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**LINCOLN COUNTY RAW WATER INTAKE  
ENVIRONMENTAL ASSESSMENT**  
Lincoln County, Tennessee

**Prepared by:**  
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Knoxville, Tennessee

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### **Purpose and Need for Action**

The Lincoln County Board of Public Utilities in Lincoln County, Tennessee (LCBPU) proposes to construct and operate a raw water intake (RWI) at Elk River Mile 75.3, left bank, in Lincoln County, Tennessee (Figure 1). The proposed action would include construction of a surface water withdrawal facility, comprised of a water intake, pump building and associated water treatment plant (Figure 2). The purpose of the proposed action is to supplement water supplies for unincorporated areas of Lincoln County, Tennessee. The proposed RWI improvements require approval by the Tennessee Valley Authority (TVA) under Section 26a of the TVA Act. Therefore, TVA proposes to issue approval under Section 26a of the TVA Act for the installation of the RWI and associated structures on the Elk River.

Currently, Lincoln County has a cumulative average water consumption rate (including system losses) of 2.2 million gallons per day (mgd), most of which is extracted from wells in the Flintville, Taft, and Elora areas, with a combined firm capacity of 1.7 mgd. The groundwater supply to the wells is unreliable during sustained periods of dry weather. LCBPU has previously requested additional water supply from the cities of Fayetteville and Lewisburg, Tennessee, but these requests were denied. Other alternatives to develop additional wells were deemed unfeasible due to cost, water quality and lack of sustainable water resources. To improve the reliability of a safe water supply to the area, and to meet the demand of expected growth to the area over the next several decades, LCBPU's proposed facility would be capable of withdrawing 4.0 mgd. However, they anticipate a typical daily withdrawal rate of 1.6 mgd by 2030 since system losses would be reduced. With an intake on the Elk River, LCBPU would be able to supplement or replace its unreliable groundwater supply, which is severely strained during dry periods.

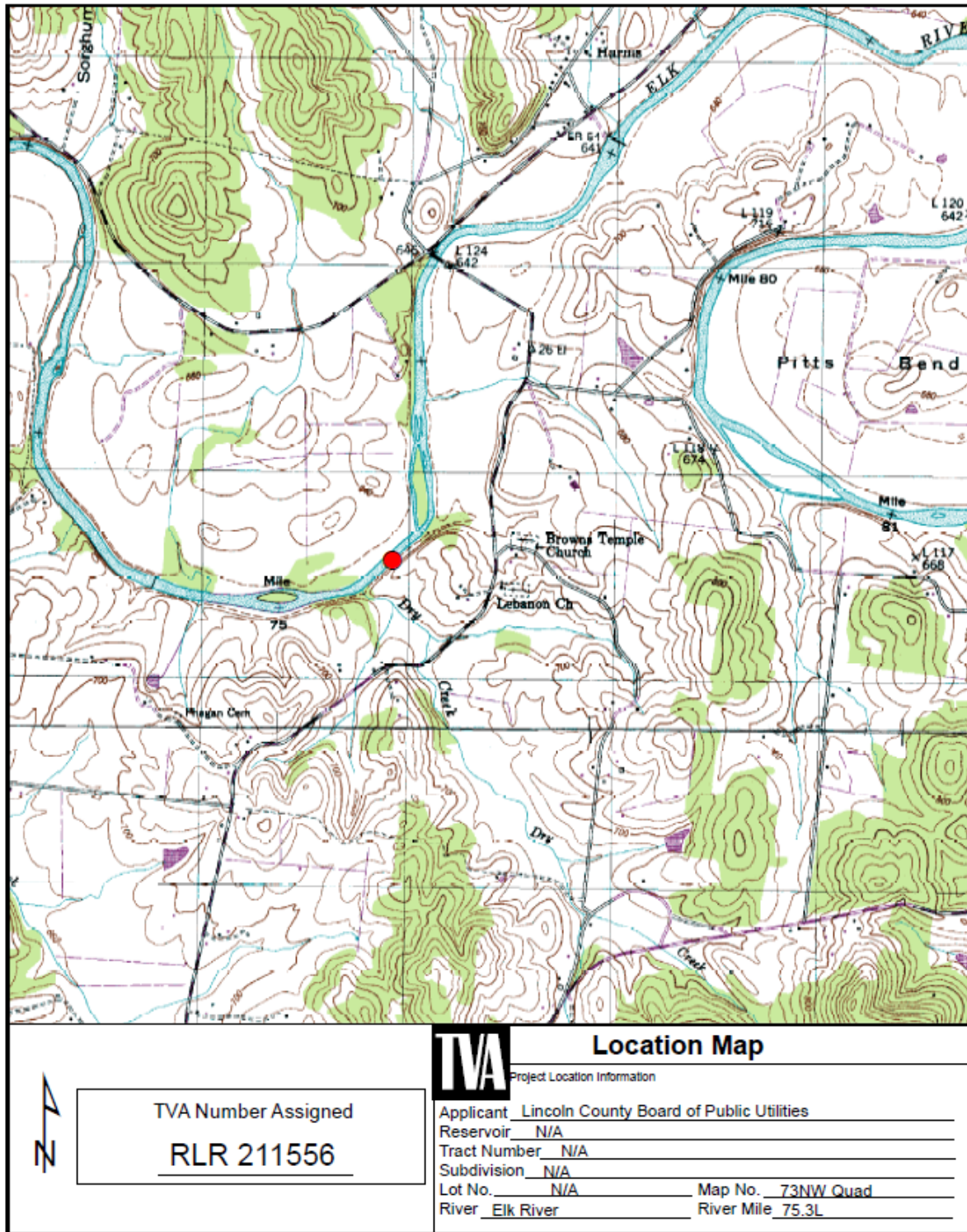
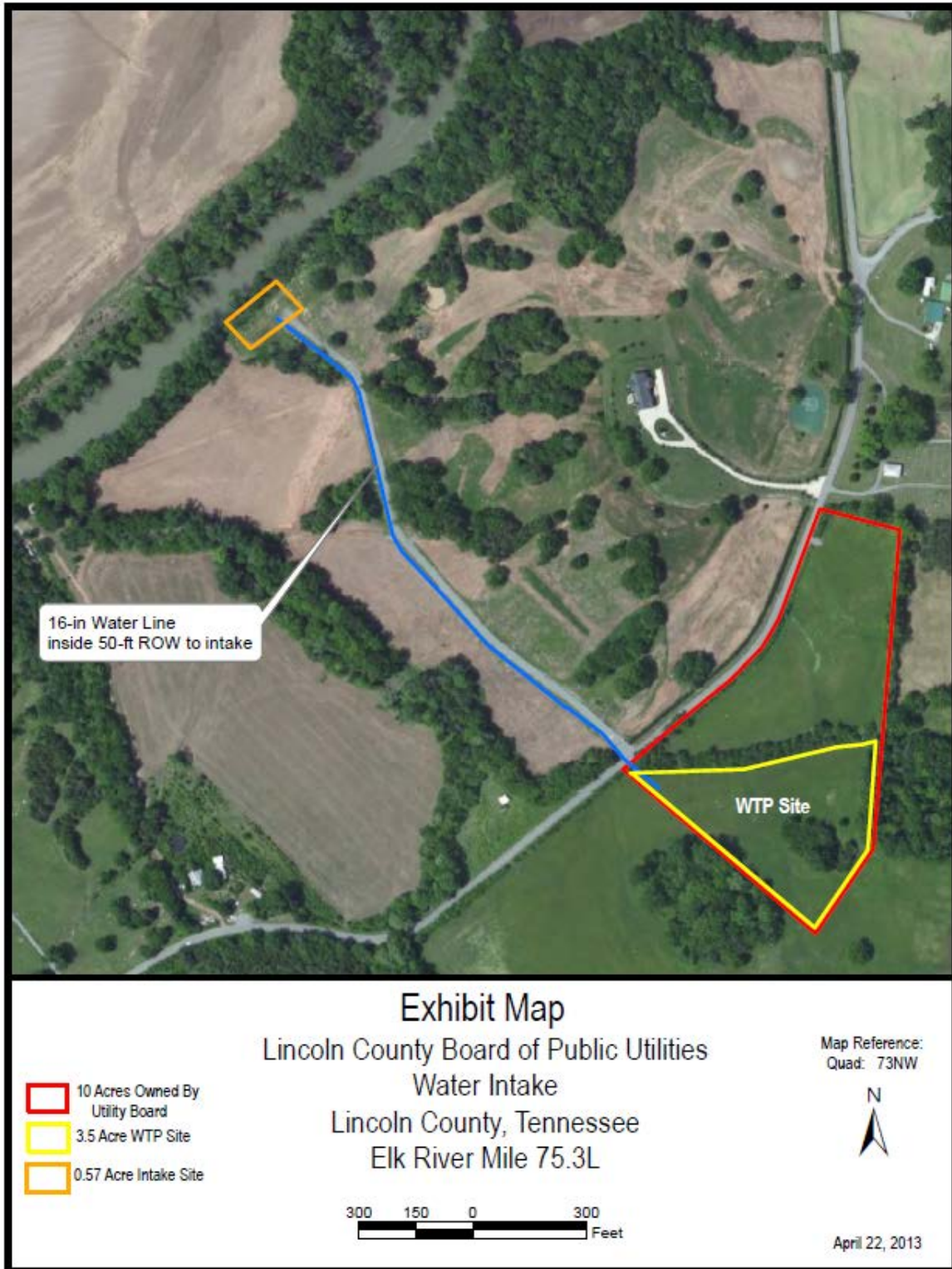


Figure 1. Proposed Raw Water Intake Location



**Figure 2. Proposed Areas of Construction**

## **Background**

In 2009, LCBPU applied for U.S. Army Corps of Engineers (USACE) and TVA permits for a RWI at Elk River Mile 75.3, left bank, in Lincoln County, Tennessee. As the lead agency at the time, the USACE advertised the proposed plan in a joint Public Notice 11-02, dated January 10, 2011 (Appendix A). In response to the public notice, the U.S. Fish and Wildlife Service (USFWS) expressed concerns about the potential impacts from water withdrawal on federally protected fish and mussels in the Elk River, especially larval boulder darters, which could be entrained by the water intake. The USFWS recommended the permit be held in abeyance until concerns regarding endangered fish and mussels were adequately addressed. The proposal was revised and the USFWS issued a biological opinion on the new plan (Appendix B). Because of a TVA mussel propagation project in the vicinity of the proposed intake, TVA took lead federal agency responsibility of coordination with USFWS pursuant to Section 7 of the Endangered Species Act. The USACE has determined that LCBPU's proposal is eligible for Section 404 Nationwide Permit No. 12, which became effective March 19, 2012, and thus categorically excluded it. Therefore, TVA is the lead agency in the preparation of the environmental assessment.

## **Other Environmental Reviews and Documentation**

The following environmental reviews and studies have been completed on the proposed water intake and associated line.

- USACE Memorandum For Record (USACE 2015)
- TVA Biological Assessment (2014)
- USFWS Biological Opinion (2014)
- Phase I Archaeological Survey (Duvall 2013)
- Mussel Survey (Lewis Environmental Consulting, LLC 2010)
- Indiana Bat Potential Habitat Assessment (Griggs & Maloney, Inc. 2013)
- Categorical Exclusion Checklist (TVA 2015)

## **Necessary Permits or Licenses**

In addition to approvals required from TVA and the USACE, other federal, state, and/or local approvals may be required for this work. The proposed action would be subject to the following additional environmental permit requirements and regulations.

- Tennessee Department of Environment and Conservation (TDEC) National Pollutant Discharge Elimination System (NPDES) Permit for discharges of storm water associated with construction activities.
- TDEC Storm Water Pollution Prevention Plan (SWPPP) to outline the best management practices (BMPs) for the NPDES permit.
- TDEC General Permit for Construction of Intake Structure.
- TDEC Aquatic Resource Alteration Permit (ARAP) or a §401 Water Quality Certification (§401 certification) for stream alterations.

## **Alternatives**

Scoping by TVA determined that from the standpoint of NEPA, two viable alternatives are available. These are the Action Alternative and the No Action Alternative as described below.

### **No Action Alternative**

Implementation of the No Action Alternative would result in the denial or withdrawal of the applicant's request for a Section 26a approval for construction of the RWI on the Elk River. LCBPU would continue to extract their water supply from wells in nearby communities. Relying on groundwater, which is highly limited and difficult to monitor available supply, is more expensive and increases potential exposure to contaminated groundwater. Groundwater treatment facilities are not as equipped to remove contaminants as surface water treatment systems. Under this Alternative, there would be no construction of the raw water intake and associated structures and the needs of the applicant would not be met.

### **Action Alternative**

Under the Action Alternative, the project would be approved as proposed. TVA would issue Section 26a approval for the construction of the RWI on the Elk River. The proposed actions include construction of a surface water withdrawal facility, comprised of a water intake, pump building and associated water treatment plant.

The new surface water intake structure would be constructed near the left descending bank of the Elk River, and include a 26 foot (ft) by 21.3 ft reinforced, concrete building above a 26 ft by 13.5 ft reinforced, concrete pump shaft. The concrete shaft would extend approximately 5 ft below the riverbed to provide an increased water depth for the pumps and allow sediment storage for reduced maintenance. The pump system would consist of three vertical turbine pumps with pump columns extending down into the shaft. Flow into the structure would pass through two, 21-inch (in) diameter, T-shaped, stainless steel, wedge, wire screens with 16-in inlet pipes bolted onto the intake structure (Figures 1 and 2, Appendix C).

Construction of the intake structure would require excavation of the riverbed and a portion of the left descending riverbank, and removing herbaceous vegetation, shrubs and trees on the bank within the project footprint. A 6 ft by 6 ft by 4 ft cofferdam, constructed with sacks of sand, would be installed within the Elk River channel to enclose and dewater the aquatic project footprint during instream construction activities. The cofferdam would extend approximately 38 ft into the river from the left descending bank, positioned approximately 71 ft upstream and 78 ft downstream, to enclose an approximately 3,200 square foot (ft<sup>2</sup>) instream area (Figure 3, Appendix C). The cofferdam would be constructed with a crane located upland and outside of the river channel, adjacent to the intake structure. Water levels within the cofferdam would be regulated via a hydraulic pump. No construction would take place on days when the cofferdam is over-topped by water (if there would be such an occurrence[s]), and all removal of trees from the riverbank would take place between October 15 and March 31 to avoid direct impacts to bats potentially present in trees during the summer roosting season.

To provide sufficient depth at the intake, LCBPU would excavate approximately 94,500 cubic feet (ft<sup>3</sup>) of upland material and 6,345 ft<sup>3</sup> of material from the riverbed to achieve an elevation of 611 ft above mean sea level (msl). Materials would be removed with rock hammers and a crane. Machinery would be restricted to bank/upland areas and within the cofferdam. Upon completing excavation, the reinforced concrete intake structure would be

constructed and intake screens installed. The area surrounding the intake structure would be backfilled with shot rock, native material, and approximately 70,200 ft<sup>3</sup> of excess excavated materials. Per the NPDES Permit, a Storm Water Pollution Prevention Plan would also be developed and implemented (Appendix B).

The proposed treatment plant site would be constructed on a 10-acre site. Raw water withdrawn from the Elk River would be routed through approximately 1,900 ft of 16-in pipe from the intake to the new treatment plant. The pipeline would require a 15-ft wide construction path that would disturb approximately 0.66-acre (Figure 4, Appendix C).

### **Other Alternatives Considered**

The LCBPU conducted an alternatives analysis which identified the below listed five alternatives to provide reliable water supply to present and future customers. This analysis was presented in LCBPU's 26a permit application.

- Alternative 1 – Purchase Water From Fayetteville
- Alternative 2 – Purchase Water from an Undetermined Watershed in Alabama
- Alternative 3 – Build a Reservoir
- Alternative 4 – Develop Additional Wells
- Alternative 5 – Withdraw Water From the Elk River

Alternatives 1 - 4 were deemed unfeasible due to cost, water quality and lack of sustainable water resources. For example, Fayetteville would be unable to provide a reliable water source LCBPU during drought periods, which would not allow LCBPU to service its customers. Additionally, LCBPU has also requested additional water supply from the cities of Fayetteville and Lewisburg, Tennessee, but these requests were denied. Alternative 5, Withdraw Water from the Elk River, was the most practical and cost effective option in order to provide the amount of water needed to sustain the customers of LCBPU. Therefore, the LCBPU submitted its 26a permit application for approval of Alternative 5. TVA reviewed the alternatives analysis during the application process and concurred with the analysis. The other alternatives were dismissed from further review.

### **Preferred Alternative**

TVA's preferred alternative is the Action Alternative, under which TVA would issue a Section 26a approval for the proposed RWI structure and associated facilities.

## **Affected Environment and Anticipated Impacts**

### **Site Description**

The proposed action would occur within the mainstem Elk River, on the left descending riverbank and in adjacent floodplain areas, south of the river, in west-central Lincoln County, Tennessee. The action area would include a total of approximately 17.7 ac of aquatic and terrestrial areas, which would consist of the project footprint, land owned by Lincoln County surrounding the proposed water treatment plant and areas of the Elk River channel outside of the project footprint (Figure 2). The action area would be in a rural setting, comprised of the river channel, riparian corridor, small woodlots, agricultural lands (pasture and crop lands) and roads.



The proposed water treatment plant site would be located on approximately 3.5 acres of a 10- acre site owned by the applicant (Figure 2). The site is located east of the RWI site adjacent to Old Molino Road. The 3.5-acre site consists of agricultural fields (uncut hay) bordered on the north by a tributary to Dry Creek (a blue line stream riparian zone); to the east by woods and open field/pasture; to the south by open field/pasture and a copse; the property comes to a point in the west and does not have any significant adjacent property. The only woody vegetation is located along the fencerows and in the middle of the property.

### **Impacts Evaluated**

TVA has conducted an environmental review of the proposed project with input from specialists by completing a Categorical Exclusion Checklist (Appendix D). The checklist identifies the resources present in the project area and documents TVA's determination that the proposal would not significantly affect these resources.

As documented in the Checklist and associated studies, the proposal would have no effect to cultural resources or endangered, special status plant or wildlife species, wetlands, navigation, or water quality. No cultural resources were identified in the project area. TVA conducted a review of its Natural Heritage Database and found two state-listed plant species (American ginseng and Water Stitchwort) located within a 5-mile radius of the project location. The habitat at and adjacent to the project site does not appear suitable for the identified species. Therefore the listed plant species would not be impacted by the project.

In accordance with Section 106 of the NHPA, the Tennessee State Historic Preservation Officer (SHPO) was consulted to assess the potential of the proposed actions to affect historic properties. A Phase I survey was conducted and concluded that no cultural resources were identified in the project area. The Tennessee SHPO concurred with TVA's determination that the proposed action would not affect any historic properties.

The following environmental issues were identified by TVA in the checklist as needing additional analysis: water supply, aquatic ecology, wildlife, aquatic threatened and endangered species, and floodplains.

### **Water Supply**

Several counties and municipalities in Tennessee and Alabama use the Elk River as a water supply. Water intakes are located at various points along the waterway. LCBPU supplies water to over 90 percent (%) of the unincorporated areas of Lincoln County. Currently, Lincoln County has a cumulative average water consumption rate (including system losses) of 2.2 mgd, most of which is extracted from wells in the Flintville, Taft, and Elora areas, with a combined firm capacity of 1.7 mgd.

LCBPU has taken steps over the past 10 years towards reducing water losses. Although significant losses of water occur in the existing system, LCBPU's efforts to date have succeeded in identifying only a few locations where water loss was occurring. Apparently, the water losses are a result of shortages that cannot be accounted for, small leaks, service theft and metering inaccuracies. Water loss over the last 10 years has generally ranged from 43% to 48%. Currently, water loss ranges from 39% to 43%. The current water supply has significant losses of water in the systems that have not been identified, and the groundwater supply to the wells is unreliable during sustained periods of dry weather.

However, even if water loss was reduced more significantly, it would not eliminate the need for the proposed Elk River water withdrawal facility due to the current demand and certain growth of the service area. Over the next several decades, increasing population in LCBPU's service area is expected to increase water supply needs. LCBPU's proposed facility would be capable of withdrawing 4.0 mgd.

**Alternative A – No Action Alternative**

Under the No Action Alternative, TVA would not issue Section 26a approval for the proposed construction of the new RWI. LCBPU would continue to address water losses resulting from leaks in its existing water supply system and the current water supply would continue to be extracted from wells, which are unreliable during sustained periods of dry weather. Therefore, adverse water supply impacts would continue under the No Action Alternative.

**Alternative B – Action Alternative**

Under the Action Alternative, TVA would issue Section 26a approval for the construction of the RWI. Approval of the proposed action would allow LCBPU to supplement water supplies for unincorporated areas in Lincoln County. Implementing the project is not anticipated to result in a change in the hydrology of the Elk River. Water withdrawn from the river would be returned to the water table via septic treatment facilities and groundwater recharge. Evaporative and consumptive losses would be minimal. Based on the low flow data that has been computed for this location, it is assumed that the permitted volume of water withdrawal will likely have no effect on minimum flows. The maximum peak daily water withdrawal would be limited and the LCBPU would be responsible for annually reporting the amount of water withdrawn and used to TVA. However, if future data collection and statistical analyses on stream flows are conducted and withdrawals are determined to impact minimum flows in the stream, TVA or the state could limit future withdrawal increases. The water withdrawal is anticipated to have minor direct and indirect impacts on the water supply of the Elk River. With measures in place by TVA to monitor and control water withdrawal and minimum flows, no cumulative impacts on water supply of the Elk River are anticipated.

**Aquatic Ecology**

The Elk River is approximately 195 miles in length and drains approximately 2,250 square miles (mi<sup>2</sup>) in south-central Tennessee and north-central Alabama (TVA 1962; Shepard et al. 2009). The Elk River originates in Grundy County, Tennessee and empties into a reach of the Tennessee River impounded by Wheeler Reservoir at Tennessee River Mile (TRM) 285, approximately 10 miles upstream of TVA's Wheeler Lock and Dam at TRM 275 (USACE 2011).

**Alternative A – No Action Alternative**

Under the No Action Alternative, TVA would not issue Section 26a approval for the proposed construction of the new RWI. Environmental conditions in the project area would remain unchanged. Therefore, no direct, indirect, or cumulative impacts to aquatic ecology would result under the No Action Alternative.

**Alternative B – Action Alternative**

Under Alternative B, TVA would issue Section 26a approval for the proposed construction of the new RWI. Sediment runoff from soil disruption and construction would be minimized through implementation of BMPs. Nonetheless, some disturbance of the river bank and some level of storm water runoff from the disturbed area could temporarily suspend fine

substrate particles into the water column. Approximately one acre of aquatic habitat could be impacted due to changes in flow levels and riverbed composition. The proposed action would result in a small loss of wetted-channel perimeter during project operations, and would encompass the sites where instream construction activities would occur. Since excavation activities would occur in the dewatered area within the cofferdam, it is anticipated that turbidity would likely be contained within this area and any increased turbidity in the water column outside of the cofferdam would be minimal. Installation of the cofferdam and intake structure would alter flows during construction. Water pumped from within the cofferdam would be subject to permit limits established during construction permitting. These limits would be protective of aquatic resources in the Elk River outside of the project area.

Aquatic organisms living in the vicinity of the construction area could be impacted by sediment deposition. Disturbance during construction can cause temporarily elevated levels of fine sediments, which can impair respiration, feeding, and reproductive activities of fish and invertebrates under varying circumstances. However, most aquatic animals (fish, mobile invertebrates) are capable of moving to preferred habitat conditions. There would be temporary and minor direct and indirect impacts to some aquatic resources under the Action Alternative. No cumulative impacts are anticipated as construction will be temporary and minor and sediment deposition would subside once work is completed.

### **Threatened and Endangered Species**

The Endangered Species Act (ESA) requires federal agencies to conserve listed species and to determine the effects of their proposed actions on endangered and threatened species and their critical habitat. Endangered species are those determined to be in danger of extinction throughout all or a significant portion of their range. Threatened species are those determined to be likely to become endangered within the foreseeable future. Section 7 of the ESA requires federal agencies to consult with the USFWS when their proposed actions may affect endangered or threatened species and their critical habitats.

### ***Aquatic Species***

A July 2015 review of the TVA Natural Heritage Database and county records managed by the USFWS indicated 10 federally-listed and 3 state-listed aquatic species that may occur within 10 miles of the proposed project area (Table 1, Appendix D). The federally endangered boulder darter is the only species that could potentially occur within the project area. Additionally, the project area within the Elk River lies within designated critical habitat for the fluted kidneyshell and slabside pearl mussel. The other federally-listed and state listed species do not occur in or adjacent to the project area.

A mussel survey was conducted in July 2010 at the area of the proposed intake structure as well as upstream, downstream, and adjacent to buffers and island habitats occurring upstream and downstream of the proposed project location (Appendix E). No slabside pearl mussels were found within the action area. There was a sparse mussel community with at least 12 live species occurring at very low densities and unfavorable habitat conditions in the immediate vicinity of the proposed project. Additionally, the designated critical habitat for the fluted kidneyshell in the Elk River is currently unoccupied by the species. The most significant mussel resource in the area is approximately a half mile upstream of the construction easement and no significant mussel resource was detected downstream of the proposed construction area (Appendix B).

Based upon past TVA monitoring records, a total of 13 boulder darters have been collected or observed in the action area since 2000 (Appendix B). Therefore, based upon these recent occurrences within the action area, boulder darters likely continue to occur within the project area and work activities associated with the proposed action could potentially affect any individuals present within the action area.

**Alternative A – No Action Alternative**

Under the No Action Alternative, TVA would not issue Section 26a approval for the proposed construction of the new RWI. Environmental conditions in the project area would remain unchanged. Therefore, no direct, indirect, or cumulative impacts to threatened and endangered species or designated critical habitat would result under the No Action Alternative.

**Alternative B – Action Alternative**

Due to the presence of federally-listed species and designated critical habitat in the proposed project area, TVA completed a comprehensive analysis of effects on these resources in its January 2014 Biological Assessment (BA). In the BA, TVA concluded that the proposed action would adversely affect boulder darters, but would not adversely affect the other federally listed species or adversely modify designated critical habitat. By a letter dated June 17, 2014, the USFWS agreed with this determination. The USFWS's rationale for these determinations is provided in its final BO for the proposed project (Appendix B). The USFWS indicated that the BO completed formal consultation for the project as required by the ESA and fulfills the obligations in accordance with Section 7 of that act. The BO included an Incidental Take Statement permitting take of boulder darter, as well as non-discretionary Terms and Conditions designed to minimize potential impacts to the boulder darter and designated critical habitat for the fluted kidneyshell and slabside pearlymussel (Appendix B).

In the BO, the USFWS concluded that the proposed action is not likely to jeopardize the continued existence of the boulder darter, and is not likely to destroy or adversely modify designated critical habitat for the fluted kidneyshell and slabside pearlymussel. This determination was made because 1) the proposed action area would be small relative to the boulder darter's range-wide distribution in the Elk River basin and the total amount of critical habitat designated for the fluted kidneyshell and slabside pearlymussel in the Elk River, and therefore, only small fractions would be affected by the action; 2) potential effects during construction would be temporary and of short duration; 3) the likelihood of lethal take of the boulder darter and impacts to fish host species for the fluted kidneyshell and slabside pearlymussel would be low with properly engineered and correctly installed project components, adherence to BMPs, regular maintenance of the intake structure/intake screen, and effectiveness monitoring to ensure the intake structure, intake screen and other project components are functioning as intended (i.e., with minimal or no apparent effects to the boulder darter); 4) any losses of suitable boulder darter habitat and designated critical habitat for the fluted kidneyshell and slabside pearlymussel from intake operations would be small and discountable. No critical habitat has been designated for the boulder darter; therefore, none would be affected.

The USFWS estimates that a small, unknown number of boulder darters within the 1.1 acres of aquatic habitat within the Elk River would be taken in the form of either lethal harm or harassment as a result of the proposed action. The following Terms and Conditions (T&C) of the BO will be incorporated into TVA and USACE permit approvals. T&C 11 has already been fulfilled by the applicant.

- 1 - LCBPU will implement the proposed action as described in the BA; the BA's supporting documentation, and the biological opinion.
- 2 - All rock materials transported to the work site will be durable and free of excessive fines.
- 3 - All fill materials, either excavated on-site or transported to the project site during project implementation, must be placed outside of the active flow channel at a minimum distance of the first terrace to minimize the potential for runoff from these materials into the Elk River; storage of fill materials on the project site will be temporary and cease upon completion of all construction.
- 4 - All heavy equipment and trucks will be cleaned, refueled and stored, when not in use, in a designated staging area, located a minimum of 300 ft from the ordinary high water mark (OHW) of the Elk River.
- 5 - All heavy equipment will carry oil-absorbent booms at all times when operating; each piece of equipment shall carry a boom with no less than 15-gallon absorbency capacity.
- 6 - The project shall be completed expeditiously, and the river bottom, riverbank, riparian corridor and any areas disturbed with the floodplain (including the staging areas, where equipment storage, cleaning and fueling, and work/laydown would occur, and equipment access points) shall be restored as close to pre-implementation conditions as possible.
- 7 - Water pumped out of the area enclosed by the cofferdam shall be held in a constructed settling basin(s) or filtered to ensure it is clean prior to its discharge back into the Elk River.
- 8 - If concrete is poured in or near the river during project implementation, an aquatic biologist or hydrologist must be present to monitor pH levels in the Elk River. If spillage or leakage of concrete into the Elk River is observed, pouring will cease immediately and not resume until the source of the spill or leak is located, the USFWS is notified of the spill or leak, and corrective action is taken to prevent further spillage or leakage.
- 9 - Removal of riparian vegetation will be kept to a minimum. Following completion of construction activities, disturbed riverbank and floodplain areas will be immediately replanted with native tree and shrub species, and/or native or close equivalent grass species. All banks disturbed by project activities will be inspected, and replanted as needed, until vegetation is successfully reestablished. The USFWS's TFO in Cookeville, Tennessee (telephone: 931/528-6481), Lincoln County, Tennessee, Soil Conservation District (telephone: 931/438-2450, ext. 3), or University of Tennessee Extension Lincoln County (telephone: 931/433-1582) can be contacted for assistance in selecting the appropriate plant species and can provide information regarding planting methods.
- 10 - Use of bioengineering methods (soft, vegetative approaches) is preferred for long-term stabilization of riverbanks and is recommended over excessive use of hard structures (e.g., riprap) to minimize potential impacts to the boulder darter and other aquatic organisms, water quality, and riparian and instream habitats. Bioengineering techniques might include, but not be limited to, use of geotextile fabrics, layering with

willow cuttings, construction of brush mattresses, fascines or vegetated geogrids, joint-planting willows into riprap, and use of a stinger to plant cuttings on upper riverbanks.

11 - The water intake screen design will minimize the potential uptake of boulder darters. LCBPU and/or their consultants will allow adequate time to coordinate with and obtain approval from the USFWS and TWRA regarding the intake screen design, prior to construction of the intake, and the final design will incorporate recommendations from the USFWS and TWRA to minimize impacts to the boulder darter.

12 - Instream work is scheduled to occur in 2018 (Howard, personal communication, 2014c). The TVA and USACE will ensure pre-construction boulder darter monitoring is conducted annually over a minimum of three consecutive years and post-construction boulder darter monitoring is conducted annually over a minimum of five consecutive years. TVA will establish a monitoring station at the intake site to monitor boulder darter use of the area and document any trends in the number of individuals (either up or down) occupying the area. Monitoring should also address effectiveness of the intake structure/intake screen in preventing incidental take of boulder darters and document any observed take associated with the intake or potential post-project failures (riverbank sloughing, channel instability issues, etc.). The first year of post-project monitoring should occur and be documented relatively soon after completion of construction. While boulder data collected from pre- and post-project monitoring efforts can be included along with TVA's ongoing boulder darter monitoring efforts in the Elk River to assess population trends, the data will not be considered or used to satisfy any of TVA's required commitments in the 2006 Biological Opinion – Routine Operations and Maintenance of TVA's Water Control Structures in the Tennessee River Basin.

13 - Because project implementation will not be initiated until 2018, LCBPU will repeat the mussel survey that was conducted from ERM 75 to ERM 75.8 during July 2010 (Lewis Environmental Consulting, LLC 2010) to ensure that the status of federally listed freshwater mussel species has not changed within and in the near vicinity of the action area (i.e., listed mussels would be found inhabiting this reach of the Elk River). This survey would occur within the 12-month period prior to project implementation.

14 - LCBPU will revisit with the TVA and USACE within 3 to 6 months of project implementation to determine if any new species have been listed or critical habitat designated that may be affected by the action. If it is discovered that new species have been listed or critical habitat designated, reinitiation of formal consultation will be required.

### ***Wildlife Species***

The federally listed endangered gray bat, Indiana bat, and threatened northern long-eared bat are known from or likely to occur within Lincoln County.

Gray bats roost in caves year-round and migrate between summer and winter roosts during spring and fall (Brady et al. 1982, Tuttle 1976). Bats disperse over bodies of water at dusk where they forage for insects emerging from the surface of the water (Harvey 1992).

Indiana bats hibernate in caves in winter and use areas around them for swarming (mating) in the fall and staging in the spring, prior to migration back to summer habitat. During the summer, Indiana bats roost under the exfoliating bark of dead snags and living trees in mature forests with an open understory and a nearby source of water (Pruitt and TeWinkel 2007, Kurta et al. 2002).

Northern long-eared bats roosts in caves or cave-like structures (such as buildings and mines) in the winter, while summer roosts are typically in cave-like structures as well as live and dead trees with exfoliating bark and crevices. Northern long-eared bats tend to forage within the mid-story and canopy of upland forests on hillsides and ridges (USFWS 2014).

In June 2013, Griggs & Maloney, Inc. conducted an Indiana bat Potential Habitat Assessment on approximately 13.5 acres owned by LCBPU. Approximately four acres is proposed for development and LCBPU also owns an adjacent 10 acres that was included in the Potential Habitat Assessment but is not being developed at this time. The findings of the assessment indicated five potential habitat trees are present in the proposed construction area for the water intake structure.

### **Alternative A – No Action Alternative**

Under the No Action Alternative, TVA would not issue Section 26a approval for the proposed construction of the new RWI. Environmental conditions in the project area would remain unchanged. Therefore, there would be no direct, indirect, or cumulative impacts to wildlife T&E species under the No Action Alternative.

### **Alternative B – Action Alternative**

Under the Action Alternative, TVA would issue Section 26a approval for the construction of the RWI. As noted above, there is suitable tree habitat in the project area for the listed bat species. No caves were identified within a 3-mile radius per the TVA Natural Heritage Database. TVA would require LCBPU to remove trees in the project area between October 15 and March 31 in order to avoid direct impacts to threatened and endangered bat species potentially present in trees during the summer roosting season. The removal of five potential habitat trees would have minor direct and indirect impact to the listed bat species. With the implementation of this mitigation measure, there would be no cumulative effect to the listed bat species.

### **Floodplains**

The proposed dredging, excavation, temporary cofferdam, intake piping, and bank stabilization would occur within the 100-year floodplain (642 feet mean sea level). The proposed intake tower, carbon feed room, and parking area would be constructed outside the 100-year floodplain.

### **Alternative A – No Action Alternative**

Under the No Action Alternative, TVA would not issue Section 26a approval for the proposed construction of the new RWI. Environmental conditions in the project area would remain unchanged. Therefore, there would be no direct or indirect impacts to floodplains under the No Action Alternative.

### **Alternative B – Action Alternative**

Under the Action Alternative, TVA would issue Section 26a approval for the construction of the RWI. To minimize adverse impacts, all electrical controls for the RWI pumps would be located above the 500-year flood elevation, and the excavated and dredged material would be located at an inland site outside the 100-year floodplain. The proposed actions are consistent with Executive Order 11988 and are considered to be repetitive actions in the floodplain that should result in minor impacts. The project would comply with the TVA Flood Control Storage Loss Guideline because there would be no loss of flood control storage. Therefore, there would be minor direct and indirect impacts to floodplains under the Action Alternative.

### **Special Conditions and Mitigation Measures**

The project has been designed to minimize adverse environmental impacts, and would be subject to TDEC's Aquatic Resource Alteration Permit (ARAP) and Water Quality Certification. TVA would require that LCBPU would remove trees in the project area between October 15 and March 31 to avoid direct impacts to threatened and endangered bat species potentially present in trees during the summer roosting season. This mitigation measure would be included in TVA's Section 26a Permit General and Standard Conditions.

To avoid impacts to endangered species, the TVA, USACE and LCBPU must comply with the terms and conditions (T&Cs) outlined in the BO (Appendix B). While these T&Cs were specifically designed to address potential effects to the boulder darter, USFWS anticipate that implementation of these measures would also minimize potential for impacts to designated critical habitat for the fluted kidneyshell and slabside pearl mussel. TVA would include the below mitigation measures in the 26a permit to LCBPU to comply with the BO.

- LCBPU will implement the proposed action as described in the BA; the BA's supporting documentation, and the biological opinion.
- All rock materials transported to the work site will be durable and free of excessive fines.
- All fill materials, either excavated on-site or transported to the project site during project implementation, must be placed outside of the active flow channel at a minimum distance of the first terrace to minimize the potential for runoff from these materials into the Elk River; storage of fill materials on the project site will be temporary and cease upon completion of all construction.
- All heavy equipment and trucks will be cleaned, refueled and stored, when not in use, in a designated staging area, located a minimum of 300 ft from the OHW of the Elk River.
- All heavy equipment will carry oil-absorbent booms at all times when operating; each piece of equipment shall carry a boom with no less than 15-gallon absorbency capacity.



- The project shall be completed expeditiously, and the river bottom, riverbank, riparian corridor and any areas disturbed with the floodplain (including the staging areas, where equipment storage, cleaning and fueling, and work/laydown would occur, and equipment access points) shall be restored as close to pre-implementation conditions as possible.
- Water pumped out of the area enclosed by the cofferdam shall be held in a constructed settling basin(s) or filtered to ensure it is clean prior to its discharge back into the Elk River.
- If concrete is poured in or near the river during project implementation, an aquatic biologist or hydrologist must be present to monitor pH levels in the Elk River. If spillage or leakage of concrete into the Elk River is observed, pouring will cease immediately and not resume until the source of the spill or leak is located, the USFWS is notified of the spill or leak, and corrective action is taken to prevent further spillage or leakage.
- Removal of riparian vegetation will be kept to a minimum. Following completion of construction activities, disturbed riverbank and floodplain areas will be immediately replanted with native tree and shrub species, and/or native or close equivalent grass species. All banks disturbed by project activities will be inspected, and replanted as needed, until vegetation is successfully reestablished. The USFWS's TFO in Cookeville, Tennessee (telephone: 931/528-6481), Lincoln County, Tennessee, Soil Conservation District (telephone: 931/438-2450, ext. 3), or University of Tennessee Extension Lincoln County (telephone: 931/433-1582) can be contacted for assistance in selecting the appropriate plant species and can provide information regarding planting methods.
- Use of bioengineering methods (soft, vegetative approaches) is preferred for long-term stabilization of riverbanks and is recommended over excessive use of hard structures (e.g., riprap) to minimize potential impacts to the boulder darter and other aquatic organisms, water quality, and riparian and instream habitats. Bioengineering techniques might include, but not be limited to, use of geotextile fabrics, layering with willow cuttings, construction of brush mattresses, fascines or vegetated geogrids, joint-planting willows into riprap, and use of a stinger to plant cuttings on upper riverbanks.
- Instream work is scheduled to occur in 2018 (Howard, personal communication, 2014c). The TVA and USACE will ensure pre-construction boulder darter monitoring is conducted annually over a minimum of three consecutive years and post-construction boulder darter monitoring is conducted annually over a minimum of five consecutive years. Monitoring should also address effectiveness of the intake structure/intake screen in preventing incidental take of boulder darters and document any observed take associated with the intake or potential post-project failures (riverbank sloughing, channel instability issues, etc.). The first year of post-project monitoring should occur and be documented relatively soon after completion of construction.
- Because project implementation will not be initiated until 2018, LCBPU will repeat the mussel survey that was conducted from ERM 75 to ERM 75.8 during July 2010 (Lewis Environmental Consulting, LLC 2010) to ensure that the status of federally

listed freshwater mussel species has not changed within and in the near vicinity of the action area (i.e., listed mussels would be found inhabiting this reach of the Elk River). This survey would occur within the 12-month period prior to project implementation.

- LCBPU will revisit with the TVA and USACE within 3 to 6 months of project implementation to determine if any new species have been listed or critical habitat designated that may be affected by the action. If it is discovered that new species have been listed or critical habitat designated, re-initiation of formal consultation will be required.

### **TVA Preparers**

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### **Environmental Assessment Recipients**

#### **Federal Agencies**

United States Army Corps of Engineers, Nashville District  
United States Fish and Wildlife Service, Cookeville Office

#### **State Agencies**

Tennessee Historical Commission

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