Georgia, Mississippi, Alabama, North Carolina and Florida. Her project experience includes site assessments, threatened and endangered species surveys, delineation of wetlands and surface waters under federal and state jurisdiction, plant, bird, and herp identification, along with the environmental permitting that is a result of site findings. Additional experiences include aquatic and upland invasive plant management for the state of Florida, Gopher tortoise surveying and bucket trapping, burrowing owl excavation and scoping, and stormwater, erosion, and sedimentation inspections.

Selected project experience

*Experience with previous employers

Charlotte Airport, Charlotte, North Carolina, Wetland Delineation

Ecologist assisting in the field delineation of multiple areas of interest within the Charlotte Airport campus. Job tasks include collecting field data using a handheld GPS device, flagging points of interest, reading soil profiles, and compiling upland, wetland, and stream data for future permitting use.

Florida Gas Transmission, Alabama and Mississippi, Site Assessment for Environmental Impacts

Ecologist assisting in the review of four anomaly dig locations along a gas pipeline running through Alabama and Mississippi. Job tasks include assessing the site for existing wetlands, surveying for the gopher tortoise and any federally listed species that may be present in the area, and assisting in the assessment for environmental impacts and permitting recommendations.

Space Florida, Cape Canaveral, Florida, Terrestrial Biological Assessment and Environmental Assessment

Ecologist leading the written report of a terrestrial biological assessment (BA) for Space Florida. Job tasks include writing and editing a biological report based on the field notes provided by the field personal and desktop review generated by online research including IPaC, FNAI, and FWC resources. The written report was ultimately approved for submittal by the client. After the submittal of the BA, the client requested an environmental assessment report for federal permitting. This task was completed and submitted for approval.

Nutrien, Vegetation Release, Hamilton County, Florida

Ecologist assisting on a vegetation release for reclaimed wetlands up for monitoring release at Nutrien phosphate mine in Hamilton County. Job tasks include walking transects and utilizing airboats to access monitoring sites to count and identify plants, record inundation depth, and observe wildlife within a 30-foot radius of marked GPS points using FDEP's 3-1 forms to collect data. Data was then analyzed and a report was written to determine if criteria for release has been met.

Confidential Client, Project Zeus Margarita, Pre-construction Nest Monitoring, LaGrange, Georgia

Ecologist assisting in pre-construction nest surveys for a private client in LaGrange, GA. Job tasks include walking pedestrian transects to collect data on active and inactive nests based on the location of bore holes. The data was collected, and a tech memo was submitted based on the data collected in field.

Imperial Irrigation District (IID), Burrowing Owl Population Study Phosphate, Coachella and Imperial Valley, California

Ecologist leading teams of three in a burrowing owl population study through rural and agricultural areas in Coachella and Imperial Valley, CA. Job tasks include planning survey routes, collecting GPS data including temperature, wind, signs of owl presence, and hazards. Data collection was used to evaluate the stability of the burrowing owl population within the region.

Nutrien, Wetland Monitoring Phosphate Mine Reclamation, Hamilton County, Florida
Ecologist assisting on a bi-annual monitoring event for 987-acres of reclaimed wetlands in Hamilton County. Job tasks include walking transects and counting and identifying plants, recording inundation depth, and observing wildlife within a 30-foot radius of marked GPS points.

Confidential Client, Project Zeus Margarita, Wetland Delineation and T&E Survey, LaGrange, Georgia
Scientist who played a crucial role in supporting the execution of a wetland delineation and T&E survey for a 421-acre parcel, followed by the execution of a draft wetland report. The report was derived from findings taken during the delineation to describe the sites hydrology, soil composition, and species make-up. The report also included the determination of USACE jurisdictional-and non-jurisdictional streams and wetlands which was supported by research and follows the guidelines of USACE *Wetland Delineation Manual and Regional Supplements to Corp Delineation Manual: Eastern Mountains and Piedmont Region.* During the T&E Survey the scientist discovered a Georgia State T&E, the Piedmont blue borrower and identified it as such using a dichotomous key. Regulations were researched to follow protection guidelines in place for this T&E.

Florida Gas Transmission, Tree Survey, Tallahassee, Florida
Ecologist assisting in the identification and diameter breast height, canopy cover, and height measurement of upland tree species along the project area which consisted of over 400 individual trees along a gas pipeline. The project also required the assistance of building an excel spreadsheet to automatically sort and categorize trees that fit within the four categories of credit and debit trees in accordance with the City of Tallahassee's tree regulations.

Airglades Airport, Burrowing Owl Excavation, Clewiston, Forida
Ecologist assisting in the mechanical excavation and collapse of multiple burrowing owl burrows within the project area located adjacent to the landing strip of Airglades Airport under a valid Burrowing Owl Agent license.

Nutrien, Wetland Delineation, Phosphate Mine, Hamilton County, Florida
Scientist assisting in the delineation of 400 acres of previously logged and mined pine and phosphate plantation. This delineation culminated over a two-week period and presented as a highly disturbed wetland with few indicators present on site.

***Bayonet Gardens, Gopher Tortoise Survey, Permitting, and Excavation, Polk County, Florida**
Scientist led the field survey and permitting efforts for a Conservation permit through Florida Fish and Wildlife Services (FWC) under a valid Gopher Tortoise Agent license and assisted with the mechanical excavation of over 45 burrows on a 30-acre parcel. Permitting efforts consisted of a report demonstrating the results of the field survey, recommendations for relocation, and the successful submittal of a Conservation permit. The project resulted in the successful capture and off-site relocation of eleven adults, two sub adult, and two hatchling Gopher tortoises.

***Wetland Delineation and Permitting on Mizell Ave, Arcadia, Florida**
Scientist that led the informal delineation, permitting and formal determination for a 5-acre highly disturbed wetland. The project area had very few indicators present to provide strong evidence for an accurate line, but proved to be accurate during the Southwest Florida Water Management District's (SWFWMD) visit to finalize the line. The permitting process included an application for a Petition of a Formal Determination of the Extent of Wetlands and Other Surface Waters. The permit was comprised of a wetland narrative, multiple historical and current aerial photos, a draft of the informal wetland line, and official records of property ownership and access authorization. The petition for a formal determination was ultimately approved.

***Pennoni, Wetland Delineation and Permitting on Dundee Rd, Winter Haven, Florida**
Scientist that led the informal delineations, permitting and formal determination through SWFWMD. The site consisted of 3 acres of highly disturbed land that was comprised of only invasive reed species and had been previously filled with dirt brought in from off-site. Few indicators were present to indicate an obvious wetland line but was proven to be accurate during the formal determination with a SWFWMD agent. The permitting process included an application for a Petition of a Formal Determination of the Extent of Wetlands and Other Surface Waters. The permit was comprised of a wetland narrative, multiple historical and current aerial photos, a draft of the informal wetland line, and official records of property ownership and access authorization. The petition was ultimately approved.

***Advanced Communication Technology, Verizon Ocala Gopher Tortoise Survey in Ocala, Florida**
Scientist led the team in conducting gopher tortoise surveys for relocation as well as client communications to find a solution that would best suit the client and follow FWC regulations. Results from the field survey determined that three of the active borrows would need to be bucket trapped and two of the burrows could be mechanically excavated under a "10 or Fewer Burrows" through FWC with on-site relocation. A report was included in client communications that outlined a recommended plan for relocation supported by figures created by the scientist to show burrow locations, activity status, and suitable habitat.

***Firethorn, Inc., Weekly Stormwater and Discharge inspection in Sarasota, Florida** Inspector responsible for weekly stormwater, sediment, and erosion inspections of an active construction site. All inspections were required to be completed once a week o4 within 24 hours of a sizable rain event yielding 0.5 inches of rain or more. Inspections were to determine any violations of

Florida's stormwater, erosion, and sediment control regulations. Some violations seen on site included the illegal discharge of stormwater into protected wetland areas, erosion of stream banks, mis-maintenance of silt fences and stocked supplies, and inappropriate turbidity control. All inspections were turned into the client within four hours following the inspection and included maps showing the locations of all violations and a violation form outlining the violation accompanied by photographs of the violation areas.

***Florida Department of Environmental Protection, Pitcher Plant Survey for Yellow Marsh Preserve in Pensacola, Florida** Scientist responsible for assisting in field survey of the endangered red, white, and hybrid Pitcher plant. The survey included pedestrian transects through ten acres of marsh beds to locations that were previously recorded to have pitcher plants. Data on species type, density, and health was recorded and compiled. This data was then delivered to the state agency to track overall population within the preserve.

*Project that occurred under the management of a different company