SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

State Route 13 Improvements
Alabama Department of Transportation
Request for 24 Acres of TVA Property on Upper Bear Creek Reservoir
and Section 26a Approval to Construct Two Bridges
and Ten Stream Crossings

Tracts BCCUR-40PT, 50PT, and 53PT

UPPER BEAR CREEK RESERVOIR
Franklin County, Alabama

TENNESSEE VALLEY AUTHORITY
MAY 2002

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1.0 PURPOSE OF AND NEED FOR ACTION

The Alabama Department of Transportation (ALDOT) proposes to upgrade State Route 13 (previously State Route 5) through the construction of a new four-lane facility between Delmar in Winston County, Alabama and Spruce Pine in Franklin County, Alabama. State Route 13 is currently a major north-south route located in northwest Alabama and is currently a two-lane facility between Phil Campbell and Haleyville. ALDOT has requested a permanent easement over 24 acres of TVA land on Upper Bear Creek Reservoir and Section 26a approval for twelve stream crossings in the Tennessee River watershed.

1.1 Background

Upper Bear Creek Reservoir is a part of the Bear Creek Project which consists of four dams and reservoirs (Bear, Upper Bear, Little Bear, and Cedar), a 9-mile floodway along an 18-mile stretch below Bear Creek Dam, and a 26-mile recreational floatway below Upper Bear Dam. The reservoirs have a combined surface area of 8,300 acres and a shoreline length of approximately 284 miles. Flood control features of the project substantially reduce flooding on about 15,000 acres of farm land. The project provides other benefits by adding controlled flood storage to the TVA control system.

Construction on Upper Bear Creek Dam and Reservoir was completed in 1978 at a cost of $5.9 million. The dam is located at BCM 114.7 in Marion County, Alabama, 5 miles northwest of Haleyville and 16 miles southwest of Russellville. The reservoir lies in Franklin, Marion, and Winston Counties. For project data on Upper Bear Creek Reservoir and Dam, see Table 1. The reservoir provides flood control, water supply, recreation, and residential development benefits.

Table 1. Upper Bear Creek Reservoir Project Data

TVA land (acres)	2,955
Length of reservoir	14 miles (2 arms at 7 miles each)
Length of shoreline	105 miles
Spillway crest elevation	799 feet msl
Top of dam elevation	813 feet msl
June 1 summer level *	797 feet msl
Impoundment at elevation 797	1,850 acres

*Reservoir storage is used to supply water for the Bear Creek Floatway. Normally the reservoir is drawn down to elevation 793 during the summer months.

In 1988, the Federal Highway Administration and Alabama Department of Transportation (ALDOT) completed an Environmental Assessment (EA) of the Project F-393(3), Proposed Corridor for State Route 13 between Dime and Spruce Pine, Franklin County, Alabama. In 1998, they completed a re-evaluation of the project and concluded the EA was still valid.

In 2001, TVA completed the Bear Creek Reservoirs Land Management Plan (TVA, 2001). The Proposed Action affects portions of three planned tracts in the Bear

Creek Land Management Plan; BCCUR-40PT, -50PT, and -53PT (see Figure 1). The land requested by ALDOT is currently allocated to Zone 3 - Sensitive Resource Management. These allocation decisions were based from data collected in 1999 during the Lands Planning Process. As a result of the data collection process, sensitive resources, including rare plants and animals, archaeological resources, wetlands, and visual resources were identified on these tracts.

1.2 Proposed TVA Actions

TVA proposes to approve the proposed permanent easement so that ALDOT can construct two bridges over Upper Bear Reservoir as part of the upgrade to State Route 13 (previously State Route 5). TVA would also issue Section 26a approval for the following stream crossings, listed from south to north:

- Station 13+34: 285' of reinforced concrete pipe crossing an unnamed tributary to Dime Spring Branch
- Station 16+87: 286' of box culvert crossing an unnamed tributary to Dime Spring Branch
- Station 19+44: 484' of double box culvert crossing Dime Spring Branch
- Station 33+00: Four-lane bridge across Little Bear Creek embayment of Upper Bear Creek Reservoir
- Station 49+60: Four-lane bridge across Gas Branch embayment of Upper Bear Creek Reservoir
- Station 82+23: 321' of double box culvert crossing to unnamed tributary to Gas Branch
- Station 20+74 (Hyde Road Connector): 204' of box culvert crossing of an unnamed tributary to Gas Branch
- Station 94+33 to 95+60: Fill in the floodplain of an unnamed tributary to Reedy Branch of 0.96 acre of wetlands
- Station 98+16: 467' of box culvert crossing an unnamed tributary to Reedy Branch
- Station 104+87: 394' of triple box culvert crossing Reedy Branch and fill of 2.36 acres of adjacent wetlands
- Station 110+90: 676' of double box culvert crossing Sandpit Branch and fill of 0.28 acres of adjacent wetlands
- Station 120+37 to 121+00: Fill in floodplain of unnamed tributary to Little Bear Creek of 0.15 acres of wetlands

In order to document its review of impacts to sensitive resources, TVA has prepared a supplement to the Federal Highway Administration's Environmental Assessment for the Project F-393(3), Proposed Corridor for State Route 5 between Dime and Spruce Pine, Franklin County, Alabama and the Re-evaluation of Project F-393(3) of the Proposed Corridor for State Route 13 (previously referred to as State Route 5).

Figure 1. Exhibit Map

1.3 Scoping and Issue Identification

1.3.1 Scoping

1.3.2 Identification of Environmental Issues

The Bear Creek Reservoirs Land Management Plan Final EA, the original EA for Project F-393(3) - the Proposed Corridor for State Route 5 EA, and the Re-Evaluation of Project F-393(3) of Proposed Corridor for State Route 13 (previously referred to as State Route 5) between Dime and Spruce Pine, Franklin County Alabama, were reviewed to identify the following important issues to be included in the environmental review:

- Terrestrial Plants and Animals
- Water Quality
- Aquatic Ecology
- Wetlands
- Floodplains
- Land Use
- Cultural/Historic Resources
- Visual Resources
- Navigation
- Recreation

1.4 Related Environmental Documents

1.4.1 Bear Creek Reservoirs Land Management Plan

In 2001, TVA completed the Bear Creek Reservoirs Land Management Plan (TVA, 2001). This plan allocates reservoir lands for a variety of single and multiple land uses (see Table 2). Because of the presence of sensitive environmental resources, about 81 percent of the lands on Upper Bear Creek Reservoir were allocated to uses that would protect rare plants, animals, wetlands, natural features, and cultural resources

Table 2. Land Use Allocations for Upper Bear Reservoir

Number of Parcels	Proposed Land Allocations	Acres
1	Zone 2, Project Operations	192.0
41	Zone 3, Sensitive Resource Management	2,401.1
17	Zone 4, Natural Resource Conservation	231.4
5	Zone 6, Recreation	81.8
5	Zone 7, Residential Access	49.3
69	**Subtotal**	**2,955.5**

1.4.2 Finding of No Significant Impact, Project F-393(3), Winston, Marion, and Franklin Counties, State Road 5. State of Alabama Highway Department and Post, Buckley, Schuh, & Jernigan, Inc. in Cooperation with the Department of Transportation, Federal Highway Administration, 1988

In 1988, the Federal Highway Administration and the Alabama Highway Department (presently the Alabama Department of Transportation, ALDOT) prepared and issued an Environmental Assessment to document their consideration of alternatives and impacts for highway improvements between Delmar and Spruce Pine. Nine alternatives were evaluated, and Alternative 9 was selected as the preferred alternative. Alternative 9 would bypass the towns of Phil Campbell, Bear Creek, and Haleyville and would involve two crossings of Upper Bear Creek Reservoir. The need for the proposed reconstruction and upgrading of State Road 5 was justified based upon providing for adequate roadway capacity and safety and meeting future traffic demands at an adequate level of service. In addition, the proposed action was judged to be consistent with the long range plans of the State of Alabama and would provide positive economic benefits to the area of Winston, Franklin, and Marion Counties served by the facility.

1.4.3 Re-Evaluation of Project F-393(3); Re-Evaluation of Proposed Corridor for State Route 13 (previously State Route 5) between Dime and Spruce Pine, Franklin County Alabama, Federal Highway Administration, 1998

In 1998, the previously approved FONSI was reevaluated for a portion of the project from County Road 79 at Dime to the existing four lane roadway at Spruce Pine, approximately seven miles in length. This section of the project from Dime to Spruce Pine was re-evaluated because an alignment shift was proposed to avoid an archaeological site and impacts to the Mon Dye Public Boat Ramp. Specific issues that were studied included wetlands, endangered species, historic structures, archaeological sites, noise impacts, and hazardous waste sites. The reevaluation document determined that the conclusions in the previously approved FONSI remained valid.

1.4.4 Environmental Assessment, Statement of Findings, and Finding of No Significant Impact (File Nos. 200100460 through 200100469), Alabama Department of Transportation, Application for Proposed Discharge of Fill Material Associated with Construction of 7.07 Miles of State Route 13, Franklin County, Alabama. U.S. Army Corps of Engineers, Regulatory Branch, 2001.

USACE prepared an EA to document its consideration of 10 permit actions under Section 404 of the Clean Water Act. These actions involved stream and wetland fills on tributary streams to Upper Bear Creek Reservoir and Little Bear Creek. USACE did not assess the impacts of the proposed bridges across Upper Bear Creek Reservoir because the highway would span the waterway. The U.S. Fish and Wildlife Service provided comments in response to the public notice and requested aquatic surveys be conducted for the crossings. The EA determined that the construction of SR 13 would impact 4.04 acres of wetlands, with mitigation to be provided by purchase of credits from the Jackson County mitigation bank within the Tennessee River watershed. The EA

also committed to requiring riparian restoration along the tributary streams to be impacted by highway construction.

1.5 Necessary Federal Permits or Licenses

The crossings of Gas Branch and Little Bear Creek on Upper Bear Creek Reservoir would span the waterways and not require individual permits from the USACE. Construction of the other stream crossings and wetland fills required permits from the U. S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act. These permits were issued in May 2001. By letter of May 2, 2001, the Alabama Department of Environmental Management (ADEM) issued Water Quality Certification for the off-reservoir portion of the project (Appendix A). By letter of March 15, 2002, ADEM has issued water quality certification for nationwide permits used for the two bridge crossings (see Appendix A). NPDES stormwater construction permits are required for activities involving soil disturbance greater than one acre.

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

The two alternatives that have been identified are described in this chapter. Alternative A is the No Action Alternative and Alternative B is the Applicant's Proposal with Special Conditions identified by TVA technical staff.

2.1 Alternative A: No Action

Under the No Action Alternative, no change would be made to the use of this property. It would be managed for protection of sensitive resources and remain as undeveloped property available to the public for informal recreational use.

2.2 Alternative B: The Applicant's Proposed Action with Special Conditions

The Proposed Action is to grant a permanent easement for two bridge crossings on the Upper Bear Creek Reservoir. Under Alternative B, TVA would grant permanent easements and Section 26a approvals for two bridge crossings with commitments identified by TVA staff to mitigate potential significant impacts to heritage, cultural, and visual resources (section 7.0). TVA would also grant Section 26a approvals to ten stream crossings.

The proposed bridge site on Little Bear Creek crosses Tracts BCCUR-53PT and BCCUR-40PT (see Figure 2). The proposed bridge site on Gas Branch crosses Tract BCCUR-50PT (see Figure 3). The project will also require the filling of wetland areas and streambeds at ten locations for the construction of roadway and culverts.

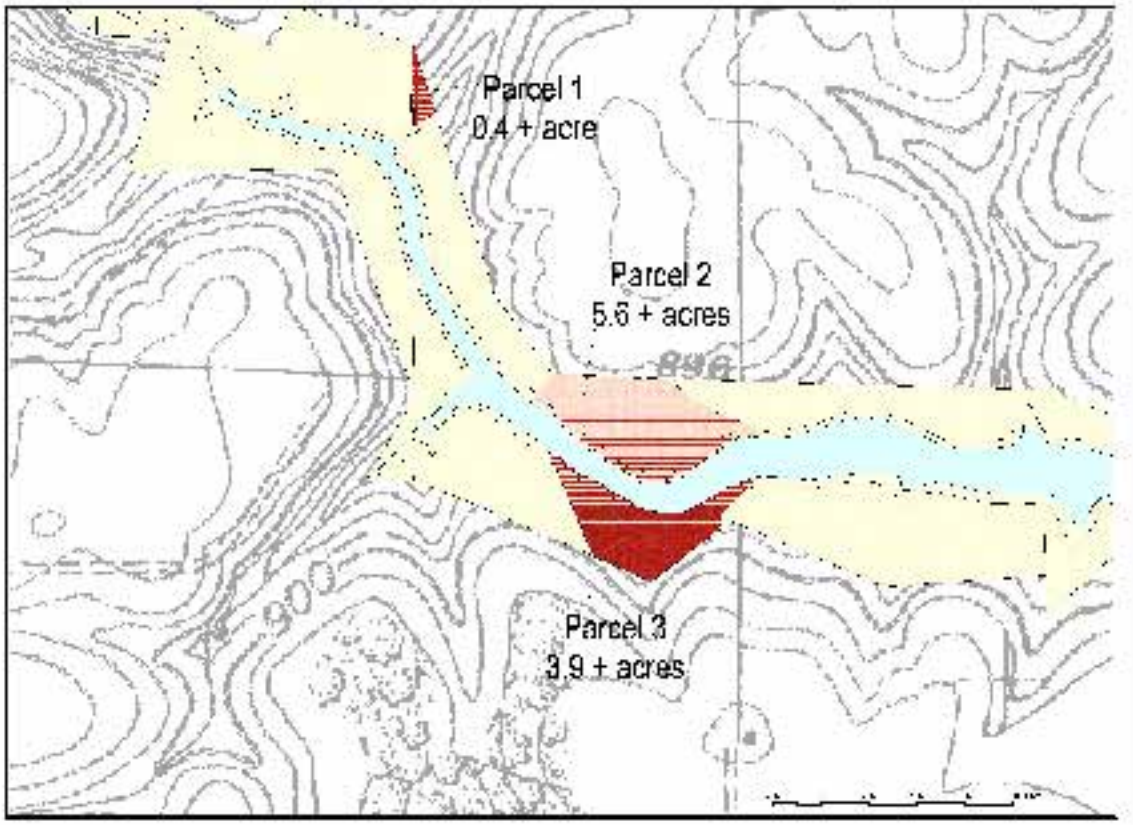

Figure 2. Little Bear Creek Crossing (Tracts BCCUR-53PT and BCCUR-40PT)

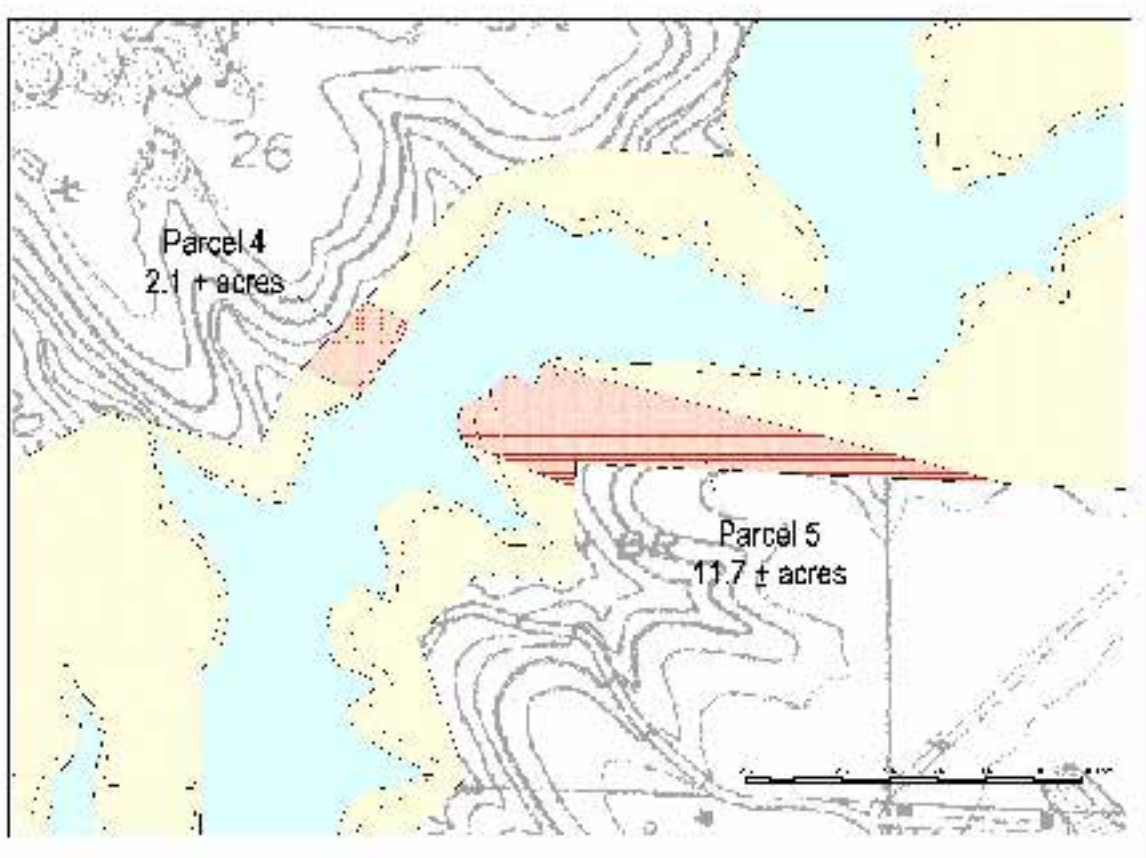

Figure 3. Gas Branch Crossing (Tract BCCUR-50PT)

2.3 Comparison of Alternatives

Under Alternative A, there would be no change in land use activities and no additional impacts are anticipated. However, ALDOT would not be able to complete the proposed upgrade to State Route 13.

Under Alternative B, potential for impacts to the terrestrial ecology of the two bridge sites is associated chiefly with the loss of three globally rare plant communities and their associated animal species. Additional impacts may occur with the disturbance of the soil surface and the enhancement of conditions for the introduction and spread of invasive terrestrial plant species. There would be adverse and potentially significant impacts to state-listed endangered plant species known to occur at the proposed bridge on the south bank of Gas Branch and near the construction zone of the bridge on the Little Bear Creek arm of the reservoir. All five plant species would be adversely impacted. There would be the loss of suitable habitat for state-protected green salamanders and suitable nesting habitat for state-protected osprey in Gas Branch. Gray bats and northern long-eared bats likely forage throughout Gas Branch. Reduction of water quality could affect these species. There would be adverse impacts to the ecologically significant Dime Bluffs and Ravines Site as both proposed bridge crossings are within this ecologically significant site. These would not be significant with the mitigation measures identified in Section 7.0.

The primary impact to water quality from construction of the proposed bridges would be increased silt load resulting from runoff during soil disturbing activities. The potential for impacts to aquatic resources depends to a large extent on the degree of vegetation removal for roadways and the amount of soil disturbing activities during construction of the bridges. There would be no effect on sensitive aquatic animals in Upper Bear Creek Reservoir because no sensitive aquatic animals are likely to occur in the potentially affected area. All wetlands would be protected from most direct impacts through compliance with federal mandates and legal requirements of wetland protection. However, construction of road ways and clearing will include extensive soil disturbing activities. These activities will increase the potential for erosion and sedimentation of wetland areas.

Under Alternative B, there would be an adverse effect on archeological site 1FR432; however that effect will be adequately mitigated through a Phase III Data Recovery Plan as outlined in a Memorandum of Agreement (MOA) (see Appendix B). All of the historic properties listed on the NRHP in Franklin County are outside the project's area of potential effect; therefore, none of these properties will be affected by the proposed project. The proposed development would change the landscape character of the undisturbed shoreline consisting of dense vegetation and rock. Scenic attractiveness and scenic integrity would degrade as the structures would contribute to increased visual congestion. Although the overall scenic integrity would be impaired, the effects to the scenic attractiveness would be minimized with appropriate mitigation. The required clearances for secondary reservoir channels are 50 feet of horizontal clearance and a minimum of 15 feet of vertical clearance above normal pool elevation. If these clearances are met, there will be no conflicts with Navigation. Expected impacts to public recreation facilities, activities and resources are insignificant.

However, all anticipated impacts would be minimized or mitigated to insignificant levels by adhering to commitments in Section 7.0. These commitments would minimize impacts from construction activities and replace uncommon habitats and unique visual resources that are destroyed by the proposed project.

2.4 Preferred Alternative

TVA has selected Alternative B as the preferred alternative because it allows for the construction of the bridges needed for the Project F-393(3), Proposed Corridor for State Route 13 between Dime and Spruce Pine, Franklin County, Alabama. Additionally, Alternative B identifies commitments to protect or avoid all sensitive resources.

3.0 AFFECTED ENVIRONMENT

3.1 Introduction

Federal resource management agencies (EPA, NRCS, USGS, and Forest Service) have determined that Upper Bear Creek Reservoir is within the Dissected Plateau ecoregion of the Southwestern Appalachians. These are low mountains, and the lands around the reservoir exhibit a greater variety of rock formations and mountain plants such as hemlock than surrounding lands to the south and west. Coal and iron mining also has occurred around the reservoir in this ecoregion. The William B. Bankhead National Forest and Lewis Smith Lake are also in this ecoregion. Ecoregions denote areas of general similarity in the type, quality, and quantity of environmental resources. They also tend to show similar patterns of human use and disturbance (EPA, 1999). The proposed SR 13 corridor generally consists of pastures, farmland, and forests typical of this ecoregion.

The proposed work involves upgrading Alabama State Route 13 (SR 13) through the construction of a new four-lane facility between Delmar in Winston County, and Spruce Pine in Franklin County, Alabama. The portion of the project under our consideration begins at Franklin County Road 79 at Dime and ends at the existing SR 13 in Spruce Pine. SR 13 is currently a major north-south route located in northwest Alabama and is comprised primarily of a two-lane facility.

3.1.1 Description of Affected TVA Property

Little Bear Creek Crossing
The proposed bridge site on Little Bear Creek crosses Tracts BCCUR-53PT and BCCUR-40PT (see Figure 2). In the Bear Creek Reservoirs Land Management Plan, these tracts were allocated to Zone 3, Sensitive Resource Management. Tract BCCUR-40PT contains heritage, cultural, and visual resources. Tract BCCUR-53PT contains heritage and visual resources.

Tract BCCUR-40PT (51.3 acres)
The northern part of this tract begins on the left bank of the mouth of Dime Spring Branch on Little Bear Creek and terminates at the back of an unnamed cove where topography changes to steep slopes and large out crops. This tract is forested with eastern hemlock, American beech, Virginia pine, sourwood, big leaf magnolia, and scattered sweet gum. Scattered yellow poplar and a large amount of mountain laurel are in the understory. Sandstone outcroppings appear to be contiguous around most of this tract. Eastern hemlock, big leaf magnolia, hophorn bean are extremely prevalent along these outcroppings. Fringe wetlands occur in shoreline depressions and shallow water areas. The western end of the tract, becomes moderately sloped near shoreline white oak and other upland hardwood species are more common in this areas. The tract encompasses an excellent habitat of extensive rockhouses, tall sandstone bluffs and occurrences of state-listed rare plants. The geological features of this tract are heavily shaded by mature hemlocks and various hardwoods. Within this area, the very

rare little mountain meadow rue and mountain camellia occurs along with a rich diversity of amphibians, reptiles, songbirds, and mammals.

Tract BCCUR-53PT (11.3 acres)
This tract is located on the right descending bank of Little Bear Creek. The upstream end of this tract consists of emergent and scrub shrub wetlands along the shoreline. The backlying land is forested with red oak, Virginia pine, hickories, and white oak. The southwest portion of this tract is dominated by sandstone out crops and large vertical bluffs. There are several natural drains along the bluffs. The vertical bluffs and rock outcrops are significant and support a diversity of wildlife habitat. The steep vertical bluffs are also visually significant.

Gas Branch Crossing
The proposed bridge site on Gas Branch crosses Tract BCCUR-50PT (see Figure 3). Tract BCCUR-50PT (101.2 acres), was allocated to Zone 3, Sensitive Resource Management because of heritage, cultural, and visual resources. This tract includes the left and right banks of Gas Branch. The tract has numerous sandstone rock outcrops and vertical bluffs. The shoreline consists of fringe wetlands and is forested with oaks, hickory, and some Eastern hemlock. Upper areas are predominantly Virginia pine. All the surface water area within this embayment is prime aquatic habitat with standing timber or high cut stumps. These features provide shade, cover, and a food source for fish. The stumps are safety concerns for recreational use of water craft and water use facilities. This tract contains the site of the triple natural arches. It has significant vertical bluffs and rock outcrops which support a diversity of wildlife habitat. It is a pristine embayment with no development and a well-forested erosion zone. Siltation is prevalent in the upper end. The steep vertical bluffs are visually significant.

3.2 Terrestrial Environment

3.2.1 Plants

The Bear Creek Project area is located at the boundaries of three physiographic provinces--the Coastal Plain, the Interior Low Plateau, and the Appalachian Plateau (Fenneman, 1938). The Upper Bear Creek Reservoir lies in the Appalachian Plateau Province.

Different physiographic provinces tend to develop distinctive plant communities and to contain plant species which are either unique to or are characteristic of each province. Near the boundaries of physiographic provinces there are frequently unusual combinations of species and resultant unique communities. Field observations and a review of communities described by the Association for Biodiversity Information's (now NatureServe) database confirm this to be true in the vicinity of Upper Bear Creek Reservoir (http://NatureServe.org).

Biological field investigation of the Bear Creek area, conducted in 1999, indicated the following:

> "The Appalachian Plateau province, in the northern portions of Alabama, is defined by Braun (1950) as lying within the mixed mesophytic forest region. This region is characterized by oaks and pines with the true mixed mesophytic communities confined to the valley slopes. Tree species typical of this forest type include various species of oak, beech, maple, hemlock, and pine" (TVA, 2001a).
>
> "Compared to other TVA reservoirs, as well as central Alabama in general, TVA public lands in the Bear Creek System have a much lower percentage of agricultural and residential use and a greater percentage of forest. The vegetation communities in association with Upper Bear Creek Reservoir support exemplary diversity and harbor several rare species. Comparatively, the biotic communities of Upper Bear and Little Bear Creek Reservoirs possess greater ecological integrity and exhibit fewer disturbances than what is found along Cedar Creek Reservoir" (TVA, 2001a).

The Association for Biodiversity Information (now named NatureServe) is in the process of classifying plant communities of the world and ranking them on a global (G) numerical scale (1-5) from globally secure (G5) to critically imperiled globally (G1). Their G2 rank is "imperiled globally", their G3 rank is "rare or uncommon", and their G4 rank is "widespread, abundant, and apparently secure, but with cause for long-term concern". The following kinds of rare plant communities occur on the TVA public land at the proposed bridge crossings over Upper Bear Creek Reservoir.

- G2 (The Cumberland Plateau Rockhouse: Cave Alumroot - Rock-house Meadowrue Herbaceous Vegetation), referred to as 'Rock-house' below.

- G1G2 (Cumberland Plateau Mesic Hemlock - Hardwood Forest: Eastern Hemlock - (Tuliptree, American Beech) / (Bigleaf Magnolia, American Holly) / Christmas Fern Forest), referred to as 'Hemlock' below.

- G3 (Cumberland Plateau Clifftop Sandstone Barren: Little Bluestem - Silky Oatgrass - Small-head Blazingstar - (Creeping Aster) Wooded Herbaceous Vegetation), referred to as 'Sandstone Barren' below (http://NatureServe.org).

At the proposed bridge crossing on Gas Branch (Tract 50 of the Bear Creek Reservoirs Land Use Plan (TVA, 2001b), the plant communities on the north bank include the globally imperiled Hemlock community and a globally secure upland slope of oaks, pines, and hickories. On the south bank, there is a larger area of Hemlock community and a small area of the rare or uncommon Rockhouse community. About 5.0 acres of the Hemlock community and about 1.0 acre of the Rockhouse community would be impacted by construction of the bridge proposed for this site.

At the proposed bridge crossing on Tract 53, on the west bank of Little Bear Creek, the sheer sandstone bluff top is covered with a globally secure community of Virginia and loblolly pines. On the east bank at this crossing, in Tract 40, most of the area is covered by globally secure young oak and hickory forest, and a small area is covered by Sandstone Barren community. About 0.25 acres of the Sandstone Barren community

would be indirectly impacted by the bridge construction. About 0.5 acres of habitat near the site would be excellent for habitat enhancement activities.

A total of about 6.75 acres of rare or imperiled plant communities are in the affected environment of both bridge sites. Nearby, on land already acquired by the state of Alabama for construction of the bridge and highway, there were approximately 3,300 stems of the federal listed *Helianthus eggertii* (Eggert's sunflower). See section 3.2.3 Threatened and Endangered Species for more information.

Invasive Species

Because of the lack of disturbance from agricultural, residential, or commercial development in the area, there are few invasive terrestrial plant species present and no areas identified where such species pose an immediate threat to the native plant communities. Although a comprehensive survey for invasive terrestrial plants has not been conducted, two species known to occur on Upper Bear Creek Reservoir, specifically on the lands associated with the two proposed bridge crossings, are multiflora rose (*Rosa multiflora*) and Japanese honeysuckle (*Lonicera japonica*). At this time these species, or any other invasive terrestrial plant species, are not widespread on the TVA public land directly or indirectly associated with the proposed bridge crossings.

3.2.2 Animals

The various plant communities and geological formations found on Upper Bear Creek Reservoir represent high quality habitat types that are uncommon in northwest Alabama. These habitats were surveyed extensively during the recent Bear Creek Reservoirs Land Planning Project and were found to provide suitable habitat for a variety of terrestrial animal species. A total of 118 species of terrestrial animals were observed or detected during field investigations. Common species of wildlife observed around the reservoir included white-tailed deer, armadillo, raccoon, beaver, eastern chipmunk, stripped skunk, white-footed mice, southern flying squirrel, and gray squirrel. Common species of birds included great blue heron, green heron, eastern phoebe, barn swallow, tufted titmouse, northern cardinal, American crow, a variety of neotropical birds, and large numbers of black and turkey vultures. Reptiles and amphibians such as ground skink, box turtle, northern water snake, slimy and long-tailed salamander were also abundant around Upper Bear Creek Reservoir.

Forested rockhouses and exposed sandstone outcrops examined around the reservoir were identified as significant habitats during land planning field surveys. These habitats contained many large and diverse populations of woodland salamanders as well as provided nesting and roosting sites for a variety of small mammals and cliff-dwelling birds. These habitats are uncommon in northwest Alabama and are typically restricted to riparian corridors on the Bear Creek and Black Warrior River systems. Examples of these habitats exist on and adjacent to the proposed highway crossings at Gas Branch and Little Bear Creek arm of the reservoir.

3.2.3 Threatened And Endangered Species

The TVA Heritage database and recent discoveries include records of 31 listed vascular plant species and one listed moss species from Franklin, Winston, and Marion Counties,

Alabama. Two of those species are federally threatened and one is federal-endangered. All 32 species are included in Table 2. (See also Appendix E, Table E-2, in TVA, 2001a.)

Table 2. State and federally listed plant species known from Marion, Franklin, and Winston Counties, Alabama

Scientific name	Common name	Global Rank	State Rank	Federal Status
Asplenium ruta-muraria	Wall-rue spleenwort	G5	S2	
Bryoxiphium norvegicum	Sword moss	G3G4	S1	
Cuscuta harperi	Dodder	G2	S2	
Dalea foliosa	Prairie clover	G2G3	S1	LE
Dalea gattingeri	Gattinger prairie clover	G3G4	S3	
Delphinium alabamicum	Alabama larkspur	G2	S2	
Eriogonum longifolium var. *harperi*	Harper umbrella plant	G4T2	S2	
Fothergilla major	Witch alder	G3G4	S2	
Frasera caroliniensis	American columbo	G5	S1S2	
Helianthus eggertii	Eggert's sunflower	G3	S1	LT
Huperzia porophila	Rock clubmoss	G4T2	S1	
Hydrastis canadensis	Goldenseal	G4T2	S2	
Hymenophyllum tayloriae	Gorge filmy fern	G1G2	S1	
Isoetes butleri	Butler quillwort	G4T2	S2	
Jamesianthus alabamensis	Jamesianthus	G3G4	S2	
Leavenworthia alabamica	Alabama glade-cress	G2G3	S2S3	
Lesquerella lyrata	Lyre-leaf bladderpod	G1	S1	
Mirabilis albida	Pale umbrella-wort	G5	S2	
Nestronia umbellula	Nestronia	G4T2	S2	
Pachysandra procumbens	Allegheny-spurge	G4G5	S2S3	
Pediomelum subacaule	Tuberous scurf-pea	G4	S2	
Pilularia americana	American pillwort	G5	S1	
Selaginella arenicola ssp. *riddellii*	Spikemoss	G4T4	S2	
Stewartia ovata	Mountain-camellia	G4	S2S3	
Talinum calcaricum	Limestone fameflower	G3	S2	
Talinum mengesii	Fame-flower	G3	S2S3	
Thalictrum mirabile	Little Mt. Meadow-rue	G2G3Q	S1	
Thelypteris pilosa var. *alabamensis*	Alabama streak-sorus fern	G4T1	S2	LT
Trichomanes petersii	Dwarf filmy-fern	G4G5	S2	
Trillium recurvatum	Prairie trillium	G5	S2	
Triosteum angustifolium	Horse gentian	G5	S1	
Xyris tennesseensis	Yellow-eyed grass	G1	S1	

Eleven state- or federal-listed species are known to occur within five miles of the proposed bridge locations on Gas Branch and the Little Bear Creek arm of the reservoir. The listed species actually found at the two bridge locations or in the proposed highway alignment near the bridge locations are as follows.

Gas Branch: *Stewartia ovata* (Mountain camellia), and *Thalictrum mirabile* (Little Mountain Meadow-rue). Approximately 50 individuals of *Thalictrum mirabile* would be lost, as would three individuals of *Stewartia ovata.* Nearby, on land already acquired by the state of Alabama for construction of the bridge and highway, there were

approximately 3,300 stems of the federal listed *Helianthus eggertii* (Eggert's sunflower). ALDOT has had a formal consultation with the United States Fish and Wildlife Service (USFWS) Office of Endangered Species on the matter and a mitigation plan for impacts to the species has been developed and is being implemented (see Appendix C).

Little Bear Creek Arm of Upper Bear Creek Reservoir: At the proposed bridge on the Little Bear Creek arm of the reservoir, 100 to 1,000 plants of *Talinum mengesii* and about 20 clumps of *Selaginella arenicola* ssp. *riddellii* occur outside but near the construction zone for the bridge supports. About six plants of witch alder (*Fothergilla major*) occur adjacent to the bridge supports at the site on the Little Bear Creek arm of the reservoir.

Eleven terrestrial animal species have been documented from Franklin, Marion, and Winston Counties (see Table 3). Seven of these species are protected by the USFWS or the state of Alabama. The remaining four species are considered rare or uncommon by The Alabama Natural Heritage Program[SM].

Table 3. Rare Terrestrial Animals Known From Franklin, Marion, and Winston Counties in Alabama.

Common Name	Scientific Name	Federal Status	Alabama State Status
Mammals			
Gray Bat	*Myotis grisescens*	Endangered	Protected
Northern Long-eared Bat	*Myotis septentrionalis*	-	No Status*
Birds			
Bald Eagle	*Haliaeetus leucocephalus*	Threatened	Protected
Barn Owl	*Tyto alba*	-	No Status
Osprey	*Pandion haliaetus*	-	Protected
Red-cockaded Woodpecker	*Picoides borealis*	Endangered	Protected
Reptiles			
Alligator Snapping Turtle	*Macroclemys temminckii*	-	Protected
Coal Skink	*Eumeces anthracinus*	-	No Status
Flattened Musk Turtle	*Sternotherus depressus*	Threatened	Protected
Amphibians			
Black Warrior Waterdog	*Necturus alabamensis*	-	No Status
Green Salamander	*Aneides aeneus*	-	Protected

* No status indicates that these species are not formally listed by the state of Alabama. However, these species are considered rare or uncommon by the ALNHP[SM]

Many of the species reported from the surrounding counties have restricted distributions and would not exist in the project area, this includes species such as Black Warrior waterdog and the federal-threatened flattened musk turtle. No suitable habitat for red-cockaded woodpeckers was found during the land planning surveys and the species is not likely to exist in the project area. Of the remaining eight species identified in Franklin, Marion, and Winston Counties, four are known from a three-mile radius of the project.

Federal-endangered gray bats were captured on Upper Bear Creek Reservoir in 1999. This species of bat forms large summer colonies in caves and forages over aquatic habitats. The species was found foraging over forested stream corridors on Upper Bear Creek Reservoir and is likely to forage throughout the reservoir.

Northern long-eared bats, listed as rare or uncommon in Alabama, have been captured from stream corridors on Upper Bear Creek Reservoir. This colonial species of bat likely roosts in high quality, forested riparian zones throughout Upper Bear Creek Reservoir and likely exists in the Gas Branch embayment.

Numerous populations of state-protected green salamanders have been reported from habitats within three miles of the project area. These salamanders are found in crevices in forested and exposed sandstone bluffs and rockhouses. These habitats exist at the Gas Branch bridge crossing and are likely used by green salamanders. However, no salamanders were observed during brief field investigations in 2001.

Common barn owls, listed as protected by the state of Alabama, have been reported from exposed sandstone bluffs downstream of the project area. Although there are numerous sandstone bluffs on Upper Bear Creek Reservoir, few contain suitable openings and ledges for barn owl nests. The sheer sandstone bluff at the Little Bear Creek Crossing is not used by barn owls.

Although bald eagle and osprey nests occur on the Bear Creek system, no nests have been reported from Upper Bear Creek Reservoir. Both species are regularly observed on the reservoir throughout the year.

Habitats at the proposed highway crossings were examined during the summer of 2001. Of the two crossings examined, the Gas Branch Embayment contained uncommon habitats that may be used by protected species of terrestrial animals. Habitats in Gas Branch consisted of extensive forested and exposed sandstone outcrops and a large concentration of partially submerged snags. The bluffs and rockhouses in this area provides suitable habitat for green salamander and the high quality riparian zone along the length of the Gas Branch represents a suitable foraging corridor for northern myotis and the endangered gray bat. Although there are no records of active osprey nests on Upper Bear Creek, the snags in the Gas Branch Embayment represent suitable nesting habitat for osprey.

Suitable habitat for alligator snapping turtle and coal skinks exists in the project area. However, these species were not observed on Upper Bear Creek Reservoir during recent surveys.

3.2.4 Natural Areas

A review of the TVA Regional Natural Heritage Project database indicates that six Managed Areas and Ecologically Significant Sites are located within three miles of the two proposed bridge crossings. In addition, eight Managed Areas and Ecologically Significant Sites are known to occur within five miles of the proposed project area.

Two of the areas found to occur within three miles are classified as Ecologically Significant Sites because of the overall ecological integrity of the area. Four of the areas found within three miles of the proposed crossings are designated as TVA Habitat Protection Areas because of the presence of populations of Alabama state-listed plants and the associated uncommon plant communities. Habitat Protection Areas are established to protect populations of species that have been identified as threatened or endangered by the U. S. Fish and Wildlife Service or that are rare to the State in which they occur. Unusual or exemplary biological communities or unique geological features also receive protection in this category.

Dime Bluffs and Ravines Site, begins on the south side of County Route 71 and extends southward to the area near the old Burdeshaw bridge. All of the land associated with the proposed bridge crossing on Bear Creek (Tracts 40 and 53) lie within this ecologically significant site. This site, a portion of the Upper Bear Creek Equi-Site, possesses high ecological, biological, and aesthetic qualities and offers valuable opportunities for ecological study. Several sheer, sandstone bluffs ranging in height to 60 feet occur along the shoreline in several places and one bluff supports nesting barn owls. Shaded sandstone bluffs occur beneath mature expanses of hemlock-tulip tree-American beech Cumberland Plateau forest that support the state protected green salamander and rare plants such as Little Mountain meadowrue, and mountain camellia. Several rockhouses occur at intervals throughout the site and support several species of mammals, birds, reptiles, and amphibians.

Dime Springs TVA Habitat Protection Area (HPA) was established in a effort to protect the botanical resources present. This HPA is located on the south side of Bear Creek and lies approximately 0.1 miles northeast of the proposed bridge crossing on Tract 40. This area was designated as a TVA HPA because of the presence of at least two populations of Alabama protected plant species, a significant Mixed Mesophytic Forest dominated by hemlock, and extensive sandstone rock outcrops and rock houses.

Hart's Bluff TVA HPA is located on the south side of Bear Creek approximately 0.5 miles downstream of the proposed bridge crossing on Tract 40. This area was found to contain populations of two Alabama protected plants, one Alabama protected amphibian, and a significant mature hemlock forest with extensive sandstone bluffs. The HPA designation was recommended by Alabama Natural heritage biologists.

Turkey Creek TVA HPA is located less than one mile east of the proposed bridge crossing on Tract 40. This area was identified by Alabama Natural Heritage biologist in conjunction with the 1999 land planning process. Deemed botanically significant, this HPA contains significant populations of at least three Alabama protected plant species.

Devil's Den TVA HPA is located approximately 0.8 miles north of the proposed bridge crossing on the main stem of Upper Bear Creek and approximately 1.5 miles east of the proposed crossing on Gas Branch. This area is characterized by sandstone cliffs and gentle forested slopes. A small woodland seep and an ephemeral stream occur over a sandstone outcrop creating excellent habitat for woodland salamanders and, possibly, the seepage salamander.

Mountain View Ravines Site, an Ecologically Significant Site lies approximately 1.3 miles north of Tract 40 and consists of a large area beginning at and including Turkey Creek

and extending northward beyond Devil's Den Hollow at the upper reaches of Little Bear Creek. The entire site, a portion of the Upper Bear Creek Equi-Site, possesses high ecological, biological and aesthetic qualities and offers valuable opportunities for biological study. Several shear sandstone bluffs ranging in height to 60 feet occur along the shoreline in several places. Extensive shaded sandstone bluffs occur beneath mature expanses of hemlock-tulip tree-American beech Plateau forest that support the state protected green salamander and rare plants such as Little Mountain meadowrue, and mountain camellia. The northern most sector of this site, along Little Bear Creek, is an important foraging corridor for the federal-endangered gray bat and the Alabama rarity northern myotis. Numerous rockhouses occur at intervals throughout the site including a coliseum-sized rock house near the mouth of Turkey Creek. This impressive site supports occurrences of the very rare sword moss, rock clubmoss, and gorge filmy fern. Additionally, several sandstone glades occur along the shoreline of this site and support populations of the globally rare and imperiled Harper's dodder as well as Menge's fame-flower and Riddell's spikemoss. This area was identified by Alabama Heritage biologists during the 1999, TVA Land Planning fieldwork.

In addition, eight Managed Areas or Ecologically Sensitive Sites are known to occur within five miles of the proposed bridge crossings. These are Quarter Creek Glades TVA HPA, Sunny Home Glades Site, William Bankhead National Forest, The Sipsey Wilderness Area, Black Warrior Wildlife Management Area, The Dismals (also called Dismals Wonder Garden), Rock Bridge Canyon, and Bear Creek Ravine.

3.3 Aquatic Environment

3.3.1 Water Quality

Water quality in Upper Bear Creek Reservoir is influenced by the physical characteristics of the reservoir, geology, land use, and inflow water quality. Upper Bear Creek Reservoir is operated for flood control, recreation and water supply. It is relatively deep with low average discharge, resulting in long average retention time. Average discharge is 200 cubic feet per second (cfs), with a retention time of 85 days. Discharges from Upper Bear Creek Reservoir fluctuate greatly during summer canoeing season. Weekend releases are usually around 250 cfs to provide sufficient water for recreational use on the Bear Creek Floatway, while weekday releases may be as low as 10 - 25 cfs (TVA, 1988).

Most of the drainage area for Upper Bear Creek Reservoir lies within the western Highland Rim physiographic province. It is primarily surrounded by sandstone and shale. Many areas are laden with coal deposits. Presence of limestone and sandstone along shorelines provides a stable surface, and shoreline erosion is limited to only small areas throughout the reservoir. Sedimentation has been found to be extensive in certain areas of Upper Bear Creek Reservoir, primarily due to improper mining activities immediately prior to completion of the dam (Carriker, 1981).

Upper Bear Creek Reservoir has not been sampled as part of TVA's routine reservoir monitoring plan. TVA provides aeration at several sites in the reservoir to minimize stratification and subsequent anoxia (TVA, 1988). The water is typically soft with very

low alkalinity. This allows poor buffering capacity of the acidic runoff from area mines (Marion, Angus, and McClintoch, (1991). Upper Bear Creek has an average pH of 6.8 pH units. Historically, the pH has been lower, probably due to surface mine runoff (Angus and Marion, 1993).

3.3.2 Aquatic Ecology

The most recent fish community samples were collected in 1993. Results of these surveys included 14 species of fish, with Bluegill being the most numerous followed by channel catfish, largemouth bass and gizzard shad. Overall, the 1993 sample rated only fair and in 1992, it rated poor. Studies conducted by the University of Alabama at Birmingham biology department in 1991 indicated that the largemouth bass population in Upper Bear Creek Reservoir was in poor condition due to a scarcity of suitable forage fish, or effects of chronic stress from poor water quality (Angus and Marion, 1993).

3.3.3 Threatened And Endangered Species

No state- or federal-listed aquatic species are likely to occur in the area potentially affected by construction activities occurring at the bridge crossings on Upper Bear Creek Reservoir. One state-listed endangered mussel species, the pocketbook (*Lampsilis ovata*), is reported from Bear Creek below Upper Bear Creek Reservoir, but is not likely to occur in the area potentially affected by this project. In the U.S. Army Corps EA for this project, the U.S. Fish and Wildlife Service requested ALDOT to perform aquatic surveys at the crossings. These assessments were conducted in April 2201 and April 2002 and no habitat for federal-listed aquatic species were found and the U.S. Fish and Wildlife Service concurred (see Appendix D).

3.3.4 Wetlands

There are numerous small wetland areas in the Upper Bear Creek Reservoir. These are generally very small fringes of scrub-shrub or emergent wetlands confined to a narrow strip of shoreline or located at the heads of coves where tributary streams enter the reservoir. Narrow bands of emergent wetland vegetation occur on Tract 40 and sparse scrub-shrub wetlands with small patches of emergent wetlands occur on Tracts 50 and 53. The proposed work along the ten stream crossings involves the discharge of fill material in approximately 4.04 combined acres of wetland fill (USACE, 2001).

3.4 Human Environment

3.4.1 Cultural/Historic Resources

Human occupation of northern Alabama has occurred from the Paleo-Indian to the Historic period. In northern Alabama, prehistoric archaeological chronology is generally broken into five broad time periods: Paleo-Indian, Archaic, Gulf Formational, Woodland, and Mississippian. Prehistoric land use and settlement patterns vary during each

period, but short- and long-term habitation sites are generally located on flood plains and alluvial terraces along rivers and tributaries. Specialized campsites tend to be located on older alluvial terraces and in the uplands. European interactions with Native Americans in this area began in the 17th and 18th centuries associated with the fur trading industry. The first permanent occupation of Northern Alabama by Europeans, Euro-Americans, and African-Americans occurred in the late 18th century. Various excursions and temporary settlements by the British, French, and Spanish occurred prior to this period. From the 1840s to the mid 20th century, northern Alabama was a major cotton growing area. Settlement and land use of the area remained primarily rural until the mid 20th century, at which time industry and urbanization increased.

Numerous archaeological sites have been identified within the Bear Creek Watershed. A site within the Area of Potential Effect (APE) of the proposed project was identified during a Phase I Archaeological Survey of the Upper Bear Creek Reservoir (Hendryx, 1999). 1FR432 is a prehistoric lithic scatter located on Parcel 5 (Land Parcel 40). This site was identified as potentially eligible for the National Register of Historic Places during the initial investigation. A Phase II archaeological investigation was conducted in August, 2001 and determined that the site was eligible (Little, 2001). One additional potentially eligible site was located just outside the APE. 1FR434 is a rockshelter located just south of Parcel 5 (Tract BCCUR-40PT). The proposed plans should have no affect on this potentially eligible historic property. No other historic properties were located within the project area.

There are two historic properties listed on the NRHP in Franklin County. These sites are not located near the project area.

A Historic Structures Report and Cultural Resource Assessment were completed for the project corridor in January of 1998. This report was coordinated with the Alabama Historical Commission and they agreed with the findings made in the reports (FHWA, 1998).

3.4.2 Visual Resources

Little Bear Creek Branch Crossing

On the north shore of the reservoir at Little Bear Creek Crossing, there is a large sandstone bluff wall that is approximately thirty feet high. This bluff wall is visible along a large portion of the north shoreline and vegetation is lush along the ridge. The tree canopy is undisturbed along the north shore where pine and mixed hardwood species are visible. The understory vegetation is thick, and in portions, grows from the face of the wall. Wet weather springs form waterfalls at a few locations along the sandstone walls and enhances the view along the steep bluffs. Collapsed portions of the bluffs are visible along the shoreline, giving depth and scale to the existing sandstone cliffs.

Views to the west are of a continuous tree canopy broken only by the Batestown recreation area, and heavily vegetated shoreline. Scenic integrity is high in this area. Across the reservoir, on the south shore, the terrain gently slopes to the water's edge. There are small pockets of open areas intermixed with predominantly hardwood plant species. The tree canopy is undisturbed, and forms a horizontal plane above the reservoir surface. The shoreline is heavily vegetated and winding, with one small cove

where informal recreational use occurs. There are slight rock outcroppings visible, just above the soil surface.

Views to the east of the proposed bridge crossing are of the larger body of the reservoir and the Mon Dye recreation area. The scenic value of the south shore is good and the scenic integrity is high. Observer groups in this area include recreational boaters, fishermen, swimmers, and primitive campers. Most views are from the foreground and middleground distances from the reservoir water body.

Gas Branch Crossing

The view into Gas Branch is framed with steeply sloping terrain on opposing sides of the reservoir, which is approximately fifty feet wide at the proposed bridge crossing. Flooded timber is sparsely scattered throughout the area and vegetation is abundant, reaching down to the shoreline on either side. Pine, hemlock, and mixed hardwoods are the predominant plant species, with numerous understory plant materials visible from the reservoir. Several specimen quality big leaf magnolias (*Magnolia macrophylla*) are visible in the foreground distance.

In the distance on the south shoreline, up the steeply sloping terrain, sheer rock walls are visible. The scenic value is good and the scenic integrity is high. The north shore is thickly vegetated and views from the reservoir into the upland areas are only available from the immediate foreground. Views continuing into the embayment are narrowed as the reservoir winds to the headwaters and views away from Gas Branch are limited as the embayment is winding and the larger portion of the reservoir is not visible. The area is serene with naturalistic views of undisturbed, pristine shoreline and wooded ridges rising upwards of 80 feet above the reservoir surface. Users would most likely be fishermen, as the waters are spotted with standing timber that was flooded upon impoundment. Views from the reservoir to the shoreline and backlying lands are available only in the foreground viewing distance.

3.4.3 Navigation

There will be multiple bridge piers on the Little Bear Creek Branch crossing. The required clearances for secondary reservoir channels are 50 feet of horizontal clearance and a minimum of 15 feet of vertical clearance above normal pool elevation.

3.4.4 Recreation

There are five developed public recreation areas on Upper Bear Reservoir. These have various facilities including one campground, five public boat ramps and parking areas, four swimming beaches, four picnic areas and one ballfield complex. Two of the developed areas are relatively close to the two proposed bridge crossings on the Little Bear Creek embayment and are operated by the Bear Creek Development Authority (BCDA). Mon Dye Public Use Area has a swimming beach, picnic pavilion, toilet building and boat ramp and parking area. It is located at the upstream mouth of Gas Branch. The original location of the SR 13 project was moved in part to avoid impacts to this public use area. Mon Dye is approximately one mile upstream of the bridge crossing Little Bear Creek and one mile from the Gas Branch crossing. Batestown

Public Use Area has a boat ramp and parking lot. It has approximately 40 acres planned for future public recreation development. Batestown Public Use Area is approximately 1,200 feet downstream of the Little Bear Creek crossing.

Informal recreation use in the area includes hunting, fishing and recreational boating. TVA and BCDA property in undeveloped areas is available for informal recreation use. This includes approximately 2,600 acres of TVA-managed property and 515 acres of BCDA-managed property on Upper Bear Creek Reservoir. Gas Branch receives light recreational boating and fishing use due to the presence of flooded timber and stumps which are a hazard to boats.

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 Introduction

This section focuses on the additional environmental impacts that were not identified in the Federal Highway Administration and USACE environmental assessments. In general, the bridge crossings of a stream would be considered to be water-dependent activities which must be located in the floodplain. Adverse impacts would be minimized by designing and constructing these facilities to withstand flooding with minimal damage, and by using BMPs during construction.

4.2 Terrestrial Environment

4.2.1 Plants

Under Alternative A, no project related activities or impacts would occur.

Under Alternative B, potential for impacts to the terrestrial ecology of the two bridge sites is associated chiefly with the loss and fragmentation of a small acreage of globally rare plant communities. The significance of the ranked communities named in Chapter 3 is reflected in the allocation of several areas of these tracts in TVA's Land Management Plan for the Upper Bear Creek Reservoirs (TVA, 2001b) as HPAs or areas of Sensitive Resource Management. Under Alternative B, impacts to three rare communities would occur. Because of the rarity of these communities, these impacts are anticipated to be significant at the state level if left unmitigated. However, anticipated impacts would be minimized or mitigated by adhering to the following commitments.

- TVA HPAs in the vicinity of the proposed bridges will be protected and enhanced. Access to areas adjacent to the approaches to the bridges, including the shoreline, will be limited by appropriate signage and barriers to vehicular and pedestrian traffic.
- Construction laydown areas, access points, and other related construction activities will not be located in sensitive habitats or other areas identified by TVA staff.
- Any areas disturbed by construction activities will be re-vegetated promptly with native or non-invasive species.
- To compensate for the loss of rare plants, animals and communities or habitats, ALDOT will acquire like areas and place these areas into the public domain and in a protected status. These areas should be of similar or better quality than the areas lost. Acreage acquired would be required to be greater than the acreage lost. Any acquisitions would be coordinated with the Alabama Heritage Program and the Alabama Natural Heritage Section of the State Lands Division and subject to approval by TVA.

In addressing the commitment to acquire and protect similar habitat as mitigation, a similar area on North Fork Creek in Marion County, Alabama, about 15 miles from the proposed bridges on Upper Bear Creek, was located by personnel of the Alabama

Natural Heritage Section of the State Lands Division and subsequently purchased by ALDOT (see Appendix E). The tract includes 80 acres, providing a ratio of 12:1 of lands acquired to TVA lands lost. The tract includes examples of the sandstone glade and the hemlock-magnolia plant communities, both of which would be lost at the Upper Bear Creek bridge sites.

If the above mitigation plan is fully implemented, impacts to the terrestrial plant ecology of the Upper Bear Creek Reservoirs from the construction of the proposed two bridges to the Rockhouse, Hemlock, and Sandstone Barren communities would not be significant.

Invasive Terrestrial Plant Species

Under the No Action Alternative the proposed project would not take place and existing ecological communities would remain undisturbed. Therefore, the opportunities for the introduction and/or spread of invasive terrestrial plant species would remain at the present level.

Under Alternative B, potential for impacts to the terrestrial ecology of the two bridge sites is associated chiefly with the loss of globally rare plant communities. This loss would immediately be realized by the removal of rare and uncommon plants and associated plant communities. Additional impacts may be realized with the disturbance of the soil surface and the resulting enhanced conditions for the introduction and spread of invasive terrestrial plant species on and adjacent to the proposed bridge crossing sites. At present the state of Alabama does not maintain a list of invasive plant species and TVA would require that the Tennessee list *Invasive Exotic Pest Plants in Tennessee* be utilized as a guideline for plant species to avoid when reseeding or replanting the disturbed areas. This list is available at http://www.se-eppc.org/states/TN/TNIList.html.

Anticipated impacts would be minimized or mitigated by adhering to the commitment to promptly re-vegetate any areas disturbed by construction activities with species recognized as native or non-invasive.

4.2.2 Animals

Under the No Action Alternative, the proposed project would not take place and existing habitats would continue to be managed for sensitive resource management.

The project as proposed under Alternative B would remove uncommon terrestrial habitats and their associated animal species. These habitats were identified as significant wildlife habitats during TVA land use planning activities because of their quality and the diversity of species of terrestrial animal species using these areas. The overall reduction of wildlife habitat by the proposed project is relatively small in comparison to the total availability of habitat on the reservoir and the impacts from the project would be insignificant. However, because the habitats around the reservoir are uncommon both on a local and regional scale, reduction of these wildlife habitats would result in negative impacts to the terrestrial ecology on Upper Bear Creek Reservoir.

Identified commitments (see section 7.0) would minimize impacts from construction activities and replace uncommon habitats that would be destroyed by the proposed

project. ALDOT purchased approximately 80 acres north of Hamilton, Alabama as mitigation for the loss of habitats at the proposed bridge crossings. The site was examined by biologists from TVA, ALDOT, and Alabama Department of Conservation and Natural Resources. The site contains a creek lined by extensive bluffs. The habitat at this site is of similar quality although the vegetative composition differs slightly. The site contains suitable habitat for a variety of wildlife species that are commonly found in riparian zones on Upper Bear Creek Reservoir. Due to the amount and quality of the habitat at this site, the purchase of this land by ALDOT would sufficiently mitigate the loss of similar habitat at Upper Bear Creek Reservoir.

Additional protective measures, such as barriers to minimize human access to uncommon habitats at the proposed bridge crossings, would reduce impacts to nearby sensitive habitats. With the adoption of best management practices and mitigation efforts, impacts to sensitive habitats and their associated terrestrial animal species would be temporary and reduced to insignificant levels.

4.2.3 Threatened And Endangered Species

Plants

Under Alternative A, no project related activities or impacts would occur. Under Alternative B, the construction of the two bridges, coupled with the highway which will connect to those bridges, would have adverse and potentially significant impacts to endangered plant species known to occur at the proposed bridge on the south bank of Gas Branch.

State-listed plants: *Thalictrum mirabile* and *Stewartia ovata* plants would be lost. Plants of *Talinum mengesii* and *Selaginella arenicola* ssp.*riddellii* occur near the construction zone of the bridge on the Little Bear Creek arm of the reservoir, as do plants of witch alder (*Fothergilla major*). All five species would be adversely impacted. Impacts to these species would be anticipated to be significant at the state level if left unmitigated. However, impacts to the five species of state-listed plant species would be reduced by implementing, during the construction phase of the project, the measures identified in Section 7.0 of this document. Those measures would include physical barriers on the bridge approaches to limit access to the lakeshore in the vicinity of the bridge supports and physical barriers and signage to prevent vehicular and pedestrian access to the area where the species occur during construction of the highway and bridge. In addition, mitigation for the loss of these state-listed populations, would be accomplished by purchasing and protecting a similar area nearby.

Federal-listed plants: A Biological Assessment of the impacts to Eggert's sunflower (*Helianthus eggertii*) has been made, formal consultation between ALDOT and the U. S. Fish and Wildlife Service has occurred, a mitigation plan has been developed and initiated, and a Biological Opinion by the U. S. Fish and Wildlife Service has been rendered in a letter dated August 21, 2001 from L.E. Goldman of U. S. Fish and Wildlife Service to Joe D. Wilkerson of ALDOT and modified November 21, 2001 (see Appendix C). If the terms and conditions detailed in the letter are carried out, impacts to Eggert's sunflower (*Helianthus eggertii*) would be insignificant. Relocation documentation has been provided by ALDOT (see Appendix C).

A similar area on North Fork Creek in Marion County, Alabama, within the TVA Power Service Region and about 15 miles from the proposed bridges on Upper Bear Creek, has been located by personnel of the Alabama Natural Heritage Section of the State Lands Division (see Appendix E). The tract includes approximately 80 acres, providing a ratio of 12/1 of lands acquired to TVA lands lost. The tract includes examples of the sandstone glade and the hemlock-magnolia plant communities, both of which would be lost at the Upper Bear Creek bridge sites. This tract was purchased by ALDOT in April 2002.

If the terms and conditions enumerated in section 7.0 above are fully implemented, the impacts to the threatened and endangered plants would be insignificant.

Animals

Under the No Action Alternative, the proposed project would not take place and existing uncommon habitats would continue to be managed to protect rare terrestrial animals that may use these habitats.

Adoption of Alternative B would result in the loss of suitable habitat for protected species of terrestrial animals in Gas Branch. These habitats were identified as significant habitats during TVA land use planning activities and were designated as sensitive wildlife habitat. Suitable habitat for state-protected green salamanders would be destroyed. The overall reduction of this habitat would be relatively small in comparison to the total availability of these habitats on the reservoir and would result in insignificant impacts. However, because the habitats around the reservoir are uncommon both on a local and regional scale, reduction of these wildlife habitats would result in negative impacts to green salamanders on Upper Bear Creek Reservoir.

Construction of the bridge crossing at Gas Branch would result in loss of suitable nesting habitat for state-protected osprey. Noise from traffic would also reduce the potential for this species to nest in close proximity of the bridge, although osprey readily acclimate to traffic noise on other reservoirs and would likely nest in other portions of Gas Branch. Due to the abundance of partially submerged snags throughout Upper Bear Creek Reservoir, the proposed project would not eliminate significant amounts of nesting habitat for osprey and therefore would not result in adverse impacts to this species.

Gray bats and northern long-eared bats likely forage throughout Gas Branch. Reduction of water quality would affect these species. However, no gray bat or northern long-eared bat colonies are known from the vicinity of the proposed project. Further, during bridge construction activities, ALDOT would utilize BMP's to control soil erosion and run-off at the construction sites, therefore protecting water quality at the site. Therefore, there would be no affect on the gray and northern long-eared bats as a result of this project.

The proposed purchase of land would be beneficial to protected terrestrial animals in the region. The mitigation site was examined and determined to be of similar quality as the habitats that would be lost. The mitigation site contains suitable habitat for green salamanders and the state-protected Eastern big-eared bat (*Corynorhinus rafinesquii*)

as well as other non-protected species of terrestrial animals that are found in riparian habitats.

The project is not expected to result in adverse direct or cumulative impacts to protected terrestrial animals or their habitats. The purchase of the mitigation site would result in a net gain in the amount of habitat suitable for rare and protected species. Additional protective measures, such as barriers to minimize human access to uncommon habitats at bridge crossings, would reduce impacts to protected species as well. With the adoption of BMPs and mitigation efforts, impacts to protected terrestrial animals or their habitats would be temporary and insignificant.

4.2.4 Natural Areas

Under the No Action Alternative, the proposed project would not take place and existing uncommon habitats would continue to be managed to protect uncommon ecologically significant resources located within Upper Bear Creek Reservoir.

Under Alternative B, the construction of the two bridges over portions of the Upper Bear Creek Reservoir and associated highway and infrastructure associated with the bridges, could have adverse impacts to the ecologically significant Dime Bluffs and Ravines Site if left unmitigated. Both the Gas Branch and the Bear Creek proposed bridge crossings lie entirely within this ecologically significant site.

In addition, Dime Springs TVA HAP is located on the south side of Bear Creek and lies approximately 0.1 miles northeast of the proposed Bear Creek bridge crossing on Tract 40. The commitments necessary to minimize and mitigate the these impacts to insignificant include:

- Protecting and enhancing Dime Springs TVA HPA by limiting pedestrian and vehicular access to the area. Signs restricting access will be posted at the approaches to the bridge and viewable from the land and water,
- Construction laydown areas, access points, and other related construction activities will not be located in sensitive habitats or other areas identified by TVA staff,
- Re-vegetation of disturbed areas will be replanted promptly with native or non-invasive species, and
- To mitigate the loss of ecologically significant areas, specifically the fragmentation of the Dime Bluffs and Ravines Site, ALDOT would acquire like areas and place these areas into the public domain and in a protected status. These areas would be required to be of similar or better quality than the areas lost. Acreage acquired should be greater than the acreage lost. Any acquisitions would be coordinated with the Alabama Heritage Program and the Alabama Natural Heritage Section of the State Lands Division and subject to approval by TVA. This was completed and ALDOT purchased approximately 80 acres of similar habitat.

With adherence to the above outlined mitigation and the use of all BMPs for construction activities of this type, impacts Managed Areas and Ecologically Significant Sites and their associated sensitive resources would be temporary and reduced to insignificant level.

4.3 Aquatic Environment

4.3.1 Water Quality

The primary impact from construction of the proposed bridges and culverts would be increased silt load resulting from runoff during soil disturbing activities. This would be mitigated to a large extent by use of standard BMPs for the control of erosion and runoff.

4.3.2 Aquatic Ecology

The potential for impacts to aquatic resource depends to a large extent on the degree of vegetation removal for roadways and the amount of soil disturbing activities during construction of the bridges and culverts. Use of standard BMPs during construction to prevent the introduction of soils or other pollutants into the reservoir would mitigate these impacts.

4.3.3 Threatened And Endangered Species

Because current reservoir conditions would continue, and no sensitive aquatic animals are known to occur in Upper Bear Creek Reservoir, adoption of the no action alternative would have no effect on sensitive aquatic animals in Upper Bear Creek Reservoir. Construction of the two bridge crossings and ten stream crossings by ALDOT would have no effect on sensitive aquatic animals in Upper Bear Creek Reservoir because no sensitive aquatic animals are likely to occur in the potentially affected area.

4.3.4 Wetlands

Statements from the Alabama Department of Transportation to the U. S. Fish and Wildlife Service in Daphne, Alabama, indicated there would be no fill associated with the placement of the full span bridges across the reservoir. All wetlands would be protected from most direct impacts through compliance with federal mandates and legal requirements of wetland protection. Construction of road ways and clearing would include extensive soil disturbing activities. These activities will increase the potential for erosion and sedimentation of wetland areas. These indirect impacts to wetlands, such as sedimentation, will be prevented through the use of appropriate BMPs, including the use of silt fences and straw bales. The 4.04 acres of wetland fill associated with the ten stream crossings would be mitigated at the Jackson County wetland mitigation bank.

4.4 Human Environment

4.4.1 Cultural/Historic Resources

Under the no action alternative, there would no effect to site 1FR432 or any historic properties.

Under Alternative B, there would be an adverse effect on site 1FR432; however that effect will be adequately mitigated through a Phase III Data Recovery Plan as outlined in a Memorandum of Agreement (MOA) among the Federal Highway Administration (FHWA), Tennessee Valley Authority (TVA) and the Alabama State Historic Preservation Officer (SHPO). The Alabama Department of Transportation signed the MOA as a concurring party. TVA, FHWA and SHPO will, prior to implementation of data recovery excavations, review and approve the Phase III scope of work. Also, all three parties will review and approve the draft Phase III report prior to its finalization. The project activities near the ten stream crossings will have no effect on any known cultural resources listed on or eligible for the National Register (FHWA, 1998).

The project activities (two bridge and ten stream crossings) will have no effect on any known cultural resources listed on or eligible for the National Register of Historic Places (FHWA, 1998).

4.4.2 Visual Resources

Under Alternative A, the bridge crossings would not be constructed and the landscape character would remain the same. Vegetation would continue to grow and natural processes would go on. Scenic attractiveness and scenic integrity would remain moderate to high, while visual discord would remain low amidst the naturalistic reservoir setting.

Under Alternative B, development would change the landscape character of the undisturbed shoreline consisting of dense vegetation and rock. Views from the water following construction would introduce a broadly horizontal element high above the shoreline that would greatly contrast with the surrounding area. Extensive tree clearing in the construction and staging areas would greatly contrast with the pristine shoreline and would irreversibly change the natural landscape character that is enjoyed by recreational users in the area. Scenic attractiveness and scenic integrity would degrade as the structures would contribute to increased visual congestion. Visual discord would occur during construction, with heavy equipment in and around the reservoir crossings. However, this would be temporary during the construction period until equipment is removed from the site and all disturbed areas have been stabilized to pre-existing conditions. With the implementation of mitigation measures in section 7.0, impacts to visual resources would be substantially reduced. This alternative would allow construction to proceed while implementing measures to reduce permanent visual discord to the area. Although the overall scenic integrity would be impaired, the effects to the scenic attractiveness would be minimized with appropriate mitigation.

ALDOT purchased approximately 80 acres located 14 miles to the southwest of the proposed Gas Branch crossing as mitigation for the loss of property within Gas Branch. The site is easily accessible from State Highway 17 (US 43), which bisects the property and crosses North Fork Creek, allowing vehicular and pedestrian access from above the sandstone bluffs and rock formations. Vegetation is mixed with mature stands of hardwoods, intermixed with pine along the steeply sloping banks and backlying land. From below, along the creek bed, views are framed by sheer sandstone bluffs, sparsely populated with native vegetation. Available views are from the immediate foreground to foreground distance as the creek winds through the steep topography. North Fork

Creek, varying from five to twenty feet in width, is shallow and winding, preventing some users access to the sandstone bluffs and intimate spaces created by collapsed and naturally forming rock features. Scenic value from these vantage points is high, while scenic integrity is moderate due to timber harvesting and the State Highway 17 bridge crossing.

From above, viewers crossing North Fork Creek on State Highway 17 experience the site only briefly, and viewing distances vary from foreground to middleground distances. From this elevation, scenic value is high, and scenic integrity is moderate, due to timber harvesting in the surrounding viewscape.

Because of the purchase of this property, cumulative impacts would be minor. The experience from the winding creek bed in relation to human scale varies somewhat from the sites located on Upper Bear Creek, and depending on seasonal rainfall, access to the mitigation property by boaters and fishermen will be difficult. However, the purchase of this tract, similar in visual character to the Upper Bear Creek properties, would sufficiently mitigate the significant impacts realized in the initial project review.

4.4.3 Navigation

The required clearances for secondary reservoir channels are 50 feet of horizontal clearance and a minimum of 15 feet of vertical clearance above normal pool elevation. If these clearances are met, there will be no conflicts with Navigation.

4.4.4 Recreation

Expected impacts to public recreation facilities, activities and resources are insignificant. Mon Dye and Batestown Public Use Areas are sufficiently removed from the construction corridor so that there will be insignificant impacts to activities at those locations. Actual construction of the bridges will cause temporary, insignificant disturbances at the river crossings. Cumulative impacts of this project on public recreation resources are insignificant.

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6.0 LIST OF AGENCIES AND PERSONS CONSULTED

State and Federal Agencies

U. S. Army Corps of Engineers, Nashville District
U. S. Fish and Wildlife Service, Cookeville, Tennessee
The Chickasaw Nation of Oklahoma
Alabama State Historic Preservation Officer

7.0 COMMITMENTS

The following conditions and commitments will be incorporated as conditions in the easement agreement between TVA and the Alabama Department of Transportation in order to reduce the potential for adverse environmental effects.

1. TVA Habitat Protection Areas in the vicinity of the proposed bridges will be protected and enhanced. Access to areas adjacent to the approaches to the bridges, including the shoreline, will be limited by appropriate signage and barriers to vehicular and pedestrian traffic.

2. Construction laydown areas, access points, and other related construction activities will not be located in sensitive habitats or other areas identified by TVA staff.

3. To compensate for the loss of rare plants, animals and communities or habitats, ALDOT will acquire one or more ecologically similar areas and place these areas into the public domain and in a protected status. These areas will be of similar or better quality than the areas lost. Acreage acquired will be greater than the acreage lost. Any acquisitions will be coordinated with the Alabama Natural Heritage Section of the State Lands Division and subject to approval by TVA. ALDOT purchased approximately 80 acres of land with similar or better quality.

4. ALDOT will comply with the necessary and appropriate conservation measures identified in the biological opinion issued by the U.S. Fish and Wildlife Service on November 21, 2001.

5. Employ and implement all appropriate construction BMPs. These BMPs include:

    a) Removal of vegetation will be minimized, particularly any woody vegetation providing shoreline/streambank stabilization.

    b) Installation of cofferdams and/or silt control structures between construction areas and surface waters prior to any soil-disturbing construction activity. Clarification of all water that accumulates behind these devices must meet state water quality criteria at the stream mile where activity occurs before it is returned to the unaffected portion of the stream. Cofferdams must be used wherever construction activity is at or below water elevation.

    c) Must keep equipment out of the reservoir or stream and off reservoir or stream banks to the extent practicable (i.e., performing work “in the dry”).

    d) Must avoid contact of wet concrete with the stream or reservoir and avoid disposing of concrete washings, or other substances or materials, in those waters.

    e) Must agree to use erosion control structures around any material stockpile areas.

    f) Must agree to apply clean/shaken riprap or shot rock (where needed at water/bank interface) over a water permeable/soil impermeable fabric or geotextile and in such a manner as to avoid stream sedimentation or

disturbance, or that any rock used for cover and stabilization shall be large enough to prevent washout and provide good aquatic habitat.

g) Must agree to remove, redistribute, and stabilize (with vegetation) all sediment which accumulates behind cofferdams or silt control structures.

h) Must agree to use vegetation (versus riprap) wherever practicable and sustainable to stabilize streambank, shorelines, and adjacent areas. These areas will be stabilized as soon as practicable, using either an appropriate seed mixture that includes an annual (quick cover) as well as one or two perennial legumes and one or two perennial grasses, or sod. In winter or summer, this will require initial planting of a quick cover annual only to be followed by subsequent establishment of the perennials. Seed and soil will be protected as appropriate with erosion control netting and/or mulch and provided adequate moisture. Streambank and shoreline areas will also be permanently stabilized with native woody plants to include trees wherever practicable and sustainable (this vegetative prescription may be altered if dictated by geologic condition or landowner requirements). Must also agree to install or perform additional erosion control structure/techniques deemed necessary by TVA.

6. Properly handle, store, and dispose of any and all waste materials.

7. ALDOT will comply with the commitments in the Memorandum of Agreement Between the Federal Highway Administration, the Tennessee Valley Authority, and the Alabama State Historic Preservation Officer submitted to the Advisory Council on Historic Preservation Pursuant to 36 CFR 800.5(e)(4) for the Proposed State Route 5 Relocation from Dime to Spruce Pine, Franklin County, Alabama (ALDOT Project F-393(3); Alabama Historical Commission Tracking Numbers 98-0346; 98-0899 signed on April 12, 2002.

8. Provide one pull-off overlook atop the bluff on the west end of the bridge across the main reservoir (sta. 36+00). The overlook will be accessible to both directions of travel by a standard median crossover.

9. Include land with a similar visual landscape character when purchasing equivalent sensitive habitat. The land will have similar ‘ravine-like’ characteristics; including, relatively steep slopes, bluffs, or substantial rock outcrops, predominantly conifer tree cover, a diversity of other vegetation, and an included water body along the ravine floor. A publicly accessible waterway is desirable, but not essential.

10. Color schemes of the bridges will blend with surrounding environment, e.g., either a very light color in the cool gray range to blend with the sky or dark, or cool gray colors to blend with the tree line.

11. To the extent practicable, the number of piers supporting the bridges will be minimized (e.g., use of single “T” type piers to support both bridges at each site).

12. Disturbance of the right-of-way will be minimized, and disturbed areas will be stabilized (re-vegetated, as appropriate) promptly.

13. Any access roads to the shoreline will be removed and the areas will be restored to their approximate original condition, or better, upon completion of construction.

14. Any future facilities or equipment subject to flood damage shall be located above or floodproofed to the TVA Flood Risk Profile elevation 419.6 feet msl.

15. All future development shall be consistent with the requirements of TVA's Flood Control Storage Loss Guideline.

16. Shoreline stabilization and erosion control shall use bio-engineering methods to the extent practical and other applicable methods as required.

17. The two bridge crossings shall maintain a 50-foot horizontal clearance and a minimum of a 15-foot vertical clearance above normal summer pool elevation.

8.0 REFERENCES

Braun, E. L. Deciduous Forests of Eastern North America. The Blakiston Co., Philadelphia. 596 pp.

Etnier, D. R., and W. C. Starnes. 1993. The Fishes of Tennessee. University of Tennessee Press, Knoxville. 681 pp.

Federal Highway Administration. 1988. Project F-393(3), Proposed Corridor for State Route 5 between Dime and Spruce Pine, Franklin County, Alabama.

Federal Highway Administration. 1998. Re-Evaluation of Project F-393(3); Re-Evaluation of Proposed Corridor for State Route 13 (previously State Route 5) between Dime and Spruce Pine, Franklin County Alabama.

Fenneman, N. M. 1938. Physiography of Eastern United States. McGraw-Hill Book Co., Inc., New York. 714 pp.

Hendryx, G. S. 1999. An Intensive Above Pool Archaeological Survey within the Upper Bear and Big Bear Creek Reservoirs. Draft report of file Tennessee Valley Authority, Cultural Resources Program, Norris, Tennessee.

Institute of Transportation Engineers. 1998. Trip Generation. 6th Edition. Washington: Institute of Transportation Engineers

Little, K. J.; Brooks, D.; and Higginbotham, G. 2001. "A Phase II Archaeological Investigation of 1FR432 Franklin County, Alabama". Jacksonvlle State University Archaeological Resource Laboratory.

Meyer, C. C. 1994. Cultural Resources in the Pickwick Reservoir. Report on file, Tennessee Valley Authority, Cultural Resources Group, Norris, Tennessee.

Tennessee Valley Authority. 1977. Yellow Creek Nuclear Plant Units 1 and 2 Environmental Report.

Tennessee Valley Authority. 1998. Shoreline Management Initiative (SMI): An Assessment of Residential Shoreline Development Impacts in the Tennessee Valley. Land Management, Norris, Tennessee.

Tennessee Valley Authority. 1999a. Shoreline Management Policy (SMP). Resource Stewardship. Norris, Tennessee.

Tennessee Valley Authority. 1999b. Aquatic ecological health determinations for TVA reservoirs-1998, An informal summary of 1998 vital signs monitoring results and ecological health determination methods.

Tennessee Valley Authority. 2001a. Environmental Assessment, Bear Creek Reservoirs Land Management Plan. Resource Stewardship. Muscle Shoals, Alabama.

Tennessee Valley Authority. 2001b. Bear Creek Reservoirs Land Management Plan. Resource Stewardship. Muscle Shoals, Alabama.

U. S. Army Corps of Engineers. 2001. Environmental Assessment. Department of the Army Permit Numbers: 200100460 thru 200100469.

Walthall, J. A. 1980. Prehistoric Indians of the Southeast: Archaeology of Alabama and the Middle South. University of Alabama Press, Tuscaloosa.