Index Field: Project Name:

Document Type: EA-Administrative Record **Environmental Assessment** Limestone County Water and Sewer Authority Easement

Project Number: 2012-01

LIMESTONE COUNTY WATER AND SEWER AUTHORITY EASEMENT **ENVIRONMENTAL ASSESSMENT**

Limestone County, Alabama

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April 2013

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Symbols, Acronyms, and Abbreviations

§	Section
ADEM	Alabama Department Environmental Management
AHC	Alabama Historical Commission
APE	Area of Potential Effect
AST	AST Environmental Group
BMPs	Best Management Practices
CEC	Categorical Exclusion Checklist
CFR	Code of Federal Regulations
CWA	Clean Water Act
EA	Environmental Assessment
e.g.	Latin term, exempli gratia, meaning "for example"
EO	Executive Order
ESA	Endangered Species Act
FRP	Flood Risk Profile
HDD	Horizontal Directional Drilling
LCWSA	Limestone County Water and Sewer Authority
msl	mean sea level
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
RFAI	Reservoir Fish Assemblage Index
SFI	Sport Fishing Index
SHPO	State Historic Preservation Officer
SWPPP	Stormwater Pollution Prevention Plan
TRM	Lennessee River Mile
TVA	Lennessee Valley Authority
U.S.	United States
USACE	U.S. Army Corps of Engineers
	U.S. FOREST SERVICE
USEWS	
WIMA	wildlife wanagement Area

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CHAPTER 1 – PURPOSE AND NEED FOR ACTION

The Limestone County Water and Sewer Authority (LCWSA) proposes to install a new water pipeline to provide water service to portions of southeast Limestone County, Alabama. The future water supply demands of Limestone County indicate that the existing 16-inch diameter water connection is inadequate and a 30-inch diameter water transmission line is needed.

Therefore the LCWSA proposes to install 14,700 feet of a 30-inch diameter municipal water transmission line across the Tennessee River at Tennessee River Mile (TRM) 304.6 in Limestone County (Figure 1-1). Of the 14,700 feet of pipeline, approximately 8,600 feet would occupy property held by the Tennessee Valley Authority (TVA) (Figure 1-2). This action would require an approximate 4-acre grant of easement from TVA over the relevant property. The LCWSA is also requesting a temporary construction license for a 30-foot-wide corridor to parallel the proposed pipeline for trench spoil holding, pipe lay down and equipment movement. The proposed action would allow LCWSA to purchase approximately 10 million gallons per day of potable water from Decatur Utilities, located in Morgan County, Alabama. Decatur Utilities has ample water supply capacity and would not need to increase their current approved water withdrawal of 68 million gallons per day from Wheeler Reservoir to supply water to LCWSA.

1.1 Background

The LCWSA initially submitted an application to TVA and the U.S. Army Corps of Engineers (USACE) in 2007. The USACE issued joint Public Notice 07-55 for that proposal. The application was subsequently withdrawn due to a contract negotiation failure between Limestone County and the City of Decatur. The LCWSA resubmitted the applications in January 2012. The USACE and the State of Alabama issued a Joint Public Notice 12-05 on April 9, 2012 and TVA released its public notice on April 23, 2012 for the proposed action (Appendix A). The USACE received comment letters from the U.S. Fish and Wildlife Service (USFWS) and Alabama Historical Commission (AHC). TVA did not receive any comments on its public notice.

The route of the proposed water pipeline would cross the TVA Decatur-General Motors 161-kilovolt transmission line. In a letter of April 9, 2012, TVA informed the LCWSA that TVA has no objection to the transmission line crossing provided due caution is used and that the water line and its associated valves are buried such that the line would not be damaged by heavy equipment used by TVA for right-of-way maintenance.

1.2 Decision to be Made

TVA will decide whether to approve the construction and installation of a water main pipeline under a grant of a permanent easement over approximately 4 acres of TVA land to accommodate the construction, operation, and maintenance of the water pipeline. TVA will also decide whether to grant a temporary construction license over approximately 6 acres of TVA property. The decision before the USACE is whether to issue a Department of the Army permit pursuant to Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. TVA is the lead federal agency in the preparation of this environmental assessment (EA) and the USACE is a cooperating agency.







Figure 1-2 Proposed Water Transmission Line

1.3 Scope of the Environmental Assessment

TVA conducted a preliminary internal review by a network of designated environmental specialists. Based on its internal scoping, TVA determined that the following resources could be potentially affected by the proposed action. Thus potential effects to the following resources are addressed in this EA:

- Cultural and Historic Resources
- Aquatic Ecology
- Wetlands
- Recreation and Natural Areas
- Terrestrial Ecology
- Water Quality
- Floodplains

Potential effects related to solid and hazardous waste, transportation, prime farmland, health and safety, geology, land use, navigation, air quality and global climate change were also considered. However, potential effects to these resources were found to be absent or minor, and these resources were not considered further.

1.4 Other Permits, Licenses, and Approvals

The proposed action requires permits from the USACE pursuant to Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act (CWA). Water quality certification from the Alabama Department of Environmental Management (ADEM) pursuant to Section 401(a)(1) of the CWA must be obtained. A National Pollutant Discharge Elimination System Permit for discharges of stormwater associated with construction activities and a stormwater pollution prevention plan (SWPPP) would be required. Construction best management practices (BMPs) to minimize impacts to water quality would be outlined in the SWPPP (See Section 3.2 for more information).

CHAPTER 2 - ALTERNATIVES

A description of the proposed action and its alternatives, together with a brief comparison of their potential environmental effects, are contained in this chapter.

2.1 Description of Alternatives

Based on preliminary internal scoping, TVA has determined that from the standpoint of the National Environmental Policy Act (NEPA), there are two alternatives available. These are Alternative A (the No Action Alternative), and Alternative B (the Proposed Action Alternative).

2.1.1 Alternative A – The No Action Alternative

Implementation of the No Action Alternative would result in the denial or withdrawal of the applicant's request for a permanent easement over TVA land for the proposed installation of the 30-inch water main pipeline. The consequences of this alternative would not meet the needs of the applicant for providing water service to southeast Limestone County.

2.1.2 Alternative B – The Proposed Action Alternative

Under the Proposed Action Alternative, the project would be approved as originally proposed (See Section 1.0 for more information). TVA would grant a permanent easement over approximately 4 acres of land on Wheeler Reservoir at TRM 304.6 (right bank, facing downstream) for the installation of a 30-inch diameter water main pipeline. Of the 8,600 feet pipeline on TVA property, 2,900 feet would be on land and 5,700 would be under water. TVA would also grant a temporary construction license over approximately 6 acres of TVA property. TVA would impose conditions in the agreements, and the applicant would implement these conditions to minimize or reduce environmental effects of the proposed project to levels of insignificance or mitigation to offset adverse project impacts (Section 2.3).

Two methods of pipeline installation would be required to construct the project. These are horizontal directional drilling (HDD) and traditional trenching and backfill. HDD would allow installation under the navigation channel while minimizing impacts to navigation. However, the total width of the river (approximately 7,500 feet) exceeds the capacity of HDD to install the pipeline in one piece, so trenching would also be required. Just after crossing onto TVA property on the north side of the navigation channel, the installation would transition to marine trenching operations that would use a shallow draft barge to trench, assemble and lay the pipe. HDD would be approximately 1,800 feet across the navigation channel, while traditional trenching and backfill would be used for a 20-foot wide corridor across approximately 5,700 feet of river overbank east of the navigation channel (Appendix A). The trenched pipeline would be installed over a bed of crushed stone, then backfilled with a minimum 3-feet cover from original stockpiled soils to preconstruction grade. Floating turbidity barriers would be utilized to minimize siltation caused by construction activities. According to submitted plans, the proposed pipeline would be a minimum of 3 feet below existing bottom grade during trenching and 30 feet below channel elevation across the maintained portion of the navigation channel during HDD (Appendix A).

2.1.3 Alternatives Considered but Eliminated From Further Discussion

The LCWSA considered other routes for the proposed action. Available routes for the proposed water line are limited due to the width of the Tennessee River in the area, various commercial and private land owners, and potential for adverse cultural and endangered

species impacts at other potential crossing locations. Placement of the pipeline downstream of the railroad bridge is not financially feasible as the pipeline would need to be trenched under the railroad in order to tie into the existing water line. Also, the placement of the pipeline upstream of the US-31 Bridge is not practicable; as the pipeline would have to be trenched under US-31 to connect into existing infrastructure. In addition the pipeline would have to cross a portion of the Wheeler National Wildlife Refuge (north side of the river) owned by the USFWS. This route would require trenching under the berm around this portion of the refuge and could potentially impact additional wetlands and endangered species. The placement of the 30-inch water main pipeline on the US-31 bridge is not practicable because the bridge currently supports a waterline and a wastewater force main. The Alabama Department of Transportation would not allow additional attachments to the existing bridge. Another option of placing the water main pipeline on the CSX railroad bridge crossing was not received favorably by CSX. Therefore, the alignment that best meets the project and stakeholders goals and requirements is the placement of the waterline under the Tennessee River between the two bridges.

Comparison of Alternatives The environmental effects anticipated under the two alternatives considered are compared and summarized in Table 2-1.

Resource Area	Impacts From No Action Alternative	Impacts From Proposed Action Alternative
Cultural and Historic Resources	None	No indirect, direct, or cumulative impacts to historic properties
Water quality	None	Temporary direct, indirect and cumulative impacts would be insignificant with use of best management practices.
Aquatic Ecology	None	Direct, indirect and cumulative impacts would be insignificant.
		No indirect, direct, or cumulative impacts
Vegetation	None	Potential minor impacts to the spread of invasive, non-native species
		Temporary impacts during construction
Wetlands	None	Minor loss of forested wetland function, but no permanent loss wetland area.

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

2.2

Resource Area	Impacts From No Action Impacts From Proposed Alternative Alternative		
Wildlife	Nono	Temporary direct and indirect impacts to terrestrial species during construction	
	None	Temporary minor impacts to foraging habitat suitable for bald eagle and gray bat	
Recreation and	None	Temporary direct and indirect impacts during construction	
Natural Areas	None	No direct, indirect or cumulative impacts during operation	
Floodplains	None	No direct, indirect or cumulative impacts	

2.3 Identification of Mitigation Measures

LCSWA would adhere to the following conditions routine measures during site preparation, installation and operation of the proposed waterline:

- To minimize the spread of exotic or invasive terrestrial plant species, as directed by Executive Order (EO) 13112, LCWSA will use clean rock for road building, will not remove vegetation from the site, will clean all equipment before leaving the action areas, and will revegetate disturbed areas with native or non-native, non-invasive species.
- Use of floating turbidity barriers around all dredge activities and silt fences around all stockpiled dredge materials to reduce potential impacts to water quality in the vicinity of the proposed work.
- To minimize impacts to the floodplain, the following measures would be included as conditions of the easement agreement:
 - Any future facilities or equipment subject to flood damage would be located above or floodproofed to elevation 562.0.
 - Any future development proposed within the limits of the 100-year floodplain, elevation 559.1 would be consistent with the requirements of EO 11988.
 - All future development would be consistent with the requirements of the TVA Flood Control Storage Loss Guideline.

LCSWA would adhere to the following non-routine condition during site preparation, installation and operation of the proposed waterline:

To mitigate for the conversion of a 0.79 acre hardwood wetland to shrub-scrub • wetland, LCWSA would within 1-year after construction of the water pipeline, plant wetland trees to replace those that were removed from the corridor at a 1:1 ratio. For every wetland tree greater than or equal to 3-inch diameter at breast height that is removed; a 1-inch caliper sapling will be planted for every 1-inch of tree removed. For example, if a 20-inch caliper tree is removed, 20 1-inch caliper saplings will be planted. The tree planting would occur in the temporary construction area immediately adjacent to the impacted wetland areas in the proposed easement. The tree species planted will be a minimum of 1-inch caliper saplings and a mix of these native tree varieties; Quercus phellos, Betula nigra, Nyssa sylvatica, and Quercus nigra. LCWSA will document the trees removed, trees replanted, and submit all in a post-construction report. Tree survival will be monitored by LCWSA for five years after planting. A plant survivability of greater than 50 percent must occur with monitoring reports submitted on a yearly basis to both TVA and USACE by LCWSA. If survivability is less than 50 percent, additional plantings will be conducted by LCWSA and monitored for an additional 3 years with monitoring reports submitted on a yearly basis to both TVA and USACE by LCWSA.

2.4 The Preferred Alternative

TVA's preferred alternative is Alternative B, the Proposed Action Alternative.

CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the affected environment with respect to the resources evaluated in this EA. The affected environment, which is the portion of the existing environment that could be affected by the project, varies for each resource. The information in this chapter establishes the baseline conditions against which the potential effects of the alternatives may be compared. The potential effects of adopting and implementing the No Action Alternative and the Proposed Action Alternative on the various resources are also are provided in this chapter.

Potential effects related to solid and hazardous waste, transportation, prime farmland, health and safety, geology, land use, air quality and global climate change were also considered. However, potential effects were found to be absent or minor; thus, impacts to these resources do not require further evaluation. The proposed pipeline would be installed through HDD under the navigation channel; therefore, potential effects to navigation are not anticipated. The provision of more reliable and adequate water supply would be a minor beneficial effect to community infrastructure. The following environmental issues and concerns were identified based on internal scoping and on the analysis of comments received in response to the public notices.

3.1 Cultural Resources

3.1.1 Affected Environment

TVA has determined the area of potential effects (APE) to be the entire 14,700 feet long by 50-feet wide waterline right of way, the 2 laydown areas, and access road. The proposed disposal site for any excess spoil material from the proposed directional boring or trenching would be at commercial landfill and has no potential to effect cultural resources.

At the request of TVA, Panamerican Consultants conducted a Phase I terrestrial and underwater survey (Murray et al., 2012). One archaeological site, 1LI801, was identified during the survey. The site represents an extremely low-density lithic scatter. TVA finds that site 1LI801 is ineligible for the National Register of Historic Places (NRHP). Results of the underwater survey identified one sunken vessel, most likely a modern watercraft.

3.1.2 Environmental Consequences

Historic and cultural resources, including archaeological resources, are protected under various federal laws, including the Archaeological Resources Protection Act, the Native American Graves Protection and Repatriation Act, and the National Historic Preservation Act (NHPA). Section 106 of the NHPA requires federal agencies to consult with the respective State Historic Preservation Officer (SHPO) when proposed federal actions could affect these resources.

Alternative A

Because there would be no foreseeable change from current conditions, there would be no project-related effects to historic or archaeological resources under this alternative. Thus, no direct, indirect or cumulative effects to cultural resources are anticipated under Alternative A.

Alternative B

In accordance with Section 106 of the NHPA pursuant to, TVA consulted with the Alabama SHPO to assess the potential of the proposed actions to affect historic properties. A Phase I survey was conducted and no eligible historic properties were identified. In a letter dated November 19, 2012 the Alabama SHPO concurred with TVA's determination that the proposed undertaking would not affect any historic properties that are potentially eligible or currently listed in the NRHP (Appendix B).

TVA also consulted with federally recognized Indian tribes regarding properties within the proposed project's APE that may be of religious and cultural significance to them and eligible for the NRHP. TVA received no objection comments from the United Keetoowah Band of Cherokee Indians, the Muscogee (Creek) Nation of Oklahoma, the Chickasaw Nation, and the Cherokee Nation (Appendix B).

3.2 Water Quality

3.2.1 Affected Environment

Wheeler Dam (Tennessee River Mile [TRM] 275) impounded this portion of the Tennessee River in 1936. The dam has 11 hydroelectric generating units (361 megawatt capacity), two navigational locks, and maintains a reservoir pool elevation between approximately 551 feet mean sea level (msl) in the winter and 556 feet msl in the summer. The reservoir is bounded upstream by Guntersville Dam at TRM 349, making Wheeler Reservoir approximately 74 miles in length with 1,027 miles of shoreline and 67,070 acres of water surface. The project site at TRM 304.6 lies within the upper portion of the impounded zone, in contrast with the upstream reach of the reservoir that is more riverine in nature up to Guntersville Dam. Therefore, the river at the project site is extremely wide, has relatively low flow conditions, and is subject to significant deposition and accumulation of fine sediments such as clay and silt.

3.2.2 Environmental Consequences

Alternative A

Under Alternative A, the proposed project would not be undertaken and there would be no in-stream disturbances associated with project construction. Therefore, there would be no project-related direct, indirect or cumulative effects to water quality under Alternative A.

Alternative B

Under Alternative B, LCWSA would use trench/fill and directional drill methods to install a 30-inch diameter water line across approximately 8,600 feet of TVA property on Wheeler Reservoir. The currently proposed plans include use of floating turbidity barriers (silt screens) to minimize impacts to surface water quality during construction activities for the 5,700-foot portion of the pipeline to be installed under the reservoir.

Construction activities would likely generate large quantities of suspended sediments in the vicinity of the proposed actions. During construction, trenched materials would be temporarily stored in the vicinity. Erosion of stored trenched materials would also have potential to adversely impact water quality. LCWSA proposes to use BMPs (i.e., turbidity barriers) to minimize impacts to surrounding surface waters. Use of floating turbidity barriers around all trench activities and silt fences around all stockpiled dredge materials would greatly reduce potential impacts to water quality in the vicinity of the proposed work. The potential impacts would be temporary and no long-term impacts to surface water quality are likely. The proposed actions within the surface waters of Wheeler Reservoir

would potentially cause adverse impacts to water quality in the vicinity. However, with proper use of BMPs direct, indirect and cumulative impacts to surface water quality would be insignificant.

3.3 Aquatic Ecology

3.3.1 Affected Environment

The proposed pipeline would cross the Tennessee River at TRM 304.6 in Limestone and Morgan Counties, Alabama, which lies within the Wheeler Reservoir impoundment of the river. Two bridges cross the reservoir near the project. The United States (U.S.) Highway 31 Bridge is located upstream about one-half mile from the project, and the CSX Railroad Bridge crosses the river just downstream of the project. Mussel and mussel habitat surveys associated with evaluating the project site reported riverbed substrate in the original river channel was primarily silt-covered gravel and sand and the overbank portion of the river was primarily mixtures of silt and clay with significant accumulations of detritus and dead Asian clam shells (AST Environmental Group [AST] 2007, 2012). Those surveys also reported river depth in the river channel was up to 25 feet, and depth in the overbank area was up to 13 feet.

General Ecological Health of Wheeler Reservoir

TVA developed the Ecological Health Monitoring Program to determine reservoir health as compared to other reservoirs in the TVA system, provide data for comparing future water quality conditions, and to be a screening program for targeting more detailed studies if the need arises. The ecological health scoring system is based on five indicators: 1) dissolved oxygen; 2) chlorophyll, a measure of the amount of algae in the water; 3) sediment contaminants – PCBs, pesticides, and metals; 4) benthic macroinvertebrates; and 5) fish assemblage. Each indicator is evaluated separately and then individual ratings are combined into a single, composite score for each reservoir. Reservoir Ecological Health Monitoring is one of five components of TVA's overall river and reservoir monitoring effort, termed Vital Signs Monitoring. Other components of the monitoring program include: 1) examination of ecological conditions in tributary streams to the Tennessee River; 2) monitoring of toxic contaminants in fish flesh to determine their suitability for consumption; 3) evaluating the number and size of important game fish species to help ensure their populations remain abundant and robust; and 4) sampling of bacteriological concentrations at recreational areas to evaluate their suitability for water contact recreation.

TVA's overall Ecological Health Rating index for Wheeler Reservoir has typically rated between "fair" and "good" since 1994, but has ranked "poor" in 2007 and 2011 (TVA 2012a).

Benthic Monitoring

Benthic macroinvertebrates are included in aquatic monitoring programs because of their importance to the aquatic food chain, and because they have limited capability of movement. Consequently, macroinvertebrate communities are generally representative of the habitat and water quality conditions in a waterbody or stream reach. Sampling and data analysis that are indicative of good (and poor) water quality include species diversity and total abundance of all species (with exceptions such as taxa that are strongly indicative of poor water quality). TVA's benthic community scores within Wheeler Reservoir, the river reach containing the proposed project, were "Excellent" to "Good" in the inflow and transition reaches of the reservoir (the latter of which is within ten miles of the proposed

project), and "Poor" for the forebay site during the last five sampling events since 2003 (Table 3-1).

Vital Signs monitoring program in Wheeler Reservoir.							
Wheeler Reser	voir	2003	2005	2007	2009	2011	
Forebay TNRM	277	Poor	Poor	Poor	Poor	Poor	

Table 3-1	Recent (2001-200) benthic community scores ¹ collected as part of the
	Vital Signs monitoring program in Wheeler Reservoir.

Excellent

Excellent

Excellent

Excellent

Good

Excellent

Good

Good

Benthic Community Score: 7-12 (Very Poor), 13-18 (Poor), 19-23 (Fair) 24-29 (Good), 30-35 (Excellent)

Excellent

Excellent

Fisheries Monitoring

Transition TNRM 295.9 Inflow TNRM 347

Fish are included in TVA's reservoir health monitoring effort because they are important to the aquatic food chain and because they have a long life cycle that allows them to reflect water quality conditions over longer periods of time (i.e., years). Fish are also important to the public for aesthetic, recreational, and commercial reasons. Ratings are based primarily on fish community structure and function using a metric known as the Reservoir Fish Assemblage Index (RFAI). Also considered in the rating is the percentage of the sample represented by omnivore and insectivores, overall number of fish collected, and the occurrence of fish with anomalies such as diseases, lesions, parasites, deformities, etc., TVA's RFAI Index for Wheeler Reservoir rated "Good" to "Fair" for the past six years sampled (TVA 2012a).

A more specific fish monitoring index included as part of TVA's reservoir health monitoring includes the Sport Fishing Index (SFI), which was developed to measure sport fishing guality for various species in Tennessee and Cumberland Valley Reservoirs. The fish species included in the SFI are black bass, channel catfish, largemouth bass, smallmouth bass, spotted bass, white bass, and white crappie. The SFI is based on the results of fish population sampling by TVA and state resources agencies and, when available, results of angler success as measured by state resource agencies (i.e., bass tournament results and creel surveys). In 2008, Wheeler Reservoir rated above the valley-wide average for sport fish with the exception of striped bass and white crappie (TVA 2012b).

Native Mollusks

The native mussel fauna of the Tennessee River basin is one of the richest in the world. supporting 102 species within Tennessee (Parmalee and Bogan 1998) and 93 species in the reach falling within Alabama (Williams et al. 2008). This group of animals has changed dramatically in much of the Tennessee River over the last century due to loss of habitat (primarily from impoundment by dams), commercial mussel harvesting, water quality problems, and introduction of non-native species like the zebra mussel. Although many species have been decimated or lost, some species that are tolerant of low-flow habitats and finer substrates have persisted or invaded the Tennessee River reservoirs. Riverine habitat is now primarily found only in tailwaters downstream of dams, which have provided refuge habitat for many of the mussels historically found here.

Although much of the habitat at the project site is considered poor or marginal for freshwater mussels, some species still occur in this reach of the river, potentially including federally listed species. A survey was conducted in 2007 when the project was originally proposed (AST 2007), and a more recent survey was conducted (AST 2012) to update biological and habitat information at the site (Appendix C). Both surveys reported similar findings. Relatively few mussels were found in 2007 (52 individuals representing 10 live

species) and 2012 (114 live mussels representing nine species) compared to the more productive areas of the Tennessee River (Appendix C). No federally listed mussels were found, and the species collected were all common species that are tolerant of low-flow conditions and soft substrates. Most mussels (particularly rare / listed species) prefer riverine conditions with heterogeneous mixtures of stable substrate. The washboard, pink heelsplitter, and mapleleaf mussels were the most common species found in 2012. Most of the mussels collected were found near the old river channel where relatively greater flow conditions persist.

AST (2007) reported the collection of three common snail species at the site, including the olive mystersnail, pointed campeloma, and silty hornsnail. Snails were collected from four sites (of 14) nearest the original river channel. No snail species were collected during the 2012 survey.

Non-native Mussels (Zebra Mussels)

Zebra mussels (*Dreissena polymorpha*) are an exotic fauna that were introduced to the U.S. in the 1980's, allegedly via ballast water of ships from Europe entering the Great Lakes. They are capable of attaching to most solid surfaces such as rocks, wood, manmade objects, shells of other zebra mussels, and shells of native mussels and snails. They can smother native mollusks, compete with native mussels for food, and are blamed for the serious depletion of native mussels throughout the Mississippi River basin and Great Lakes. Zebra mussels were first reported in the Tennessee River in 1992. While densities in the Tennessee River haven't appeared to reach levels needed to decimate native mussels (presumably because of drainage-specific water quality conditions), they pose a serious threat should favorable conditions develop (TVA 1994, TWRA 2008). Zebra mussels are present in Wheeler Reservoir and are expected to be continually reintroduced by barge and recreational boat traffic (TVA 1994). The mussel surveys reported no zebra mussels at the project site (Appendix C).

Aquatic Threatened and Endangered Species

A review of the TVA Regional Natural Heritage Project database indicated records of 37 state and/or federally listed aquatic animal species within a ten-mile radius of the proposed project area (Table 3-2). As mentioned previously, impoundment conditions have modified formerly riverine habitat conditions in this reach of the Tennessee River where diverse mussel communities once thrived. Consequently, records of many riverine species in this area are now considered historical (not found in over 25 years) or extirpated (no long occur in this portion of their former range). Eight mussel species now considered extirpated will not be addressed further in the EA (Table 3-2). Similarly, six other mussel species (Cumberland moccasinshell, kidneyshell, orangefoot pimpleback, ring pink, Tennessee clubshell, and Tennessee pigtoe) have not been collected near the project in several decades or more and are therefore either extirpated from the area or only occur in extremely low numbers such that their likelihood of being affected by the project is discountable. Consequently, these species will also not be addressed further in the EA. Many of the aquatic species listed in Table 3-2 are only "tracked" by the state heritage program and will not be evaluated further in the EA.

Common Name	Scientific Name	Element Rank ²	Federal Status ³	State Status ³	State Rank ⁴
CRUSTACEANS					
A Troglobitic Crayfish	Cambarus veitchorum	Е		TRKD	S1
Troglobitic Crayfish	Cambarus jonesi	Е		SPCO	S2
INSECTS					
A Caddisfly	Hydropsyche rotosa	Е		RARE	S1
A Caddisfly	Triaenodes abus	E		RARE	S1
FISHES					
Bigeye Chub	Hybopsis amblops	Е		TRKD	S3
Flame Chub	Hemitremia flammea	Е		TRKD	S3
Southern Cavefish	Typhlichthys subterraneus	Е		PROT	S3
Spring Pygmy Sunfish	Elassoma alabamae	Е		PROT	S1
Tuscumbia Darter	Etheostoma tuscumbia	E		PROT	S2
MUSSELS					
Cumberland Bean	Villosa trabalis	Х	END	PROT	SX
Cumberland Moccasinshell	Medionidus conradicus	Н		PROT	S1
Dromedary Pearlymussel	Dromus dromas	Х	END	PROT	S1
Fine-rayed Pigtoe	Fusconaia cuneolus Ptychobranchus	Х	END	PROT	S1
Fluted Kidneyshell	subtentum	Н	PE	PROT	SX
Hickorynut	Obovaria olivaria	Н		EXTI	SX
Kidneyshell	Ptychobranchus fasciolaris	Н		TRKD	S1
Mucket	Actinonaias ligamentina	E		TRKD	S2
Ohio Pigtoe	Pleurobema cordatum	E		TRKD	S2
Orangefoot Pimpleback	Plethobasus cooperianus	Н	END	PROT	S1
Pink Mucket	Lampsilis abrupta	E	END	PROT	S1
Pink Papershell	Potamilus ohiensis	E		TRKD	S3
Pocketbook	Lampsilis ovata	E			
Purple Lilliput	Toxolasma lividus	Е		TRKD	S2
Ring Pink	Obovaria retusa	Н	END	PROT	S1
Rough Pigtoe	Pleurobema plenum	E	END	PROT	S1
Sheepnose	Plethobasus cyphyus	Е	PE	PROT	S1
Slabside Pearlymussel	Lexingtonia dolabelloides	Х	CAND	PROT	S1
Spectaclecase	Cumberlandia monodonta Epioblasma florentina	E	PE	PROT	S1
Tan Riffleshell	walkeri	Н	END	PROT	SX
Tennessee Clubshell	Pleurobema oviforme	Н		TRKD	S1
Tennessee Pigtoe Tuberculed Blossom	Fusconaia barnesiana Epioblasma torulosa	Н		TRKD	S1
Pearlymussel	torulosa	Х	END	PROT	SX
SNAILS					
Anthony's River Snail	Athearnia anthonyi	E	END	PROT	S1
Armored marstonia	Marstonia pachyta	E	END	PROT	S1

Table 3-2Records of federal and state-listed aquatic animal species within ten
miles of the proposed project at Tennessee River Mile 304.6

Common Name	Scientific Name	Element Rank ²	Federal Status ³	State Status ³	State Rank ⁴
Skirted Hornsnail	Pleurocera pyrenella	Е		TRKD	S2
Slender Campeloma	Campeloma decampi	Е	END	PROT	S1
Spiral Hornsnail	Pleurocera brumbyi	Е		TRKD	S2

¹ Source: TVA Natural Heritage Database, queried by C. Phillips on April 23, 2012

² Heritage Element Occurrence Rank; E = extant record ≤25 years old; H = historical record >25 years old; X = considered extirpated

³ Status Codes: CAND = Candidate for federal listing; END = Endangered; EXTI = Extirpated from state or region; PE = Proposed Endangered; PROT = Protected; SPCO = Listed Special Concern; RARE = Listed Rare; TRKD = Tracked by state natural heritage program (no legal status)

⁴ State Ranks: S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable; SX = Presumed Extirpated

Pursuant to Section 7 of the Endangered Species Act (ESA), TVA and the USACE consulted with the USFWS in 2007 and again in 2012 about the potential for the project to affect federally listed species. In 2007, the USFWS recognized that the federally endangered pink mucket and rough pigtoe mussels were the only federally listed species that may potentially be affected by the project (Appendix D). In a 2012 letter, the USFWS indicated that the recently listed as endangered spectaclecase and sheepnose mussels may also occur in the project area (Appendix D). Therefore, these four mussel species are the only federally listed species addressed further in the EA. The three federally endangered snail species recorded within ten miles of the project do not occur in the project area and are not evaluated further in the EA.

Mussel and habitat surveys of the pipeline crossing conducted in 2007 and 2012 found poor to marginal habitat suitable for most mussel species (Appendix C). These surveys found few mussels (mean density less than 0.2 mussels per square meter) representing a total of ten common mussel species that are tolerant of reservoir conditions and soft substrates. No federally listed mussel species (live or dead) were collected during either survey. Based on the survey results, the project site appears to be generally unsuitable for the federally listed mussel species that may potentially occur near the project.

Species Accounts

A brief description of species potentially occurring within the project area can be found below. More extensive accounts are provided in the mussel survey reports (Appendix C). Habitat requirements for species accounts are as described in NatureServe (2011) for all species, Etnier and Starnes (1993) for fish, and Parmalee and Bogan (1998) for mussels.

Crayfish

Both the crayfish found within ten miles of the project (*Cambarus veitchorum* and *C. jonesi*) are endemic to caves. Therefore, no habitat for these species occurs in the project area, and they will not be addressed further in the EA.

Fishes

The southern cavefish is an eyeless, pink-white fish reaching length of 8 to 9 centimeters. It is found only in cool waters of cave streams and underground waterbodies. This habitat is not found in the project area, and this species would not inhabit the project area specifically. This species will not be addressed further in the EA.

The spring pygmy sunfish is a small fish reaching maximum size of 25 millimeters. It apparently lives only one year and dies after reproduction. Habitat includes springs, spring outflows and associated swamps in areas with grassy/weedy and marshy vegetation.

Habitat for this species does not occur in the project area; therefore this species would not be affected by the project and will not be evaluated further in the EA.

The Tuscumbia darter is a small darter restricted to vegetated spring pools and runs in slow current of springs and spring brooks. Habitat for this species does not occur in the project area; therefore this species would not be affected by the project and will not be evaluated further in the EA.

Insects

The caddisfly (*Hydropsyche rotosa*) is not well-known. Although it has been recorded in Lauderdale, Limestone, and Madison counties in Alabama, NatureServe indicated that it is possibly extirpated from these counties. Therefore, is it extremely unlikely that this species occurs in the project area.

Another species of caddisfly (Triaenodes abus) is not well-known. Although it is listed as rare in Alabama, it is widespread in eastern North America and considered globally rare. It's potential to occur in the project area or be affected by the project is unknown.

Mussels

The pink mucket is a moderately large mussel as an adult. It is considered a big river species but occasionally this species is found in small to medium sized tributaries of large rivers. It inhabits rocky bottoms with swift current usually but is tolerant of impounded rivers and usually persists in low densities wherever it occurs. This species may occur in the project area in low numbers.

Rough pigtoe is a thick-shelled bivalve found in medium to large rivers over substrate composed of firmly packed gravel and sand and occasionally found in muddy sand. This species may occur in the project area in low numbers.

The sheepnose is a mussel having an oblong shell with a row of knobs/bumps down the center of the shell. It inhabits medium to large rivers with moderate gradient in gravel/cobble substrates, but also occurs in mud, sand, or gravel. Numerous fish hosts are known for this species, including stone rollers, shiners, minnows, dace, and shiners. Habitat for this species does not appear to be found in the project area.

Spectaclecase is a long-shelled mussel species documented in various types of substrate, including gravel, sand, and mud, in medium-sized to large rivers. However, it is typically found wedged in large rocks adjacent areas with moderate flow conditions. Habitat for this species does not appear to be found in the project area.

3.3.2 Environmental Consequences

Alternative A

Under Alternative A, TVA would not approve the land easement for the proposed Limestone County waterline project. No changes to existing environmental conditions would occur; thus no indirect, direct, cumulative effects to the aquatic ecology of the project area and threatened or endangered aquatic species would occur.

Alternative B

Under this Alternative, TVA would approve the easements for the proposed pipeline. Direct impacts to the riverbed would occur along the pipeline trench across the overbank and where the HDD route exits the substrate on the eastern edge of the old river channel.

Macroinvertebrates inhabiting the drilling exit site and trench area may be crushed or buried by these activities. Construction activities would also generate suspended sediments in the vicinity of the proposed actions. During construction, dredged materials would be temporarily stored in the vicinity. However, use of silt curtains and low-flow conditions would minimize the area subjected to elevated levels of suspended sediment and sedimentation to areas immediately adjacent the pipeline trench. Erosion of stored dredge materials would also have potential to adversely impact water quality. These disturbances would be temporary, and the riverbed would be returned to near original conditions by placing dredged material back over the pipeline.

Elevated levels of suspended sediments can impair respiration, feeding, and reproduction of aquatic insects, fish, mollusks and macroinvertebrates by clogging gills. However, many of these animals can move away from disturbed areas temporarily or permanently. Some animals, such as mussels and snails would likely be subject to disturbance effects. However, no long-term or major impacts to surface water quality or the riverbed substrate would occur, particularly considering the generally depositional nature of aquatic habitat and substrate in impounded areas. Given the project construction methods, BMPs, and existing aquatic habitat in the project area, the overall project direct, indirect and cumulative impacts to the aquatic environment and overall fauna would be insignificant.

Threatened and Endangered Species

Considering the habitat, survey results, species' ecology, and time since last collection of the four federally endangered mussels, the TVA and USACE determined that the project would not affect the sheepnose or spectaclecase, and was not likely to adversely affect the pink mucket and rough pigtoe mussels, which could occur in very low numbers in the project area (Appendix D). In a November 9, 2012 letter, the USFWS concurred with the above project effect determinations (Appendix D). Therefore, ESA compliance for this project has been completed unless any reinitiation criteria are met in the future. Potential project effects to any state-listed aquatic animals would be similar to those described above for impacts to the general aquatic environment.

3.4 Vegetation

3.4.1 Affected Environment

The proposed construction of a water pipeline across the Tennessee River near Decatur, Alabama occurs in the Eastern Highland Rim of the Interior Plateau Ecoregion. Natural vegetation is transitional between the oak-hickory type to the west and the mixed mesophytic forests of the Appalachian Ecoregions to the east. Much of the original bottomland hardwood forests have been inundated by impoundments. The flatter areas in the east and on both sides of the Tennessee River have very deep, well-drained, reddish, soils that are intensively farmed (Griffith et al. 2001).

Of the 8,600 feet of proposed pipeline that would be located on TVA-controlled property, approximately 62 percent would be placed under water and the remaining 38 percent would be placed on land. The terrestrial plant communities found within the project area consist mainly of palustrine forest. Canopy and subcanopy species found in these forested wetlands include: green ash, red maple, river birch, slipper elm and sweetgum. Buttonbush and Chinese privet can be found in the shrub layer along with several woody vines such as poison ivy, rattan vine, round-leaf greenbrier, and trumpet creeper. Common wetland herbaceous plants observed were American water plantain, lizard tail, and Pennsylvania smartweed.

Invasive Plant

Executive Order (EO) 13112 defines an invasive species as any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem; and whose introduction does or is likely to cause economic or environmental harm or harm to human health (U.S. Department of Agriculture 2012). According to NatureServe (2012), invasive species are the second leading threat to imperiled native species. Much of the native vegetation within and surrounding the proposed project has been altered by previous land use history and invasive non-native species are abundant throughout the area. According to EDDMapS (2012) there are 149 non-native plant species reported from Limestone County and 104 in Morgan County. Commonly encountered invasive species include but not limited to: Bermuda grass, bush honeysuckle, callery (Bradford) pear, Chinese privet, Japanese honeysuckle, Japanese privet, Japanese stilt grass, Johnson's grass, kudzu, mimosa, multiflora rose, princess tree, and sericea lespedeza.

Threatened and Endangered Species (Plants)

A review of the TVA Natural Heritage Database in 2012 indicated there are no federally listed and two state-listed plant species known to occur within five miles of the proposed project near Decatur, Alabama on Wheeler Reservoir (Table 3-3). Three federally listed plants are reported from elsewhere in Morgan County, Alabama. Habitat to support populations of these federally listed species does not occur within or adjacent to the proposed water pipeline.

Table 3-3Species of conservation concern within five miles of Limestone County
water pipeline across Wheeler Reservoir near Decatur, Alabama and Federally listed
plant species known from Morgan County.

Common Name	Scientific Name	Federal Status	State Rank	State Status
Sweetflag	Acorus calamus	-	S1	SLNS
Engelmann's quillwort	Isoetes engelmannii		S3	SLNS
Fleshy-fruit gladecress	Leavenworthia crassa	С	S1	SLNS
Leafy prairie clover	Dalea foliosa	LE	S1	SLNS
American Hart's tongue fern	Asplenium scolopendrium var. americanum	LT	S1	SLNS

Federal status abbreviations: C= Candidate; LT=Listed threatened

State rank abbreviations: S1 - critically imperiled often with 5 or fewer occurrences, S2 -

Imperiled often with <20 occurrences, S3 – rare or uncommon often with <80 occurrences, S4--

apparently secure in the state with many occurrences;

State status: Alabama does not give status to state listed species; SLNS=no state status

Sweetflag, a wetland species, is becoming increasingly rare across its distributional range due to habitat destruction and degradation of wetlands (NatureServe 2012). Even though individuals of sweetflag have not been reported from the action area, habitat to support this species does occur within the footprint of the proposed project.

Engelmann's quillwort is a widely distributed emergent aquatic fern ally that grows in a variety of wetland habitats which includes: shallow water of lakes, ponds, streams, and ditches (FNA 2012). Even though individuals of Engelmann's quillwort have not been reported from the action area, habitat to support this species does occur within the footprint of the proposed project.

3.4.2 Environmental Consequences

No federally or state-listed plant species are found in the immediate vicinity of the proposed project. Therefore, no direct, indirect or cumulative impacts to rare plant populations are anticipated as a result of adopting either Alternative A or Alternative B.

Alternative A

Implementation of Alternative A would result in the denial or withdrawal of the applicant's request for a grant of permanent easement over TVA land for the proposed installation of the 30-inch water pipeline. Because the terrestrial communities found in and around the project area common and representative of the region, no impacts to the terrestrial ecology are anticipated under Alternative A. In addition, because the project would not be conducted, no disturbance to soil or vegetation would occur, and there would be little to no chance for the introduction or spread of non-native exotic plants as a result of the implementation of Alternative A.

Alternative B

Under Alternative B, the project would be approved as originally proposed. Vegetation and soil disturbances would occur during the construction phase of preparing the ground for the installation of the water pipeline through a palustrine forest. Since this community is common and representative of the region, no indirect, direct, or cumulative impacts to the terrestrial ecology are anticipated.

The adoption of Alternative B would result in the movement of heavy equipment through the area in preparation for the installation of the water pipeline. This would include the removal of trees and brush that would result in soil disturbance that could potentially be a vector for the introduction of invasive species. In addition, invasive plant seeds, roots or leaves could be transported to uninfested areas during disposal of cut vegetation. The potential for this project to contribute to the spread of exotic or invasive terrestrial plant species as directed by EO 13112 would be minimized with the implementation of project requirements such as the use of clean rock for road building, no removal of vegetation from the site, cleaning all equipment before leaving the action areas, and revegetating disturbed areas with native or non-native, non-invasive species.

3.5 Wetlands

3.5.1 Affected Environment

Wetlands are areas inundated by surface water or groundwater such that vegetation adapted to saturated soil conditions is prevalent. Examples include swamps, marshes, bogs, wet meadows, and shoreline fringes. Limestone County is located in the Interior Plateau ecoregion. According to land use/land cover data compiled by the U.S. Geological Survey, wetlands comprise 0.70 percent of the total land use within this ecoregion (Drummond 2010). Wetlands in this region are typically associated with low-lying, poorly drained areas, or linear in feature and associated with the floodplain areas of streams, rivers, and the reservoir. Wetlands are relatively common along the margins of Wheeler Reservoir. Data analyzed for the 2004 Reservoir Operations Study indicated there were approximately 10,627 acres of wetlands located along the entire reservoir (TVA 2004, Figure 3-1).



Figure 3-1 Wetland Types on Wheeler Reservoir

In 2007, a wetland delineation was performed on the 4 acres of TVA property which the proposed water pipeline would cross (Appendix E). Three wetlands totaling 1.09 acres occur within the footprint of the proposed line. However, in 2013 LCWSA re-evaluated the impacted wetlands because the 2007 delineation surveyed a 70-ft water pipeline corridor, which is larger than the 20-ft water pipeline corridor being proposed. The new evaluation identified that the proposed project would only impact 0.79 acre of the three wetlands identified (Figure 3-2). Dominant vegetation includes slippery elm (*Ulmus fulva*), green ash (*Fraxinus pennsylvanica*), red maple (*Acer rubrum*), water oak (*Quercus phellos*), sycamore (*Liquidambar styraciflua*), buttonbush (*Cephalanthus occidentalis*), lizard tail (*Saururus cernuus*), and smartweed (*Polygon pennsylvanicum*).

3.5.2 Environmental Consequences

Alternative A

Under Alternative A, the subject properties would remain in their current condition and TVA would not grant an easement for construction of the water pipeline. No direct, indirect or cumulative impacts to wetlands are anticipated.

Alternative B

Under Alternative B, pipeline construction would temporarily impact 0.79 acre of wetlands. Direct impacts would be clearing of wetland vegetation for pipeline placement, excavation of wetland soils, and alteration of wetland hydrology. After construction the area would be allowed to revert to wetland habitat, but it would be maintained entirely in a scrub-shrub and emergent wetland to facilitate pipeline maintenance. There would be a minor loss of forested wetland function, but no permanent loss of wetland area.



Figure 3-2 Wetlands Map

To offset project impacts associated with the conversion of 0.79 acre of forested wetlands. LCWSA would within 1-year after construction of the water pipeline, plant wetland trees to replace those that were removed from the pipeline corridor at a 1:1 ratio. For every wetland tree greater than or equal to 3 inches diameter at breast height that is removed; a 1-inch caliper sapling will be planted for every 1-inch of tree removed. For example, if a 20-inch caliper tree is removed, 20 1-inch caliper saplings will be planted. The tree planting would occur in the temporary construction area immediately adjacent to the impacted wetland areas in the proposed easement. The tree species planted will be a minimum of 1-inch caliper saplings and a mix of these native tree varieties; Quercus phellos, Betula nigra, Nyssa sylvatica, and Quercus nigra. LCWSA will document the trees removed, trees replanted, and submit all information in a post-construction report. Tree survival will be monitored by LCWSA for five years after planting. A plant survivability of greater than 50 percent must occur with monitoring reports submitted on a yearly basis to both TVA and USACE by LCWSA. If survivability is less than 50 percent, additional plantings will be conducted by LCWSA and monitored for an additional 3 years with monitoring reports submitted on a yearly basis to both TVA and USACE. This mitigation has been determined by TVA and USACE to be sufficient to offset both the temporal impacts associated with construction and the minor loss of forested wetland function after the completion of the project.

3.6 Wildlife

3.6.1 Affected Environment

Habitat within the project footprint (14,700 feet long by 20 feet wide) is characterized as approximately 40 percent open water (Wheeler Reservoir) and approximately 60 percent palustrine forest (or bottomland hardwood forest). Approximately 1 acre of palustrine forest habitat was characterized as forested wetland. Refer to Section 3.4 of this EA for a more detailed vegetative description of the palustrine forest habitat and Section 3.7 for a more detailed description of the open water habitat.

Wheeler Reservoir provides island and shoreline habitat for a number of wading bird species including great blue heron, great egret, and black-crowned night heron. One wading bird colony has been documented on an island in Wheeler Reservoir, located approximately 1,000 feet northwest of the project area. Diving birds that inhabit the reservoir throughout the year include double-crested cormorant and American coot. A large number of overwintering bird species utilize the Reservoir and nearby Wheeler National Wildlife Refuge and include American widgeon, pied-billed grebe, common loon, and sandhill crane. Mammals associated with open water include beaver, muskrat and river otter. Reptiles present along the shoreline may include yellow-bellied slider, river cooter, and northern watersnake.

Palustrine forest provides habitat for a number of terrestrial animal species. Neotropical migratory songbirds typical of this type of forest include prothonotary warbler, northern parula, woodthrush, Acadian flycatcher, yellow-billed cuckoo and red-eyed vireo. Typical year-round resident songbirds include tufted titmouse, eastern towhee, northern cardinal, blue jay, American crow, downy woodpecker, Carolina chickadee and Carolina wren. Common raccoon, white-tailed deer, beaver, eastern chipmunk, eastern gray squirrel, evening bat and red bat are mammals likely to inhabit bottomland hardwood forest habitat in this region. Common reptiles in this habitat include eastern box turtle, common snapping turtle, broadhead skink, copperhead, cottonmouth and eastern garter snake. Low gradient streams and wetlands in these forested habitats provide habitat for amphibians including

green frog, gray treefrog, spring peeper, northern cricket frog, upland chorus frog, dusky salamander, slimy salamander, and southern two-lined salamander.

No caves have been documented within 3 miles of the project area. The project area does not contain any designated critical habitat for federally protected species.

Endangered and Threatened Species (Terrestrial Animals)

Review of terrestrial animals in the TVA Natural Heritage database in August, 2012, found no records of Alabama or federally listed species within a three-mile radius of the project area. Federally endangered gray bat and federally protected bald eagle have been documented in both Limestone and Morgan counties, Alabama (Table 3-4).

Table 3-4Federally listed terrestrial animal species reported from Limestone and
Morgan Counties, Alabama¹

Common Name	Scientific Name	Federal Status	State Status ² (Rank) ³
Bald eagle	Haliaeetus leucocephalus	DM	PROT (S3)
Gray bat	Myotis grisescens	LE	PROT (S2)

¹Source: TVA Regional Natural Heritage Database, extracted August 2012

²Status Abbreviations: DM = Delisted, recovered, and being monitored; LE = Listed endangered; PROT = Protected

³State rank: S2 = Very rare or imperiled, S3 = Rare or uncommon

Bald eagles and their nests are federally protected under the Bald and Golden Eagle Protection Act (USFWS 2007). This species typically nests in the crown of large mature trees capable of supporting massive nests to which nest materials are added at the beginning of every nesting season. These nests are usually found near large waterways over which bald eagles forage. Multiple bald eagle nests have been documented along Wheeler Reservoir which provides abundant suitable nesting and foraging habitat.

The federally listed as endangered gray bat inhabits caves year-round while foraging over waterways during summer months (Tuttle 1976). No caves have been documented in the project area or within 3 miles of the project area. Abundant foraging habitat is available for this species along Wheeler Reservoir.

3.6.2 Environmental Consequences

Alternative A

Under Alternative A, the proposed 30-inch water pipeline would not be established and the project area would likely remain in its current state. Therefore, terrestrial animals and their habitats would not be affected.

Threatened and Endangered Species

Under Alternative A, proposed actions would not be undertaken, and the project area would likely remain in its current state. Therefore, this implementation of this alternative would not result in adverse impacts to protected terrestrial animal species or their habitats.

Alternative B

Under Alternative B, any birds, mammals, amphibians or reptiles that may be present within this section of the pipeline at the time of construction would be displaced to adjacent open water habitat. Because the pipeline would be underground and proposed actions include

implementation of standard BMPs that would minimize input of pollution and sediment into the Reservoir, open water habitat within the project footprint is expected to return to its previous state and be available for use as habitat by animals that would have been associated with this area prior to construction. Any impacts to wildlife within the open water section of the project footprint would therefore be minimal and temporary. The documented wading bird colony that is located approximately 1000 feet northwest of the project area is at a sufficient distance such that impacts to this colony are not expected to occur as a result of proposed actions.

Palustrine forest habitat (8,600 feet long by 20 feet wide) within the project footprint would be cleared and permanently maintained as early successional habitat. The width of the footprint (20 feet) would be similar to that of a typical unimproved road within a forest setting. Any animals present within this terrestrial portion of the project footprint at the time of construction would likely flush or otherwise be displaced to adjacent forest habitat. Over time, after construction is complete and the area has been replanted in herbaceous vegetation, this section of the project footprint likely would be used as a travel corridor for a variety of species, including bats, small mammals (e.g., mice), mesomammals (e.g., fox, opposum, gray fox), large mammals (e.g., deer, coyote), and birds (e.g., eastern wild turkey, barred owl, pileated woodpecker). Based on the relatively small size of the footprint and availability of similar habitat immediately adjacent to the project area on both sides of the footprint, potential impacts to wildlife are expected to be limited to those individuals not able to relocate to adjacent habitat at the time of construction.

Threatened and Endangered Species

No terrestrial animal species with state or federal protective status have been documented within 3 miles of the project footprint. Bald eagle and gray bat have been documented within both Limestone and Morgan counties, and suitable foraging habitat for both species is available within the project footprint. Given the extent and abundance of suitable foraging habitat (open water) surrounding the project footprint and the temporary nature of disturbance that would occur in the open water component of the project footprint, impacts to foraging habitat suitable for bald eagle and gray bat are expected to be minimal and temporary at most. Implementation during construction of standard BMPs that avoid or minimize inputs of sediment and pollutants into Wheeler Reservoir would further minimize impacts to water quality and any subsequent associated impacts to insects (prey items for gray bat), birds, turtles or fish (prey items for bald eagle).

3.7 Natural Areas and Recreation

3.7.1 Affected Environment

A 2012 review of data from the TVA Natural Heritage Project database indicated that there are six recreation and natural areas within 3 miles of the project area. A small portion of the proposed project site is within Decatur Hospitality Nature Park. This park, formerly known as Decatur Day Use Park, is located on the north shore of Wheeler Lake between the railway line and Joe Wheeler Highway and is licensed by TVA to Decatur Parks and Recreation. In 2005, this park went through an extensive renovation project and now has short walking trails, a two story bird pavilion, fishing access, and picnic areas.

A small portion of the proposed project site is also within Rhodes Ferry Park. This park is located on the south side of Wheeler Lake between the railway line and Joe Wheeler Highway. This park, managed by Decatur Parks and Recreation, features two shelters, large and small pavilions, gazebo, lighted walkway, and playground.

Swan Creek State Wildlife Management Area (WMA) is located on the north side of railway line, 0.1 miles north of the proposed project. This 8,870 acre Wildlife Management Area is located along the north bank of Wheeler Lake and is managed for waterfowl and small game hunting. This WMA also has a target range.

Wheeler National Wildlife Refuge is located on the south side of the Joe Wheeler Highway Bridge, 0.1 miles south of the proposed project. This 35,000 acre refuge attracts thousands of wintering and migrating birds and boasts 115 species of fish, 74 species of reptiles and amphibians, and 47 species of mammals. It is also home to 10 federally listed species. This area contains a variety of habitats including bottomland hardwoods, wetlands, pine uplands, and backwater embayments.

Decatur Municipal Boat Harbor is located immediately south of the proposed project on the north side of the Joe Wheeler Highway Bridge. This area is owned by the city of Decatur and features numerous boat slips and a public boat launch.

Point Mallard Park is located 2.9 miles southeast of the proposed project, on the south bank of Wheeler Lake. This 700 acre park features a golf course, 25 acre wooded campground, tennis courts, batting cages, ice skating rink and a wave pool.

Pryor Branch TVA Habitat Protection Area is located 2.8 miles north of the proposed project, along Highway 31. This area was designated to protect two rare fish and contains numerous limestone springs. Athens State Community College also uses this area for research.

3.7.2 Environmental Consequences Alternative A

Under Alternative A, the proposed 30-inch water pipeline would not be established and the project area would likely remain in its current state. Therefore, no direct or indirect impacts on natural areas and recreation would be anticipated.

Alternative B

Under Alternative B, the proposed project would be implemented. There would be minor temporary impacts to recreational boating and fishing during construction. Use of Decatur Hospitality Nature Park to access the northern section of the project may have some minor impact on public use of the park. However, any impacts would be temporary and minor in nature. The water pipeline would also pass along the western (downstream) edge of Rhodes Ferry Park. Access to the park would not be interrupted during construction and no significant impacts on this facility are expected due to the pipeline being underground. Overall direct, indirect and cumulative impacts on public recreation activities and facilities are expected to be minor and temporary.

Swan Creek State Wildlife Management Area, Wheeler National Wildlife Refuge, Decatur Municipal Boat Harbor, Point Mallard Park, and Pryor Branch TVA Habitat Protection Area are not immediately adjacent to or crossed by the proposed project. Therefore, because of the intervening distance, no direct, indirect or cumulative impacts to these natural areas are anticipated.

3.8 Floodplains

3.8.1 Affected Environment

The proposed project is located at about Tennessee River mile 304.6 on Wheeler Reservoir in Limestone County, Alabama. The 100-year floodplain on Wheeler Reservoir is the area that would be inundated by the 100-year flood. The 100-year flood elevation at Tennessee River mile 304.6 is 559.1-feet above mean sea level (NGVD 1929). The Flood Risk Profile (FRP) elevation at Tennessee River mile 304.6 is 560.0-feet above mean sea level (NGVD 1929). At this location, the FRP elevation is equal to the 500-year flood elevation and is used to control flood damageable development for TVA projects and on TVA Lands.

3.8.2 Environmental Consequences

Alternative A

Under Alternative A, there would be no construction within the limits of the 100-year floodplain. Therefore, no direct or indirect impacts on floodplains would be anticipated.

Alternative B

The proposed installation of the water pipeline is within the limits of the 100-year floodplain. Consistent with EO 11988, an underground water pipeline is considered to be a repetitive action that would result in minor floodplain impacts because the area would be returned to pre-construction conditions after completion of the project. The project would comply with the Flood Control Storage loss Guideline because there would be no loss of flood control storage. To minimize impacts to the floodplain, the following measures would be included as conditions of the easement agreement:

- Any future facilities or equipment subject to flood damage would be located above or floodproofed to elevation 562.0.
- Any future development proposed within the limits of the 100-year floodplain, elevation 559.1 would be consistent with the requirements of EO 11988.
- All future development would be consistent with the requirements of the TVA Flood Control Storage Loss Guideline.

There would be no direct, indirect or cumulative impacts to floodplains. TVA would retain the right to flood the project area and TVA will not be liable for damages resulting from flooding.

3.9 Cumulative Impacts

Cumulative effects of the Proposed Action Alternative would be limited to Limestone County. However, there are no resources that could be affected cumulatively by the site preparation and construction activities. The implementation of the No Action Alternative would have no cumulative impacts because the proposed water pipeline would not be installed.

3.10 Unavoidable Adverse Environmental Impacts

Construction activities associated with the proposed water pipeline installation could cause short-term displacement of resident wildlife and minor loss of forested wetland function. Some of these adverse effects could be reduced through implementing mitigation measures described in Section 2.3. Construction would generate minor amounts of fugitive dust and noise, but these would be temporary and minor in nature.

3.11 Relationship of Short-Term Uses and Long-Term Productivity

NEPA requires consideration of the "relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity" (40 CFR § 1501.1.16). For the proposed water pipeline, short-term uses generally are those that are expected to occur during the site preparation and construction (several months), while the long term refers to the operation of the water pipeline (e.g. 20 years or more). Productivity is the capability of the land to provide market and amenity outputs and values for future generations. The capability of the land to sustain productivity is one factor that influences the quality of life for future generations. The vegetation and soil would be temporarily disturbed during construction and installation of the pipeline. The non-submerged portion of the right-of-way would be mowed periodically to maintain low growing vegetation and to provide access for the duration of the easement agreement. However, the site would revert back to previous condition should the easement agreement be terminated. Thus, no loss in the long-term productivity is expected.

3.12 Irreversible and Irretrievable Commitments of Resources

Irreversible commitments of resources include the use or consumption of non-renewable resources as a result of a decision or implementing a proposed action. For example, extraction of ore is an irreversible commitment. Irretrievable commitments involve the use or commitment of resources for a long period of time. An example of an irretrievable resource commitment is the loss of timber production on a newly cleared transmission line right-of-way would eventually result in the restoration of forest land and timber productivity.

Construction and installation of the proposed water pipeline would result in the irreversible commitment of certain fuels, energy, and construction materials. TVA's issuance of permanent easement would constitute an irretrievable commitment of land resources and land use for the duration of the easement agreement. However, because the proposed land use of the tract is consistent with the planned and intended use, these commitments would likely have minor and insignificant impacts on the land use.

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CHAPTER 5 – ENVIRONMENTAL ASSESSMENT RECIPIENTS

5.1 Federal Agencies

U.S. Army Corps of Engineers, Nashville District U.S. Fish and Wildlife Service

5.2 Federally Recognized Tribes

Absentee Shawnee Tribe of Oklahoma Alabama-Coushatta Tribe of Texas Alabama-Quassarte Tribal Town Cherokee Nation Chickasaw Nation Eastern Band of Cherokee Indians Eastern Shawnee Tribe of Oklahoma Kialegee Tribal Town Muscogee (Creek) Nation of Oklahoma Poarch Band of Creek Indians Seminole Nation of Oklahoma, Seminole Tribe of Florida Shawnee Tribe Thlopthlocco Tribal Town United Keetoowah Band of Cherokee Indians in Oklahoma

5.3 State Agencies

Alabama Forestry Commission Alabama Historical Commission Alabama Department of Conservation and Natural Resources Alabama Department of Economic and Community Affairs Alabama Department of Environmental Management Alabama Department of Transportation National Forests of Alabama Top of Alabama Regional Council of Governments This page intentionally left blank

CHAPTER 6 – LITERATURE CITED

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