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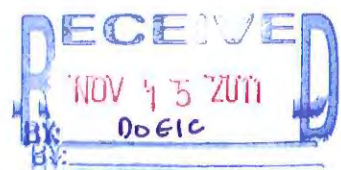


Environmental Study Report

**Proposed 69-kV Delivery Point
Horizon Center,
Oak Ridge, Tennessee**

**BECHTEL JACOBS COMPANY LLC
OAK RIDGE ENVIRONMENTAL
MANAGEMENT CLEANUP CONTRACT
WITH THE UNITED STATES
DEPARTMENT OF ENERGY**

BJCF-4 (10/08) Rev. 4



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BJC/OR-3567

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Proposed 69-kV Delivery Point
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Date Issued—April 2011

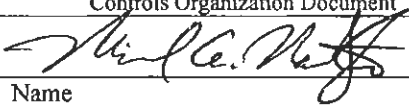
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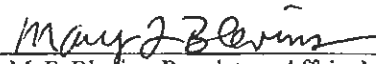


Prepared for the
U. S. Department of Energy
Office of Nuclear Fuel Supply

BECHTEL JACOBS COMPANY LLC
managing the
Environmental Management Activities at the
East Tennessee Technology Park
Y-12 National Security Complex Oak Ridge National Laboratory
under contract DE-AC05-98OR22700
for the
U. S. DEPARTMENT OF ENERGY

APPROVALS

Environmental Study Report Proposed 69-kV Delivery Point Horizon Center, Oak Ridge, Tennessee	BJC/OR-3567 April 2011
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USQD Review Determination	<input checked="" type="checkbox"/> USQD <input type="checkbox"/> UCD <input type="checkbox"/> CAT X <input type="checkbox"/> Exempt (Select Criteria below.) USQD/UCD/CAT X No.: <u>USQD-MS-ENVRPTS-0816</u>	
Exemption Criteria	<input type="checkbox"/> (1) Non-Intent Change <input type="checkbox"/> (2) DOE-Approved Document <input type="checkbox"/> (3) Clearly no impact on Nuclear Facilities <input type="checkbox"/> (4) Chief Financial Officer, Internal Audit, Labor Relations, Legal, Public Affairs, or Project Controls Organization Document	
USQD Preparer:	 Name	<u>4/14/11</u> Date
Exhibit L Mandatory Contractor Document	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (Requires review by the Proforma Change Control Board.)	
PCCB Reviewer:	Name	Date

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ACRONYMS

ARAP	Aquatic Resources Alteration Permit
BMP	best management practice
BORCE	Black Oak Ridge Conservation Easement
CROET	Community Reuse Organization of East Tennessee
CWA	Clean Water Act of 1972
DOE	U. S. Department of Energy
EA	Environmental Assessment
EFPC	East Fork Poplar Creek
ETEC	East Tennessee Economic Council
EO	Executive Order
GPS	Global Positioning System
IDB	Industrial Development Board
kV	kilovolt
MAP	Mitigation Action Plan
NA	Natural Area
ORED	Oak Ridge Electrical Department
ORR	Oak Ridge Reservation
ROW	right-of-way
TDEC	Tennessee Department of Conservation
TN-EPPC	Tennessee Exotic Pest Plant Council
TVA	Tennessee Valley Authority
TVARAM	Tennessee Valley Authority Rapid Assessment Method
TWRA	Tennessee Wildlife Resources Agency
USACE	U. S. Army Corps of Engineers

EXECUTIVE SUMMARY

This report describes the environmental resources within the project corridor of a proposed 69-kilovolt (kV) transmission line delivery point in Roane County, Tennessee, that would provide electricity to Development Parcel 5 at the Horizon Center (also referred to as Parcel ED-1). The Oak Ridge Electrical Department (ORED) proposes to construct the new 69-kV delivery point from the ORED substation on Blair Road to Development Parcel 5. The proposed transmission line will extend approximately 0.74 mile on a 50-ft right-of-way (ROW).

On February 8, 2011, a field survey was completed of the proposed ROW. The survey identified several aquatic, botanical, terrestrial, and wetland resources in or adjacent to the proposed transmission line ROW.

Aquatic resources included crossings on Poplar Creek, East Fork Poplar Creek (EFPC), two unnamed tributaries to EFPC, and a wet weather conveyance. Two wetlands were identified near the proposed ROW, including one on EFPC and one on an unnamed tributary to EFPC. Both wetlands exhibited moderate to superior wetland condition and provision of wetland functions. Roughly half of the proposed ROW is within the 100- and 500-year floodplains of EFPC.

The botanical survey did not identify any threatened or endangered species or sensitive communities in the proposed ROW. Vegetation is typical of that found throughout the area with a mix of native and exotic, invasive pest plants. Proposed ROW clearing would affect 1.72 acres of forested habitat, including about 0.14 acre of riparian forest along Poplar Creek and EFPC and 1.58 acres of floodplain forest along EFPC. About 1.86 acres of the proposed ROW includes the East Fork Road ROW (includes existing gravel road and mowed ROW), which is already cleared and maintained.

The terrestrial survey identified nine birds, four mammals, two fish, one mussel, and one crayfish. The bottomland hardwood forests of the EFPC floodplain provide potentially suitable roosting and/or foraging habitat for two federally endangered bats, Indiana bats and gray bats, although the occurrence of these bats has never been documented in this habitat. Other unique resources in the area include the Black Oak Ridge Conservation Easement (BORCE) and the Horizon Center Natural Area (NA), which includes Oak Ridge Reservation NA 47.

ORED would be responsible for securing any needed permits to complete the proposed construction of the proposed transmission line and for compliance with all applicable local, state, and federal regulations. ORED would be responsible for any required mitigative measures associated with all required permits. ORED would also be responsible for conducting periodic monitoring during and after construction of the proposed transmission line to identify and solve problems quickly and to ensure that restoration and revegetation of the ROW are successful. In addition, ORED would be required to observe the following mitigative measures:

- ORED will avoid any encroachment on the BORCE. Encroachment on the Horizon Center NA will be confined to the proposed 50-ft ROW for the transmission line.
- No mechanized vehicles (e.g., bulldozers or skidders) will be allowed within 50 ft of any stream or wetland. Vegetation clearing within 50 ft of a wetland or stream would be done by hand.
- Use of best management practices (BMPs) to prevent any erosion and sedimentation from stormwater runoff from impairing any aquatic resources including streams, wetlands, and floodplains.

- Use of exotic, invasive pest plants is prohibited for any required permanent revegetation of areas disturbed during ROW construction. In situations where rapid revegetation of construction areas is necessary between site clearing and actual construction to minimize soil erosion and sedimentation, a seed mixture of annual rye grass and white clover can be used.
- Use of plants native to the Ridge and Valley Province and consistent with local community types will be used for any permanent revegetation of disturbed areas in the ROW including a mix of low-growing shrubs in areas adjacent to streams and wetlands and other low-growing native vegetation (such as a mix of native warm-season grasses) in upland areas. Qualified botanists or ecologists, and local native plant nurseries, will be consulted for guidance on the species to be used, sources of plant material, and planting plans and design. Suggested shrub species for revegetating stream and wetland buffers include smooth alder (*Alnus serrulata*), silky dogwood (*Cornus amomum*), ninebark (*Physocarpus opulifolius*), and indigo bush (*Amorpha fruticosa*). Suggested native warm-season grasses include big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), switchgrass (*Panicum virgatum*), plumegrass (*Saccharum giganteus* or *S. alopecuroidum*), and Indian grass (*Sorghastrum nutans*).
- Long-term maintenance of upland areas of the transmission line ROW would be accomplished mechanically (e.g., gang-mowers or bush-hog). Vegetation management within 50 ft of any stream or wetland would be conducted manually. Herbicide use is not permitted in any part of the proposed ROW without prior permission.
- Any indications that construction activities are promoting encroachment of exotic, invasive pest plants (see <http://www.tneppc.org/>) in the BORCE or Horizon Center NA will be reported and an appropriate response plan will be developed and implemented on a case-by-case basis to control and/or eliminate the problem.
- No clearing of live or dead trees with exfoliating bark would occur between April 15 and September 15 without permission of the U. S. Fish and Wildlife Service (FWS).

It is anticipated that construction of the proposed 69-kV transmission line would not adversely affect any of the natural resources of the Horizon Center NA or the BORCE. Proposed monitoring and mitigation measures (e.g., BMPs) would be sufficient to prevent the possibility of any adverse environmental effects to these resources.

1. INTRODUCTION

In 1996, the U. S. Department of Energy (DOE) documented potential environmental impacts associated with the lease of Parcel ED-1 to the East Tennessee Economic Council (ETEC) [DOE 1996a]. At that time DOE prepared a Mitigation Action Plan (MAP) to document mitigative measures to be implemented by ETEC to mitigate significant adverse impacts from industrial development activities including installation of utilities on Parcel ED-1 (DOE 1996b). In 2003, DOE transferred title of Parcel ED-1 to the Community Reuse Organization of East Tennessee (CROET) [DOE 2003a]. At that time DOE revised the MAP to summarize previous monitoring and to update monitoring requirements and mitigation measures that would ensure the continued protection of sensitive ecological and cultural resources at Parcel ED-1. Subsequently Horizon Center was transferred from CROET to the Oak Ridge Industrial Development Board (IDB).

The original MAP (DOE 1996b) anticipated that some linear developments, such as installation of utilities, may require unavoidable encroachment in floodplains, streams, and stream buffers. In floodplain, stream, or stream buffer areas in which encroachment is unavoidable, the following restrictions will apply:

- The proposed area will be surveyed at the appropriate time of year for rare species, wetlands, and other sensitive areas (c.g., sinkholes, caves, and springs).
- Crossings will be allowed at the edge of the protected area where there is the lowest probability of impacts, or, in the case of a stream crossing, at the narrowest point of the floodplain.
- Road crossings and utility line rights-of-way (ROWs) will be as narrow as practicable.
- Cleared areas will be regraded to original contours when feasible and replanted with native vegetation.

This report describes the environmental resources within the project corridor of a proposed 69-kilovolt (kV) transmission line delivery point in Roane County, Tennessee, that would provide electricity to Development Parcel 5 at the Horizon Center (also referred to as Parcel ED-1). The Oak Ridge Electrical Department (ORED) proposes to construct a new 69-kV delivery point from the ORED substation on Blair Road to Development Parcel 5. The proposed transmission line will extend approximately 0.74 mile on a 50-ft ROW. The proposed route will cross Poplar Creek and East Fork Poplar Creek (EFPC) at or near their confluence and then follow East Fork Road along the base of Blackoak Ridge before turning southeastward into Development Parcel 5 (Fig. 1). For about 0.58 mile, the proposed ROW is located between the Black Oak Ridge Conservation Easement (BORCE) state Natural Area (NA) and the Horizon Center NA.

On February 8, 2011, a field survey was completed of the proposed ROW. The survey included aquatic, botanical, terrestrial, and wetland resources in or adjacent to the proposed ROW. Descriptions of each of these natural resources follow with discussion of potential environmental impacts to each resource. Natural resources were mapped with a Trimble® GeoXH¹ Geographic Positioning System (GPS) and ESRI ArcMap 10 mapping software. Geographic data were post-processed to achieve submeter accuracy.

¹ Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors.

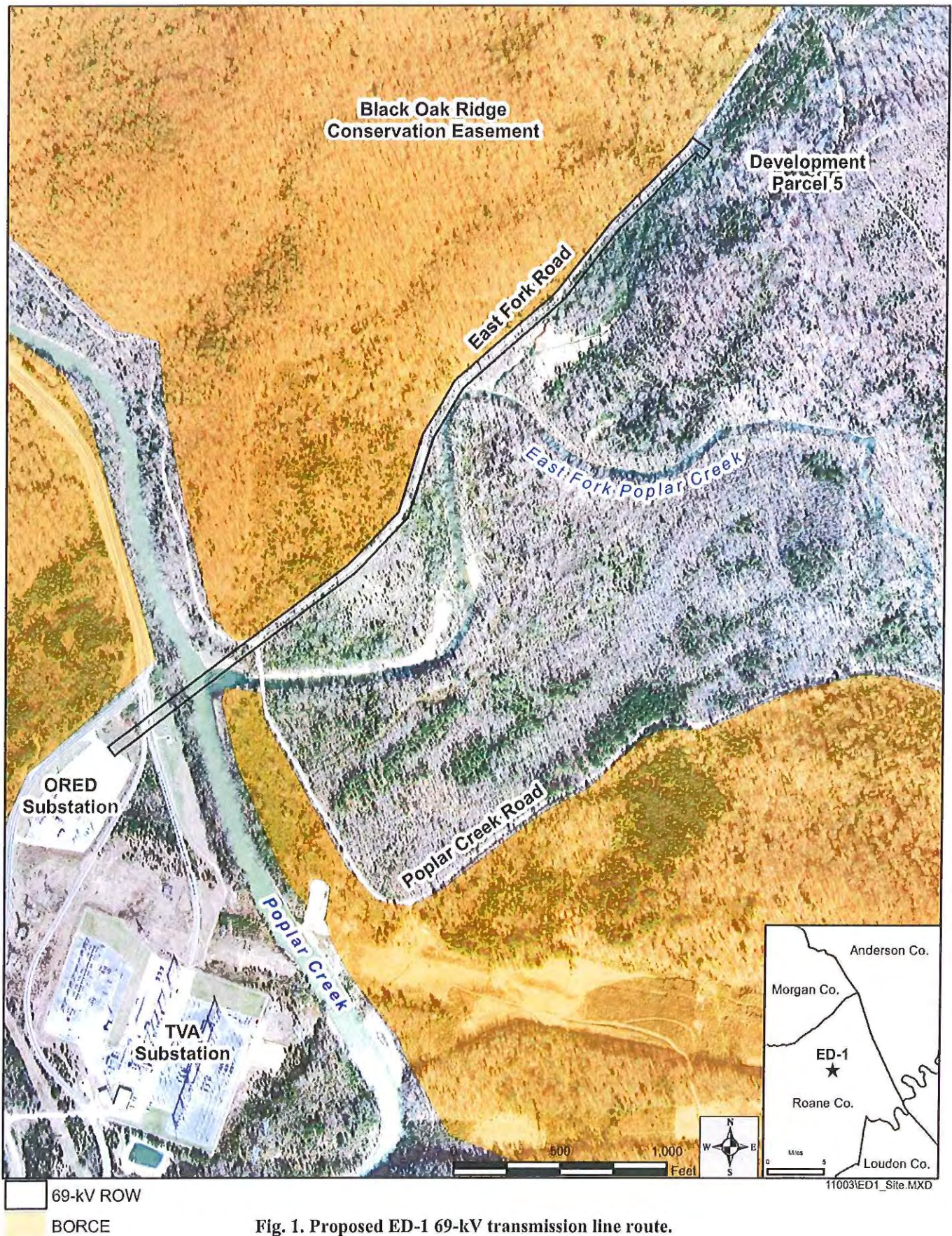


Fig. 1. Proposed ED-1 69-kV transmission line route.

2. AQUATIC RESOURCES

Surface water resources in the proposed transmission line ROW include streams, wetlands, and floodplains. These resources are important for a variety of reasons, including irrigation, power generation, recreation, flood control, and human health. Under the Clean Water Act of 1972 (CWA), it is illegal to discharge pollutants from a point source into any surface water without a National Pollutant Discharge Elimination System (NPDES) permit. Under the CWA, applicants for a federal license or permit to conduct activities that may result in the discharge of a pollutant into waters of the United States must obtain certification from the state in which the discharge would originate, or if appropriate, from the interstate water pollution control agency with jurisdiction over the affected waters at the point where the discharge would originate. Therefore, all projects that have a federal component and may affect state water quality (including projects that require federal agency approval, such as issuance of a Section 404 permit) must also receive a Section 401 water quality certification. The state of Tennessee has legal authority to implement and enforce the provisions of the CWA, while the U. S. Environmental Protection Agency retains oversight responsibilities.

In Tennessee, water resources are afforded regulatory protection under the Tennessee Department of Environment and Conservation (TDEC) in accordance with the state's stormwater management program and the Tennessee Aquatic Resources Alteration Permit (ARAP) program. Potential impacts to surface waters may result if the Proposed Action triggers permitting requirements under the Section 401 Certification program [40 *Code of Federal Regulations* 230.10(b)]. Erosion and sedimentation control regulations were established for controlling erosion and sedimentation from land-disturbing activities, requiring that permits be obtained for land-disturbing activities. Permit applicants must submit an erosion and sedimentation control plan that incorporates specific conservation and engineering practices or mitigations. The permitting process includes special requirements for land-disturbing activities in stream buffer zones. Land-disturbing activities are not allowed within 25 ft of any state waters unless a variance is granted by TDEC for drainage structures. The TDEC Division of Water Pollution Control is responsible for administration of the Tennessee Water Quality Control Act of 1977 (Tennessee Code Annotated 69-3-101). On an annual basis, the Division monitors, analyzes, and reports on the quality of Tennessee's water. TDEC uses a watershed approach under the concept that many water quality problems, such as the accumulation of pollutants or nonpoint source pollution, are best managed at the watershed level.

2.1 SURFACE WATER

Aquatic habitats in and directly adjacent to the proposed ROW include Poplar Creek, EFPC, two unnamed tributaries, and one spring/seep complex. The proposed ROW will cross Poplar Creek and EFPC at or near their confluence. Poplar Creek and EFPC support a diverse aquatic community made up of five biotic communities: phytoplankton, periphyton, zooplankton, benthic macroinvertebrates, and fish. Five aquatic sites (AS1, AS2, AS3, AS4, and AS5) [shown on Figs. 2a and 2b] were surveyed within the proposed ROW.

AS1 is located north and south parallel to the banks of Poplar Creek. AS1R is located in the riparian zone across from the bridge on Poplar Creek Road at the intersection with East Fork Road while AS1L is south of the bridge along the riparian zone (Fig. 2a). Poplar Creek is approximately 100 ft in width and was flowing at a moderate rate. The right bank (AS1R) was a gradual slope with approximately 3 to 5 ft of mud, debris, and large rocks reaching to the tree line of deciduous hardwood and low-lying vegetation. The left bank (AS1L) was made up of mud and thick leaf debris in the riparian zone extending 5 to 10 ft up to low-lying vegetation and deciduous hardwood. Visible beaver activity included a pathway from the

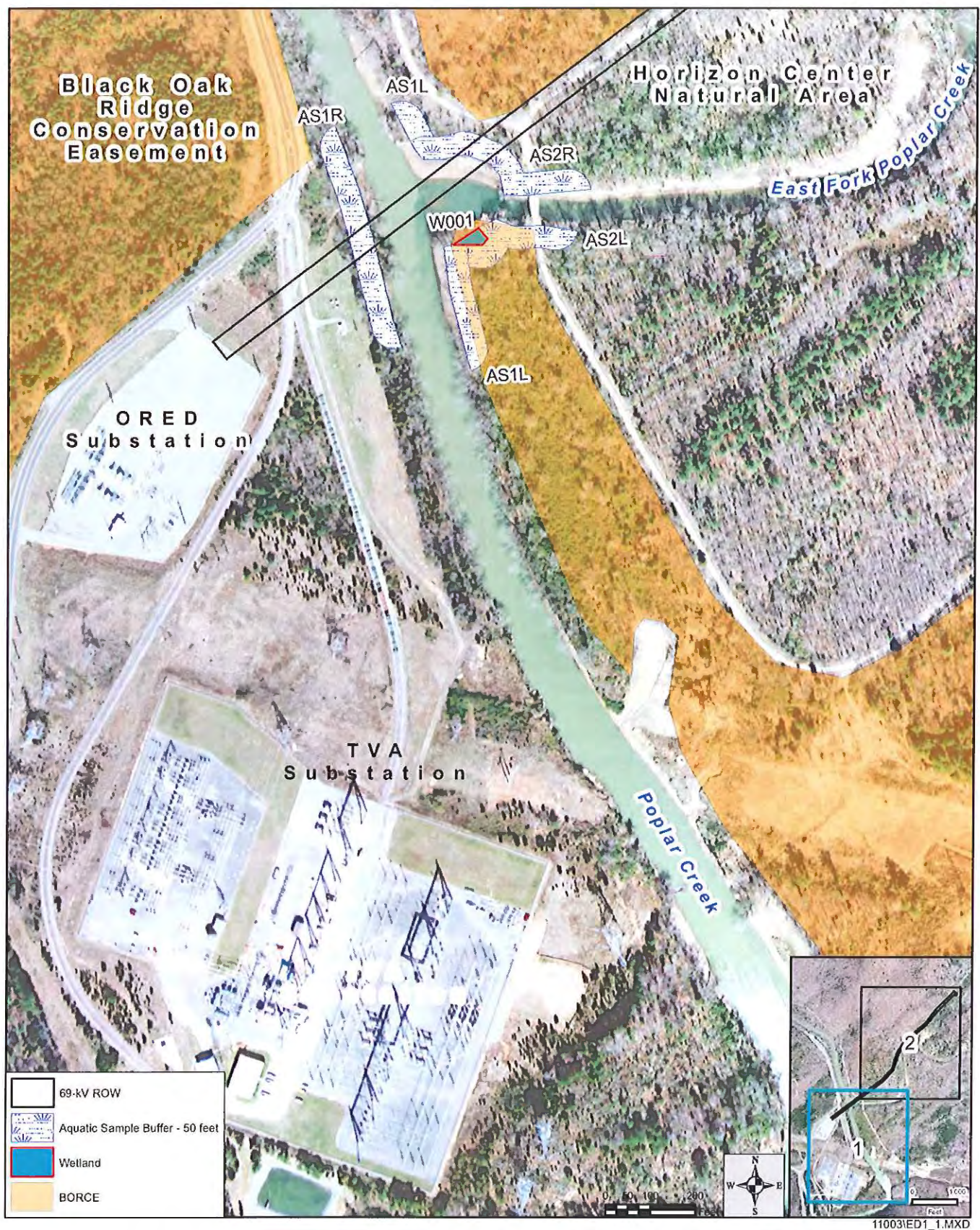


Fig. 2a. Proposed Parcel ED-1 69-kV transmission line right-of-way (southwestern section).

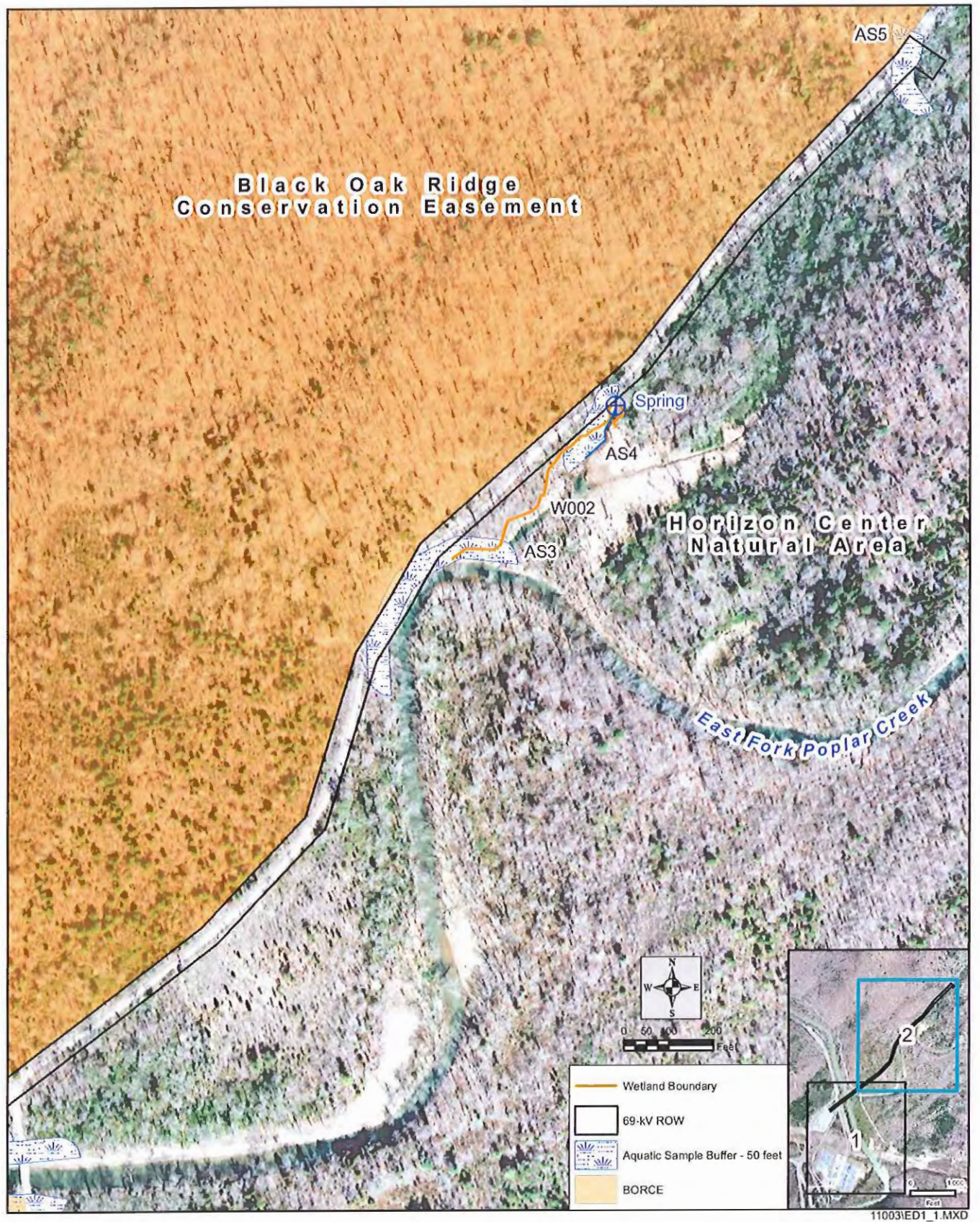


Fig. 2b. Proposed Parcel ED-1 69-kV transmission line right-of-way (northeastern section).

forest to EFPC and gnawed branches. Wetland (W001) is adjacent to the AS1 survey station on the left side of the bank along the left descending bank of EFPC immediately upstream from the confluence with Poplar Creek.

AS2 is along the left and south descending bank of EFPC immediately upstream from the confluence with Poplar Creek (Fig. 2a). Poplar Creek is approximately 25 to 50 ft in width and was flowing at a rippling slow to moderate rate. The right bank of the riparian zone, approximately 3 to 5 ft from shore, was layered with mud, debris, and concrete slabs from an old bridge abutment. The bank reached to the tree line of dense low-lying vegetation and scattered hardwood. The left bank was made up of mud and thick leaf debris in the riparian zone extending 10 to 15 ft from the shore line to the tree line of low-lying vegetation and deciduous hardwood. The water was clear with a mud, gravel, and cobble substrate. Beaver tracks were observed along the mud bank near the bridge. This portion of the EFPC is straight as it passes under the bridge on Poplar Creek Road. Poplar Creek and EFPC are within the hydrologic influence of Watts Bar Reservoir (Clinch River watershed). The station is located within a currently unused, 200-ft Tennessee Valley Authority (TVA) transmission line ROW that will be used to bring the 69-kV transmission line from the ORED Blair Road substation across Poplar Creek and EFPC.

AS3 is located in a large bend on the right bank of EFPC (Fig. 2b). The slope of the bank is steep and the riparian zone is made up of mud and rocks with some vegetation and trees. The width of the shoreline is 5 to 10 ft before merging into a tree line of low-lying vegetation and deciduous hardwoods. Many raccoon and deer tracks were observed along the bank and two small beaver dams were also present. The water was clear with a mud, gravel, and cobble substrate.

AS4 is located southeast of the gravel road in a large wetland complex (W002) that includes areas of emergent and forested wetland habitat (Fig. 2b). The wetland is associated with two unnamed tributaries to EFPC. Wetland hydrology has been enhanced by two beaver dams that have been in place for nearly two decades. The northernmost tributary is a perennial stream fed by a large volume spring and seep complex that rises in the wetland. This stream is approximately 3 to 6 ft wide with a clean gravel bottom. This tributary is clear with aquatic vegetation (duckweed). Several small fish, including a banded sculpin (*Cottus carolinae*), were also observed. Giffen et al. (2009) identified the area around AS4 as a "significant location for the management of reptile and amphibian populations" based on a combination of habitat quality and species present at the site. The second tributary is 2 to 4 ft in width with a predominately moss and silt bottom. The water is free-flowing (slow to moderate) and drains into W002. Both streams and the wetland are located outside the proposed ROW.

AS5 is a wet weather conveyance and runs north and south of the gravel road along the proposed ROW approximately 1,500 ft from the bend of EFPC (Fig. 2b). It is surrounded by low-lying vegetation, privet, and hardwood forest. The wet weather conveyance is filled with small to medium size gravel from the run-off of the road during storms and flooding. Wet weather conveyances typically flow for approximately 24 to 48 h after a rain event, receive negligible subsurface flow, and maintain mild to moderate bed and bank structure. These factors make it difficult for aquatic life to survive in these channels.

No aquatic species will be directly or indirectly affected by the construction, operation, and maintenance of the proposed ROW because support structures are normally located as far as possible from surface waters to minimize water-related impacts. However, if the support structures do impede upon the surface water, there could be an indirect effect on local populations of aquatic animals in EFPC. A potential concern is an increased sediment load or other changes in physical habitat. Increased sediment loading, extensive disruption of the canopy cover, or changes in the water temperature could disrupt or eliminate nearby populations of aquatic species. The proposed transmission line will be built on an existing road ROW that is already cleared and regularly maintained. All new transmission line structures

at the Poplar Creek/EFPC crossing will use stream protection measures and best management practices (BMPs) as described in *Tennessee Erosion & Sediment Control Handbook* (TDEC 2002). A plan of procedure and construction would be implemented to minimize erosion and sedimentation effects from ROW clearing and construction of the proposed transmission line. Use of existing access points would further reduce access-related impacts. Therefore, no direct or indirect impacts to aquatic animals or to the viability of any aquatic species' populations in the project area are anticipated.

2.2 WETLANDS

Wetlands are protected under Sections 404 and 401 of the CWA and by Executive Order (EO) 11990. In order to conduct specific activities in wetlands, authorization under a Section 404 Permit from the U. S. Army Corps of Engineers (USACE) may be required depending on the wetland's size and hydrologic connectivity to a navigable waterway. Section 401 gives states the authority to certify whether activities permitted under Section 404 are in accordance with state water quality standards. In Tennessee, TDEC is responsible for issuing Section 401 water quality certification with the ARAP. EO 11990 requires all federal agencies to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities. The *Code of Federal Regulations* (CFR) Title 10 Part 1022 describes DOE's procedures to comply with EO 11990.

Wetland determinations were performed according to USACE standards (USACE 2010), which require documentation of hydrophytic vegetation (USFWS 1996), hydric soil, and wetland hydrology. Broader definitions of wetlands, such as the definition provided in EO 11990 (Protection of Wetlands), the U. S. Fish and Wildlife Service definition (Cowardin et al. 1979), and the USACE definition, were also considered in this review. The USACE Routine Wetland Determination forms are attached.

The Tennessee Valley Authority Rapid Assessment Method (TVARAM) was used to assess wetland condition and identify wetlands with potential ecological significance (Mack 2001). Using TVARAM, wetlands may be classified into three categories. Category 1 wetlands are described as "limited quality waters." They are considered to be a resource that has been degraded, has limited potential for restoration, or is of such low functionality that lower standards for avoidance, minimization, and mitigation can be applied. Category 2 includes wetlands of moderate quality and also wetlands that are degraded but exhibit reasonable potential for restoration. Category 3 generally includes wetlands of very high quality and wetlands of concern regionally and/or statewide, such as wetlands that provide habitat for species listed as threatened or endangered. TVARAM scores and categories are reported in Table 1 and on the USACE forms.

Table 1. Wetlands associated with proposed Horizon Center 69-kV transmission line ROW

Wetland ID	Wetland Type ^a	TVARAM Category (Score)	Total Wetland Acreage in TL ROW	Structures or Clearing Required in Wetland
W001	PEM1E	2 (55)	0.035 ^b	No
W002	PEM1E/PFO1E	3 (76)	Not determined	No
Total			~0.55 acre	

^aCowardin Classification: PEM1E = Palustrine, persistent emergent vegetation, seasonally flooded/saturated; PFO1E = Palustrine forested, broad-leaved deciduous vegetation/needle-leaved deciduous vegetation, seasonally flooded/saturated.

^bDelineated portion of wetland confined to designated investigation area only; wetland extends east and south beyond the proposed ROW.

ROW = right-of-way.

TL = transmission line.

TVARAM = Tennessee Valley Authority Rapid Assessment Method.

Wetland 001 (W001) is a small, emergent, fringe wetland located along the left descending bank of EFPC immediately upstream from the confluence with Poplar Creek (Fig. 2a). The wetland covers 0.035 acre and is within the hydrologic influence of Watts Bar Reservoir (Clinch River watershed). The wetland is located within a currently unused, 200-ft TVA transmission line ROW that would be used to bring the new 69-kV transmission line from the ORED Blair Road substation across Poplar Creek and EFPC. Dominant vegetation includes bladder sedge (*Carex intumescens*) with a diverse, but small, assortment of many other native wetland plants. W001 scored in Category 2 using TVARAM, which indicates moderate wetland condition and provision of wetland functions. The wetland is located a few hundred feet south of the proposed ROW and would likely be unaffected by construction of the proposed transmission line.

Wetland 002 (W002) is a large wetland complex that includes areas of emergent and forested wetland habitat (Fig. 2b). The wetland is associated with two unnamed tributaries to EFPC. Wetland hydrology has been enhanced by two beaver dams that have been in place for more than a decade. One of the streams is a perennial stream fed by a large volume spring and seep complex (AS04) that rises in the wetland about 15 to 20 ft outside the proposed transmission line ROW. W002 scored in Category 3 using TVARAM, which indicates superior wetland condition and provision of wetland functions. Giffen et al. (2009) identified the area around W002 as a “significant location for the management of reptile and amphibian populations” based on a combination of habitat quality and species present at the site. No portion of the wetland is inside the proposed 69-kV transmission line ROW. The wetland would possibly be affected indirectly by potential clearing adjacent to the wetland boundary; no transmission line structures are proposed inside the wetland.

Potential wetland impacts would result from vegetation clearing in the proposed ROW near or adjacent to wetlands; the proposed ROW does not cross any wetlands and no vehicular or mechanical equipment would be required to install transmission line poles or other structures in wetlands. Construction crews should use BMPs to ensure that any potential impacts to wetlands would be avoided or minimized (DOE 2003; TDEC 2002). ORED would be responsible for securing all applicable permits and permissions and for compliance with any mitigation requirements associated with any required permits. Therefore, ORED’s proposed project activities would not adversely affect any wetlands in or near the proposed ROW.

2.3 FLOODPLAINS

EO 11988, “Floodplain Management,” encourages measures to preserve and enhance the natural and beneficial functions of floodplains. The EO also requires federal agencies to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of flood plains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. DOE’s procedures for compliance with EO 11988 are found in 10 *CFR* 1022.

Any actions that take place in the floodplain at Parcel ED-1 are subject to regulation by the USACE, TDEC—Division of Water Pollution Control, and possibly the TVA. USACE regulates activities in floodplains through Sect. 404 of the CWA. The state of Tennessee also regulates activities in floodplains under Sect. 401 of the CWA and the Tennessee Water Quality Control Act of 1977 (Tennessee Administrative Code 69-3-108). TVA regulates all construction, operation, or maintenance of structures affecting navigation, flood control, or public lands or reservations in the Tennessee River or its tributaries under Sect. 26a of the TVA Act (U. S. Congress, 1933, as amended).

Approximately 1.8 acres of the proposed transmission line route are within the 100- year floodplain of EFPC and 2.6 acres are within the 500-year floodplain of EFPC. The proposed route will follow the natural topography and no fill or construction of buildings is proposed. The only possible structures to be

placed within the floodplain are transmission line poles. These poles will not interfere with flood flow or flood storage. The land surface around any poles installed would be returned to original topography, stabilized, revegetated, and protected from erosion. Thus, construction of the proposed 69-kV transmission line will not have any adverse effects on floodplains at the site.

3. TERRESTRIAL RESOURCES

3.1 VEGETATION

The proposed transmission line extends a total distance of about 0.74 mile from the ORED substation on Blair Road to Development Parcel 5 at Horizon Center (Table 2). From the Blair Road substation, the proposed ROW includes about 0.40 acre of grassland that is periodically mowed. Forested habitat includes about 0.14 acre of riparian forest along Poplar Creek and EFPC and 1.58 acres of floodplain forest along EFPC. About 0.28 acre of the proposed ROW includes a black walnut (*Juglans nigra*) plantation. The remainder of the proposed ROW includes 0.23 acre of open water that includes Poplar Creek and EFPC and 1.86 acres of the East Fork Road ROW (includes existing gravel road and mowed ROW).

The riparian portion of the ROW is forested with a small area of exposed streambanks associated with the open drawdown zone of Watts Bar Reservoir near the confluence of Poplar Creek and EFPC. The drawdown zone is affected by water levels in Watts Bar Reservoir. The forests are bottomland hardwood types merging into lower slope upland forests. Common trees are green ash (*Fraxinus pennsylvanica*), box elder (*Acer negundo*), sycamore (*Platanus occidentalis*), and sweet gum (*Liquidambar styraciflua*) with Virginia pine (*Pinus virginiana*) and eastern redcedar (*Juniperus virginiana*) in more disturbed areas. The understory in some areas is heavily infested with exotic Chinese privet (*Ligustrum sinense*).

Table 2. Habitat in proposed 69-kV transmission line right-of-way

Habitat Type	Length of Segment (ft)	Acres	Comment
Mowed Grassland	344	0.40	Assume 50-ft ROW for entire length of segment
Riparian Forest	124	0.14	Assume 50-ft ROW for entire length of segment
Open Water (Poplar Creek/East Fork Poplar Creek)	197	0.23	Assume 50-ft ROW for entire length of segment
Floodplain Forest	2,753	1.58	Assume 25-ft ROW for entire length of segment and 25-ft maintained ROW for East Fork Road
Black Walnut Plantation	490	0.28	Assume 25-ft ROW for length of segment along maintained ROW for East Fork Road
Total area already cleared and maintained for East Fork Road ROW	3,243	1.86	Assume 25-ft ROW for East Fork Road
TOTAL		4.48	
Total forested acreage proposed to be cleared		1.72	

kV = kilovolt.

ROW = right of way.

3.2 SENSITIVE COMMUNITIES

The quality of plant communities was generally low because of the high density of invasive pest plant species throughout the floodplain. The high-flow spring/seep complex in Wetland 002 (W002) creates some special aquatic and wetland habitat just outside the proposed ROW.

The proposed ROW runs along the boundary of the BORCE, the Horizon Center NA, and Oak Ridge Reservation (ORR) NA 47 (EFPC Floodplain). The Horizon Center NA and NA 47 protect floodplain forests and wetlands associated with EFPC (Figs. 2a and 2b). No vegetation clearing on the BORCE will be allowed; thus, direct impacts to the BORCE will be avoided. Impacts to the Horizon Center NA and NA 47 will be kept insignificant by restricting vegetation clearing only within the proposed 50-ft ROW. Potential adverse impacts to these natural areas will be further reduced by using BMPs to prevent erosion and sedimentation to protect aquatic resources and wetlands in or near the ROW (see the aquatic resources and wetlands sections of this report). The large spring in W002 is particularly important to protect.

3.2.1 Black Oak Ridge Conservation Easement Area

The BORCE was designated in April 2005 through an agreement between DOE and the state of Tennessee (DOE-ORO 2008). The agreement protects 2966 acres at the northwest part of the ORR. The Tennessee Wildlife Resources Agency (TWRA) manages the land in accordance with a management plan developed jointly by TDEC and TWRA with input from the public. The BORCE forms the northern edge of most of the proposed 69-kV ROW; no vegetation clearing on the BORCE will be permitted.

3.2.2 Horizon Center Natural Area

In April 2003 the developable portions (about 490 acres) of the Horizon Center (formerly Parcel ED-1) were transferred to CROET (DOE-ORO 2008) and subsequently to the Oak Ridge IDB. DOE retained ownership of the Horizon Center NA (including ORR NA 47). DOE is responsible for meeting all the requirements of the MAP. A small amount of the vegetation in the Horizon Center NA would be cleared during construction of the proposed ROW. Since the proposed ROW follows the existing gravel road, which has already been cleared and regularly maintained, additional clearing for the new transmission line ROW would be permitted only within the proposed 50-ft ROW.

3.3 INVASIVE PEST PLANTS

Invasive pest plants observed during the site visit include Chinese privet, greater periwinkle (*Vinca major*), lesser periwinkle (*Vinca minor*), Nepal grass (*Microstegium vimineum*), multiflora rose (*Rosa multiflora*), and Japanese honeysuckle (*Lonicera japonica*). The impact of the proposed construction of the proposed transmission line should be very low in terms of opening habitat to invasive pest plants since these exotic plants are already well-established in the proposed ROW. No significant impacts from invasive pest plants are expected from this project assuming any revegetation follows the original requirements as specified in the MAP (DOE 1996b):

- For all revegetation of disturbed areas, only species native to the Ridge and Valley Province and consistent with local community types will be used.
- TDEC, qualified botanists or ecologists, and local nurseries will be consulted for guidance on the species to be used, sources of plant material, and planting plans and design.

- In situations where rapid revegetation of construction areas is necessary temporarily between site clearing and actual construction to minimize soil erosion and sedimentation, a seed mixture of annual rye grass and white clover may be used.

3.4 WILDLIFE RESOURCES

Habitats observed in the proposed project area have been impacted by previous agricultural, forestry, and urban construction practices within the region. Two primary habitat types (early succession habitats and hardwood forests) were observed along the proposed transmission line corridor.

The survey included a walkover to observe wildlife along the proposed ROW. Visual and vocal observations were used to determine the presence of wildlife along the proposed ROW. Common species of wildlife for the state of Tennessee and Parcel ED-1 (DOE 1996) were observed during the walkover. An account of each species and location is listed in Table 3. It should be noted that Giffen et al. (2009) identified the area around W002 as a “significant location for the management of reptile and amphibian populations” based on a combination of habitat quality and species present at the site.

Table 3. List of terrestrial animals observed during walkover of proposed 69-kV transmission line right-of-way at ED-1

Species	Locations							
	AS1R	AS1L	AS2R	AS2L (W001)	AS3	AS4 (W002)	AS5	Patrol Road
<i>Birds</i>								
American crow (<i>Corvus brachyrhynchos</i>)	—	—	—	—	X ^a	—	—	—
American robin (<i>Turdus migratorius</i>)	X ^b	X ^b	X ^b	X ^{a,b}	X ^b	X ^b	X ^b	X ^a
Carolina chickadee (<i>Parus carolinensis</i>)	—	—	—	—	—	X ^b	—	X ^a
Common flicker (<i>Colaptes auratus</i>)	—	—	—	—	X ^b	—	—	X ^a
Northern cardinal (<i>Cardinalis cardinalis</i>)	—	—	—	—	—	—	—	X ^a
Red-breasted nuthatch (<i>Sitta canadensis</i>)	—	—	—	—	—	—	X ^b	—
Rufus-sided towhee (<i>Pipilo erythrophthalmus</i>)	—	—	—	—	—	X ^a	X ^a	—
Song sparrow (<i>Melospiza melodia</i>)	—	—	—	—	—	X ^a	—	—
Tufted titmouse (<i>Parus bicolor</i>)	—	—	—	—	—	X ^b	X ^b	—
<i>Mammals</i>								
Beaver (<i>Castor canadensis</i>)	—	X ^c	—	X ^c	X ^c	—	—	—
Cottontail rabbit (<i>Sylvilagus floridanus</i>)	—	—	—	—	X ^d	—	—	—
Raccoon (<i>Procyon lotor</i>)	—	—	—	—	X ^c	—	—	—
White-tail deer (<i>Odocoileus virginianus</i>)	X ^a	—	—	—	X ^c	—	—	—

Table 3. List of terrestrial animals observed during walkover of proposed 69-kV transmission line right-of-way at ED-1 (Continued)

Species	Locations							
	AS1R	AS1L	AS2R	AS2L (W001)	AS3	AS4 (W002)	AS5	Patrol Road
<i>Fish</i>								
Banded sculpin (<i>Cottus carolinae</i>)	—	—	—	—	—	X ^a	—	—
Unidentified fry	—	—	—	—	—	X ^a	—	—
<i>Other</i>								
Giant floater (<i>Pyganodon grandis</i>) [a mussel]	—	X ^a	—	—	—	—	—	—
Unidentified crayfish	—	—	—	—	—	X ^e	—	—
Unidentified scat	—	—	—	—	—	—	X ^a	—

^a Visual; ^b vocal; ^c tracks; ^d scat; and ^e signs
kV = kilovolt.

Other terrestrial animals likely to occur in forested areas and riparian zones include gray squirrel (*Sciurus carolinensis*), eastern chipmunk (*Tamias striatus*), white-footed mouse (*Peromyscus leucopus*), wild turkey (*Meleagris gallopavo*), slimy salamander (*Plethodon glutinosus*), ground skink (*Scincella lateralis*), five-lined skink (*Eumeces fasciatus*), black rat snake (*Elaphe obsoleta*), eastern box turtle (*Terrapene carolina carolina*), and river otter (*Lontra canadensis*). No listed state or federal Threatened and/or Endangered Species or state-listed in-need-of-management terrestrial species were observed during this survey.

The construction of the proposed transmission line and clearing of vegetation will not likely impact terrestrial wildlife because similar habitat is available throughout the remaining undeveloped portions of the Horizon Center and BORCE and can be easily utilized. Also, the work to complete this project will take place mostly within the existing East Fork Road ROW and would not increase the loss and fragmentation of forested habitats. No other unusual or unique wildlife habitats, including caves, were observed in the immediate project area. However, a cave is reported to exist approximately 1,200 ft (DOE 1996) northeast of the spring located near survey station AS4. Construction crews will manage the project to ensure that any potential impacts to habitat will be avoided or minimized. ORED would be responsible for securing all applicable permits and permissions and any mitigation requirements associated with any required permits. Therefore, ORED's proposed project activities will not result in significant wildlife impacts.

4. THREATENED AND ENDANGERED SPECIES

No federal or state-listed plants or animals were found during the field survey, but few listed plants would be conspicuous at the time of year of the survey. Potential habitat for golden seal (*Hydrastis canadensis*) and American ginseng (*Panax quinquefolius*) are present. These species are listed by Tennessee as commercially exploited. The state does not recommend that they be included in the normal environmental review process. Potential habitat for Nuttall waterweed (*Elodea nuttallii*) was present, but the plant would have been conspicuous even in the winter, if present. No significant impacts to listed species are expected from this project assuming protection of aquatic resources and wetlands (see the respective sections).

Bottomland hardwood forest habitat in the EFPC floodplain has previously been identified as potentially suitable roosting habitat for maternity colonies of the federally endangered Indiana bat (*Myotis sodalis*) [DOE 1996a]. The EFPC floodplain may also provide suitable foraging habitat for the federally endangered gray bat (*Myotis grisescens*). Various mist-netting surveys have been completed over the past 15 to 20 years, but no Indiana or gray bats have been documented from the area. Nevertheless, to protect Indiana bat habitat, the Horizon Center Covenants Conditions Restrictions (2003) include a restriction on cutting any live or dead trees with exfoliating bark between April 15 and September 15 unless the required processes of the FWS are followed.

No federally or state-listed aquatic species will be directly or indirectly affected by the construction, operation, and maintenance of the proposed ROW because support structures are normally located as far as possible from surface waters to minimize water-related impacts. However, if the support structures do impede upon the surface water, there could be an indirect effect on local populations of aquatic animals in the EFPC. A potential concern is an increased sediment load or other changes in physical habitat. Increased sediment loading, extensive disruption of the canopy cover, or changes in the water temperature could disrupt or eliminate nearby populations of many protected aquatic species, such as the federally endangered yellow blossom mussel (*Epioblasma florentina florentina*), federally endangered pygmy madtom (*Noturus stanauli*), and federally threatened spotfin chub (*Erimonax monachus*) [FWS 2011]. The proposed transmission line will be built on an existing road right-of-way that is already cleared and regularly maintained. All new transmission line structures at the Poplar Creek/EFPC crossing will use stream protection measures and BMPs as described in *Tennessee Erosion & Sediment Control Handbook* (TDEC 2002). A plan of procedure and construction would be implemented to minimize erosion and sedimentation effects from ROW clearing and construction of the proposed transmission line. Use of existing access points would further reduce access-related impacts. Therefore, no impacts to protected aquatic animals or to the viability of any aquatic species' populations in the project area are anticipated.

5. MONITORING AND MITIGATION

Monitoring and mitigation requirements for any construction activities at Horizon Center are described in the *Mitigation Action Plan for the Lease of Parcel ED-1* (DOE 1996b) and the *Mitigation Action Plan for the Protection of the Natural Area on Parcel ED-1* (DOE 2003b).

5.1 MONITORING

Monitoring was specified in the MAP (DOE 1996b) to detect and characterize changes from the baseline (pre-development) conditions. During construction activities, ORED, or its designee, will conduct frequent inspections of areas being disturbed to ensure that there is no encroachment of BORCE boundary, no encroachment of the NA boundary beyond the proposed 50-ft ROW, and that no significant adverse impacts occur to any of the natural resources of the BORCE or the NA. These inspections will be in addition to any other inspections that may take place by city or state officials (i.e., codes or other regulatory enforcement). The MAP also included a requirement for conducting on-site inspections of the sensitive areas within the NA boundary three times each year. These inspections were to assess whether the integrity of the sensitive areas within the NA is being maintained and to identify encroachments and any necessary maintenance or potential mitigation. Effective monitoring will identify problems quickly so solutions can be implemented to prevent any harm to sensitive resources,

5.2 MITIGATION

ORED would be responsible for securing all applicable permits prior to initiating work in streams, wetlands, or floodplains. Permit conditions would stipulate which activities could occur in or around the streams, wetlands, or floodplains. Regulatory permits would also specify any additional required mitigative measures, including compensation.

ORED will be held responsible to ensure that they maintain the integrity of the NA, and that they take appropriate measures to prevent significant adverse impacts to the sensitive resources within the NA. A small amount of encroachment into the NA is necessary to construct the proposed transmission line but this will be limited to the 50-ft ROW as proposed. Construction will be done in accordance with the appropriate local, state, and federal regulations and the conditions specified in the lease.

ORED will design the proposed ROW such that the entire transmission line would be constructed on property controlled by DOE and/or the IDB and CROET. No encroachment on the BORCE will be allowed. Vegetation clearing will be restricted to the proposed 50-ft ROW and would include portions of the existing East Fork Road ROW and sections of the Horizon Center NA adjacent to the road that are within the proposed ROW.

During construction vegetation clearing within 50 ft of any aquatic or wetland resources will be conducted by hand. No mechanized vehicles (e.g., bulldozers or skidders) will be permitted within the 50-ft stream or wetland management zone.

After construction long-term, routine vegetation management within upland areas of the proposed ROW may be accomplished mechanically (e.g., by gang mowers or bush-hogs); vegetation management within 50 ft of any stream or wetland will be maintained by manual clearing. The use of herbicides would not be permitted within the ROW for routine maintenance operations without prior approval.

To help control erosion and sedimentation during land-disturbing activities, BMPs such as those described in the *Tennessee Erosion & Sediment Control Handbook* (TDEC 2002) will be used as appropriate. These BMPs can include vegetative practices (e.g., buffer zones and temporary vegetation); structural practices (e.g., silt fences, diversions, sediment basins); or a combination of both. In addition to the proper design and installation, any BMPs must also be properly maintained in order to effectively reduce erosion and sedimentation. Complete erosion control must be accomplished wherever proposed ROW clearing and construction has the potential to affect aquatic and wetland resources. This is particularly important around AS4 and W002, an area which has been identified as a "significant location for the management of reptile and amphibian populations" based on superior habitat quality and species diversity (Giffen et al. 2009). The protection and stewardship of these high-quality habitats are an integral part of DOE's ongoing ORR-wide wildlife management strategy.

ORED also will provide mitigation for clearing existing vegetation by using native plants for all restoration and revegetation of disturbed areas in the proposed ROW. These species should be native to the Ridge and Valley Province and consistent with local community types. ORED may not, under any circumstances, revegetate disturbed areas of the proposed ROW using any plant identified as an invasive, exotic, pest plant by the Tennessee Exotic Pest Plant Council (TN-EPPC) [TN-EPPC 2009]. Plants used for revegetation should be native to the Ridge and Valley Province and consistent with local community types (see the recommendation in the Horizon Center Covenants, Conditions, and Restrictions document). TN-EPPC has provided a list of native plants recommended as substitutes for exotic, invasive pest plants (TN-EPPC 2011).

Disturbed areas within 50 ft of streams and wetlands will be restored using low-growing, native shrubs that will not grow into or interfere with the transmission line. Other low-growing native vegetation (such as native warm-season grasses) will be used in upland areas of the ROW. Qualified botanists or ecologists, and local native plant nurseries, will be consulted for guidance on the species to be used, sources of plant material, and planting plans and design. Suggested shrub species for revegetating stream and wetland buffers include smooth alder (*Alnus serrulata*), silky dogwood (*Cornus amomum*), ninebark (*Physocarpus opulifolius*), and indigo bush (*Amorpha fruticosa*). Suggested native warm-season grasses include big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), switchgrass (*Panicum virgatum*), plumegrass (*Saccharum giganteus* or *S. alopecuroidum*), and Indian grass (*Sorghastrum nutans*).

In situations where rapid revegetation of construction areas is necessary temporarily between site clearing and actual construction to minimize soil erosion and sedimentation, a seed mixture of annual rye grass and white clover may be used.

If periodic on-site inspections reveal that exotic, invasive pest plants (see <http://www.tueppc.org/>) are encroaching into the NAs or other sensitive habitats (e.g., riparian zones or wetlands), ORED will be required to eliminate the encroachment (a determination on the best method of removal will be made on a case-by-case basis). This maintenance will provide the mitigation needed to help reduce or eliminate potential impacts (i.e., degradation) to the sensitive habitats and resources.

As specified in the Horizon Center Covenants, Conditions, and Restrictions (CROET 2003) to protect habitat of endangered gray and Indiana bats, ORED is restricted from cutting any live or dead trees with exfoliating bark between April 15 and September 15 unless the required processes of the FWS are followed. These processes would, at a minimum, include informal consultation with the FWS and possibly additional mist-netting or other surveys to determine if any endangered bats are using the proposed ROW.

6. SUMMARY OF FINDINGS

On February 8, 2011, a field survey was completed of the ROW of a proposed 69-kV transmission line delivery point to be constructed by ORED. The transmission line would extend from the ORED substation on Blair Road to Development Parcel 5 at the Horizon Center. The survey identified several aquatic, botanical, terrestrial, and wetland resources in or adjacent to the proposed transmission line ROW.

Aquatic resources included crossings on Poplar Creek, EFPC, two unnamed tributaries to EFPC, and a wet weather conveyance. Two wetlands were identified near the proposed ROW, including one on EFPC and one on an unnamed tributary to EFPC. Both wetlands exhibited moderate to superior wetland condition and provision of wetland functions. Roughly half of the proposed ROW is within the 100- and 500-year floodplain of EFPC.

The botanical survey did not identify any threatened or endangered species or sensitive communities. Vegetation in the proposed ROW is typical of that found throughout the area with a mix of native and exotic, invasive pest plants. Proposed ROW clearing would affect 1.72 acres of forested habitat, including about 0.14 acre of riparian forest along Poplar Creek and EFPC and 1.58 acres of floodplain forest along EFPC. About 1.86 acres of the proposed ROW includes the East Fork Road ROW (existing gravel road and mowed ROW), which is already cleared and maintained.

The terrestrial survey identified nine birds, four mammals, two fish, one mussel, and one crayfish. The bottomland hardwood forests of the EFPC floodplain provide potentially suitable roosting and/or foraging habitat for two federally endangered bats, Indiana bats and gray bats, although the occurrence of these bats has never been documented in this habitat. Other unique resources in the area include the BORCE and the Horizon Center NA (which includes ORR NA 47).

ORED would be responsible for securing any needed permits and for compliance with all applicable local, state, and federal regulations to complete the proposed construction of the proposed transmission line. ORED would also be responsible for any required monitoring and mitigative measures associated with those permits, including any monitoring and mitigation required by the MAPs (DOE 1996b and 2003b). Additional mitigative measures include use of BMPs to prevent any erosion and sedimentation from stormwater runoff from impairing any aquatic resources including streams, wetlands, and floodplains; prohibition of using exotic, invasive pest plants for any required revegetation of areas disturbed during ROW construction; and use of native plants for any revegetation. No clearing of live or dead trees with exfoliating bark would occur between April 15 and September 15 without permission of the USFWS.

Proposed monitoring and mitigation measures (e.g., BMPs) would be sufficient to prevent the possibility of any adverse environmental effects to these resources. Proposed monitoring would identify problems quickly so remedies can be implemented before adverse impacts can occur. Proposed mitigations will avoid or minimize any anticipated adverse impacts to sensitive resources. As long as ORED complies fully with all monitoring and mitigation measures, it is anticipated that construction of the proposed 69-kV transmission line would not adversely affect any of the natural resources of Horizon Center or the BORCE.

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