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FINAL ENVIRONMENTAL ASSESSMENT

KINGSTON FOSSIL PLANT ASH RECOVERY – PROPOSED RECREATION AREAS

Roane County, Tennessee

PREPARED BY:
TENNESSEE VALLEY AUTHORITY

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Direct comments to:

Kelly R. Baxter
NEPA Compliance
Tennessee Valley Authority
400 West Summit Hill Drive, WT 11D
Knoxville, Tennessee 37902
Phone: 865-632-2444
Fax: 865-632-3451
E-mail: krbaxter@tva.gov

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ACRONYMS, ABBREVIATIONS, SYMBOLS, AND GLOSSARY OF TERMS

§	Section
2009 Plan	*Watts Bar Reservoir Land Management Plan Final Environmental Impact Statement*
Acre	A unit measure of land area equal to 43,560 square feet
APE	Area of potential effects
ARAP	Aquatic Resources Alteration Permit
BMPs	Best management practices, i.e., accepted construction practices designed to reduce environmental effects
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CRM	Clinch River Mile
Designated critical habitat	A specific geographic area that is essential for the conservation of a threatened or endangered species
Developed recreation area	Day use areas provided by TVA for the public's convenience and enjoyment
EA	Environmental assessment
e.g.	Abbreviation for the Latin term, *exempli gratia*, meaning "for example"
Emergent wetland	Wetland areas of low-growing marshes and wet meadows
EO(s)	Executive order(s)
ERM	Emory River Mile
ESA	Endangered Species Act
Forested wetland	Swamp and bottomland areas with hardwood and other wetland tree species
FPPA	Farmland Protection Policy Act
Green space	A land use planning and conservation term used to describe protected areas of undeveloped landscape
HPA	Habitat protection area
Hydric soil	Soil formed under conditions of saturation, flooding, or ponding.
I-	Interstate highway
Ibid	Abbreviation for the Latin term, *ibidem*, meaning "in the same place"; refers to the immediately preceding work cited
i.e.	Abbreviation for the Latin term, *id est*, meaning "that is"
KIF	Kingston Fossil Plant
msl	Mean sea level
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NRCS	Natural Resources Conservation Service
PCBs	Polychlorinated biphenyls

Riparian	Related to or located on the banks of a river or stream
ROS	*Reservoir Operations Study*
Runoff	That portion of total rainfall that eventually enters a stream or river
Scrub-shrub wetland	Wetland areas with shrubs and or saplings
SHPO	State Historic Preservation Officer
Site 1	Proposed 45-acre site for planned ball field area
Site 2	Proposed 32-acre site for planned developed recreation and green space area
Site 3	Proposed 60-acre area for planned green space, wetland restoration, and wildlife observation
SMZ(s)	Streamside management zone(s)
SWPPP	Storm Water Pollution Prevention Plan
TDEC	Tennessee Department of Environment and Conservation
TVA	Tennessee Valley Authority
TWRA	Tennessee Wildlife Resources Agency
US	United States Highway
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
Wetland	A marsh, swamp, or other area of land where the soil near the surface is saturated or covered with water

CHAPTER 1

1.0 PURPOSE OF AND NEED FOR ACTION

1.1. Proposed Action

The Tennessee Valley Authority (TVA) proposes to develop public recreation areas to help restore and enhance the community that was impacted by the December 2008 Kingston Fossil Plant (KIF) ash spill in Roane County, Tennessee (see Figure 1-1). The proposed public use areas would be on property impacted in some way by the spill. The proposal involves three recreation concepts (see Figure 1-2): a ball field area on a 45-acre site (Site 1), a 32-acre developed recreation area (Site 2), and 60 acres of green space intended for public use such as nature walks and bird/wildlife watching, as well as proposed wetland restoration and wetland management (Site 3). Conceptual drawings of each proposed recreation site are included as Appendix A.

The proposed action also includes allocation changes to nine parcels of TVA Watts Bar Reservoir property in the vicinity of the proposed recreation project that were potentially impacted by the ash spill (see Figure 1-3). Development of the *Watts Bar Reservoir Land Management Plan Final Environmental Impact Statement* (TVA 2009a), hereafter referred to as the 2009 Plan, was underway at the time of the ash spill and was completed in February 2009. On November 19, 2009, the TVA board of directors approved the 2009 Plan, with the exception of the parcels mentioned above affected by the ash spill. TVA decided that the appropriate future uses of these parcels would be determined during the ash spill recovery planning process. Because TVA had already published the final EIS for the 2009 Plan, TVA issued an errata sheet (summary of corrections) in March 2010 (Appendix B) to document the change. In the errata, TVA proposed to exclude the nine affected parcels from the 2009 Plan and to consider their allocation at another time. The TVA board of directors reviewed the errata and approved the proposal at the April 2010 TVA board meeting.

Background

On December 22, 2008, a dike failed at KIF, releasing about 5.4 million cubic yards of coal ash that covered about 300 acres of TVA and private land, including two embayments on Watts Bar Reservoir. In January 2009, TVA began developing a recovery plan that would address remediation of the area affected by the dike failure and subsequent ash spill. TVA has purchased 174 parcels of private property totaling about 932 acres surrounding the KIF ash spill site based on direct impacts from the spill or remediation as part of its continuing efforts to address the impacts of the spill and cleanup.

The objective of the proposed recreation plan is to enhance and restore some of the land and recreation opportunities that were impacted by the ash spill by converting lands near KIF to public recreational areas. Prior to the ash spill, baseball/softball and soccer fields on TVA's KIF property were available for use by the public. The adjacent ash and water treatment ponds were also used by the public as a wildlife observation area, particularly for viewing shorebirds during the spring and late summer/early fall. These areas have been closed to the public since the ash spill; the ball field area now serves to support the ash recovery effort.

The 2009 Plan served to update the TVA 1988 *Watts Bar Reservoir Land Management Plan* to reflect changing community needs and TVA policies at that time and guides land

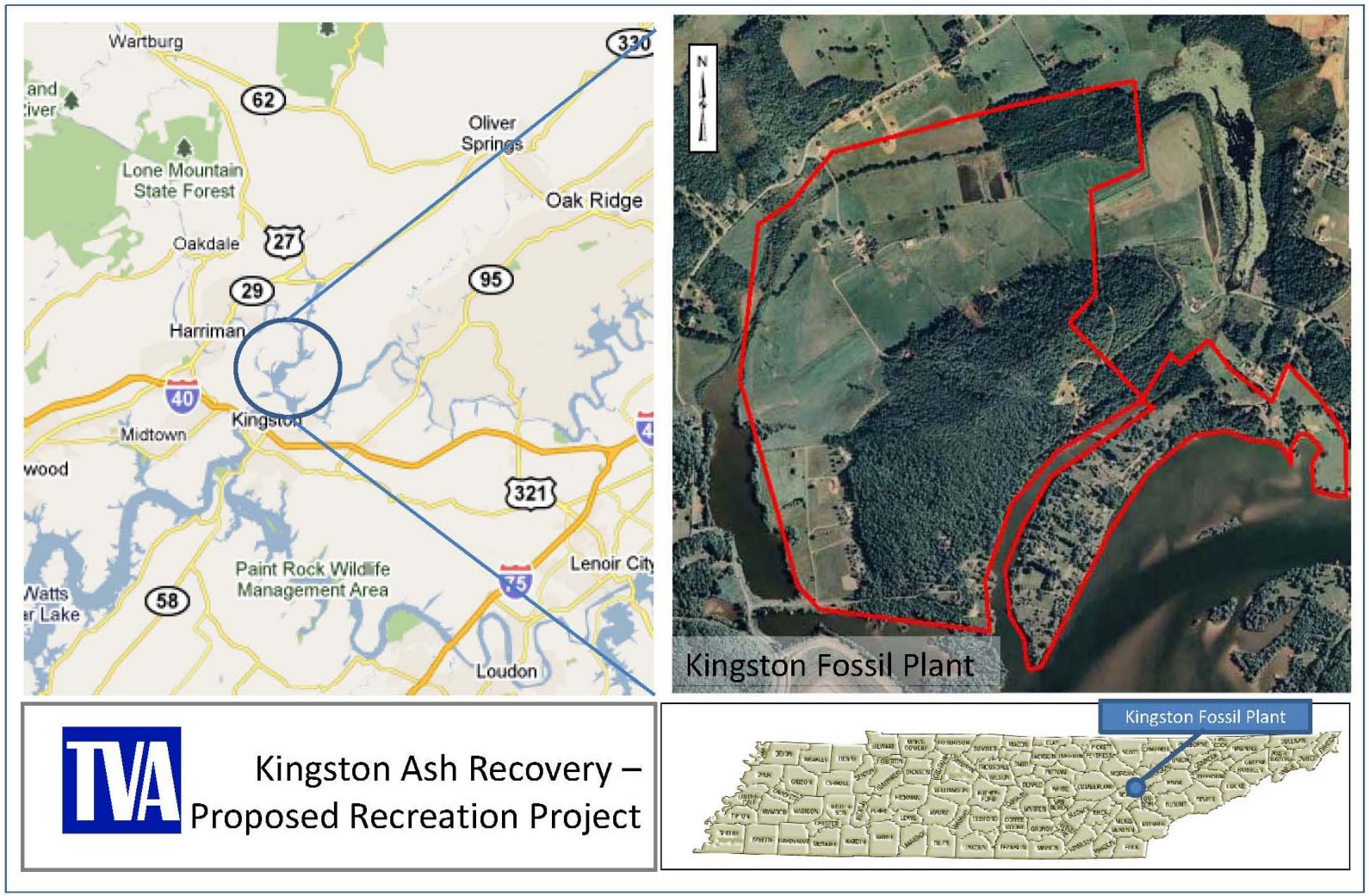

Figure 1-1. Kingston Fossil Plant Proposed Recreation Project Vicinity Map

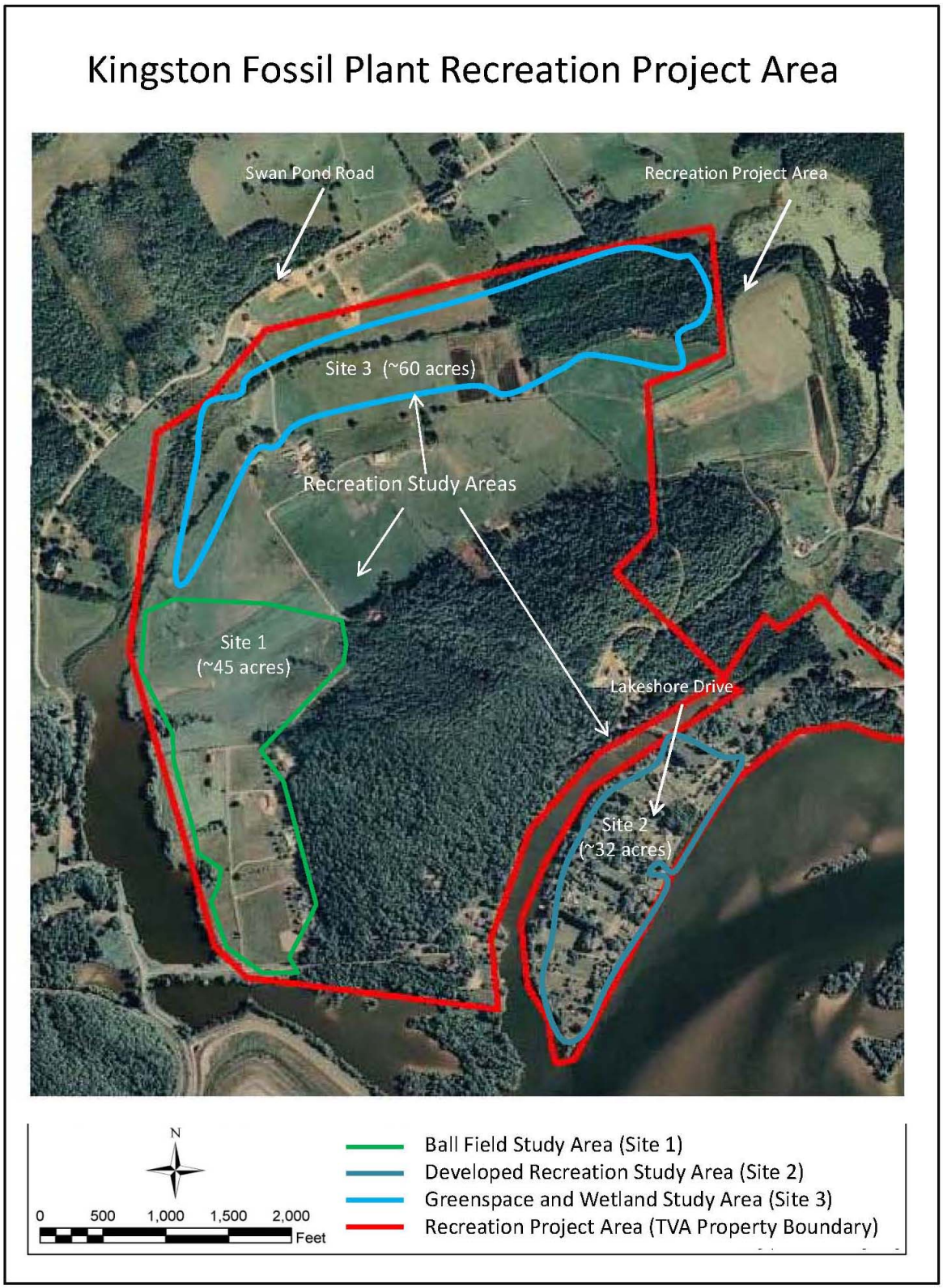

Figure 1-2. Kingston Fossil Plant Proposed Recreation Project Aerial Site Map

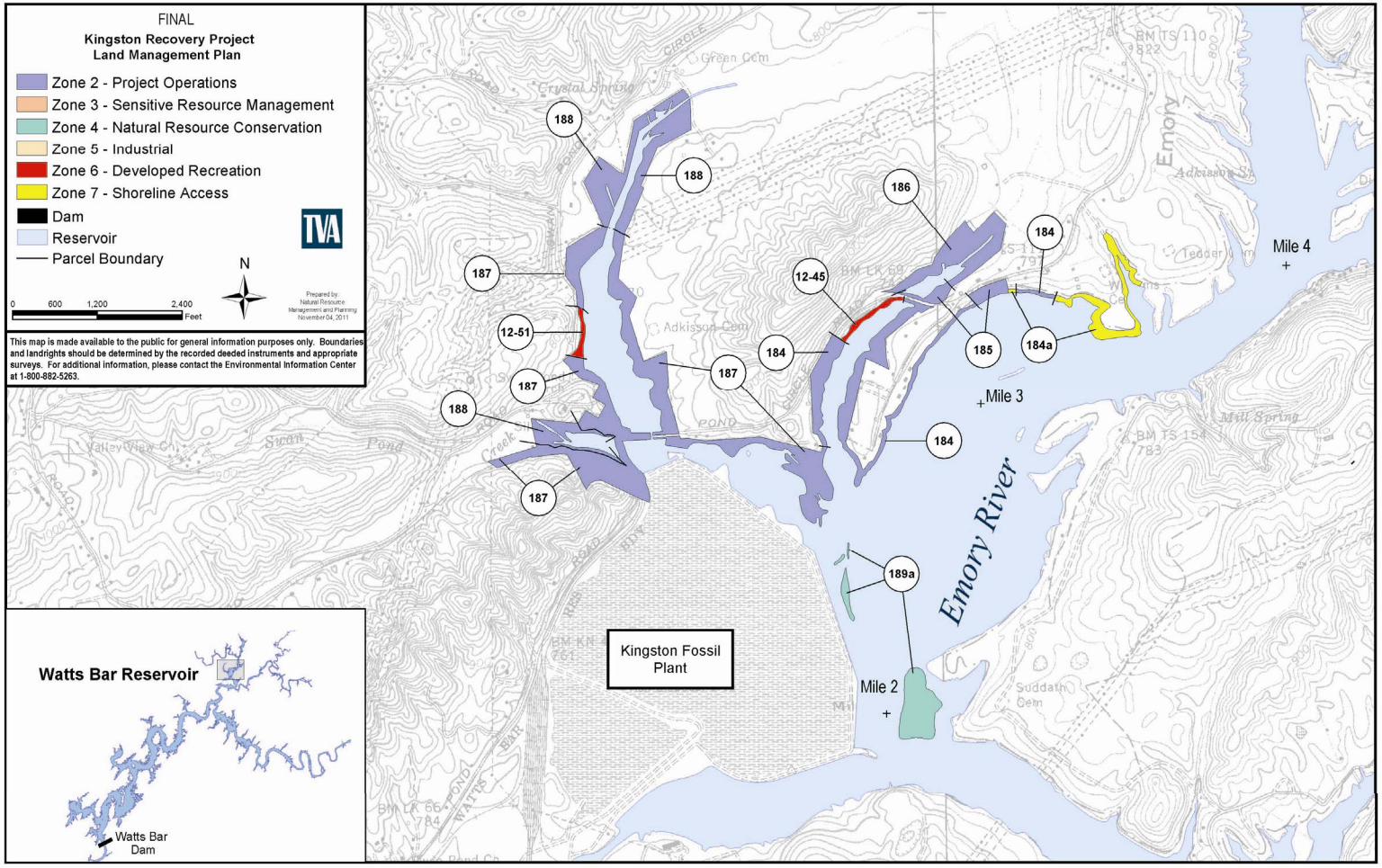

Figure 1-3. Watts Bar Reservoir Property in the Vicinity of the 2008 Ash Spill

use approvals, private water use facility permitting, and resource management decisions on Watts Bar Reservoir. Under the preferred alternative in the 2009 Plan, parcels were allocated into broad categories or "zones," including Project Operations, Sensitive Resource Management, Natural Resource Conservation, Industrial, Developed Recreation, and Shoreline Access.

As mentioned above, because of the ash recovery process, the reservoir parcels affected by the spill were not included in the 2009 land planning process for Watts Bar. TVA proposes to allocate nine of the parcels to appropriate planning zones (Appendix C) in this environmental review. The continued appropriateness of the allocation of these affected parcels is being reevaluated through the recovery planning process.

1.2. Decisions

The primary decision before TVA is whether to develop three recreation areas on property surrounding KIF that it acquired following the 2008 ash spill event. If the proposed recreation areas are developed, other secondary decisions are involved, such as development and approval of the comprehensive recreation plans and the timing of the construction for the recreation areas. Other considerations include the allocation of reservoir property in the vicinity of the recreation project area that was not considered in the 2009 Plan. These proposed actions are described in further detail in Section 2.1.2.

1.3. Other Pertinent Environmental Reviews or Documentation

In 2009, TVA completed the *Watts Bar Reservoir Land Management Plan Final Environmental Impact Statement* (TVA 2009a). That study (the 2009 Plan) addressed potential effects of several alternative ways of managing TVA-controlled reservoir lands on Watts Bar Reservoir. The 2009 EIS is incorporated by reference.

In June 2011, TVA completed the *Kingston Fossil Plant Structure Razing Environmental Assessment* (TVA 2011). The potential effects of the removal of some of the approximately 105 homes and ancillary structures on properties purchased by TVA following the 2008 KIF ash spill were addressed in this document. TVA identified structures as needing to be removed because of building code requirements, TVA needs, habitability issues, or for buffer requirements. The environmental review considered removal of 67 homes and the environmental assessment (EA) indicated that TVA plans to retain some of these properties as permanent extensions to the existing KIF plant boundary, and that TVA would continue to evaluate potential uses for these sites. The EA and maps of structures slated for removal are available at http://www.tva.gov/environment/reports/kif_structure/index.htm. Several of these structures are located on proposed recreational area Site 2 (see Figure 1-2). This EA is incorporated by reference.

In addition, the following National Environmental Policy Act (NEPA) documents have been prepared for actions associated with the ash spill recovery:

Initial Emergency Response Action for the Kingston Fossil Plant Ash Dike Failure Environmental Assessment (TVA 2009b). In this EA, TVA considered the potential environmental impacts of emergency site stabilization and restoration activities after the ash spill including repair and restoration of railroad and roadway operations, installation of temporary weir structures, stabilization of the spill area, demolition of damaged homes, clean up of debris, and collection of cenospheres in response to the ash dike failure at KIF.

Emergency Dredging for the Kingston Fossil Plant Ash Dike Failure Final Environmental Assessment (TVA 2009c). This EA documented the potential environmental effects of proposed dredging and disposal options for ash that spilled into the Emory River following the December 2008 ash dike failure at KIF.

Kingston Fossil Plant Ash Recovery - Utility Restorations and Enhancements Final Environmental Assessment (TVA 2009d). This EA addressed the potential environmental effects of replacing approximately 28,700 linear feet of damaged water lines, a sanitary sewer line, and gas lines that were affected by the ash spill. Additionally, TVA proposed to install three new water lines totaling 22,300 linear feet.

1.4. The Public Involvement Process

Draft EA Release

A draft of this EA of the proposed recreation areas was released to the public on August 1, 2011, and TVA accepted comments through September 16, 2011. Public notices were placed in local newspapers, and several newspaper articles appeared during the comment period. TVA advertised public participation opportunities through local news papers encouraging individuals to submit comments regarding the proposed recreation areas identified in the draft EA. Printed copies and/or compact discs (CDs) containing electronic files of the document were mailed to state and federal agencies and stakeholders. The draft EA was also available at local libraries and on TVA's website for review. TVA received 46 comment submissions from 43 commenters and one petition with 382 signatures. One agency comment was received from the Tennessee Department of Environmental and Conservation (TDEC) (Appendix D). TVA has considered all of the substantive comments it received on the draft EA and has prepared responses to comments and modified the text of this final EA as appropriate. The Recreation, Wildlife, and Socioeconomics sections have been revised to include further information in response to public comments. Public comments received on the draft EA and TVA's comment responses are included as Appendix D.

Proposed Recreation Areas Public Meeting

TVA held a public meeting in Kingston, Tennessee, on August 2, 2011. At the meeting, TVA presented a conceptual property plan for the Swan Pond area and answered questions about the proposed plan and the content of the draft EA. The meeting was supported by multiple TVA environmental experts, and United States Environmental Protection Agency (USEPA) and TDEC representatives. Local elected officials along with Roane County recreation representatives also attended. Over 100 individuals, stakeholders, and local officials registered and participated in the meeting.

Roane County Public Scoping Meeting

Prior to TVA's release of the draft EA, Roane County representatives held a public meeting on September 21, 2010, to allow the community to comment on desired future uses of the land that TVA acquired adjacent to KIF. The following is a summary of the preferred land uses the community members submitted to TVA:

- An environmental wildlife area and recreation center with public docks
- Walking and bike trails
- Multifunction community center
- Playgrounds with shade cover
- Community activity area

- Public fishing pier
- Multiuse sports complex for soccer and softball/baseball

Additionally, stakeholders described a need for adequate parking along trails, roadway improvements, fishing areas, a fire station and training facility, and fire hydrants. In developing TVA's proposed action, TVA has worked with Roane County and its parks and recreation staff on the plans to develop Sites 1, 2, and 3 (see Figure 1-2).

1.5. The Scoping Process

TVA conducted an internal review by a network of designated environmental specialists. The proposed recreation areas project was reviewed in accordance with Executive Order (EO) 11988 (Floodplain Management), EO 11990 (Protection of Wetlands), the Farmland Protection Policy Act (FPPA), the National Historic Preservation Act (NHPA), the Endangered Species Act (ESA), Section 404 of the Clean Water Act, and EO 12372 (Intergovernmental Review). Correspondence received related to NHPA coordination is contained in Appendix D.

The physical impacts to the environment that could result from the development, operation, and maintenance of the proposed recreation areas were evaluated in this EA. The recreation project area includes the three proposed recreation areas, which encompass about 137 acres. The EA also addresses any relevant changes to land allocations for reservoir property affected by the ash spill, and would serve to supplement the 2009 Plan (TVA 2009a).

Since the release of the draft EA in August 2011, TVA has initiated work to prepare a Master Plan for further embayment restoration and recreational development activities on TVA property. Portions of the Master Plan involve the proposed recreation areas that are the subject of this EA. Other areas of the Master Plan include ash recovery efforts that do not involve the areas proposed for recreation and these are not included in the EA. These other actions are being developed under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) requirements. CERCLA does not require NEPA analysis for response actions; however, it does specify detailed procedures that are similar to NEPA analysis. TVA anticipates completion of the Master Plan in March 2012.

1.6. Issues to be Addressed

TVA identified resources that could potentially be affected by the proposed project through an early internal scoping process. This list of resources has been developed with the consideration of public comments received during the draft EA comment period and from public scoping held by Roane County officials. Potential impacts to the following resource issues are addressed in this EA.

- Recreation, parks, and managed areas
- Wetlands
- Floodplains
- Land use
- Prime farmland
- Visual resources
- Vegetation and wildlife
- Aquatic life
- Endangered and threatened species

- Groundwater and geology
- Surface water
- Archaeological and historic resources
- Socioeconomics and environmental justice

Potential effects related to wild and scenic rivers, air quality, noise, transportation, hazardous and nonhazardous waste, health and safety, and global climate change were also considered. However, potential effects were found to be absent or minor, and these resources do not require further evaluation.

1.7. Necessary Federal Permits or Licenses

A Tennessee General National Pollutant Discharge Elimination System (NPDES) Permit for discharges of storm water associated with construction activities and a Storm Water Pollution Prevention Plan (SWPPP) would be required. Construction best management practices (BMPs) to minimize impacts to water quality and aquatic life would be outlined in the SWPPP. TVA's construction contractors would prepare the required erosion and sediment control plans and coordinate them with the appropriate state and local authorities.

An Aquatic Resources Alteration Permit (ARAP) under the Tennessee Water Quality Control Act of 1977, T.C.A. §69-3-108, would be required. Because the TVA's proposed action is associated with waters of the United States, a United States Army Corps of Engineers (USACE) Department of the Army Permit under Section 404 of the Clean Water Act would also be required.

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CHAPTER 2

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

As previously described, TVA proposes to develop three recreation areas near KIF on property that TVA acquired following the 2008 ash spill event. TVA also proposes to address the allocation of several reservoir property parcels that were impacted by the ash spill in the vicinity of the proposed recreation project area that was not addressed in the 2009 Plan.

2.1. Alternatives

2.1.1. Do Not Develop and Maintain the Proposed Recreation Areas or Proposed Allocation Changes to Reservoir Property (No Action Alternative)

Under the No Action Alternative, TVA would not develop three proposed recreation concepts (totaling 137 acres) or allocate 143.6 acres of reservoir property at this time. Environmental conditions in the project area would not change, and anticipated recreation and environmental improvements would not occur. Additionally, the proposed allocation changes to reservoir property would not occur at this time and could be addressed at another time. Adoption of this alternative would not meet TVA's commitment to restore the area to as good or better condition than it was before the spill.

2.1.2. Develop and Maintain Proposed Recreation Areas and Proposed Allocation Changes to Reservoir Property (Action Alternative)

Under the Action Alternative, TVA would enhance and restore land and recreation areas impacted by the 2008 TVA ash spill at KIF by developing three recreation concepts, i.e., a ball field area, a developed recreation and green space area, and a green space for wildlife observation and wetland restoration/management activities (see Figure 1-2 and Appendix°A). TVA would ultimately entrust the land management responsibilities for the ball field area (Site 1) to Roane County under a licensing agreement. TVA would manage the two green space public use areas (Sites 2 and 3). If Roane County were unable to manage the ball field area, TVA would not likely develop the proposed recreation concept for Site 1 at this time.

Proposed Recreation Concepts

Development of Site 1 would involve grading portions of the approximately 45-acre site. TVA would revegetate disturbed areas with native plant species or nonnative, noninvasive species. Plans for Site 1 include the following components:

- Existing access road and parking area
- Natural turf baseball/softball and soccer fields
- Low-growing vegetation around the perimeter of the sports field area

Site 2 construction activities would include minor grading within the 32-acre site. TVA would preserve the vegetative buffers along the shoreline and revegetate disturbed areas with native plant species or nonnative, noninvasive species. Site 2 would include the following features:

- A lakeshore walking trail
- Two fishing piers
- A boat-launching ramp with a courtesy boarding pier
- Parking areas
- Signage

Site 3 would primarily be left in its current natural state as green space with some planned observation areas, trails, interpretive signage, and a small parking area. TVA is also planning to restore wetland areas on the property, and anticipated land uses would include bird/wildlife watching and wetland management.

Reservoir Property Allocations

The final 2009 Plan assesses impacts to environmental resources and private and public reservoir property on Watts Bar Reservoir (TVA 2009a). The continued appropriateness of the previous allocation of these affected parcels has been reevaluated and were considered in this EA as part of the recovery planning process.

TVA has determined that 10 parcels of reservoir property on Watts Bar Reservoir were affected by the December 2008 ash spill. Nine of the 10 parcels, totaling 143.6 acres above mean summer pool elevation, are being proposed at this time for allocation by TVA (see Figure 1-3 and Table 2-1). The allocations of four of these nine parcels would not change from those proposed in the 2009 Plan. However, TVA has determined that the proposed zoning allocations of five of the parcels are no longer appropriate, and proposes to change these allocations. Subsequent to this EA, a reservoir land management plan would be prepared by TVA to reflect the proposed allocations as described in this document.

Table 2–1. TVA Retained Reservoir Land Near the Proposed Recreation Project

Parcel	Acreage	Proposed Allocation in 2009 Plan	*Proposed Allocation*
Parcel 12-45	1.6	Developed Recreation (Zone 6)	Developed Recreation (Zone 6)
Parcel 12-51	1.2	Developed Recreation (Zone 6)	Developed Recreation (Zone 6)
Parcel 184	21.3	Shoreline Access (Zone 7)	*Project Operations (Zone 2)*
Parcel 184a	7.7	Shoreline Access (Zone 7)	Shoreline Access (Zone 7)
Parcel 185	4.1	Natural Resource Conservation (Zone 4)	*Project Operations (Zone 2)*
Parcel 186	13.7	Sensitive Resources (Zone 3)	*Project Operations (Zone 2)*
Parcels 187	56.8	Natural Resource Conservation (Zone 4)	*Project Operations (Zone 2)*
Parcel 188	25.3	Sensitive Resources (Zone 3)	*Project Operations (Zone 2)*
Parcel 189a[1]	11.9	Natural Resource Conservation (Zone 4)	Natural Resource Conservation (Zone 4)
TOTAL = 184.2 acres			TOTAL = 143.6 acres

[1]This is a new parcel, 11.9 acres of Parcel 189 were affected and are proposed for allocation at this time. The affected parcel is identified as 189a for future planning. The remaining acreage of Parcel 189 will remain as allocated in the 2009 Plan.

Parcels to Retain Allocation Proposed in the 2009 Plan

As shown in Table 2-1, Parcels 12-45, 12-51, 184a, and 189a would retain the allocations as proposed in the 2009 Plan. Allocation descriptions, examples of appropriate land uses for the associated allocations, and parcel descriptions are included as Appendix C.

Parcels 12-45 and 12-51 – Directly impacted by the ash spill, includes 2.8 acres allocated for Developed Recreation; land managed for water access for public agencies and for public and commercial recreation uses. This allocation involves reservoir land managed for concentrated, active recreational activities that require capital improvement and maintenance. It includes TVA public land under easement, lease, or license to other agencies for recreational purposes.

Parcel 184a – This parcel was not directly impacted by the ash spill and includes 7.7 acres proposed for allocation to Shoreline Access; TVA-owned shoreland adjacent to private land. Private landowners have the right to request TVA approval of water use facilities on the TVA-owned shoreland. Types of facility development/management that can occur on this land include docks, piers, launching ramps/driveways, marine railways, boathouses, pathways, wooden steps, walkways, or mulched paths, and shoreline stabilization.

Parcel 189a – Involves 11.9 acres of several small islands impacted by the ash spill that will be restored. This parcel's proposed allocation is for Natural Resource Conservation; land managed for the enhancement of natural resources for human use and appreciation Appropriate activities in this zone include hunting, timber management to promote forest health, wildlife observation, and camping on undeveloped sites.

Parcels Proposed for Allocation Change (From Allocation Proposed in 2009 Plan)
Under the Action Alternative, 121.2 acres of reservoir property (Parcels 184, 185, 186, 187, and 188) are proposed for allocation to Project Operations; TVA reservoir land currently used for TVA operations and public works projects. This allocation is appropriate for the future use of this land given the proximity to KIF, ongoing ash recovery activities, and proposed uses. Examples of appropriate land uses under Project Operations include TVA reservation land used for power generation, developed and dispersed recreation, maintenance facilities, watershed team offices, research areas, and visitor centers. TVA is planning to enhance and restore three recreation areas located on Parcels 184, 187, and 188.

Parcel 184 - 21.3 acres that were proposed for Shoreline Access in the 2009 Plan; TVA-owned land where Section 26a applications and other land use approvals for shoreline alterations are considered. However, TVA will retain the backlying land and there would be no need for shoreline access rights. The primary function of this parcel is to support the ongoing recovery efforts and provide for future operational use of KIF.

The proposed recreation area on Parcel 184 would include the following components: lakeshore walking trail; two fishing piers; a boat-launching ramp with courtesy pier; parking areas; and signage. Disturbed areas would be revegetated with native plant species, or nonnative noninvasive species.

Parcels 185 and 187 - 60.9 acres that were proposed for Natural Resource Conservation; land managed for the enhancement of natural resources for human use and appreciation. Upland and riparian/wetland wildlife species are found in this area. The primary function of this tract is to support the ongoing recovery efforts and provide for future operational use of KIF.

The proposed recreation area on Parcel 187 would include the following components: access road and parking area; natural turf sports fields; and low-growing vegetation around the perimeter of the sports field area. TVA would revegetate disturbed areas with native plant species, or nonnative noninvasive species.

Parcels 186 and 188 - 39.0 acres that were proposed for Sensitive Resources; land managed for protection and enhancement of sensitive resources such as endangered and threatened species, historic properties, and wetlands. The sensitive resources on these parcels involve wetlands and quality wildlife habitat. The primary function of these tracts are to support the ongoing recovery efforts and provide for future operational use of KIF. TVA will strive to balance the competing demands of the recovery efforts while continuing to manage the wetland resources present in this area.

TVA is also planning to restore wetland areas on Parcel 188, and anticipated land uses would include bird/wildlife watching and wetland management. The proposed recreation area on Parcel 188 would be mainly green space with some planned observation areas, trails, interpretive signage, and a small parking area.

2.2. Comparison of Alternatives

Table 2-2 summarizes and compares impacts by alternative for each resource area evaluated. The potential effects with respect to the three recreation concepts are described under ‘a’ and the proposed reservation allocation changes are described under ‘b’.

Table 2–2. Comparison of Alternatives

Resource	*Potential Impacts*	*No Action Alternative*	*Action Alternative*
Recreation, parks and managed areas	Availability of recreational opportunities	a. No replacement of public recreation opportunities lost in ash spill b. No change in recreation opportunities on 143.6 acres of reservoir property	a. Beneficial increase in public recreation opportunities b. Minor reduction of dispersed recreation opportunities
Wetlands	Effects to wetlands from land clearing, ground disturbance, or restoration	a. No beneficial wetland impacts from restoration b. No adverse wetland impacts	a. Minor beneficial wetland impacts from restoration **b.** Minor and insignificant adverse wetland impacts
Floodplains	Impacts to floodplain values in the floodplain	No impacts	Minor and insignificant impacts
Land use	Impacts due to loss or gain of TVA public lands	a. No impacts b. Beneficial impacts	a. Beneficial impacts b. Potential loss of public access to reservoir property
Prime farmland	Conversion of prime farmland	No impacts to prime farmland	Minor impacts due to potential loss of prime farmland
Visual resources	Effects to visual resources	No impacts to visual resources	a. Minor impacts due to development of recreation facilities b. Minor impacts to visual resources
Plants and wildlife	Vegetation clearing could impact the composition and abundance of plant and animal species	No impacts to plants and wildlife	Minor and insignificant impacts
Aquatic life	Alteration of aquatic habitat, primarily from shoreline modification	No impacts to aquatic life	Absent or minor impacts with the use of standard construction BMPs
Endangered and threatened species	Alteration of vegetation along riparian areas could impact suitable habitat	No effects to endangered and threatened species	
Surface water and groundwater	Pollution and siltation from erosion and ground-disturbing activities	No impacts to water quality	With the use of standard construction BMPs, water quality impacts would be minimal
Archaeological and historic resources	Potential impacts to archaeological and historic properties	No impacts to archaeological and historic resources	
Socioeconomics and environmental justice	Effects to the local economy and communities	No change in opportunities for future beneficial development; no impacts to environmental justice	Minor beneficial impacts to socioeconomics, no impacts to environmental justice

2.3. The Preferred Alternative

TVA's Preferred Alternative is the Action Alternative, which is to develop the three planned recreation areas, manage the developed recreation area and two green space public use areas, and allocate nine parcels of Watts Bar reservoir property in the vicinity of the recreation project area.

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CHAPTER 3

3.0 AFFECTED ENVIRONMENT

Introduction
The existing condition of the environmental resources that could be affected by the proposed actions and the potential environmental consequences associated with the No Action and Action Alternatives are described in this chapter. The affected environment descriptions below are based on field surveys conducted in 2011, on published and unpublished reports, the 2009 Plan, and on personal communications with resource experts. This information establishes the baseline conditions against which the decision maker and the public can compare the potential effects of the alternatives under consideration.

As described in Chapter 2.0, the EA documents the potential impacts that would result from the proposed recreation concepts and the allocation of nine tracts of Watts Bar Reservoir property that were impacted by the 2008 KIF ash spill.

Proposed Recreation Areas
The recreation project area includes about 137 acres; the project area is shown in Figure 1-2 and includes Site 1, the 45-acre site for a new ball field area; Site 2, 32 acres along Lakeshore Drive proposed for a developed recreation and green space area; and Site 3, 60 acres proposed for green space, wetland restoration, and wildlife observation.

Watts Bar Reservoir Land Allocations
As part of the ash recovery process, the potential impacts of the proposed allocation of nine parcels of TVA reservoir land (Figure 1-3) affected by the ash spill are evaluated in the EA. Proposed allocations for Parcels 184a, 189a, 12-45, and 12-51 include Shoreline Access, Natural Resource Conservation, and Developed Recreation, respectively. Five parcels, 184, 185, 186, 187, and 188, are proposed for allocation to Project Operations.

3.1. Recreation, Parks, and Managed Areas

Proposed Recreation Areas
As previously mentioned, public baseball/softball and soccer fields that were located on TVA's KIF property and available for public use have been permanently closed as a result of the ash spill (see Figure 3-1). The baseball/softball field was initially developed by TVA in the 1980s. The public was also given access to and regularly used the ball field. The soccer fields were established by community volunteers in the mid-1990s under an informal arrangement with TVA's KIF management. The area was managed primarily by the local chapter of the American Youth Soccer Organization and traditionally received heavy use during the spring and fall soccer seasons. The loss of these facilities has notably reduced opportunities for Roane County residents to participate in baseball/softball and soccer-related activities.

The Emory River arm of Watts Bar Reservoir has traditionally received heavy recreational boating use, especially during the summer months. In particular, several natural sand beaches upstream from the ash spill area receive concentrated use, and several public recreation facilities in the immediate vicinity provide water access to the area. Because of the attractiveness of the Emory River area, demand for water-oriented recreation is expected to increase in the future. Currently, there are few recreation areas that provide

Figure 3–1. Former Recreation Ball Fields on the Kingston Fossil Plant Reservation

public access to this section of the reservoir. Parking capacity at existing boat-launching ramps is limited to a combined total of approximately 36 vehicle and trailer spaces.

The public recreation facilities in the vicinity of KIF include the following areas:

- Sugar Tree Boat-Launching Ramp is a Tennessee Wildlife Resource Agency (TWRA) ramp located about 2 river miles downstream of the project area on the left bank at Emory River Mile (ERM) 0.75.
- Little Emory Boat-Launching Ramp is another TWRA ramp located about 3 miles upstream of the project area on the left bank at ERM 5.25.
- Harriman Waterfront Park is located on the left bank at ERM 12 and provides day use picnic facilities, walking trails, and a boat-launching ramp.

- Ladd Park has picnic facilities, a fishing pier, and a boat-launching ramp and is located on the Clinch River arm of Watts Bar Reservoir near the mouth of the Emory River.
- KIF Boat-Launching Ramp, which has been closed to the public since the ash spill, and the Fisherman's Parking Lot, recently reopened for public use, are also located on the Clinch River arm of Watts Bar Reservoir.

There are three natural areas within 3 miles of the proposed project area: A former natural area, the Kingston State Wildlife Management and Refuge and Wildlife Observation Area, occurred at the location of the former and remaining KIF ash storage area, adjacent settling ponds, and the peninsula to the east of the KIF powerhouse. The peninsula area was formerly managed in cooperation with TWRA. Its use as a wildlife management area was terminated prior to the ash spill to facilitate its development as a coal combustion byproducts storage area (see TVA 2005). As noted in Section 1.1, the ash storage and settling pond area was closed to public use following the ash spill.

The following three natural areas lie within 3 miles of the proposed project area:

- The Sugar Grove TVA Habitat Protection Area (HPA) is located 1.9 miles southeast of the proposed recreation area along the Emory River across from KIF. This approximately 6.4-acre area features habitat for the rare plants spreading false-foxglove and mountain honeysuckle.
- Rayburn Bridge TVA HPA is located 1.9 miles southwest of the proposed recreation area along the Clinch River near the Interstate highway (I-) 40 and United States Highway (US) 70 bridges. This approximately 8.6-acre area features habitat for the rare spreading false-foxglove.
- Stowe Bluff TVA HPA is located 2.7 miles southwest of the proposed recreation area along the Clinch River downstream of the I-40 bridge. This approximately 11.4-acre area features habitat for the rare northern bush-honeysuckle and spreading false-foxglove. This area also provides habitat for the golden eye saxifrage.

No Wild and Scenic Rivers or Nationwide Rivers Inventory streams are adjacent to or within 3 miles of the proposed recreation project sites.

Watts Bar Reservoir Land Allocations

Currently, the nine parcels being considered for allocation are public land. Where access is not restricted for recovery efforts, the land is available for informal recreation use. Some limited activity such as bank fishing, informal camping, and nature observation may occur. Demand for such informal use is likely to continue and possibly increase in the future.

3.2. Land Use

Proposed Recreation Areas

Site 1 is characterized by loam soils covered in grasses and pastureland and is characterized by lands with 5 to 12 percent slope. The addition of the planned ball fields would allow most of the 45 acres to remain grass covered, similar to the site's current and

predevelopment land use. There is an existing paved parking area that would likely be used for ball field parking. Access roads may be added, which would convert some of the grassy areas to paved surfaces.

Site 2 is characterized by a silt loam soil with 5 to 12 percent slope. About 6 acres in the middle of the site is relatively flat and considered prime farmland with less than 5 percent slope. Originally, Site 2 was covered in forests, shrubs, and grasslands, but it was later converted to residential use. As it was developed for residential use during the last 30 years, the land was cleared, leveled, structures were built, and the property was landscaped with shrubs, flowers, trees, and turf lawns. Some of these structures would be removed to meet TVA business needs and to expand the buffer surrounding the KIF Reservation boundary (TVA 2011), which would result in more green space. The recreational plan for Site 2 would return some of the land to native vegetation and grasslands. The existing roadway infrastructure would be used for access to the walking trail, boat launch, and fishing piers.

Site 3 is characterized by silt loam soils previously covered by grass, shrubs, pasture, and mixed forests with no prime farmland. Because much of this area is subject to frequent flooding, areas of wetlands and swamp existed before they were drained to make way for farmland. Swan Pond Circle runs north of Site 3 and would provide access to much of the area. The proposed recreational use would involve leaving most of the property in its natural state. The proposed recreation plans also involve development of walking trails, wildlife-viewing areas, and restoration of wetlands.

Watts Bar Reservoir Land Allocations

About 143.6 acres of TVA-managed reservoir lands occur in the vicinity of the proposed recreation project area. This property is located along the reservoir shoreline (see Table 2-1 and Figure 1-3) and much of it was impacted by the ash spill. The following discussion describes each parcel.

Parcel 12-45 contains 1.6 acres of reservoir land. This area contains land with 20 to 50 percent slope. Parcel 12-45 was forested before the ash spill, and it remains forested. The area around Parcel 12-45 was covered in ash after the spill, and the area has been restored by TVA to its pre ash-spill condition and land use.

Parcel 12-51 is 1.2 acres of low-lying area that is frequently flooded, with some areas characterized by 5 to 12 percent slope. Before the ash spill, Parcel 12-51 was covered in trees and shrubs between the road and the water. The ash knocked over the trees closest to the water, and ash has been removed from this area. TVA now plans to allow it to return to its former use.

Parcel 184 is 21.3 acres that includes the shoreline on the peninsula and the shoreline on the other side of the embayment to the west of the peninsula. Originally, this land was characterized by loam soils with 5 to 12 percent slope, with most backlying land occupied by residential houses. The ash spread into this embayment, filling it and uprooting trees. The ash has now been removed from the embayment. Trees and turf grasses covered most of this parcel, and lands recovered from the ash are now covered in grass with some trees remaining.

About half of Parcel 184a follows the southern areas along the shoreline and are loam soils considered prime farmland. These were and are maintained with grass cover or pastureland with some trees. The northern sections begin to steepen and are

characterized by a 12 to 20 percent slope that are covered in trees and scrub. The ash spill did not extend this far northeast, so the land appearance or use has not changed.

Parcel 185 contains 4.1 acres located on either side of the northern section of the peninsula. This area was not affected by the ash spill and has the same vegetation coverage as before the spill. The southern section of Parcel 185 is characterized by a 12 to 20 percent slope and covered in trees and scrub. The north side has a gentler slope of 5 to 12 percent with tree, scrub, and grass coverage. Both land use areas offer riparian strips of trees and scrub along the water's edge with some grass coverage further inland.

Parcel 186 includes 13.7 acres and is located on the most northeastern section of the embayment of the peninsula. Similar to Parcel 185, the ash did not spread into this region, and it is unchanged. This parcel is low-lying and subject to frequent flooding with a spring running through the middle of it and feeding the embayment. The area is covered in trees along the water and lowest elevations and covered in grass further inland. The trees, grass, and scrub help protect the riparian zone along the spring outflow.

Parcel 187 encompasses 56.8 acres that run along the both banks of the north and west embayments and the north side of the Swan Pond Creek embayment. The ash filled Swan Pond Creek and the west and north embayments and trees were uprooted along the edges. Originally, these embayments were fairly shallow and lined with trees; the remainder of the parcel was mostly grass and pastureland. The west embayment has been dredged and the areas surrounding it were planted in grasses. Ash has been removed from the north embayment and grass has been planted on all the recovered shoreline. The areas surrounding the Swan Pond Creek embayment are fairly flat loam soils and were originally covered with trees and scrub. The ash removed most of the trees from this area. Some of these areas surrounding the Swan Pond Creek embayment have been recovered, and grasses have been planted. Small areas within Parcel 187 are characterized by slopes of 20-35 percent, and all these areas are covered in trees and scrub.

Parcel 188 is comprised of two distinct areas, one small area on the west side of the west embayment and the rest surrounding the spring that feeds the north embayment to its north. A total of 25.3 acres comprise this parcel and were not exposed to the ash spill. This area is a low-lying silt loam soil that is subject to frequent flooding. The northern section of this parcel is included in the wetlands recreation land use.

Parcel 189a is comprised of small islands in the Emory River that total 11.9 acres. The smaller island is directly east of the TVA ash cells and was affected by ash during the spill. The larger (over 8 acres) southern island was not impacted. Both islands are fairly flat loam soils covered in trees and scrub. The smaller northern island has much of its area under water most of the year. Following the dredging of the Emory, the northern island has been restored and still maintains a coverage of trees and scrub. The southern island remains the same.

3.3. Wetlands

Wetlands are areas inundated by surface water or groundwater such that vegetation adapted to saturated soil conditions is prevalent. Wetlands in the Ridge and Valley Physiographic Province are typically associated with low-lying, poorly drained areas, or are linear in feature and associated with the floodplain areas of streams, rivers, and the reservoir. In this region, wetlands represent a small percentage of the landscape relative to uplands, mainly due to the geology of the region (Hefner et al. 1994).

The environmental quality of rivers, watersheds, estuaries, and water supplies is closely tied to the functions of wetlands. Examples of wetland functions include storm water storage, shoreline stabilization, sediment retention, removal and transformation of contaminants, and support for biological species, habitat, and landscape diversity (Mitsch and Gosselink 1993).

Wetland determinations were performed according to USACE standards, which require documentation of hydrophytic (i.e., wet-site) vegetation, hydric soil, and wetland hydrology (Environmental Laboratory 1987; Reed 1997; United States Department of Defense and USEPA 2003). Broader definitions of wetlands, such as that used by the United States Fish and Wildlife Service (USFWS) (Cowardin et al. 1979), the Tennessee definition (Tennessee Code 11-14-401), and the TVA Environmental Review Procedures definition (TVA 1983), were also considered in this review. Wetlands were categorized by their functions, sensitivity to disturbance, rarity, and ability to be replaced. The categorization was used to evaluate potential effects to wetlands and to determine the appropriate levels of mitigation for wetland impacts.

Proposed Recreation Areas

There are three wetlands (KI-W1, KI-W2, and KI-W3) occurring within the project area (Table 3-1; Figure 3-2). These wetlands are a mix of high-quality emergent, scrub-shrub, and forested wetlands. KI-W1 occurs on Site 3; KI-W2 occurs near Site 3, and KI-W3 occurs near Site 2; no wetlands occur on Sites 1 or 2.

Table 3–1. Wetlands in the Proposed Recreation Project Area

Wetland Identifier	Wetland Type	Size
KI-W1	Forested/scrub-shrub/emergent	4.71 acres
KI-W2	Forested/scrub-shrub/emergent	62.71 acres
KI-W3	Forested	5.9 acres

TVA monitors portions of these three wetlands under TVA's *Reservoir Operations Study* (ROS), a study that developed a new operating policy for the Tennessee River and reservoir system (TVA 2003). The wetland monitoring activities serve to determine how the new river system operations would impact wetland plant communities. The commitment calls for TVA to perform monitoring activities at designated wetland areas on a 3- to 5-year basis for 15 years.

Wetland KI-W1, a 4.71-acre wetland with a mix of forest, scrub-shrub, and emergent wetland habitats, occurs on portions of Parcels 187 and 188. The dominant plant species in KI-W1 include red maple, buttonbush, soft rush, water oak, swamp rose mallow, and arrowleaf tearthumb.

KI-W2 is a large (62.71 acres) forested and scrub-shrub wetland complex. The western portion of this wetland occurs on property acquired by TVA after the ash spill. The dominant species found in the western portion of KI-W2 are similar to those found in KI-W1. The eastern portion of this wetland extends beyond TVA's property boundary onto private property. The wetland area that extends onto private property has been identified by aerial photography and National Wetland Inventory maps, but has not been field surveyed.

KI-W3 occurs on Parcels 185 and 186. It is 5.9 acres and is associated with the floodplain of the unnamed tributary stream crossed by Swan Pond Circle Road adjacent to Site 2.

Dominant species include sycamore, willow oak, red maple, black willow, and green ash. KI-W3 is the site of another forested wetland monitoring plot for ROS.

Additionally, an analysis of soil maps (United States Department of Agriculture [USDA] 2011a) indicated a large portion of the area on Site 3 consists of hydric soils. This area is now a fallow field, but the hydric soil data indicate that this area was likely a wetland that was drained for agricultural production. This fallow field is among the potential areas on Site 3, as seen in Figure 3-2, for wetland restoration activities.

Overall, the December 2008 ash spill eliminated approximately 4 acres of forested wetlands along the shoreline across from the ash cell. Scrub-shrub and emergent wetlands were also impacted; however, scrub-shrub wetland areas impacted by the spill appear to be expanding. The expansion is likely due to the increased hydroperiod, the period of time in which a wetland is covered by water.

Figure 3–2. Wetlands in the Proposed Recreation Project Area

<u>Watts Bar Reservoir Land Allocations</u>
There are wetlands associated with Parcels 185, 186, 187, and 188. These parcels are currently allocated as Sensitive Resources and Natural Resource Conservation and are proposed for allocation to Project Operations.

Parcel 185 contains forested wetlands associated with the small embayment. The wetland occurs in a low-lying narrow riparian zone with a mix of hardwoods. The shoreline of Parcel 186 is comprised of a multi-age palustrine forested wetland.

Parcel 186 is located on the right bank of Emory River mile 3.2 within the Swan Pond Circle Road embayment. The shoreline of this parcel is comprised of a multi-age palustrine forested wetland. The supporting hydrology is from back flooding from the reservoir, ponding precipitation, and beaver impoundments. This wetland provides many water quality protection and enhancement functions including filtering and sequestration of sediments and nutrients while increasing local floodwater retention capacity.

Parcel 187 is comprised of three segments adjoining a large unnamed tributary embayment, Swan Pond Creek embayment, and the ash disposal area at KIF. The segment of the parcel that extends into the main reservoir is comprised of bottomland hardwoods and a scrub-shrub and emergent wetland fringe is present along the shallower shoreline areas.

Parcel 188 contains a wetland similar to that described under Parcel 186. However, the forested component of this wetland is somewhat younger in age. The hydric soils are mostly super saturated with numerous vernal pools and depression type situations.

As shown in Table 3-2, portions of Wetland KI-W1 and KI-W3 occur on reservoir land plan parcels proposed for allocation in this EA. The shoreline wetland associated with the Parcel 187 is proposed for allocation to Project Operations in the EA.

Table 3–2. Watts Bar Reservoir Property – Proposed Wetland Allocation Changes

Wetland Identifier	Land Plan Parcel	Allocation in 2009 Land Plan	Proposed Allocation	Wetland Type
KI-W1	Parcels 187 and 188	Sensitive Resources (Zone 3)	Project Operations (Zone 2)	Palustrine Forested (PFO)
KI-W2	Not Applicable (NA)	NA	NA	NA
KI-W3	Parcel 185	Natural Resource Conservation (Zone 4)	Project Operations (Zone 2)	Palustrine Forested (PFO)
	Parcel 186	Natural Resource Conservation (Zone 4)	Project Operations (Zone 2)	Palustrine Forested (PFO)

3.4. Floodplains

A floodplain is the relatively level land area along a stream or river that is subject to periodic flooding. The 100-year floodplain on Watts Bar Reservoir is the area that would be inundated by the 100-year flood. According to the National Geodetic Vertical Datum of 1929, the 100-year flood elevation in the project area, ERM 2.5, is 748.5 feet above mean sea level (msl), and the 500-year flood elevation is 751.1 feet above msl.

Proposed Recreation Areas

According to the Roane County Flood Insurance Rate Map (Appendix E), portions of Sites 1, 2, and 3 occur within the 100-year floodplain. The Swan Pond Creek embayment and the smaller unnamed embayment to Swan Pond Creek opposite ERM 2.5 on Watts Bar Reservoir occur within Sites 1 and 3. Floodplains on Site 2 occur on the shoreline where the two fishing piers, boat-launching ramp, and courtesy dock are planned.

Watts Bar Reservoir Land Allocations
The area affected by the proposed allocation of reservoir property in the project area impacted by the ash spill includes the Swan Pond Creek embayment and a smaller embayment to Swan Pond Creek opposite ERM 2.5. Much of the reservoir property considered for allocation, primarily the low-lying areas directly associated with the shoreline, occurs in the floodplain. Parcel 186 is low-lying and subject to frequent flooding, and portions of Parcel 188 are subject to frequent flooding. The smaller northern island associated with Parcel 189a is under water most of the year.

3.5. Prime Farmland

Prime farmland is arable land that has the best combination of soil physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, and labor, and without intolerable soil erosion. Such land can be cropland, pastureland, rangeland, forestland, or other land, but not urban or water. The conversion of prime farmland and other unique farmland soils to industrial and other nonagricultural uses essentially precludes farming the land for the foreseeable future. The FPPA sets guidelines that require all federal agencies to evaluate impacts to farmland prior to permanently converting such lands to a nonagricultural land use.

The FPPA requires that a Farmland Conversion Impact Rating (Form AD 1006) be completed by federal agencies with assistance from the Natural Resources Conservation Service (NRCS) before an action is taken. This impact rating is based on soil characteristics as well as site assessment criteria such as agriculture and urban infrastructure, support services, farm size, compatibility factors, on-farm investments, and potential farm production loss to the local community and county. Site assessment scores tend to be higher for the more rural locations. Sites receiving scores greater than 160 points (out of a possible 260) are given greater consideration for protection so that agricultural use can be preserved.

Proposed Recreation Areas
According to NRCS soil web survey data (USDA 2011b) for Sites 1, 2, and 3, approximately 18 acres are considered to be prime farmland (Table 3-3; Appendix F).

Table 3–3. TVA Prime Farmlands in the Vicinity of the Proposed Recreation Project Areas

Parcel	Total Acreage	Acres of Prime Farmland
Site 1 (Mainland site for ball field complex)	45 acres	0
Site 2 (Peninsula site for developed recreation)	32 acres	7
Site 3 (Green space and wildlife watching/wetlands management area)	60 acres	11
TOTAL = 137 acres		TOTAL = 18.0 acres

Watts Bar Reservoir Land Allocations
On the nine parcels of reservoir property considered in this proposal, approximately 18 percent of the area is considered prime farmland soils by the USDA NRCS (USDA 2011b). The total acreage of prime farmland within each parcel can be found in Table 3-4.

Table 3–4. Prime Farmlands Occurring on TVA Reservoir Property Considered for Allocation

Parcel Number	Total Acreage	Acres of Prime Farmland
12-45	1.6	0.0
12-51	1.2	0.0
184	21.3	5.2
184a	7.7	3.8
185	4.1	0.0
186	13.7	4.8
187	56.8	4.0
188	25.3	0.0
189a	11.9	9.1
TOTAL = 143.6 acres		Total = 26.9 acres

3.6. Visual Resources

Proposed Recreation Areas
The general landscape character of the recreation project area is described in this section. The physical, biological, and cultural features of an area combine to make the visual landscape character both identifiable and unique. Scenic integrity indicates the degree of unity or wholeness of the visual character. Scenic attractiveness is the evaluation of outstanding or unique natural features, scenic variety, seasonal change, and strategic location. Where and how the landscape is viewed affects the more subjective perceptions of its aesthetic quality and sense of place.

Views of a landscape are described in terms of what is seen in foreground, middleground, and background distances. In the foreground, an area within 0.5 mile of the observer, details of objects are easily distinguished in the landscape. In the middleground, normally between 1 and 4 miles from the observer, objects may be distinguishable, but their details are weak and they tend to merge into larger patterns. Details and colors of objects in the background, the distant part of the landscape, are not normally discernible unless they are especially large and standing alone. The impressions of an area's visual character can have a significant influence on how it is appreciated, protected, and used.

Site 1 (see Figure 1-2) is currently an open field with mild to moderately sloping terrain. The area is visible from Swan Pond Circle to the north and south. Houses within the viewshed of the ball field site have been purchased by TVA and are either vacant or used as office space by TVA personnel. Some of these structures would be removed to meet TVA business needs and to expand the buffer surrounding the KIF Reservation boundary. Scenic attractiveness is common. Scenic integrity is low.

Site 2, proposed for developed recreation and green space along Lakeshore Drive, was formerly a residential area with views of an embayment or the Clinch River to the east and west. TVA has purchased all of the houses in this area with the exception of one residence. Most of these structures would be removed to meet TVA business needs and to

expand the buffer surrounding the KIF Reservation boundary. The topography is mildly sloping, and views of the residential area are mainly from the water for recreation users and motorists along Lakeshore Drive. Scenic attractiveness is common. Scenic integrity is low.

Site 3 can be seen intermittently by motorists along Swan Pond Road. The site is a combination of old pasture and forested wetland that is inundated by standing water part of the year. Scenic attractiveness is common. Scenic integrity is moderate.

Watts Bar Reservoir Land Allocations

Watts Bar provides 721 miles of shoreline and over 39,000 acres of water surface. The reservoir and floodplain areas near the recreation project area include attractive islands, secluded coves, wetlands, and agricultural land, which are framed by high wooded ridges. Since the scenic features of the ridge and valley landscape are not limited by property boundaries, the attractive landscape character extends across TVA and private lands alike. The natural elements together with the communities and other cultural development provide a scenic, relatively harmonious, rural countryside.

The physical, biological, and cultural features seen in the landscape give reservoir land its distinct visual character and sense of place. Varied combinations of these elements make the scenic resources of any portion identifiable and unique. Areas with the greatest scenic value such as islands, bluffs, wetlands, or steep forested ridges generally have the least capacity to absorb visual change without substantial devaluation. Comparative scenic values of reservoir land were assessed to help identify areas for scenic conservation and scenic protection. Four broad visual characteristics were evaluated. Two of these distinct but interrelated characteristics—viewing distance and human sensitivity—are commonly considered together as scenic visibility.

Where and how the reservoir landscape is viewed affects human perceptions of its aesthetic quality and sense of place. These impressions of the visual character can influence how the scenic resources of public lands are appreciated, protected, and used.

Among the scenic resources of Watts Bar Reservoir, the water body itself is the most distinct and outstanding aesthetic feature. The horizontal surface provides visual balance and contrast to the islands, bluffs, and wooded hillsides.

The Emory River segment of Watts Bar Reservoir begins just beyond Clinch River Mile (CRM) 4, east of KIF. Views of KIF are mainly of the smokestacks and broadly horizontal industrial facilities. Scenic attractiveness is minimal. Depending upon viewer location, scenic integrity is low to very low. Northeast of KIF, the industrial setting transitions to sparse residential development. This riverine setting is less altered with the exception of occasional private water use facilities seen along the shoreline. The shoreline character becomes mainly light residential interspersed with tracts of undisturbed woodlands and agriculture lands. At ERM 5, the main body of water turns west toward Harriman, and the Little Emory River tributary enters from the north at this point.

3.7. Vegetation

The project area occurs in a landscape mostly disturbed and shaped by development including residential buildings, outbuildings, farmland, roadways, and docks along waterways. In addition, the project area is immediately adjacent to KIF, whose development and operation have greatly altered the vegetation on the power plant site.

Proposed Recreation Areas

The Southern Limestone/Dolomite Valleys and the Rolling Hills landforms are mostly rolling valleys and rounded ridges and hills, with many caves and springs. Soils vary in their productivity, and land cover includes oak-hickory and oak-pine forests, pastures, intensive agriculture, and urban and industrial areas (Griffith et al. 1998).

The vegetative classes found within the 137-acre KIF recreation project area include herbaceous vegetation, deciduous forests/woodlands, and shrublands. Herbaceous vegetation accounts for approximately 65 percent of the total project area in the form of agricultural fields, pastures, and lawns. Approximately 28 percent of the proposed project area is wooded and consists of mixed evergreen-deciduous forests.

Much of the herbaceous vegetation occurs as actively managed fields and includes cool season grasses, predominantly Kentucky fescue with some orchard grass and clover that are likely mowed two to three times during the growing season for hay crops. Older fields that are more infrequently mowed support several species of coarse herbs and shrubs including annual ragweed, lamb's quarters, pigweed, panic grass, sericea lespedeza, tall ironweed, Canada goldenrod, common blackberry, northern dewberry, Japanese honeysuckle, and winged sumac. The mixed evergreen-deciduous forests are found on the slopes and bottomland areas. Typical species occurring in these stands include white oak, black oak, chestnut oak, southern red and scarlet oak, hickories, yellow poplar, red maple, and beech. Mixed pine/hardwood stands include several of these upland species as well as sweetgum, sugar maple, white ash, chinquapin oak, and Virginia, shortleaf, and/or loblolly pines. Palustrine forests and shrublands in the form of scrub-shrub wetland communities account for the remaining 7 percent of the land cover. This community commonly contains American sycamore, green ash, persimmon, river birch, swamp chestnut oak, and willow oak. Black willow, buttonbush, silky dogwood, and tag alder occur in the scrub-shrub wetlands.

Site 1 consists of almost 100 percent herbaceous vegetation in the form of fields, pastures, and lawns. There are forested areas at the fringes and beyond the site as the topography slopes upland. Site 2 consists predominantly of lawns and native and ornamental plantings. About 44 percent of Site 3 consists of forested wetlands. The remaining vegetative cover includes 42 percent herbaceous vegetation, and 14 percent is scrub-shrub or emergent wetlands.

The entire project area is on land in which the native vegetation has been extensively altered by previous land use, and invasive plant species occur throughout the property. EO 13112 (Invasive Species) directs federal agencies to prevent the introduction of invasive species and provide for their control to minimize the economic, ecological, and human health impacts that invasive species cause. According to Morse et al. (2004), invasive plant species are the second-leading threat to imperiled native species.

Common invasive plant species occurring within the project area include bush honeysuckle, Chinese privet, Japanese honeysuckle, Japanese stilt grass, Johnson grass, mimosa, multiflora rose, Russian olive, and sericea lespedeza. In addition, reed canary grass has invaded wetland communities in the area. No other plant species listed as federal noxious weeds (USDA 2007) are known to occur in the vicinity of the project area.

Watts Bar Reservoir Land Allocations

Five parcels of reservoir property are proposed for allocation to Project Operations (see Table 2-1) due to their proximity to KIF. The 21.3 acres of Parcel 184 include the peninsula

shoreline with most backlying land occupied by residential houses, and the shoreline across the embayment to the west of the peninsula. The ash that filled this embayment and uprooted trees has now been removed. Trees and turf grasses covered most of this parcel prior to the spill and the lands recovered from the ash are now covered in grass with some trees remaining. Parcels 185 and 187, totaling 60.9 acres, are composed of upland hardwoods, bottomland/riparian hardwoods, scrub-shrub wetlands and open fields. Parcels 186 and 188 cover 39 acres of emergent, forested, and scrub-shrub wetlands.

Parcel 184a is 7.7 acres and is composed of bottomland/riparian hardwoods, scrub-shrub wetlands and open fields. Parcel 189a occurs on small islands and is covered with bottomland hardwoods and fringe wetlands. Parcels 12-45 and 12-51 are forested areas that were impacted by the spill. The ash has been removed and the impacted areas will be allowed to naturalize.

3.8. Wildlife

Proposed Recreation Areas

The project area occurs in a landscape greatly disturbed by human activity in the form of residential and industrial uses. In addition, the site was affected by the KIF ash spill in 2008. Wildlife habitat in the recreation project area includes forested wetland fragments, agricultural early successional fields, early successional fields surrounding industrial infrastructure, maintained lawns associated with residential property, and small woodland fragments and fence rows scattered throughout the project area, particularly on Site 2.

Wildlife habitat composed primarily of woody and herbaceous vegetation provides habitat for common bird species that are highly tolerant of disturbance. These include the Carolina wren, American robin, red-tailed hawk, tufted titmouse, northern cardinal, field sparrow, and song sparrow. Mammals such as eastern mole, white-footed mouse, and prairie vole, as well as larger mammals, such as eastern cottontail, woodchuck, common raccoon, coyote, and white-tailed deer, are found in these disturbed habitats. Reptiles common in these habitats include the yellow-bellied slider, black rat snake, and common garter snake. Wetlands and streams in the project area provide habitat for amphibians including American toad, green frog, northern cricket frog, upland chorus frog, and red-spotted newts.

Watts Bar Reservoir provides riparian habitat for raptors such as bald eagles and osprey, as well as other birds, including great egrets, great blue herons, and belted kingfishers. These shoreline areas also provide habitat for amphibians such as the northern cricket frog and red-spotted newts.

As part of the on-going ash recovery effort, the ecological impacts of the ash spill are being monitored by TVA and other agencies. This monitoring includes observing more than 500 tree swallow nest boxes near KIF and at other nearby reservoirs. Of these 500 nest boxes, approximately 100 nest boxes occur on and near the Site 2 shoreline (see Figure 3-3).

Watts Bar Reservoir Land Allocations

As described in Section 3.7, reservoir property proposed for allocation includes deciduous hardwood forest, bottomland/riparian hardwoods, scrub-shrub wetlands, riparian and fringe wetland habitats, and open fields.

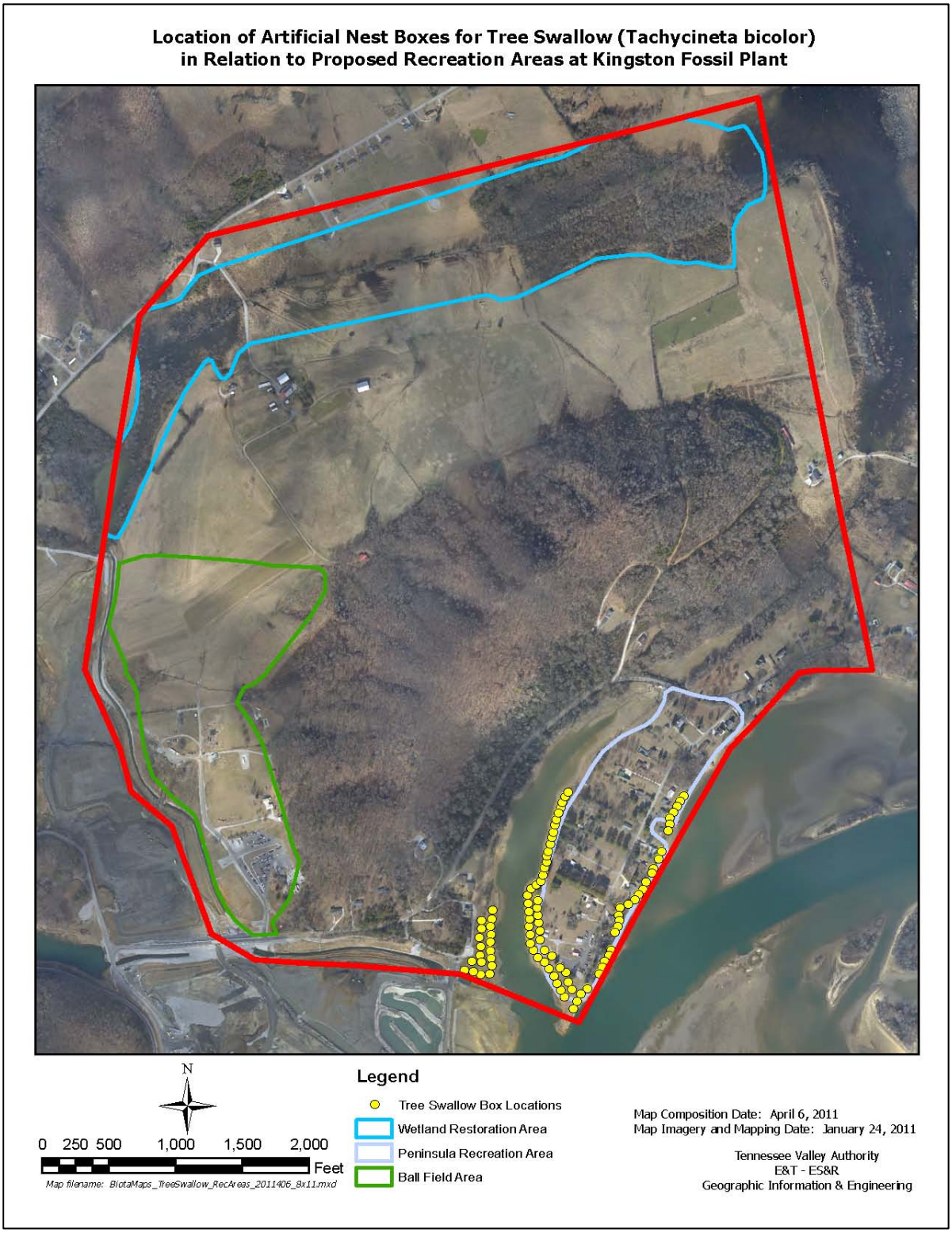

Figure 3–3. Tree Swallow Nesting Sites in the Proposed Recreation Project Area

Throughout the project area, scattered deciduous hardwood forests typically support the greatest diversity of wildlife. Common mammals in this type of forest include eastern gray squirrel, white-tailed deer, red bat, short-tailed shrew, and white-footed mouse. The bird community includes species present throughout the year, species that nest in the region and migrate to winter in the Caribbean and in Central and South America (often referred to as Neotropical migratory birds), and species that winter in the region. Common birds present throughout the year include eastern wild turkey, red-shouldered hawk, woodpeckers, blue jay, Carolina chickadee, tufted titmouse, and Carolina wren. Common Neotropical migrants include the yellow-billed cuckoo, wood thrush, red-eyed vireo, hooded and Kentucky warblers, and summer tanager. Wintering birds include the golden-crowned kinglet, winter wren, and yellow-rumped warbler. Among the common reptiles and amphibians found in deciduous forests are eastern box turtle, five-lined skink, black rat snake, dusky and slimy salamanders, American toad, and Cope's gray treefrog.

Portions of the reservoir property proposed for allocation contain emergent, forested, and scrub-shrub wetlands and bottomland/riparian hardwoods. Some of the more common waterfowl species seen include mallards, American black ducks, hooded mergansers, resident Canada geese, and wood ducks. There are also other water/wading birds such as green herons, great egrets, pied-billed and horned grebes, and various tern and gull species. Common amphibians and reptiles occurring in this habitat include green frog, narrow-mouth toad, and Fowler's toad, northern water snake, common snapping turtle, painted turtles, and red-eared sliders. Mammals that use these habitats include mink, muskrat, raccoon, and beaver.

Riparian/shallow water/overbank habitats are widespread and common along the reservoir. These shallow water/riparian habitats, coupled with a consistent fish forage base, provide excellent habitat for several fish-eating bird species. Great blue herons and black-crowned night herons, along with a growing number of cattle egrets and double-crested cormorants, are common throughout the reservoir area and numerous nesting colonies are located on TVA-owned properties.

Other wildlife habitat in the area includes open fields. The frequently mowed open hayfield areas provide somewhat limited wildlife habitat. Bird species that use these areas include resident Canada geese, eastern bluebird, eastern meadowlark, American crow, American kestrel, and red-tailed hawk. Amphibians and reptiles utilizing these habitats, at least on a seasonal basis, include spring peeper, upland chorus frog, and eastern garter snake.

A review of the TVA Natural Heritage database indicated four heron colonies and four osprey nests occur within 3 miles of the project area; the nearest heron colony is approximately 0.5 mile from the project area. No recorded caves or other unique areas have been reported within 3 miles of the project area.

3.9. Aquatic Life

Proposed Recreation Areas

The recreation project area has one distinct drainage area, which drains to the Swan Pond Creek embayment and/or to an unnamed embayment, and eventually empties into the Emory River. This drainage area is located in the upper portion of Watts Bar Reservoir. Aquatic communities in the project area would vary depending on water quality, size, and habitat conditions both within and along watercourses. Aquatic species were not sampled during field surveys; however, aquatic communities are expected to be similar to those

known from the region as described in Etnier and Starnes 1993 and Parmalee and Bogan 1998.

A desktop review using United States Geological Survey (USGS) topographic maps and aerial photography indicated two perennial streams occur within the project area. Several wet-weather conveyances occur within the project area along the ridgetop adjacent to Sites 1 and 3.

Because the planned actions would potentially affect riparian conditions and in-stream habitat, TVA evaluated the condition of both of these features at the streams in the project area. From these habitat assessments, riparian condition was assigned to one of three classes to indicate the current condition of streamside vegetation in the recreation project area (Table 3-5).

Table 3–5. Riparian Condition of Streams Located Within the Project Area

Riparian Condition	Number of Perennial Streams	Number of Intermittent Streams	Total
Forested	0	0	0
Partially forested	1	0	1
Nonforested	1	0	1
Total	**2**	**0**	**2**

- Forested - Riparian area is fully vegetated with trees, shrubs, and herbaceous plants. Vegetative disruption from mowing or grazing is minimal or not evident. Riparian width extends more than 60 feet on either side of the stream.
- Partially forested - Although not forested, sparse trees and/or scrub-shrub vegetation is present within a wider band of riparian vegetation (20 to 60 feet). Disturbance of the riparian zone is apparent.
- Nonforested - No or few trees are present within the riparian zone. Significant clearing has occurred, usually associated with pasture or cropland.

In order to minimize potential impacts to streams and other water courses, TVA assigns appropriate streamside management zones (SMZs) and BMPs based upon these evaluations and other considerations, such as proximity of state impaired waters, i.e., streams recognized on the State of Tennessee 303(d) list 2010 (TDEC 2010), and presence of endangered or threatened aquatic species. Implementation of these measures minimizes the potential for impacts to water quality and in-stream habitat for aquatic organisms.

Watts Bar Reservoir Land Allocations

As described in the 2009 Plan, aquatic habitat in the littoral (near shore) zone is greatly influenced by underwater topography and backlying land use. Underwater topography at Watts Bar Reservoir varies from moderately steep, with scattered small bluffs near the river channel, to typically shallow embayments, coves, and areas further from the river channel and tributary stream channels. Undeveloped shoreline is mostly wooded, so fallen trees and brush provide woody cover in those areas. Woody habitat is usually reduced on TVA and non-TVA lands where backlying property is largely residential or agricultural.

Rock is an important constituent of littoral aquatic habitat over much of the reservoir, in either the form of bedrock outcrops or a mixture of rubble and cobble on steeper shorelines or gravel along shallower shorelines. Substrate and available aquatic habitat in coves and embayments also typically correspond to shoreline topography and vegetation. In areas characterized by residential development, habitat includes manmade features such as shoreline stabilization structures (e.g., seawalls or riprap) and docks. Some aquatic habitats, such as fallen trees, are less numerous in residential areas.

TVA has systematically monitored the ecological conditions of its reservoirs since 1990 as part of its Vital Signs Monitoring Program (TVA 2010a). Vital Signs monitoring activities focus on (1) physical/chemical characteristics of water; (2) physical/chemical characteristic of sediments; (3) benthic macroinvertebrate community sampling; and (4) fish assemblage sampling. Several reservoir monitoring and evaluation tools were developed in the initial phase of the Vital Signs Monitoring Program, and those tools are often used in other TVA studies. Such is the case for KIF where TVA's fish assemblage monitoring tool (Reservoir Fish Assemblage Index) has been used in recent years at CRM 1.5, downstream of KIF, and CRM 4.4, upstream of KIF. The fish assemblage at these sites has consistently rated "good" except for lower scores in 2007, a likely result of widespread drought conditions that continued into 2008. Watts Bar Reservoir rated at or above the Valleywide average in the quality of its sport fishery (TVA 2010b).

The mussel fauna in the Emory River near KIF has been substantially altered by the impoundment of Watts Bar Reservoir and upstream impacts including mining and urbanization. Six mussel species (giant floater, fragile papershell, pistolgrip, pimpleback, wartyback, and threehorn wartyback) and a common aquatic snail (hornsnail) were found in a recent survey of this area (Yokley 2005). All of these species, except pistolgrip, are generally tolerant of reservoir conditions.

3.10. Endangered and Threatened Species

Proposed Recreation Areas

Several federally listed and state-listed plant and animal species are known from Roane County and/or the vicinity of the project area (see Table 3-6). Descriptions of the federally listed species and their habitat are included as Appendix G.

Table 3–6. Federally and State-Listed Endangered and Threatened Species Known From Roane County, Tennessee, and/or Within a 3-Mile, 5-Mile, or 10-Mile Radius[1] of the Project Area

Common Name	Scientific Name	Status[2]	
		Federal	State (Rank[3])
Plants			
Earleaf foxglove	*Agalinis auriculata*	-	END (S2)
American Hart's-tongue fern	*Asplenium scolopendrium* var. *americanum*	THR	END (S1)
Spreading false-foxglove	*Aureolaria patula*	-	SPCO (S3)
Appalachian bugbane	*Cimicifuga rubifolia*	-	THR (S3)
Cumberland rosemary	*Conradina verticillata*	THR	THR (S3)
Tall larkspur	*Delphinium exaltatum*	-	END (S2)
Northern bush-honeysuckle	*Diervilla lonicera*	-	THR (S2)
Mountain bush-honeysuckle	*Diervilla sessilifolia* var. *rivularis*	-	THR (S2)

Common Name	Scientific Name	Status[2]	
		Federal	State (Rank[3])
Branching Whitlow-wort	*Draba ramosissima*	-	SPCO (S2)
Western wallflower	*Erysimum capitatum*	-	END (S1S2)
Schreber aster	*Eurybia schreberi*	-	SPCO (S1)
McDowell sunflower	*Helianthus occidentalis*	-	SPCO (S2)
Goldenseal	*Hydrastis canadensis*	-	S-CE (S3)
Fetter-bush	*Leucothoe racemosa*	-	THR (S2)
Slender blazing-star	*Liatris cylindracea*	-	THR (S2)
Canada lily	*Lilium canadense*	-	THR (S3)
Mountain honeysuckle	*Lonicera dioica*	-	SPCO (S2)
Large-flowered Barbara's-buttons	*Marshallia grandiflora*	-	END (S2)
American ginseng	*Panax quinquefolius*	-	S-CE (S3S4)
White fringeless orchid	*Platanthera integrilabia*	CAND	END (S2S3)
Heller's catfoot	*Pseudognaphalium helleri*	-	SPCO (S2)
Pursh's wild-petunia	*Ruellia purshiana*	-	SPCO (S1S2)
Prairie goldenrod	*Solidago ptarmicoides*	-	END (S1S2)
Virginia spiraea	*Spiraea virginiana*	THR	END (S2)
Shining ladies'-tresses	*Spiranthes lucida*	-	THR (S1S2)
Northern white cedar	*Thuja occidentalis*	-	SPCO (S3)
Bird			
Bald eagle	*Haliaeetus leucocephalus*	DM	PROT (S3)
Mammal			
Gray bat	*Myotis grisescens*	END	PROT (S2)
Fish			
Blue sucker	*Cycleptus elongatus*	-	THR (S2)
Ashy darter	*Etheostoma cinereum*	-	THR (S2S3)
Spotfin chub	*Erimonax monachus*	THR	THR (S2)
Flame chub[4]	*Hemitremia flammea*	-	NMGT (S3)
Tangerine darter	*Percina aurantiaca*	-	NMGT (S3)
Tennessee dace	*Phoxinus tennesseensis*	-	NMGT (S3)
Mollusks			
Spectaclecase[4]	*Cumberlandia monodonta*	PE	TRKD (S2S3)
Fanshell[4]	*Cyprogenia stegaria*	END	END (S1)
Fine-rayed pigtoe[4]	*Fusconaia cuneolus*	END	END (S1)
Pink mucket	*Lampsilis abrupta*	END	END (S2)
Alabama lampmussel[4]	*Lampsilis virescens*	END	END (S1)
Ring pink[4]	*Obovaria retusa*	END	END (S1)
Orange-foot pimpleback[4]	*Plethobasus cooperianus*	END	END (S1)
Sheepnose mussel	*Plethobasus cyphyus*	PE	TRKD (S2S3)
Pyramid pigtoe	*Pleurobema rubrum*	-	TRKD (S2S3)

Common Name	Scientific Name	Status[2]	
		Federal	State (Rank[3])
Purple bean[4]	*Villosa perpurpurea*	END	END (S1)
Aquatic Snails			
Ornate Rocksnail[4]	*Lithasia geniculata*	-	TRKD (S3)
Spiny Riversnail	*Io fluvialis*	-	TRKD (S2)

Source: TVA Natural Heritage database March 2011
[1]Terrestrial animals = 3-mile radius, Plants = 5-mile radius, Aquatic animals = 10-mile radius for species records
[2]**Status Codes:** CAND = Candidate; DM = Recovered, delisted, and being monitored; END = Endangered; NMGT = In need of management; PE = Proposed endangered; PROT = Protected; SPCO = Special concern; S-CE = Special concern-commercially exploited; THR = Threatened; TRKD = Tracked as sensitive but has no legal status
[3]**State Ranks**: S1 = Extremely rare and critically imperiled in the state; S2 = Very rare and imperiled within the state; S3 = Rare or uncommon; S4 = Apparently secure; S#S# = Denotes a range of ranks because the exact rarity of the element is uncertain (e.g., S1S2)
[4]**Historical occurrence**, species considered "possibly extirpated" due to general habitat loss or degradation of the environment in the area

Review of the TVA Natural Heritage database (accessed March 24, 2011) indicated four federally listed plant species are known from Roane County, and 22 state-listed plant species are known to occur from within 5 miles of the project area (Table 3-6). Habitat for the federally listed species does not occur in the project area. Although habitat for some state-listed plants could potentially occur in the project area, no federally or state-listed plants species are known to occur within 1 mile of the project area.

One federally listed species, the gray bat and one federally protected species, the bald eagle, have been documented in Roane County. Potential foraging habitat occurs adjacent to the project area along the Emory River and Watts Bar Reservoir. However, the nearest gray bat or bald eagle records occur more than 5 miles from the project area.

One federally listed fish species and nine federally listed mussel species are known from Roane County (Table 3-6); however, seven of the mussel species are considered to be possibly extirpated due to general habitat loss or degradation of the environment in the area. Furthermore, conditions within the project area are currently not suitable for any of the listed aquatic species in Table 3-6.

Watts Bar Reservoir Land Allocations

At present, no populations of federally listed plants are known to occur on Watts Bar Reservoir lands. However, four populations of Virginia spiraea and one population of Cumberland rosemary, both federally listed as threatened species, occur along the Emory River less than 1 mile upstream of the stretch impounded by Watts Bar Reservoir. There are no federally listed aquatic species that are known to occur in the vicinity of the reservoir property proposed for allocation.

The various plant communities on Watts Bar Reservoir provide suitable habitat for a variety of federally and state-listed terrestrial animals including pine forests, mixed hardwood/conifer forests, upland and riparian hardwood forests, wetlands, and early successional and agricultural lands. No uncommon habitats such as caves, rock outcrops, and sinkholes found on Watts Bar Reservoir lands are known from the parcels proposed for allocation. Although gray bat and bald eagle are known to occur on reservoir lands, neither of these species is known from the project area. The gray bat likely forages along the Clinch and Emory rivers. The closest cave known to be occupied by gray bats is 16 miles

from KIF. Suitable habitat for other federally listed species does not occur in the vicinity of KIF.

3.11. Water Quality

The water quality analyses for the recreation project area and the property proposed for allocation are combined in this section.

3.11.1. Surface Water

Watts Bar Dam is approximately 40 river miles downstream of the project area (37.9 miles on the Tennessee River and 2.0 miles on the Clinch River) at Tennessee River Mile 529.9 and ranges approximately 5.5 river miles upstream to 3.5 river miles on the Emory River. The Emory River joins the Clinch River at CRM 4, near the city of Kingston. The proposed project's surface waters flow into the Swan Pond Creek embayment, an unnamed embayment, and eventually into the Emory River.

River flow rates past the recreation project area are regulated by upstream dams (i.e., Melton Hill and Norris dams) on the Clinch River and downstream on the Tennessee River by Watts Bar Dam. The flow rates are also influenced by upstream dam operations on the Tennessee River (Tellico and Fort Loudoun dams). Flow patterns can be complex in the Emory River and Clinch River embayments. The Emory River flow fluctuates between flowing upstream from the Clinch River through the Emory River embayment to also flowing backward upstream of KIF. Water is pushed up the Emory River because of inflows that raise the pool elevation in Watts Bar Reservoir. Such inflow typically occurs when the reservoir is filling in the spring or during a spring flood event. Different rates and timing of releases from Watts Bar, Fort Loudoun, and Melton Hill reservoirs can also cause reverse flows in the Clinch River arm of Watts Bar Reservoir. There is the potential for water from the Clinch River to backflow upstream into the Tennessee River during the filling of Watts Bar Reservoir.

The 2008 KIF dike failure released about 5.4 million cubic yards of coal ash and about 327 million gallons of water. This ash and water spread over nearly 300 acres of land and water adjacent to KIF and into the Emory River. Since the spill, the USEPA, TDEC, and TVA water quality crews have been sampling water to assess the quality of public drinking water supplies, private wells, in-stream river water (both near the spill and at multiple downstream locations), and local springs.

The state 303(d) list is a compilation of the streams and lakes in Tennessee that are "water quality limited" or are expected to exceed water quality standards in the next two years. Currently, the Emory River arm of Watts Bar Reservoir is listed on the state 303(d) list because of polychlorinated biphenyls (PCBs), mercury, and chlordane contamination of the sediment from legacy (historical) pollutants, industrial point source discharges, and from atmospheric deposition (TDEC 2010). Additionally, the Emory River arm, Swan Pond Creek embayment, and the unnamed embayment are listed because of ash spill-related arsenic and coal ash deposits.

In general, the levels of contaminants in water increase as flow increases, and levels of contaminants decrease as flow recedes. Higher flow rates and high water velocities cause small particles of solid materials to become suspended in the water column and, therefore, increase concentration. The chemical constituents of greatest concern are the metals contained in the ash. These trace constituents are chemically combined with the ash.

Depending on the temperature, pH, and oxygen availability in the water, the metals may disassociate from the ash.

According to the *Kingston Ash Recovery Project Non-Time-Critical Removal Action Surface Water Monitoring Plan for the Emory, Clinch, and Tennessee Rivers* (Jacobs 2010), periodic samples were collected in the direct vicinity of these surface waters. Samples from the comparison of the maximum and average concentrations for dredge plume and Emory River at ERM 0.1 (as described in the monitoring plan) indicate that even during dredging activities, ash-related constituents settled out of the water column quickly. Additionally, all the local drinking supply and groundwater wells are frequently tested, and all samples have continuously met public health standards.

Current site conditions in the recreation project area include mostly cleared and stabilized property. Some infrastructure and a few buildings have been left in place for use in the prospective recreation areas. Potential adverse impacts to surface water and groundwater quality are normally related to those resulting from construction activities and the maintenance of the new facilities. Potential construction-related impacts in waterways include increased turbidity, erosion, and sedimentation. Soil erosion and sedimentation can clog streams and groundwater features and can threaten aquatic life. Because the proposed project deals with construction activities of mostly residential and agricultural lands, constituents naturally occurring in the soil and sediment would be the primary potential pollutants to surface water.

3.11.2. Groundwater

The proposed project area is located in the Ridge and Valley Physiographic Province and is underlain by Cambrian-aged rocks of the Conasauga Group and Ordovician-aged rocks of the Knox Group. The Ridge and Valley aquifer consists of folded and faulted carbonate, sandstone, and shale. Soluble carbonate rocks and some easily eroded shales underlie the valleys in the province, and more erosion-resistant siltstone, sandstone, and cherty dolomite underlie ridges. The arrangement of the northeast-trending valleys and ridges are the result of a combination of folding, thrust faulting, and erosion. Compressive forces from the southeast have caused these rocks to yield, first by folding and subsequently by repeatedly breaking along a series of thrust faults. The result of the faulting is that geologic formations are repeated several times across the region. Carbonate-rock aquifers in the Chickamauga, the Knox, and the Conasauga groups are repeated throughout the Ridge and Valley Physiographic Province (Lloyd and Lyke 1995).

Groundwater movement in the Ridge and Valley Province is localized, restricted by the repeating lithology created by thrust faulting. Older rocks, primarily the Conasauga Group and the Rome Formation have been displaced upward over the top of younger rocks (the Chickamauga and the Knox groups) along thrust fault planes, thus forming a repeating sequence of permeable and less permeable hydrogeologic units. The repeating sequence, coupled with the stream network, divides the area into a series of adjacent, isolated, shallow groundwater flow systems. The water moves from the ridges where the water levels are high, toward lower water levels adjacent to major streams that flow parallel to the long axes of the valleys. Most of the groundwater is discharged directly to local springs or streams (Lloyd and Lyke 1995).

The chemical quality of water in the freshwater parts of the Ridge and Valley aquifers is similar for shallow wells and springs. The water is hard, is a calcium-magnesium-bicarbonate type, and typically has a dissolved-solids concentration of 170 milligrams per

liter or less. In places where the residuum, soil material formed from rock weathering in place, that overlies the carbonate rocks is thin, the Ridge and Valley aquifers are susceptible to contamination by human activities (USGS and TDEC 1995).

Public drinking water for Roane County is supplied by surface water sources (USEPA 2010). All public groundwater sources in Roane County were closed prior to December 2008, except for one, and it is located approximately 10 miles east of the project area. The northern section of the project area, Swan Pond Circle, is located within a State Designated Wellhead Protection Area.

3.12. Archaeological and Historic Resources

In East Tennessee, during the 17th and 18th centuries, Europeans and Native Americans began interacting through the fur-trading industry. European-American expansion into East Tennessee began after the Revolutionary War, with settlement concentrated along the fertile valleys of the Tennessee River. As European-American settlement increased, the Cherokee were forced to give up their land. Permanent European-American settlement near KIF and the project area began after the Treaty of Tellico Blockhouse in 1798, which ceded the land between the Clinch River and Cumberland Mountains to the United States.

Roane County was created in 1801 and the town of Kingston, located at the confluence of the Clinch and Tennessee rivers, was designated the Roane County seat. Small-scale or subsistence farming was the principal occupation of most 19th century residents in Roane County. Although agriculture made up most of the economy in East Tennessee, the commercial potential of local mineral deposits was recognized. Union Colonel John Wilder, with other northern industrialists, organized the Roane Iron Company, and in 1868, established the town of Rockwood, the "Company Town of the New South." The Roane Iron Company produced pig iron that was initially shipped by steamboat and later by rail. In 1939, construction began on Watts Bar Dam, part of the system of dams and locks on the Tennessee River intended to improve navigation and control flooding. In the early 1950s, TVA constructed KIF. Construction and operation of the dam and KIF provided jobs, flood control, and electricity to Roane County and surrounding areas (Hall and Parker 1998; Killebrew 1974).

TVA considers the archaeological area of potential effects (APE) to be in the 205.5-acre area that includes Sites 1, 2, and 3, as well as the portions of the nine tracts of Watts Bar Reservoir property from the 2009 Plan proposed for allocation as part of the proposed action. An archaeological survey was completed within the APE by TRC, an environmental contractor (Karpynec et al. 2010a and 2010b). One previously recorded archaeological site (Site 40RE580, a historic artifact scatter site) was identified within the APE. TVA found Site 40RE580 to be ineligible for listing in the National Register of Historic Places (NRHP), due to lack of integrity/intact deposits and low research potential, and consulted with the Tennessee State Historic Preservation Officer (SHPO) and other consulting parties. In a letter dated May 17, 2010, the SHPO concurred with TVA's finding that the site was ineligible for listing (Appendix D).

The architectural APE involves a 0.5-mile radius around the proposed aboveground facilities. The majority of the architectural APE was previously surveyed (Karpynec et al. 2010a, 2010b, 2010c) as part of the *Kingston Fossil Plant Structure Razing EA* (TVA 2011) analysis, and no historic properties eligible for listing in the NRHP were identified. On February 22, 2010, TVA Cultural Compliance staff conducted a historic structure survey for

the remainder of the architectural APE that had not been previously surveyed by TRC. No historic structures were identified.

3.13. Socioeconomics

The proposed recreation project area and the reservoir property proposed for allocation are located about 36 miles west of Knoxville. The 2010 United States Census of Population indicates the population of Roane County is 54,181 (United States Census Bureau 2010a). This is an increase of 4.4 percent since the 2000 Census of Population, well below the state increase of 11.5 percent. The KIF site is in Census Tract 307, Block Group 2, which had a population of 581 in 2010, a decrease of 21.2 percent from the 2000 population of 737 (ibid). Several damaged houses in this area were razed as a result of the coal ash spill. Other nearby areas increased in population between 2000 and 2010.

Total employment in Roane County in 2009 was 22,061 (Bureau of Economic Analysis 2009), a 9.6 percent decline from 24,406 in 1999. Most of the loss was in manufacturing, which declined from 2,526 jobs to 1,242, and in retail trade, which declined from 3,692 to 1,627. Both of these sectors also declined statewide and nationally. However, the rate of decline in both sectors was greater in the county than in the state and the nation. Professional, scientific, and technical services is a major employer in the county, accounting for almost one-fourth (24.8 percent) of total jobs in the county in 2009. In contrast, this sector accounted for 5.1 percent of jobs in the state and 6.8 percent nationally. Per capita personal income in Roane County in 2009 was $33,015, about 83 percent of the national average. Statewide, per capita personal income was $34,277, and nationally, $39,635 (ibid).

The minority population of Roane County, based on the 2010 United States Census, is 6.3 percent of the total, well below the state average of 24.4 percent and the national average of 36.3 percent. The poverty level in the county is estimated to be 14.0 percent, as of 2005-2009 estimates, lower than the state average of 16.1 percent (United States Census Bureau 2010b). The poverty level in Census Tract 307 was estimated to be only 7.6 percent. Nationally, the poverty level was estimated to be 13.5 percent during this same period (ibid).

As previously mentioned, the ash spill event resulted in TVA acquiring numerous properties in the project area, resulting in relocation of many residents and reduced property tax revenues in the project area. However, the conversion of private property to TVA power property increased the tax equivalent payments TVA makes to Tennessee and Roane County, as required under Section 13 of the TVA Act.

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CHAPTER 4

4.0 ENVIRONMENTAL CONSEQUENCES

The potential effects of adopting and implementing the No Action Alternative and the Action Alternative on the various resources described in Chapter 3 are provided in this chapter. Under the No Action Alternative, TVA would not develop the proposed recreation areas at this time. Environmental conditions in the project area would change due to the continued removal of the spilled ash, restoration of shorelines and other areas following ash removal, and the removal of the houses and other buildings from the tracts purchased by TVA. Additionally, TVA would not address the reservoir land plan allocation changes to 143.6 acres at this time. The lack of updated land plan allocations would likely have little immediate effect on the uses of the areas. Under the Action Alternative, TVA would enhance and restore land impacted by the 2008 ash spill at KIF by developing three recreation concepts on TVA-managed property acquired after the ash spill. Furthermore, TVA would allocate nine parcels of TVA reservoir land removed from the 2009 Plan to reflect the land use zones defined in Appendix C.

4.1. Recreation, Parks, and Managed Areas

4.1.1. No Action Alternative

Under the No Action Alternative, no enhancements or land restoration would occur that could provide alternative recreation opportunities for the public to replace some of those lost due to the ash spill. The baseball/softball and soccer facilities formerly available for public use would not be replaced, and opportunities for Roane County residents to participate in these outdoor sports would continue to be limited. Opportunities for public boat-launching, picnicking, bank fishing, walking, and nature observation would also continue to be limited in the middle section of the Emory River. Depending on TVA's ultimate use of the lands acquired in the vicinity of Sites 1, 2, and 3, they could provide opportunities for picnicking, bank fishing, walking, and nature observation, although without roads and facilities specifically constructed to support the activities.

No direct impacts to existing natural areas within 3 miles are anticipated under the No Action Alternative. Because areas previously set aside for recreation and resource conservation were damaged or deemed unusable due to the ash spill or recovery operations, potential adverse indirect effects from implementing the No Action Alternative would be continued loss of recreational and natural resource-focused opportunities such as wildlife viewing, bird watching and hiking trails in the community. No cumulative impacts to natural areas are foreseeable under the No Action Alternative.

The public would continue to have limited access to the TVA-managed reservoir parcels, and some informal use would continue as described in Section 3.1.

4.1.2. Action Alternative

<u>Proposed Recreation Areas</u>

Under the Action Alternative, land that was impacted by the ash spill would be enhanced and restored by converting lands near KIF to public recreational areas for the community. This alternative would accommodate the outdoor recreation needs identified by Roane County residents and would provide formal and informal recreation benefits to the community. Development of the proposed 45-acre ball field area would serve to replace the baseball/softball and soccer facilities previously available on the KIF property.

Development of the 32-acre developed recreation and green space area would provide increased opportunities for boat-launching, bank fishing, picnicking, and nature trail enjoyment in this area of the Emory River. The 60-acre green space and wetland restoration area would provide recreation opportunities for nature walks and nature observation in the region. Potential effects would be positive and beneficial due to the conversion of land that would provide new opportunities for low-impact recreation and would improve the scenic and aesthetic qualities of the area. The proposed birding and wetlands trail complex could potentially become a new designated natural area and could possibly be utilized for ecological research and environmental education.

As previously discussed, TVA is developing a Master Plan which will consider the creation and enhancement of habitat suitable for migratory shorebirds and other resident and migratory wildlife. The planned efforts to restore shoreline and shorebird habitat in the project area and the near vicinity (under the Master Plan) would benefit wildlife and the wildlife-watchers observing these species.

Watts Bar Reservoir Land Allocations
Under this alternative, five parcels would be allocated to support and maintain consistency with development of the proposed recreation areas. Allocation and subsequent recreation development of parcels 184, 185, 186, 187, and 188 would result in improvements in public recreation opportunities compared to the limited recreation benefits available under the current allocation for these tracts. Further, Parcels 12-45 and 12-51 would be allocated as Developed Recreation and these sites would continue to be managed by TWRA.

Because natural areas previously set aside for recreation and resource conservation (i.e., Kingston State Wildlife Management and Refuge Wildlife Observation Area) were damaged or deemed unusable due to the ash spill or recovery operations, establishing new areas for recreational and resource conservation activities such as wildlife viewing, bird watching and hiking trails in the vicinity of the ash spill as proposed to restore and enhance the community would help to mitigate areas impacted by the spill.

4.2. Land Use

TVA manages public land on Watts Bar Reservoir to protect and enhance natural resources, generate prosperity, and improve the quality of life in the Tennessee Valley. TVA public land is used for public and commercial recreation, industrial development, natural resource management, and a variety of other community needs, often with adjoining or nearby private lands.

4.2.1. No Action Alternative

Under the No Action Alternative, the land use in the project area would remain in its current state, and no beneficial changes to TVA-managed land would occur. Proposed land use allocation changes would not take place, and no changes to current land use categories would take place. The public would continue to have limited access to the TVA-managed reservoir parcels, and some informal use would continue as described under current conditions.

4.2.2. Action Alternative

Proposed Recreation Areas
Under the Action Alternative, potential effects to land use would be minor and beneficial. The addition of the planned ball fields would allow most of Site 1 to remain grass-covered,

similar to its current and predevelopment land use. The recreational plan for Site 2 would return some of the land to native vegetation and grasslands. Site 3 would mostly remain in its current natural state.

Watts Bar Reservoir Land Allocations

Because Parcels 12-45 and 12-51 would be allocated for Developed Recreation, no impacts are anticipated. The land allocation for Parcel 189a would be Natural Resource Conservation, therefore the proposed action would have no effect on land use as the adjacent landowners possess access rights. Parcel 184a contains 7.7 acres allocated for Shoreline Access and the allocation would have no effect on land use as the adjacent landowners possess access rights. Allocation of Parcel 184 to Project Operations rather than Shoreline Access would result in the potential loss of public access to reservoir property. As described above, allowable land uses under Project Operations include developed and dispersed recreation, therefore the land could remain available for public access. The proposed allocation would allow better management of those lands along the water's edge and would have a positive effect on land use.

Parcel 185 was as allocated for Natural Resource Conservation in the 2009 Plan and the current proposal would a change the allocation to Project Operations. The proposed allocation change of Parcels 185 and 187 to Project Operations rather than Natural Resource Conservation is not anticipated to result in any significant change in land use because allocation changes would not remove any environmental protections for resources, such as wetlands, on these parcels. Allocation of Parcel 186 and 188 to Project Operations rather than Sensitive Resources is not anticipated to result in any significant change in land use. TVA would mitigate accordingly under all laws and regulations if adverse impacts were to occur to the wetlands occurring on Parcels 185, 186, 187, and 188. The northern section of Parcel 188 is included in the Site 3 proposed for wetland restoration activities. Protection of these low-lying areas would have a beneficial effect on land use.

4.3. Wetlands

All wetlands, regardless of their ecological significance, are subject to various federal and state mandates and regulations. Activities that affect wetlands in the TVA region are regulated under Section 404 of the Clean Water Act, and permit approvals are administered by USACE. TVA is also subject to EO 11990 (Protection of Wetlands), which requires all federal agencies to avoid construction in wetlands to the extent practicable and to mitigate potential impacts as appropriate. Wetlands are also protected under the ARAP program administered by TDEC.

4.3.1. No Action Alternative

Under the No Action Alternative, environmental conditions in the project area would remain unchanged. Adoption of this alternative would result in no direct, indirect, or cumulative wetland impacts on TVA property. While overall wetland conditions would remain the same, proposed restoration and enhancement of wetlands and the associated beneficial effects on wetlands would not occur. However, changes to wetlands would likely occur over the long term due to factors such as population growth and land use changes within the area.

4.3.2. Action Alternative

Proposed Recreation Areas

Under the Action Alternative, TVA would enhance and restore land that was impacted by the TVA ash spill at KIF by creating public recreational areas. There would be no impacts to wetlands associated with construction of the ball field, because there are no wetlands present in this area. There would also be no impacts to wetlands associated with development of the peninsula recreation area. This proposal includes conceptual plans to restore and enhance wetlands within the 60-acre wetland and wildlife area. As discussed in Section 3.3, a large portion of this area consists of hydric soils, indicating that wetlands were likely present in this area before it was converted to agricultural use. Restoration in this area would lead to minor beneficial impacts to wetlands, with an increase in wetland area and improved habitat value. The proposed action is in accordance with EO 11990 and any direct, indirect, or cumulative impacts to wetlands associated with this project would be minor and insignificant.

Watts Bar Reservoir Land Allocations

This alternative also involves the allocation changes to reservoir property. Three of those parcels (Parcels 185, 188, and 189) proposed for allocation changes contain wetlands. In general, wetlands are best protected on parcels that are allocated to Sensitive Resource Management and Natural Resource Conservation. A change to a Project Operations designation would not remove any protection these wetlands currently have. However, TVA may need to use the property to support TVA operations, therefore there is potential for wetland impacts. Thus the proposed changes in allocations would potentially have adverse wetland impacts. If wetland impacts were to occur, TVA would comply with the Clean Water Act and EO 11990 guidelines and regulations.

Net cumulative impacts associated with implementing the Action Alternative would be overall beneficial, as additional wetland acreage and habitat quality would be enhanced via the proposed wetland restoration plans.

4.4. Floodplains

As a federal agency, TVA is subject to the requirements of EO 11988, Floodplain Management. The objective of EO 11988 is "…to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative" (United States Water Resources Council 1978). The EO is not intended to prohibit floodplain development in all cases, but rather to create a consistent government policy against such development under most circumstances. The EO requires that agencies avoid the 100-year floodplain unless there is no practicable alternative. Roane County participates in the National Flood Insurance Program, and any development must also be consistent with these regulations.

4.4.1. No Action Alternative

Under the No Action Alternative, there would be no additional direct, indirect, or cumulative impacts to floodplains because there would be no physical changes to the current conditions found within the local floodplains. However, changes to floodplains could occur over the long term due to factors such as population growth and land use changes within the area.

Development, and/or management of properties would proceed under the current land use allocations, and floodplain evaluations would be done individually to ensure compliance with EO 11988. Potential development would generally consist of water use facilities and other repetitive actions in the floodplain that would result in no impacts or minor floodplain impacts. Under this alternative, impacts to floodplain values would be insignificant.

4.4.2. Action Alternative

Proposed Recreation Areas

Portions of Sites 1, 2, and 3 are within the floodplain. Development of Site 1, the ball field area, would involve grading to level the site, construction of fields for baseball/softball and soccer, and leaving the current access road and parking area. Portions of these facilities would be located within the 100-year floodplain. Consistent with EO 11988, an access road, and parking area are considered repetitive actions in the 100-year floodplain that would result in minor impacts. Baseball/softball and soccer fields are considered to be recreational facilities that can be constructed in the 100-year floodplain provided adverse floodplain impacts are minimized. These facilities would not be subject to damage if flooded, and the project would not result in any displaced flood control storage.

Portions of Site 2 involving the walking trail, the fixed fishing piers, and boat-launching ramp with a fixed courtesy pier would be located within the 100-year floodplain. Consistent with EO 11988, the fixed fishing piers and boat-launching ramp with a fixed courtesy pier are considered repetitive actions in the 100-year floodplain that would result in minor impacts. A walking trail is considered a recreational facility that can be constructed in the 100-year floodplain provided adverse floodplain impacts are minimized. However, if flooded, these planned features would not displace any flood control storage. Furthermore, the parking area associated with Site 2 would be located outside the 100-year floodplain. To ensure that the proposed actions for the developed recreation area (Site 2) would not adversely impact floodplains and flood risk,, per Section 1304.204(d) of TVA's Section 26a Regulations) the floor elevation of the fixed dock would be a minimum of 2 feet above the normal summer pool elevation 741.0 feet msl.

Development of Site 3, the 60-acre green space area, would potentially include observation areas, trails, a parking area, and wetland restoration activities. The parking area would be located outside the 100-year floodplain. Consistent with EO 11988, trails and observation areas are considered to be recreational facilities that can be constructed in the 100-year floodplain provided adverse floodplain impacts are minimized during construction. None of these facilities would be subject to damage if flooded. Creation of a wetland is not considered a repetitive action in the floodplain. However, the project would result in enhanced natural and beneficial floodplain values as a result of the restoration of these wetland area; thus, the proposed actions are consistent with EO 11988. The proposed project would comply with the TVA Flood Control Storage Loss Guideline because there would be less than 1 acre-foot of displaced flood control storage.

Watts Bar Reservoir Land Allocations

The proposed action also involves the allocation of reservoir property in the vicinity of the recreation project area. Under the Action Alternative, development, and/or management of properties would proceed under the new land use allocations. Any proposed actions on these parcels would involve floodplain evaluations that would be done individually to ensure compliance with EO 11988. Potential development would generally consist of water use

facilities and other repetitive actions in the floodplain that would result in minor floodplain impacts.

4.5. Prime Farmland

Potential effects to prime farmlands can occur when actual or designated land uses are changed to other uses or designations, such as commercial, residential or recreational development, that preclude the property being used for agricultural purposes. Generally, those properties located in zones allocated for Sensitive Resource Management and Natural Resource Conservation are not subject to impacts to prime farmland, as they would be retained in a relatively natural state and would not be converted to other land uses. However, parcels allocated for Project Operations, Developed Recreation, or Shoreline Access are subject to potential effects to prime farmland because farmland in these zones could be devoted to other, nonagricultural uses such as TVA operations, research areas, and developed recreation.

4.5.1. No Action Alternative

Under the No Action Alternative, there would be no direct, indirect, or cumulative impacts to prime farmland because there would be no physical changes to the project area. Therefore, no effects to current prime farmland conditions would occur. However, changes to prime farmland would likely occur over the long term due to other factors such as population growth and land use changes in the area.

4.5.2. Action Alternative

<u>Proposed Recreation Areas</u>
Under the Action Alternative, the creation of the public recreation areas would have limited impacts on prime farmland resources because no prime farmland soils are located on Site 1, therefore no impacts to prime farmland are anticipated in this area. Although there are 7 acres of prime farmland soils located on Site 2, this land has been taken out of agricultural production for the past 30 years by the construction of roads, homes, and supporting facilities. As a result, all of the site assessment criteria factors lead to a very low impact rating score and support a finding of insignificance. The 11 acres of prime farmland within Site 3 would not be adversely impacted by the proposed land uses for wildlife observation and wetland restoration.

<u>Watts Bar Reservoir Land Allocations</u>
The 11.9-acre Parcel 189a would be allocated for Natural Resource Conservation, therefore, the 9.1 acres of prime farmland it contains would remain in its natural state. The remaining parcels proposed for allocation to Project Operations, and Parcel 184a to Shoreline Access, could require the completion of Form AD 1006 if the prime farmlands located within those parcels were designated for uses not compatible with the FPPA. However, using Parcel 184a as an example, the probable impact of its conversion to nonagricultural use would be insignificant to prime farmland resources in the area. This assumption is based on the low site assessment criteria rating calculated for the site. Primarily, these criteria would include the fact that the surrounding area has been developed, the close proximity of utilities that would support further nonfarm development, the relatively small size of each land unit in the area, and the fact that no substantial and well-maintained on-farm investments such as barns, orchards, irrigation, and conservation measures exist.

4.6. Visual Resources

Visual consequences are examined in terms of visual changes between the existing landscape and proposed actions, sensitivity of viewing points available to the public, their viewing distances, and visibility of proposed changes. Scenic integrity indicates the degree of intactness or wholeness of the landscape character. These measures help identify changes in visual character based on commonly held perceptions of landscape beauty, and the aesthetic sense of place. The foreground, middleground, and background viewing distances were described previously in Section 3.6.

4.6.1. No Action Alternative

Under the No Action Alternative, TVA would not construct the proposed recreation areas at this time, and there would be no direct, indirect, or cumulative impacts to visual resources. Visual resources would not be affected, but the scenic quality of the area would eventually change over time as other factors such as population growth, land use such as other industrial development, and cultural and ecological interests in the area change.

4.6.2. Action Alternative

Proposed Recreation Areas

Under the Action Alternative, the ball field site would be graded to provide a level site for sports activities. These new elements would create a new broadly horizontal element and would contrast with the existing landscape seen now by motorists along Swan Pond Circle. However, this area is located in an existing industrial setting and would be seen as a broader pattern of cumulative and on-going development, and any changes would be visually insignificant.

Restoration of the wetlands area would be visually beneficial. Restoring the wetlands to a natural element would provide positive visual contrast to the existing landscape character. The water body and contrasting wetlands vegetation would restore scenic attractiveness to a distinctive level as a result of its unique visual quality. Scenic integrity would likely be high, as the landscape character would appear to be intact and unaltered.

Construction of developed recreation along Lakeshore Drive would be visually insignificant. The area would be seen in the foreground by recreation users and motorists. The new elements would likely have a low vertical profile and would be visually similar to other recreation elements seen along this section of the Clinch River.

Operation, construction, and postconstruction activities for the proposed development would not negatively affect visual resources. There may be some minor visual discord during the construction period due to an increase in personnel and equipment and the use of laydown and materials storage areas. If necessary, dust emissions from disturbed areas and unpaved roads would be mitigated using wet suppression. Visual obtrusions would be temporary until areas have been restored. Therefore, no significant visual impacts are anticipated under the Action Alternative.

Watts Bar Reservoir Land Allocations

Adoption of the Action Alternative would potentially have a minor impact on visual resources. Under this alternative, changes of scenic resources would potentially occur as a result of the proposed land allocation to Project Operations. Allocation changes to Project Operations could result in development on these parcels, thereby contributing to gradual losses of visual resources, scenic attractiveness, and loss of undeveloped natural areas, as

well as changes in the aesthetic sense of place. Direct, indirect, and cumulative impacts to visual resources are anticipated to be insignificant.

4.7. Vegetation

4.7.1. No Action Alternative

Under the No Action Alternative, the development of the three proposed recreational areas on 137 acres of TVA land would not take place, and the project area would remain in its current condition. Terrestrial plant communities would not be affected by any project-related actions. Changes to the area would nonetheless occur over time, as factors such as population trends, land use and development, quality of air/water/soil, recreational patterns, and cultural, ecological, and educational interests change within the area. Ash recovery efforts would involve controls to minimize the spread of exotic invasive plants. Therefore, no significant direct, indirect, or cumulative impacts on terrestrial plants are anticipated under the No Action Alternative.

4.7.2. Action Alternative

<u>Proposed Recreation Areas</u>
Under the Action Alternative, construction of community ball fields would involve potential impacts to approximately 45 acres of herbaceous vegetation. The conversion of agricultural fields to athletic field turf would have a minor impact on terrestrial plant communities. Because this area has been altered by human disturbance, no natural uncommon terrestrial communities are present.

The proposed recreational development on Site 2 occurs in an area that was previously a residential area, and most natural areas have been significantly altered by human disturbance. Therefore, no negative impacts to uncommon terrestrial plant communities are expected. Because noninvasive plants would be used to revegetate disturbed areas, and portions of the peninsula would be allowed to revert to natural plant communities, these activities would enhance the terrestrial community structure of the project area.

Under the Action Alternative, Site 3 would provide public access for wildlife observation and bird watching. Because all the terrestrial communities found on site are common and representative of the region, no adverse impacts to this resource are expected. Reestablishing native vegetation in the restored wetland areas and revegetating disturbed areas with native warm season grasses would enhance the terrestrial communities impacted by the ash spill.

The recreation development activities would result in soil disturbances that could potentially be a vector for the introduction and spread of invasive plant species. As described under the Action Alternative, in order to minimize potential impacts and to comply with EO 13112, disturbed areas would be revegetated with native or nonnative, noninvasive species to ensure that TVA does not introduce or spread exotic species in the proposed project area.

<u>Watts Bar Reservoir Land Allocations</u>
The 7.7 acres of Parcel 184a and 2.8 acres of Parcels 12-45 and 12-51 would continue to be allocated for Shoreline Access and Developed Recreation, respectively; which compliments their current use. Therefore, there would be no impacts to plant communities on these parcels.

Approximately 21.3 acres (Parcel 184) would be allocated for Project Operations rather than Shoreline Access. Potential impacts to terrestrial plant communities on this parcel would be minor under the proposed allocation because both uses allow for development and management of the land. An estimated 60.9 acres proposed for allocation to Natural Resource Conservation (Parcels 185 and 187) and 39.0 acres proposed for allocation to Sensitive Resources (Parcels 186 and 188) would also be reallocated for Project Operations. These parcels had been considered for conservation allocations primarily due to the presence of wetlands and wildlife habitats. Allocation for TVA operations and public works projects would potentially impact the terrestrial communities on these parcels, and impacts would vary from none to minor depending on the land uses. No impacts would potentially occur under proposed allocations because the land would likely continue to be used for similar activities, such as developed and dispersed recreation. Potential land uses involving construction of structures would result in minor impacts because the terrestrial communities found on these parcels are considered common and representative of the region.

Therefore, no significant impacts to terrestrial plant resources are anticipated as a result of the proposed allocation of the nine parcels of TVA reservoir property. No adverse direct, indirect or cumulative impacts are anticipated to the terrestrial ecology of the area or from the spread of invasive plant species as a result of adopting the Action Alternative.

4.8. Wildlife

4.8.1. No Action Alternative

Under the No Action Alternative, recreation areas would not be developed and the TVA reservoir lands would not receive updated land plan allocations. The most noticeable changes to wildlife and wildlife habitats would result from the continued removal of spilled ash, related restoration activities, and the removal of houses and other buildings from tracts recently purchased by TVA. These changes would result in beneficial effects on wildlife and wildlife habitats in the project area.

4.8.2. Action Alternative

<u>Proposed Recreation Areas</u>
Under the Action Alternative, construction of proposed recreation areas would result in a moderate change in the composition of wildlife habitats in the project area. Restoration activities associated with improving wildlife habitat and wetland function would occur on the 60-acre Site 3. These activities, illustrated in Appendix A include removal of invasive plants from wetland and fields and conversion of pastures and hayfields to native warm season grasses and shrublands. Birds that would benefit from these activities include American kestrel, common yellowthroat, yellow-breasted chat, indigo bunting, blue grosbeak, grasshopper sparrow, eastern meadowlark, and red-winged blackbird. The construction of trails and wildlife viewing platforms would increase opportunities for the public to observe these birds and other wildlife in the area.

As previously discussed, TVA is developing a Master Plan which would involve the creation and enhancement of wildlife habitats suitable for shorebirds, wading birds, and waterfowl that were eliminated from the KIF site by the ash spill and subsequent recovery activities. In the Master Plan, efforts would be made to offset the loss of the previous ash storage ponds to the extent practicable, primarily in the North Embayment area and on the newly acquired properties. As part of this effort, TVA would continue to solicit ideas on the proposed concepts from wildlife resource management agencies and state and local

ornithological groups. TVA would consider incorporating birding observation blinds, nodes, and trails in the site plans to facilitate bird viewing opportunities in the newly created habitat areas and on the newly acquired properties where TVA plans to enhance existing wetland areas. These planned efforts would result in beneficial effects to wildlife and to the wildlife-watchers observing these species.

Some smaller, less mobile animals, such as mice, shrews, frogs, and salamanders occupying the areas where construction would occur, primarily on Sites 1 and 2, may be affected by construction activities. However, species that would likely be affected by these changes are locally and regionally common.

As described in Section 3.8, the nesting of tree swallows in boxes along the shoreline of Site 2 is being studied as part of an observational experiment on the effects of the ash spill. Although nesting tree swallows are not unusually sensitive to disturbance, the proposed Site 2 construction activities could affect the study results by introducing another factor not otherwise considered in the experimental design. To reduce this potential effect, the following measure would be taken to avoid impacts to these birds.

- Construction activities planned for Site 2 would not occur during the tree swallow breeding season (March 1 through July 1).

With the implementation of this seasonal avoidance measure, the effects of developing Site°2 on the nesting tree swallows and on the experimental design would be minimized.

Although one heronry occurs within 0.5 mile of the project area, this is an adequate distance from the project area, and this and other heronries in the area would not be affected adversely by proposed actions.

<u>Watts Bar Reservoir Land Allocations</u>
The terrestrial ecology on Watts Bar Reservoir lands could be impacted by management scenarios dictated by land use allocations. Each of the land use allocation designations allow for specific uses (see Chapter 2, Table 2-1), which would have individual and specific impacts on terrestrial ecology.

As described in the 2009 Plan, the least environmental impacts to terrestrial animals and vegetation would occur on lands allocated to Sensitive Resource Management and Natural Resource Conservation, where land is managed for the protection of sensitive resources, maintenance of wildlife habitat, and dispersed recreation uses. Conversely, the greatest potential for negative effects on general terrestrial ecology may occur on lands allocated to Project Operations. While a range of impacts could occur on lands allocated to Developed Recreation and Project Operations, the effects on the terrestrial ecology resources are expected to be minor and insignificant, and the range of impacts would depend on the type and extent of development.

4.9. Aquatic Life

4.9.1. No Action Alternative

Under the No Action Alternative, the site's environmental conditions would not change, and no direct, indirect, or cumulative impacts to aquatic communities on or adjacent to the project area would occur. However, changes to aquatic life would likely occur over the long

term due to factors such as population growth and local land use changes. Additionally, long-term benefits to riverine environments would be forfeited.

4.9.2. Action Alternative

Proposed Recreation Areas

Aquatic life could be affected by the proposed action either directly by the alteration of habitat conditions within streams or indirectly due to modification of the riparian zone and storm water runoff resulting from construction and maintenance activities associated with the proposed public recreation areas. Potential impacts due to removal of streamside vegetation within the riparian zone include increased erosion and siltation, loss of in-stream habitat, and increased stream temperatures. Siltation has an adverse effect on many aquatic animals adapted to riverine environments. Turbidity caused by suspended sediment can negatively affect spawning and feeding success of many fish species (Sutherland et al. 2002).

To minimize potential impacts, appropriate standard BMPs would be implemented, as defined in the SWPPP, during construction, operation, and maintenance of the proposed public recreation areas. Therefore, potential impacts to aquatic life from implementing the proposed action would be minor and insignificant.

Watts Bar Reservoir Land Allocations

Ground disturbance activities associated with the Project Operation-designated parcels could have minor impacts to aquatic animal species (mollusks and fish) found in nearby water bodies. Appropriate standard BMPs and SMZs would be implemented, as defined in the SWPPP. The current allocations to other parcels not proposed to change would have no impact on aquatic animal species. Overall, proposed allocation changes under the Action Alternative would not significantly affect aquatic species.

4.10. Endangered and Threatened Species

Species listed at the federal level as threatened or endangered are protected under the ESA, which is administered by the USFWS. Section 7 of the ESA requires federal agencies to consult with USFWS in situations where a proposed federal action may affect federally listed species or their habitats.

The State of Tennessee provides legal protection for species considered threatened, endangered, special concern, or deemed in need of management within the state other than those federally listed under the ESA.

4.10.1. No Action Alternative

Under the No Action Alternative, the development of the three proposed recreational areas on 137 acres of TVA land would not take place, and allocations for 143.6 acres of reservoir property designated by the 2009 Plan would not be updated to reflect current conditions resulting from the KIF ash spill. Thus, the status and conservation of any potentially affected listed species would continue to be determined by the actions of others. Nevertheless, changes to the area could occur over time as factors such as population trends, land use and development, quality of air/water/soil, recreational patterns, and cultural, ecological, and educational interests change within the area. Therefore, there would be no direct, indirect, or cumulative impacts on endangered and threatened species or designated critical habitat under the No Action Alternative.

4.10.2. Action Alternative

No federally or state-listed plants or aquatic animal species are known to occur within or immediately adjacent to proposed recreation project areas or the reservoir property proposed for allocation changes, and no listed plants or aquatic animal species were detected during field inspections. Likewise, no designated critical habitat for any federally listed species would be affected. Implementing the proposed action would have no effect on any threatened or endangered plants or aquatic animal species; thus, requirements under Section 7 of the ESA are satisfied. No direct, indirect, or cumulative impacts to endangered and threatened plants and aquatic animal species would occur as a result of these actions.

Suitable roosting or foraging habitat for bald eagles was not identified in the project area. Therefore, this species and its habitat would not be affected under the proposed Action Alternative. Similarly, suitable roosting habitat for gray bats is not available in the project area. However, several small nearby streams provide suitable, but low-quality, foraging habitat for gray bats in or immediately adjacent to the project area. Implementation of standard construction BMPs would minimize sediment and pollutant input into water bodies, and implementing the Action Alternative would not affect this foraging habitat. Undertaking the proposed action would have no effect on any terrestrial animal species; likewise, no designated critical habitat for any federally listed species would be affected. Requirements under Section 7 of the ESA are satisfied. Furthermore, there would be no direct, indirect, or cumulative impacts to federally or state-listed terrestrial animal species or their habitats under the Action Alternative.

4.11. Water Quality (Surface Water and Groundwater)

4.11.1. No Action Alternative

Under the No Action Alternative, there would be no direct, indirect, or cumulative impacts to water quality because there would be no physical changes to the project area. Therefore, no environmental effects to current surface water conditions would occur. However, changes to surface water and groundwater would likely occur over the long term due to other factors such as population growth and land use changes in the area.

4.11.2. Action Alternative

<u>Proposed Recreation Areas</u>
Proper standard erosion control measures, as described in the SWPPP, would be followed to minimize the potential for adverse impacts on aquatic organisms and habitats. Any stream disturbances would be temporary.

TVA would comply with all appropriate local, state and federal permit requirements. More specifically, a notice of intent would be submitted to TDEC for coverage under the *General NPDES Permit for Discharges of Stormwater Associated With Construction Activities* (TDEC 2011). As part of this project, an SWPPP would be developed and implemented to control and confine sediment to the project site. This plan would identify specific BMPs to address construction-related activities that would be adopted to minimize storm water impacts. A complete list of BMPs and locations would be detailed in the site SWPPP. The BMPs that would be implemented for this project would include, but not be limited to, the following measures: Construction entrances and exits would be constructed on an existing road, which would be utilized at all points of entry and exit from the site to reduce any sediment leaving the site on vehicle tires; silt fencing, riprap check dams, waddles, temporary sediment traps and basins, and buffer zones would be utilized as parameter and

outlet protection; vegetative cover would be reestablished on all denuded areas. Where soil disturbance would occur, the area would be ultimately stabilized and vegetated with native or nonnative, noninvasive grasses and mulched, as described in *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities* (Muncy 1999).

With the use of standard BMPs, impacts to surface water and groundwater from the proposed action would be insignificant.

Other Wastewater Streams
Additional wastewater streams potentially generated during the proposed construction project may include domestic sewage, nondetergent equipment washing, equipment refueling, and dust control. Portable toilets would be provided for the additional construction workforce as needed. These toilets would be pumped out as needed, and the sewage would be transported by tanker truck to a publicly owned wastewater treatment works that accepts pump out. TVA would comply with all appropriate local, state, and federal regulations during the installation of utilities and/or septic systems. All fueling of equipment and vehicles on site would be conducted in a designated area. Any spillage would be removed immediately. Contaminated soils would be removed from the area and properly disposed of at approved solid waste facilities to avoid storm water impacts. All fuel tanks would be kept in a containment area. Oils or other vehicle fluids would also be stored to prevent contamination. Equipment washing and dust control discharges would be handled in accordance with BMPs described in the SWPPP for water-only cleaning and dust control.

Watts Bar Reservoir Land Allocations
Under the Action Alternative, surface water and groundwater could potentially be impacted due to increased silt load resulting from runoff during soil-disturbing activities. However, proper implementation of BMPs would result in minor and temporary direct and indirect impacts to surface water and groundwater. No cumulative impacts to surface water and groundwater are anticipated.

4.12. Archaeological and Historic Resources

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 NHPA. Section 106 of the NHPA requires federal agencies to consult with the respective SHPO when proposed federal actions could affect these resources.

4.12.1. No Action Alternative

Under the No Action Alternative, there would be no direct, indirect, or cumulative impacts to historic or archaeological resources because there would be no changes to the project area. Changes to cultural resources would likely occur over time as factors such as population increases, changes in land use, and further industrial development occur in the area.

4.12.2. Action Alternative

An archaeological and historic structure survey was conducted within the APE. One previously recorded archaeological site (40RE580, a historic artifact scatter) was identified within the APE. TVA consulted with the Tennessee SHPO regarding 40RE580 and

received concurrence, in a letter dated May 17, 2010 (Appendix D), that the site was ineligible for the NRHP. TVA finds that no historic properties would be affected by the proposed undertaking. Thus, requirements under Section 106 of the NHPA are satisfied.

4.13. Socioeconomics and Environmental Justice

4.13.1. No Action Alternative

Under the No Action Alternative, the land impacted by the TVA ash spill would continue under TVA ownership, but would not be converted to recreational uses. There would be no potential for economic stimulus from the proposed project, and there would be no project-related change in the existing conditions relative to minority and low-income populations. Furthermore, the socioeconomics of the area would eventually change over time as other factors such as population growth, land use such as other industrial development, and cultural and ecological interests in the area change.

4.13.2. Action Alternative

Proposed Recreation Areas

Under the Action Alternative, land impacted by the TVA ash spill would be enhanced and improved by creating the proposed public recreation areas. There would be small positive economic impacts during construction of the facilities. Converting this land to public use and providing additional recreation opportunities would enhance the quality of life for residents of the area around the site and increase the area's attractiveness as a place to live. The result would be positive social and economic impacts to residents of the immediate and surrounding areas, including minority and low-income residents.

Watts Bar Reservoir Land Allocations

Specific land use proposals under Project Operations could potentially have minor environmental justice impacts by reducing affordable public access to the reservoir and lands for dispersed recreation. These proposals would be evaluated as appropriate during the environmental review process. However, the extent and degree of such impacts would depend on the specific proposals, and impacts are not expected to be significant.

4.14. Cumulative and Indirect Impacts

A cumulative impact includes the total effect on a natural resource, ecosystem, or human community due to past, present, and future activities or actions of federal, nonfederal, public, and private entities. Indirect effects are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable.

Cumulative effects of adopting the Action Alternative would be limited to communities surrounding the project area within Roane County. As stated above, adoption of the Action Alternative would result in minor adverse effects to vegetation and wildlife, groundwater, and threatened, endangered, or special status species and minor beneficial recreation, wetland, wildlife, and socioeconomic effects. Some cumulative effects to wetlands, floodplains, aquatic ecology, and surface water quality would likely occur as a result of the planned wetland restoration activities and cumulative effects to socioeconomics have occurred as a result of the ash spill.

Although implementing the proposed action would not require any additional displacement of residents of the area, the ash spill event resulted in TVA acquiring numerous properties in the project area resulting in relocation of residents. Relocation of residents resulted in

reduced property tax revenues in the project area, but many former residents of the impacted area have relocated to other locations in Roane County, thereby reducing the potential property tax losses associated with their former residence. Furthermore, conversion of private property to TVA power property has resulted in increased tax equivalent payments TVA makes to the state and to Roane County. Therefore, indirect and cumulative tax revenue economic impacts in the project area have not been significant.

As Roane County grows, more development is likely to occur, and slight increases to the socioeconomics of the region would be anticipated. The creation of new recreation opportunities would potentially generate additional local business and local government revenues as a result of purchases and sales tax proceeds from recreation area user spending and sales tax proceeds from purchases of equipment and services. However, the beneficial cumulative impacts from these additional revenues are not expected to be regionally significant.

The increase in habitat complexity associated with the planned wetland restoration areas would result in a minor overall increase in wetland acreage and quality within the watershed. As a result, cumulative impacts to wetlands would be minor and beneficial.

Streams in the project area would be avoided, and construction activities mainly would affect riparian conditions and in-stream habitat. Potential impacts from the removal of streamside vegetation within the riparian zone include increased erosion and siltation, loss of in-stream habitat, and increased stream temperatures. Other potential construction and maintenance impacts include alteration of stream banks and runoff of herbicides into streams. TVA would employ BMPs to minimize these potential impacts.

Short-term changes to the visual character would occur within the local area during construction due to equipment and ground-disturbing activities, and later during the periodic vegetation control of mowed areas. Long-term changes to the visual character would include construction of the ball fields, piers, boat-launching ramp, trails, and other infrastructure. There would also be temporary localized increases in noise during construction and vegetation maintenance activities. TVA considers these resources during the planning process, and TVA would implement measures to reduce any adverse effects to affected environmental resources. Indirect effects are expected to be minor and insignificant.

4.15. Summary of TVA Commitments and Proposed Mitigation Measures

TVA would implement the following nonroutine measure to reduce the potential for adverse effects to wildlife.

- To avoid adverse impacts to nesting birds, construction activities planned for Site 2 would not occur during the tree swallow breeding season (March 1 through July 1).

TVA would implement the following standard and routine environmental protection measures to reduce the potential for adverse effects to floodplains and flood risk, aquatic life, water quality, and visual resources:

- To ensure that the proposed actions for the developed recreation area (Site 2) would not adversely impact floodplains and flood risk, the floor elevation of the fixed dock would be a minimum of 2 feet above the normal summer pool elevation 741.0 msl.

- A General NPDES Permit for Discharges of Storm Water Associated With Construction Activities (TDEC 2011) for the entire project site would be obtained. As part of this application, an SWPPP would be developed and implemented to control and confine sediment to the project site and will identify specific BMPs to address construction related activities to minimize storm water impacts. A complete list of BMPs will be detailed in the site SWPPP.

- Waste materials would be removed from the area and properly disposed of at approved solid waste facilities or recycled in compliance with Tennessee waste regulations and laws.

- If necessary, dust emissions from disturbed areas and unpaved roads would be mitigated using wet suppression.

CHAPTER 5

5.0 LIST OF PREPARERS

5.1. NEPA Project Management

Kelly R. Baxter

Position:	NEPA Specialist
Education:	M.S., Plant Science and Landscape Systems; B.S., Botany
Experience:	8 years in Field Biology and Environmental Impact Assessment
Involvement:	NEPA Compliance and Document Preparation

5.2. Other Contributors

Jacqueline G. Broder

Position:	Project Engineer
Education:	M.S., Agriculture
Experience:	28 years in Project Management, Environmental Evaluations, Technical Report Writing and Editing, and Proposal Preparation
Involvement:	Prime Farmland

W. Nannette Brodie, CPG

Position:	Senior Environmental Scientist
Education:	B.S., Environmental Science; B.S., Geology
Experience:	15 years in Environmental Analyses, Surface Water Quality, and Groundwater Hydrology Evaluations
Involvement:	Groundwater/Surface Water

J. Chris Buttram, P.E.

Position:	Senior Civil Engineer
Education:	B.S., Civil Engineering
Experience:	11 years in Civil/Site, Structural, and Highway Engineering
Involvement:	Transportation

Patricia B. Cox

Position:	Botanist, Specialist
Education:	Ph.D., Botany (Plant Taxonomy and Anatomy); M.S. and B.S., Biology
Experience:	31 years in Plant Taxonomy at the Academic Level; 7 years in Environmental Assessment and NEPA Compliance
Involvement:	Threatened and Endangered Species Compliance, Invasive Plant Species, and Terrestrial Ecology

James H. Eblen

Position:	Contract Economist
Education:	Ph.D., Economics; B.S., Business Administration
Experience:	44 years in Economic Analysis and Research
Involvement:	Socioeconomics and Environmental Justice

Patricia Bernard Ezzell

Position:	Native American Liaison and Historian
Education:	M.A., History with an emphasis in Historic Preservation; B.A., Honors History
Experience:	24 years in History, Historic Preservation, and Cultural Resource Management; 8 years in Tribal Relations
Involvement:	Cultural Resources

Jerry G. Fouse

Position:	Recreation Manager
Education:	M.B.A.; B.S., Forestry and Wildlife
Experience:	36 years in Natural Resources – Recreation Planning and Economic Development
Involvement:	Recreation

Michaelyn S. Harle

Position:	Archaeologist
Education:	Ph.D., Anthropology
Experience:	11 years in Archaeology
Involvement:	Cultural Resources Analysis

Heather M. Hart

Position:	Contract Natural Areas Biologist
Education:	M.S., Environmental Science and Soils; B.S., Plant and Soil Science
Experience:	8 years in Surface Water Quality and Soil and Groundwater Investigations; 6 years in Environmental Reviews
Involvement:	Natural Areas (Managed Areas and Ecologically Significant Sites)

Clinton E. Jones

Position:	Senior Aquatic Community Ecologist
Education:	B.S., Wildlife and Fisheries Science
Experience:	18 years in Environmental Consultation and Fisheries Management
Involvement:	Aquatic Ecology and Aquatic Threatened and Endangered Species

Holly G. LeGrand

Position:	Biologist/Zoologist
Education:	M.S., Wildlife; B.S., Biology
Experience:	7 years in Biological Surveys, Natural Resource Management, and Environmental Reviews
Involvement:	Terrestrial Ecology and Threatened and Endangered Species

P. Alan Mays

Position:	Environmental Scientist
Education:	B.S., Plant and Soil Science
Experience:	33 years in Soil-Plant-Atmospheric Studies
Involvement:	Prime Farmland

Roger A. Milstead, P.E.

Position:	Program Manager, Flood Risk
Education:	B.S., Civil Engineering
Experience:	34 years in Floodplain and Environmental Evaluations
Involvement:	Floodplains

W. Chett Peebles, RLA; ASLA

Position:	Specialist, Landscape Architect
Education:	Bachelor of Landscape Architecture
Experience:	22 years in Site Planning, Design, and Scenic Resource Management; 5 years in Architectural History and Historic Preservation
Involvement:	Visual Resources and Historic Architectural Resources

Kim Pilarski

Position:	Senior Wetlands Biologist
Education:	M.S., Geography, Minor Ecology
Experience:	15 years in Wetlands Assessment and Delineation
Involvement:	Wetlands

A. Chevales Williams

Position:	Senior Environmental Engineer
Education:	B.S., Environmental Engineering
Experience:	8 years in Water Quality Monitoring and Compliance; 6 years in NEPA Planning and Environmental Services
Involvement:	Surface Water and Industrial Wastewater

W. Richard Yarnell

Position:	Archaeologist
Education:	B.S., Environmental Health
Experience:	39 years in Cultural Resource Management
Involvement:	Cultural Resources

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CHAPTER 6

6.0 LIST OF AGENCIES, ORGANIZATIONS, AND PERSONS TO WHOM COPIES ARE SENT

Federal Agencies

National Park Service
United States Environmental Protection Agency

State Agencies

Tennessee Department of Environment and Conservation
Tennessee Wildlife Resources Agency

Organizations

The Roane Alliance
Roane County Community Advisory Group
Roane County Parks and Recreation Committee

Individuals

The Honorable Troy Beets
Mayor of Kingston
Kingston, Tennessee

The Honorable Chris Mason
Mayor of Harriman
Harriman, Tennessee

The Honorable James Watts
Mayor of Rockwood
Rockwood, Tennessee

The Honorable Ron Woody
Roane County Executive
Kingston, Tennessee

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CHAPTER 7

7.0 LITERATURE CITED

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