

3.0 AFFECTED ENVIRONMENT

3.1 Regional Setting

At normal summer pool, Pickwick Reservoir is 52.7 miles long, and the shoreline length is 490.6 miles. Pickwick Reservoir spans portions of four counties in three states, (Colbert and Lauderdale Counties in Alabama, Hardin County in Tennessee, and Tishomingo County in Mississippi). This section of the Tennessee River is located in the Highland Rim physiographic province of the Interior Low Plateau section (Fenneman, 1938) and spans the Mississippian Plateau and Embayment Sections of the Western Mesophytic Forest Region as recognized by Braun (1950). Western and southern tributaries of the reservoir are in the geographic regions of the Coastal Plains or Limestone Valley physiographic provinces (USDA, 1963; 1977; 1987; 1994). The Highland Rim is composed primarily of limestone and chert and some shale. The Limestone Valley physiographic province is characterized by broad, gently sloping areas with semi-karst topography. Long, narrow, winding ridgetops and steep side slopes characterize the Coastal Plains. In the riparian woodlands along the Tennessee River and small water courses, the forest canopy is composed primarily of white oak, winged elm, river birch, sycamore, sweetgum, and hornbeam.

Throughout its history, TVA has used its reservoir shorelands, which were acquired as part of its mainstem and tributary projects, to meet a range of regional and local resource development needs and to enhance and improve the quality of life in the Valley. Reservoir property, often together with adjoining private land, has been utilized for the development of state parks, industry, and recreation, as well as to serve a variety of specific needs of local communities. Therefore, TVA public land surrounding Pickwick Reservoir includes a variety of land uses. This land includes TVA-managed Natural Areas, Habitat Protection Areas (HPAs), land fronting residential development, state parks, Wildlife Management Areas (WMAs), forest areas, licensed recreation areas, power transmission line corridors, riparian/wetland areas along streams and the reservoir shoreline, TVA's Colbert Fossil Plant, Yellow Creek Port Authority, and the Pickwick Landing Dam Reservation. Use of TVA public land for utility rights-of-way and facilities is necessary to provide the infrastructure for development of residential and industrial/commercial development around the reservoir. Utilities present on TVA public land include electric, gas, sewer, telephone, and water service. Highway/roads and railroad easements provide the necessary transportation infrastructure to permit access to and around the reservoir.

Privately-owned land surrounding Pickwick Reservoir is a mosaic of residential and industrial/commercial development, upland and bottomland forests, and farmland comprised of hay, pasture, row crops, and small woodlots. The upper end of the reservoir is the site of a major industrial, commercial, and residential complex consisting of Florence, Muscle Shoals, Sheffield, and Tuscumbia, Alabama. Outside of the urban area, land on the upper half of Pickwick is predominantly in large commercial farms with occasional industry. Land on the lower half of the reservoir (west of the Natchez Trace) is mostly wooded acreage with extensive recreational development, including two state parks. Industrial development activities include Hardin County Port, Yellow Creek Port,

Tri-State Commerce Park, and the Pickwick Lock. The Tenn-Tom Waterway connects with the Tennessee River at Yellow Creek.

Pickwick Reservoir begins at Wilson Dam (TRM 259.4). This section of the reservoir is referred to as the upper end. Patton Island and Jackson Island are located immediately below Wilson Dam. Jackson Island, the smaller of the two, is undisturbed, and a colony of great blue herons has been established here in recent years. Development on Patton Island consists of two each two-lane bridges and a transmission tower. The port of Florence, an industrial port, is located across from Patton Island along the northern shoreline. The cities of Florence and Sheffield, Alabama, are located on either side of the reservoir, with O'Neal Bridge crossing the reservoir at TRM 256.4. Just downstream of O'Neal Bridge on the north shore is Florence Harbor and McFarland Park. Seven Mile Island begins near TRM 253. There are expansive islands in this section of river. The island grouping comprises the Seven Mile Island Wildlife Management Area (WMA) and is sanctuary for many diverse wildlife species. On the northern side of Seven Mile Island is Coffee Slough and the Seven Mile Island WMA. Many features, such as forested and emergent wetlands, streams, caves, and sinkholes, on these parcels provide unique habitats for terrestrial and aquatic animals. Much of the habitats consist of upland pine/hardwoods and mixed hardwood forests. Riparian habitats are also abundant along this section of the reservoir. Key Cave National Wildlife Refuge, located on the northern shoreline in Coffee Slough, was formed to protect the watershed for Key Cave, the only known locality of the Alabama cave fish. The cave also contains the largest maternity colony of gray bats on Pickwick Reservoir.

Downstream of this area of the reservoir, several small tributaries flow into the reservoir, creating small coves with natural settings and interspersed residential development. There is industrial development along the shoreline consisting of barge unloading facilities, TVA Colbert Fossil Plant, and the Barton industrial site. The Natchez Trace Parkway Bridge spans the reservoir at TRM 236.6. Further downstream is Second Creek, a large embayment which joins the reservoir just upstream of the town of Waterloo, Alabama, near TRM 227.5. The Second Creek embayment is the largest embayment along the north shore of the reservoir, and contains residential development and wooded shoreline. Just downstream from the Second Creek embayment is the town of Waterloo, Alabama. On the opposite shore of the reservoir is the Bear Creek embayment, the largest embayment on the south shore of the reservoir. A Norfolk Southern Railroad causeway, a derelict bridge that was once U.S. Highway 72, and two existing bridges for U.S. Highway 72 are present in this embayment. The historic towns of Eastport, Mississippi and Riverton, Alabama, are near the confluence of Bear Creek and Pickwick Reservoir. Proceeding downstream from the mouth of Bear Creek, residential development occurs along the southern shoreline. J. P. Coleman State Park is located on the shoreline at the mouth of Indian Creek embayment. The remainder of the embayment is forested, with gentle to moderate slopes. The north shore of the reservoir consists of the Lauderdale WMA, reaching downstream to TRM 211.

Continuing downstream, several small coves are along both shorelines, and visual character remains consistent until reaching the mouth of Yellow Creek at TRM 215.2. This area of the reservoir is often referred to as the lower end. The shoreline along the entrance to Yellow Creek is wooded with mixed hardwoods and pines. Residential development and water use facilities are visible including the Tenn-Tom Marina, now known as the Grand Harbor Marina. Beyond the entrance is an unnamed island and

State Route 25 is in the distance to the west. The facilities at Yellow Creek Port Authority and Tri-State Commerce Park are visible near TRM 447.5. As the creek widens beyond the area of heavy development, Goat Island, a recreation area, is visible. Beyond Goat Island, residential development exists on the east and west shores of the inlet. Exiting the Yellow Creek embayment, State Line Island is located directly across from the north end of the Lauderdale WMA near TRM 214.7. This undeveloped shoreline continues until TRM 212 near Dry Creek, as the Lauderdale WMA ends and heavy residential development begins. The rear of the cove (Dry Creek) consists of pristine forest land. Leaving the cove and continuing around the north shore, there is residential development. The south shore of the reservoir is predominantly wooded with moderate to gently sloping terrain. Residential development is sparsely located along the shoreline until reaching Hardin County Port and Pickwick Landing State Park. Near TRM 208, the Pickwick Landing Dam can be seen. The sizable structure of the dam and the two-lane road that crosses the reservoir give a sense of terminus to the reservoir.

Regionally, several changes in the land use surrounding Pickwick Reservoir have occurred. Since 1985, the Lauderdale WMA acreage has been reduced from approximately 29,000 acres to 8,211 acres of which about half is TVA public land. This is the result of private land owners (timber companies) removing their land from the WMA and allowing private individuals to manage it for wildlife. However, in 2001, the State of Alabama purchased 32,000 acres through the Forever Wild Land Trust Program from Mississippi-based Southern Timber Ventures. The Alabama Department of Conservation and Natural Resources (ADCNR) is developing a plan to manage the 32,000 acres purchased to expand the Freedom Hills and Lauderdale WMAs.

In 1998, SEDA purchased the 1,284-acre Gilbert farm site, near Barton, Alabama, for development of an industrial site. The site was expanded with a purchase of 320 acres of adjoining property in 1999. In 2000, the city of Florence purchased a nearly 300-acre site off Alabama Highway 20 in Lauderdale County with plans to construct an industrial park. Key Cave National Wildlife Refuge is about five miles west from the site.

3.2 Terrestrial Ecology (Plant and Animal Communities)

The numerous plant communities on Pickwick Reservoir provide suitable habitat for a variety of wildlife species. These diverse plant communities include pine/hardwood forests, upland and riparian hardwood forests, old field, and agricultural field habitats. In addition to distinctive vegetated communities, many features, such as forested and emergent wetlands, streams, limestone bluffs, caves, and sinkholes, on reservoir parcels provide unique habitats for terrestrial wildlife.

Much of the habitats adjacent to Pickwick Reservoir consist of upland pine/hardwoods and mixed hardwood forests. Large expanses of these habitats are located in Seven Mile and Lauderdale WMAs and along more narrow strips of TVA-owned lands near Pickwick Landing Dam and Natchez Trace Parkway. These areas are dominated by loblolly pine, oaks (white, southern red, black, chestnut, and scarlet) and hickories with smaller numbers of yellow poplar, red maple, beech and blackgum.

These upland forest communities provide habitat to a large, diverse group of wildlife. Bird species such as the common crow, tufted titmouse, Carolina chickadee, northern

cardinal, and blue jay are common in these areas. These upland communities provide vital nesting and travel corridors for neotropical birds. Spring and fall migrations of these birds are quite spectacular along Pickwick Reservoir and can be easily viewed at the Muscle Shoals Reservation. Other species commonly observed in upland forest communities include the armadillo, white-tailed deer, raccoon, striped skunk, gray squirrel, eastern cottontail rabbit, and a variety of amphibians and reptiles.

Riparian habitats are also abundant along the reservoir. Bottomland hardwoods are restricted to low-lying areas along creeks and rivers and are occupied by water and willow oaks, sweetgum, red maple, ash, and sycamore. Several stands of bald cypress occur in Coffee Slough and several wetland areas along the river. These areas provide habitat to wildlife such as the belted kingfisher, great blue heron, blue-gray gnatcatcher, Louisiana waterthrush, northern rough-winged swallow, prothonotary warbler, and northern parula. Mammals such as the beaver, mink, and muskrat are common throughout the reservoir. Other species such as the northern water snake, midland water snake, rough green snake, northern cricket frog, and bullfrog are also abundant in riparian habitats.

Pastures, reverting old fields, and edge habitats include a variety of shrubs, forbs, vines, tree seedlings, and grasses. These old field communities might include green ash, maple, sweetgum, persimmon, sumac, honeysuckle, ironweed, ragweed, thistle, beggarweed, blackberry, and broom-sedge. Meadows may include planted grasses, clovers, sericea lespedeza, orchard grass, and wheat. These communities provide habitat for birds, such as the indigo bunting, blue grosbeak, mourning dove, chipping sparrow, and American kestrel. Other common species of wildlife include the gray rat snake, upland chorus frog, American toad, coyote, least shrew, and hispid cotton rat.

Privately-owned land surrounding the reservoir consists of a mosaic of residential and industrial/commercial development, upland and bottomland forests, and farmland comprised of hay, pasture, row crops, and small woodlots. While many of these sites only provide habitat for species that are more tolerant to developmental pressures, private land surrounding Pickwick Reservoir contains a diverse group of habitats ranging from extensive stands of high quality forests to large tracts of early successional habitats. These areas provide habitat for additional species of wildlife and contribute to the overall diversity of terrestrial wildlife species surrounding Pickwick Reservoir.

As stated in Section 2.2.2, this FEIS includes two action alternatives that differ in the land use zone category assigned to each of three parcels (Tables 2-3 and 2-4). Surveys of parcels for site-specific, sensitive botanical resources, including the presence of uncommon or sensitive plant communities, were conducted during June 2001. A description of each of these parcels is presented below. A description of Parcel 128 is included because of the sensitive resources found during the field investigations and the recommendation for this area to be included as a Natural Area.

Parcel 37

This 35.97-acre parcel is located between elevations 450 and 500 feet (msl). It consists of a disturbed hardwood forest with dominant tree species including hackberry, sycamore, princess tree, and locust. The average canopy age is approximately 30 years old. Understory species include privet, trumpet creeper, mimosa, Virginia creeper, and poison ivy. The herbaceous layer includes dog fennel, ragweed, nimble

will, and pale-flowered leaf-cup. There is a level area on part of the slope which has been cleared. Extensive cover by exotic plants, such as privet, mimosa, sericea lespedeza, tree of heaven, and gill-o-ground, is found in this cleared area. The landscape of this area has been altered and shaped by earth-moving machinery.

Because of this parcel's proximity to the tailwaters of Wilson Dam, great blue herons and black-crowned night herons can be observed along this parcel. Neotropical songbirds also use this parcel as a travel corridor during spring and fall migrations. However, due to extensive exotic plants, this parcel does not provide high quality wildlife habitat.

Parcel 53

This 88.59-acre parcel is located between elevations 410 and 500 feet (msl). It extends along the shoreline of the Tennessee River and up the east shore of the embayment of Mulberry Creek. Wetlands, dominated by water willow and alligator weed, are present in and along this embayment. The entire parcel is forested. The Tennessee River shoreline section is a narrow strip of limestone ledges and cliffs. Many species of trees, including yellowwood (state-listed), are found here, but hackberry and red cedar are particularly common. The limestone ledges are dominated by alumroot and fragile fern. By contrast, the Mulberry Creek portion of the parcel has little rock outcrop. There are some small areas of bottomland, particularly on the upstream end of this section. River birch, box elder, silver maple, and sycamore are the dominant trees along the shore and bottomlands. A few cypress trees are also present in these areas. Water oak and hop hornbeam are found in low areas and uplands. Other upland trees on the parcel include white oak, sugar maple, southern red oak, hickory, and loblolly pine. Understory species found in uplands and bottoms include beauty berry, coral berry, red bud, and dogwood. Exotic species observed on the parcel include privet, mimosa, moneywort, Japanese honeysuckle, multiflora rose, sericea lespedeza, and nandina. The Mulberry Creek section of the parcel can be distinguished on the basis of two areas, approximately equal in size, which differ in the level of prior land disturbance present. The section closest to the mouth has trees 50 to 80 years old and few exotic species. Further up slope, the trees are 20 to 30 years old; although, a few older trees are present, and there are many exotics.

The large stand of upland hardwoods along this parcel provides excellent habitat for wildlife. An extensive network of deer and small mammal trails was observed throughout the parcel. The mature oaks and hickories provide excellent habitat for woodland species of wildlife. This parcel also provides a visual screen from industrial development on the back-lying property.

Parcel 128

This 50.26 parcel occurs between elevations 420 and 520 feet (msl). Much of this parcel is open or semi-open, dry shale ledges. This contrasts with a few ravine area which are cool and moist with seeps. Dominant dry area trees include Virginia pine, yellow pine, red cedar, sweet gum, and sour wood. Sycamore, white oak, yellow poplar, hickory, oak, beech, and American ash tend to be found in the moist areas. Moist area understory species include leadbush, climbing hydrangea, Virginia willow, buttonbush, and spice bush. New Jersey tea and mock orange are found in dry areas. Herbaceous species of the dry shale include alumroot, agava, saxifrage, pussy toes, and stonecrop.

The moist areas support several species of fern and one small population of whorled pogonia.

There is little indication of disturbance on the parcel. Two exotic species, mimosa and Japanese honey suckle, were noted. Five Mississippi state-listed species occur on the parcel, more state-listed species would be expected upon further investigation of the area. The dry, steep areas of exposed rock-shale have produced a plant community that is uncommon in Mississippi. The community consists of an open cliff face dominated by the alumroot as well as New Jersey tea, mock orange, woolly lip-fern, stonecrop, purple cliff-brake, and saxifrage. Removal of vegetation on top of the bluffs would seriously alter this community.

This parcel also contains stands of mature loblolly pines, yellow poplars, oaks, and hickories, providing excellent habitat for wildlife. Large snags and hollow trees are common on this parcel. The numerous seepages and bedrock streams also provide habitat for woodland species of amphibians including several species considered to be uncommon by the Mississippi Natural Heritage Program. The seepages and mature woodland habitats appear to be uncommon around the Yellow Creek embayment.

Parcel 156

This 21-acre parcel consists of cabin sites that extend along the shoreline of Parcel 155. The cabin area is fairly undisturbed except for the area immediately around each homesite. Some small cleared areas exist on the south side of the parcel, as well as cleared utility corridors for the cabins. Exotic species are found mostly in bottomland areas and cleared areas. Exotics include privet, moneywort, Nepal grass, and sericea lespedeza.

This parcel also contains good habitat for wildlife. The mixture of mature loblolly pines and hardwoods provides a variety of foraging and nesting habitat for many species of wildlife. The parcel is used heavily by neotropical songbirds as they migrate during spring and fall. During winter months, bald eagles and osprey rest in the larger trees along the shoreline as they search for food.

3.3 Sensitive (Endangered and Threatened) Species

3.3.1 Plants

Field surveys were conducted in June 2001, as part of TVA's effort to update the 1981 Plan. Prior to these surveys, a search of the TVA Regional Natural Heritage Project database was conducted for protected plant species known from the four counties spanned by Pickwick Reservoir. This search revealed that one federal-threatened plant species, one species that is a candidate for federal-listing, and 105 species that are protected by the states of Alabama, Tennessee, and/or Mississippi are known from these counties (see Appendix C). This list, combined with regional information on additional species likely to occur on Pickwick Reservoir public land, provided a focus for the field surveys.

The June 2001 field investigations focused on parcels for which alternative land use designations have been proposed under the two action alternatives. Prior to field

surveys, no sensitive plant species were known from any of these four parcels. On each of the parcels examined, emphasis was placed on locating populations of federal- or state-listed plants, uncommon habitats, and sensitive ecological areas. No federal- or state-listed plant species or suitable habitat for such species, were located during the June 2001 surveys of Parcels 37, 53, or 156. Five Mississippi state-listed plant species were observed during these surveys, all occurring on Parcel 128 (see Table 3.3-1).

Table 3.3-1. Listed Plants Observed During June 2001 Surveys of Land Planning Parcels on Pickwick Reservoir			
Common name	Scientific name	Federal status	State status*
Alumroot	<i>Heuchera villosa</i> var. <i>macorhiza</i>	--	NOST
Purple cliff-brake	<i>Pellaea atropurpurea</i>	--	NOST
Stonecrop	<i>Sedum ternatum</i>	--	NOST
Virginia pine	<i>Pinus virginiana</i>	--	NOST
Woolly lip-fern	<i>Cheilanthes lanosa</i>	--	NOST

*NOST = State listed, but no state status assigned

The Mississippi Heritage Program uses the Heritage ranking system developed by The Nature Conservancy, in which each species is assigned a rank representing its status in the state (S rank). Species with a rank of 1 are considered critically imperiled; those with a rank of 5 are the most secure. All of the Mississippi state-listed plant species observed during field surveys have been assigned ranks of S1 (critically imperiled), S2 (imperiled) or S1S2 (an intermediate ranking) under this system. The ranks assigned to each species are included in their descriptions below.

Alumroot (*Heuchera villosa* var. *macorhiza*)

This Mississippi state-listed plant species (state rank S1) was observed on Parcel 128. Three other occurrences of this species are known from Tishomingo County, Mississippi.

Purple cliff-brake (*Pellaea atropurpurea*)

This Mississippi state-listed plant species (state rank S1S2) was observed on Parcel 128. Three other occurrences of this species are known from Tishomingo County, Mississippi.

Stonecrop (*Sedum ternatum*)

This Mississippi state-listed plant species (state rank S2) was observed on Parcel 128. Five other occurrences of this species are known from Tishomingo County, Mississippi.

Virginia pine (*Pinus virginiana*)

This Mississippi state-listed plant species (state rank S2) was observed on Parcel 128. Nine other occurrences of this species are known from Tishomingo County, Mississippi.

Wooly lip-fern (*Cheilanthes lanosa*)

This Mississippi state-listed plant species (state rank S2) was observed on Parcel 128. Nine other occurrences of this species are known from Tishomingo County, Mississippi.

3.3.2 Animals

The various aquatic and terrestrial habitats in the vicinity of Pickwick Reservoir provide suitable habitat for many species of federal- and state-listed species of wildlife. The TVA Regional Natural Heritage Project database was reviewed to identify federal- and state-protected terrestrial animals as well as sensitive ecological areas, such as caves and heron colonies, from counties adjacent to Pickwick Reservoir. The counties include Colbert and Lauderdale Counties in Alabama, Tishomingo County in Mississippi, and Hardin County in Tennessee. Twenty-five listed terrestrial animal species (see Table 3.3-2), approximately 165 caves and five heron colonies were identified from the project area. Four of these terrestrial animals are protected by the U.S. Fish and Wildlife Service (USFWS), and the remaining 21 are protected by the states of Alabama, Mississippi, or Tennessee.

Table 3.3-2. Records of Protected Terrestrial Animals Known to Occur in the Vicinity of Pickwick Reservoir					
Common Name	Scientific Name	Alabama Status	Mississippi Status	Tennessee Status	Federal Status
Amphibians					
Cave salamander	<i>Eurycea lucifuga</i>	-	END	-	-
Eastern hellbender	<i>Cryptobranchus a. alleganiensis</i>	Protected	NOST	INM	-
Four-toed salamander	<i>Hemidactylum scutatum</i>	SPCO	NOST	INM	-
Green salamander	<i>Aneides aeneus</i>	Protected	END	-	-
Spring salamander	<i>Gyrinophilus porphyriticus</i>	-	END	-	-
Tennessee cave salamander	<i>Gyrinophilus pallescens</i>	Protected	-	THR	-
Reptiles					
Alligator snapping turtle	<i>Macroclmys temminckii</i>	Protected	NOST	INM	-
Pigmy rattlesnake	<i>Sistrurus miliarius streckeri</i>	-	-	THR	-
Southern coal skink	<i>Eumeces anthracinus pluvialis</i>	SPCO	NOST	INM	-
Birds					
Bachman's sparrow	<i>Aimophila aestivalis</i>	SPCO	NOST	END	-
Bald eagle	<i>Haliaeetus leucocephalus</i>	Protected	END	INM	THR
Bewick's wren	<i>Thryomanes bewickii</i>	Protected	END	THR	-
Cooper's hawk	<i>Accipiter cooperii</i>	Protected	NOST	-	-
Lark sparrow	<i>Chondestes Grammacus</i>	-	-	THR	-
Little blue heron	<i>Egretta caerulea</i>	-	-	INM	-

Table 3.3-2 (cont.). Records of Protected Terrestrial Animals Known to Occur in the Vicinity of Pickwick Reservoir					
Common Name	Scientific Name	Alabama Status	Mississippi Status	Tennessee Status	Federal Status
Mammals					
Osprey	<i>Pandion haliaetus</i>	Protected	NOST	-	-
Red-cockaded woodpecker	<i>Picoides borealis</i>	Protected	END	EXTI	END
Sharp-shinned hawk	<i>Accipiter striatus</i>	-	NOST	INM	-
Swainson's warbler	<i>Limnophlypis swainsonii</i>	-	-	INM	-
Eastern big-eared bat	<i>Corynorhinus rafinesquii</i>	Protected	NOST	INM	-
Gray bat	<i>Myotis grisescens</i>	Protected	END	END	END
Indiana bat	<i>Myotis sodalis</i>	Protected	END	END	END
Long-tailed weasel	<i>Mustela frenata</i>	Protected	-	-	-
Meadow jumping mouse	<i>Zapus hudsonius</i>	-	-	INM	-
Southeastern shrew	<i>Sorex longirostris</i>	-	-	INM	-

END = Endangered

THR = Threatened

EXTI = Assumed extirpated from this portion of its former range

- = No official status

NOST - No status. However the species is considered uncommon by the Mississippi Natural Heritage Program.

INM - In Need of Management. The species is deemed in need of management by the Tennessee Wildlife Resources Agency.

SPCO - Species of Concern-the species has no status. The species is considered uncommon by the Alabama Natural Heritage Program.

Ten additional species considered uncommon or rare by Mississippi and/or Alabama Natural Heritage Programs were also reported from the project area. However, these species have no protective status in either state. The species include:

- southern zigzag salamander (*Plethodon ventralis*)
- red salamander (*Pseudotriton ruber*)
- mountain chorus frog (*Pseudacris brachyphona*)
- Ouachita map turtle (*Graptemys ouachitensis*)
- black king snake (*Lampropeltis getula nigra*)
- mole king snake (*Lampropeltis calligaster rhombomaculata*)
- queen snake (*Regina septemvittata*)
- cliff swallow (*Petrochelidon pyrrhonota*)
- old field mouse (*Peromyscus polionotus*)
- northern long-eared bat (*Myotis septentrionalis*)

Terrestrial animal surveys were conducted from June 2001 through August 2001 on TVA public land on Pickwick Reservoir (Parcels 16, 32, 37, 42, 53, 69, 128, 155). In each parcel, special emphasis was placed on locating populations of federal- and state-listed animals, uncommon habitats, and sensitive ecological areas, such as caves and heron colonies. A general overview of select parcels was also completed to identify suitable habitat for rare species. Surveys were performed in Bear Creek and Yellow Creek embayments, Coffee Slough, Wilson Dam tailwaters, and various localities throughout the reservoir. Wildlife habitat was also examined at Seven Mile and

Lauderdale WMAs. The protected terrestrial animals that were observed during field surveys and trips are listed in Table 3.3-3.

Table 3.3-3. Listed Terrestrial Animals Observed During Surveys on Pickwick Reservoir		
Common Name	Scientific Name	Parcel Number
Bald Eagle	<i>Haliaeetus leucocephalus</i>	16, 39, 153
Osprey	<i>Pandion haliaetus</i>	39, 58, 152
Gray Bat	<i>Myotis grisescens</i>	Various Parcels
Long-tailed weasel	<i>Mustela frenata</i>	32

Bald eagle (*Haliaeetus leucocephalus*)

Bald eagles are listed as federal-threatened and are listed as in need of management in Tennessee and protected in Alabama and Mississippi. Bald eagles were observed on several occasions roosting and flying on or near parcels. Bald eagle populations continue to increase throughout the Tennessee River Valley. There are numerous active nests reported from Kentucky Reservoir and the Tenn-Tom Waterway; however, there are no confirmed nesting bald eagles known from Pickwick Reservoir. Historically, bald eagles have nested in the Bluff Creek embayment; however, they have not been active at this site since 1990.

Bald eagles were observed on several occasions during field surveys. Winter observations of eagles are regularly observed in Second Creek and Coffee Slough embayments, along the tailwaters of Wilson Dam and on larger portions of the reservoir near Waterloo. During the 2001 summer surveys, adult bald eagles were observed at Parcels 39 and 153. An adult and a juvenile bird were also observed foraging at Parcel 16. ADCNR reported that bald eagles successfully nested in the vicinity of Waterloo in 2002.

Large, middle-age and mature parcels of deciduous woodlands adjacent to Pickwick Reservoir represent suitable nesting habitat for resident eagles and wintering roosting habitat for migratory bald eagles. Protecting large forested parcels and more secluded areas adjacent to the reservoir would benefit bald eagles on Pickwick Reservoir.

Osprey (*Pandion haliaetus*)

Ospreys are also increasing in numbers throughout the Tennessee River Valley. The number of successful nests have increased to such levels that the Tennessee Wildlife Resources Agency recently de-listed the osprey in Tennessee. Ospreys are listed as protected in Alabama and are considered to be uncommon in Mississippi. Ospreys recently began nesting on Pickwick Reservoir in 2000. A pair of birds has maintained a successful nest for two years on Parcel 39 (D. Simbeck, June, 2000). While no other nests have been reported, ospreys are regularly observed on Pickwick Reservoir during summer months, indicating that more nests likely exist around the reservoir.

Suitable habitat for ospreys is abundant on Pickwick Reservoir. Maintaining forested islands (i.e., Parcel 58) and forested shoreline along the reservoir is vital for this

species. Ospreys also readily nest on man-made structures. Placement of osprey nesting structures in Coffee Slough and in more shallow waters around Koger Island and in Second Creek would benefit the species.

Gray bat (*Myotis grisescens*)

Gray bats are listed as federal endangered. This bat occupies a limited geographic range that includes limestone karst areas of the southeastern United States (USFWS, 1982). Gray bats utilize caves year-round, usually occupying different caves during the summer and winter. In the summer, female gray bats form maternity colonies in caves that contain unique habitat requirements (i.e., temperature, size, and structure). Summer maternity caves are nearly always located near rivers or reservoirs over which the bats feed. Forested areas surrounding caves, between caves, and over-water feeding habitat are important for gray bat survival (USFWS, 1982). In the winter, gray bats congregate and hibernate in a limited number of caves across the Southeast.

Gray bat colonies are known from several caves on Pickwick Reservoir. Key Cave National Wildlife Refuge was formed to protect the watershed for Key Cave, the only known locality of the Alabama cave fish (*Speoplatyrhinus poulsoni*). The cave also contains the largest maternity colony of gray bats on Pickwick Reservoir. This colony of bats provides nutrients that are critical for the survival of the Alabama cave fish and other rare species of organisms that live in Key Cave. Several smaller colonies of gray bats exist in caves throughout Pickwick Reservoir. Gray bats use these and other caves as resting sites as they forage along the Tennessee River and its tributaries. They regularly travel up to 20 miles from their roosts as they feed. They primarily feed on adult stages of aquatic insects emerging from the reservoir at night. These insects are sensitive to changes in water quality; therefore, degradation of water quality would have a negative impact on gray bats.

Long-tailed weasel (*Mustela frenata*)

This small weasel, protected in the state of Alabama was found on Parcel 33. The den was located on the edge of a hardwood forest. There are no other reports of the long-tailed weasel from the vicinity. However, due to the abundance of suitable habitat, the lack of records is likely due to the secretive nature and nocturnal habits of this small mammal.

Red-cockaded woodpecker (*Picoides borealis*)

Although this species was not observed during field surveys, it was considered during this review. This federal-endangered species was last reported in Hardin County when a single bird was observed in 1946. Red-cockaded woodpeckers are now considered to be extirpated from Tennessee. Little suitable habitat for red-cockaded woodpeckers exists on Pickwick Reservoir land. Forested parcels containing mature trees did not have the appropriate habitat structure (open midstory) to be suitable for red-cockaded woodpeckers.

Indiana bats (*Myotis sodalis*)

Recently, several small colonies of federal-endangered Indiana bats have been reported from caves in the Bankhead National Forest. Historically, the species has been reported from the abandoned chalk mine in the Bear Creek embayment adjacent to Parcel 114. However, Indiana bats have not been observed in caves on Pickwick

Reservoir land in recent years. The mine was surveyed extensively in 1990 to determine its use by Indiana bats as well as gray bats and northern long-eared bats, but investigators found no evidence of these species using the cave in recent years. Additional caves such as Collier Cave and Key Cave have been examined during winter months for Indiana bats, but none have been found at these caves. Pickwick Reservoir land having mature hardwood forest communities provide suitable summer habitat for Indiana bats. This habitat is abundant in Coffee Slough.

Heron colonies

Heron colonies are colonial nesting sites used by migratory wading birds, typically great blue herons (*Ardea herodias*). Several species of birds, in large numbers, may nest in colonies, often in large numbers. A colony of great blue herons has been established in recent years below Wilson Dam (Parcel 39). This colony has grown from 30 to 100 nests in the past three years. Currently only great blue herons are known to nest at this site. This site could potentially be used by other species, such as great egrets (*Ardea alba*) or little blue herons (*Egretta caerulea*), in the future.

The presence of this heron colony and the increase in ospreys and bald eagles in the vicinity of Pickwick Reservoir is significant. These species were severely affected by the widespread use of the pesticide DDT during the 1970s. As DDT levels decreased in the past 15 years, numbers of heron colonies, ospreys and bald eagles have increased throughout the Tennessee River Valley. However, numbers of these birds have remained low in Pickwick and Wheeler Reservoir. The recent increase in these nesting birds in the past five years suggests that the water quality has improved to the point that these birds can successfully reproduce on Pickwick Reservoir.

Suitable Habitat for Threatened and Endangered Species

No populations of the remaining rare animal species listed in Table 3.3-2 were found during field surveys. However, suitable habitat exists on the public land surrounding Pickwick Reservoir for most of these species. The presence of sensitive terrestrial animal species was projected based on the geographical range of the species and the presence of habitat deemed suitable for the respective species. Pickwick Reservoir parcels contain special habitat types which contribute to regional natural resources or landscape diversity. These include mature deciduous woodlands, wetlands, woodland rock outcrops, bluffs, seepages, and karst features.

Mature Deciduous Woodlands

There are numerous forested woodland communities on Pickwick Reservoir land. Parcels having mature deciduous woodlands of excellent quality include Parcels 8, 9, 16, 27, 29, 30, 32, 42, 126, and 128. These parcels contain suitable habitat for Cooper's hawk, Swainson's warbler, eastern big-eared bat, and northern long-eared bat. These parcels contain trees that are mature enough to provide roosting habitat for federal-endangered Indiana bats.

Wetland Communities

Pickwick Reservoir has several wetland communities, although most are limited to the mouths of tributaries (see Section 3.7.1). Wetlands are located on Parcels 16, 30, 32, 33, 93, 95, 99, and 104. These habitats are suitable for the little blue heron, queen snake, map turtle, chorus frog, meadow jumping mouse, southeastern shrew, southern coal skink, and pigmy rattlesnake.

Woodland Rock Outcrops and Sandstone Bluffs

Woodland rock outcrops can provide habitat for a variety of protected species of terrestrial animals. Rock outcrops provide habitat for green salamander, cave salamander, black king snake, eastern wood rat, and old field mouse. An extensive network of rock outcrops and bluffs is located on Parcel 32.

Seepages

Seepages are uncommon on Pickwick Reservoir land. Several small seepages were found on Parcels 155 and 128. These sites provide suitable habitat for red salamander, southern zigzag salamander, and spring salamander.

Karst Features

Caves are fragile ecosystems that provide habitat to a diverse group of organisms. A variety of bats, small mammals, birds, fish, and invertebrates spend most or all of their lives in caves. Because cave systems are usually isolated from other cave systems, groups of organisms that live in a given cave often depend on the presence of one particular species (keystone species) to survive. Gray bats, for instance, provide nutrients that are vital for other species to survive in specific cave systems. Therefore, cave systems are extremely fragile and often biologically significant.

There are several biologically significant caves on or adjacent to Pickwick Reservoir land. Many of these caves, such as Key Cave, are the only known locality for many species. Also, many of the caves on Pickwick Reservoir land are used by federal-listed species such as gray bats and other protected species. Most caves on Pickwick Reservoir land have been monitored through the years by biologists from several state and federal agencies, universities, and museums. Federal-listed gray bat colonies are monitored annually by state and federal biologists.

3.3.3 Aquatic Animals

Information stored in the TVA Regional Natural Heritage database indicates that there are preimpoundment records of several mussels, a snail, and three fish from the waters now included in the vicinity of Pickwick Reservoir which are protected as state- and federal-listed endangered or threatened species. In addition to the federal-listed species included in Table 3.3-4, this list includes 10 snails, 18 mussels, three crayfish, and four fish that are tracked as sensitive aquatic species by the Alabama Heritage Program. However, because of the habitat changes resulting from impoundment, many of these sensitive aquatic species are believed to be extirpated from the reservoir. The turgid blossom (*Epioblasma turgidula*), tubercled blossom (*Epioblasma torulosa torulosa*), and yellow blossom pearlymussel (*Epioblasma florentina florentina*) are believed to be extinct (Parmalee and Bogan, 1998). Anthony's Riversnail (*Athearnia anthonyi*), while still alive in other parts of the mainstem Tennessee River, also is believed to have been extirpated from this portion of the river (Garner, 1992). The federal-threatened spotfin chub [*Cyprinella* (= *Hybopsis*) *monacha*] is only known from a few individuals at two localities: one in Shoal Creek (Lauderdale County) and one in Little Bear Creek (Colbert County). All other Alabama populations of spotfin chub are believed to have been extirpated since the 1930s (Mettee, 1996). Currently, six federal-listed mussels, one federal-listed fish, and one rare shrimp are known from the areas included in the Pickwick Reservoir Land Management Plan (Table 3.3-4). These species are discussed in more detail below.

Table 3.3-4. Federal-listed aquatic species historically known from Pickwick Reservoir and its tributaries, and recent status of those species in and around Pickwick Reservoir				
Common Name	Scientific Name	Federal Status	State Status	Recently Found in Study Area?
Snails				
Anthony's river snail	<i>Athearnia anthonyi</i>	END	-	No
Mussels				
Dromedary pearl mussel	<i>Dromus dromas</i>	END	END	No
Oyster mussel	<i>Epioblasma capsaeformis</i> *	END	-	No
Cumberland combshell	<i>Epioblasma brevidens</i>	END	END	No
Yellow blossom pearl mussel	<i>Epioblasma f. florentina</i>	END	EXTI	No
Purple catspaw	<i>Epioblasma o. obliquata</i>	END	-	No
Tubercled blossom pearl mussel	<i>Epioblasma t. torulosa</i>	END	EXTI	No
Turgid blossom pearl mussel	<i>Epioblasma turgidula</i>	END	-	No
Shiny pigtoe pearl mussel	<i>Fusconaia cor</i>	END	END	No
Fine-rayed pigtoe	<i>Fusconaia cuneolus</i>	END	END	No
Cracking pearl mussel	<i>Hemistena lata</i>	END	END	No
Pink mucket	<i>Lampsilis abrupta</i>	END	END	Yes
Alabama lamp mussel	<i>Lampsilis virescens</i>	END	END	No
Scaleshell	<i>Leptodea leptodon</i>	P	-	No
Birdwing pearl mussel	<i>Lemiox rimosus</i>	END	EXTI	No
Ring pink	<i>Obovaria retusa</i>	END	END	Yes
White wartyback	<i>Plethobasus cicatricosus</i>	END	END	Yes
Orange-foot pimpleback	<i>Plethobasus cooperianus</i>	END	END	Yes
Clubshell	<i>Pleurobema clava</i>	END	END	No
Rough pigtoe	<i>Pleurobema plenum</i>	END	END	Yes
Winged mapleleaf	<i>Quadrula fragosa</i> *	END	-	No
Cumberland bean pearl mussel	<i>Villosa trabalis</i> *	END	END	No
Cumberland monkeyface	<i>Quadrula intermedia</i>	END	END	No
Slabside pearl mussel	<i>Lexingtonia dollabelleoides</i>	C	END	No
Fluted kidneyshell	<i>Ptychobranthus subtentum</i>	C	END	No
Cave invertebrates				
Undescribed blind cave shrimp	<i>Palaemonias sp.**</i>	-	-	Yes
Fish				
Slackwater darter	<i>Etheostoma boschungii</i>	THR	THR	No
Alabama cave fish	<i>Speoplatyrhinus poulsoni</i>	END	END	Yes
Spotfin chub	<i>Cyprinella monacha</i>	THR	-	No

END = Endangered; THR = Threatened; P = Proposed endangered; C = Candidate for federal listing; EXTI = assumed extirpated from this portion of its former range; - = no official status.

*These species are included in the NEP status designation for the free-flowing reach of the Tennessee River between Wilson Dam and the backwaters of Pickwick Reservoir.

**This record is included because its identification has not been confirmed. Records of this species in the TVA Regional Natural Heritage Project database are considered *Palaemonias alabamae*, but recent communications (Godwin, 2001) indicate it is a separate species.

In addition to those mussels presently known from this section of the Tennessee River, the USFWS (USFWS, 2001) has designated the free-flowing reach (about 12 miles) of the Tennessee River between Wilson Dam and the backwaters of Pickwick Reservoir in Colbert and Lauderdale Counties, Alabama, as nonessential experimental population (NEP) status for 16 federal-listed mussels and one federal-listed snail (see Table 3.3-4). Mussel species recently known from this section of river were not included in the NEP rule. Some of the mussels included in this proposal are believed to be extinct, but they are included in the designation in the event any living populations are found. The purpose of this designation is to preclude the applicability of certain regulatory requirements under the Endangered Species Act (ESA) for populations of these species that might result from reintroductions within this river reach. The NEP rule indicates that most individuals used for stocking would likely result from captive production, and that culture techniques have been recently developed for many, but not all, of these species. The long-term goal is to improve the status of these species so that they no longer need the protection of the ESA.

Mussels

Six federal-endangered mussel species have been observed relatively recently in Pickwick Reservoir: pink mucket (*Lampsilis abrupta*), ring pink (*Obovaria retusa*), white wartyback (*Plethobasus cicatricosus*), rough pigtoe (*Pleurobema plenum*), orange-foot pimpleback (*Plethobasus cooperianus*), and cracking pearlymussel (*Hemistena lata*). Most of these observations were in the vicinity of Seven Mile Island (Parcel 32); however, a few species, including the pink mucket and rough pigtoe, are apparently more widely distributed in the reservoir. Except for the mainstem of the Tennessee River, no state- or federal-listed mussels species are known from parcels under consideration for this Plan.

Cave Invertebrates

One species of cave shrimp, *Palaemonias* sp., has been recently reported from two caves near Parcel 47. Although this shrimp is being tracked in the TVA Heritage database as the federal-endangered Alabama cave shrimp (*Palaemonias alabamae*), it apparently is an undescribed species closely related to the Alabama cave shrimp (Godwin, 2001). In addition to the shrimp, these caves also are known to contain several other blind cave crayfish species considered as sensitive by the state of Alabama.

Fish

The federal-endangered Alabama cave fish (*Speoplatyrhinus poulsoni*) is only known to occur in Key Cave, located on Parcel 31. In addition to the Alabama cave fish, Key Cave also contains three aquatic species considered sensitive by the state of Alabama: the southern cave fish (*Typhlichthys subterraneus*) and two cave crayfish (*Cambarus jonesi* and *Procambarus pecki*).

The federal-threatened slackwater darter (*Etheostoma boschungii*) is known from the Cypress Creek watershed within the Pickwick Reservoir study area. However, it is found only in small, high quality streams or flooded grassy or swampy areas (when spawning) (Etnier and Starnes, 1993; McGregor and Shepard, 1995). This fish is not known from the mainstem Tennessee River or from any streams potentially affected by this land use plan.

3.4 Managed Areas and Sensitive Ecological Sites

As part of TVA's effort to update the 1981 Plan, field surveys were conducted in June 2001. The purpose of the survey, from a Natural Areas perspective, was to evaluate parcels for their scenic and aesthetic qualities, ecological significance, and suitability for designation as a TVA Natural Area. TVA Natural Areas include Small Wild Areas (SWAs), Ecological Study Areas, HPAs, and Wildlife Observation Areas. Descriptions of these categories and the criteria considered when evaluating them are provided below.

- Small Wild Areas are sites with exceptional natural, scenic, or aesthetic qualities, which are suitable for low-impact public use, such as walking, hiking, photography and birding. Examples include concentrations of wildflowers, high bluffs with long views, geologic features (excluding caves), waterfalls or dripping rock ledges, and mature or "undisturbed" forests. Access by public road is preferred.
- Habitat Protection Areas are established to protect populations of species that have been identified as threatened or endangered by the USFWS or that are rare to the state in which they occur. Unusual or exemplary biological communities or unique geological features, such as bat caves or rare plant/animal habitat, also receive protection in this category.
- Wildlife Observation Areas are sites that have concentrations of viewable wildlife like shorebirds, songbirds, white-tailed deer, migratory hawks or monarch butterflies, turkey, raccoons, etc. Locations could include drawdown zones, dam reservations, urban wetlands, and bluffs. Public access to these sites is required for designation.
- Ecological Study Areas consist of sites judged suitable for ecological research or environmental education. Such areas typically contain plant or animal populations of scientific interest or are usually located near an educational institution that will use the area. The area should have potential benefit to the local educational community.

The following criteria were used to evaluate each parcel for its potential for TVA Natural Area designation:

- *Aesthetics* include the presence of unique natural features (i.e., waterfalls, mature trees, wildflower displays, concentrations of observable wildlife, and panoramic views).
- *Solitude* is a measure of the parcels' isolation from developed landscapes and ability to provide a quiet place in the natural world without the background sounds of urban, industrial, and residential activities.
- *Access* includes ease of access from public roads, the ease of development of parking areas, as well as a determination of whether the topography of the parcel is favorable for trail development.
- *Ecological integrity* is the capability to (1) protect the resource, (2) minimize visual intrusions, and (3) separate incompatible uses and presence of invasive, exotic species.
- *Environmental Education and Scientific Research* is the site's potential to be used for wildlife viewing opportunities, environmental education, and scientific research. These are often unique or uncommon ecological communities or habitats important to migratory wildlife or easily observable species.

- *Threatened and Endangered Species Habitat* is the known occurrence of plant or animal species with federal or state status.

Based on the survey findings, one parcel was found suitable for designation as a TVA Natural Area. Parcel 128 was found to contain a dry, steep area of exposed rock-shale resulting in a plant community unique to Mississippi. At least five Mississippi state-listed plant species occur on this parcel. The uniqueness of this area affords a high probability that additional rare plants and animal species are present. These species and their habitats are described in the Threatened and Endangered Species section of this report. None of the parcels surveyed were found suitable for SWA, Wildlife Observation Areas, or Ecological Study Areas designation at this time.

There are 15 Managed Areas or Significant Ecological Sites on or adjacent to public land on Pickwick Reservoir. Several of the areas, including the Natchez Trace Parkway (Parkway), Pickwick Landing State Resort Park (including Bruton Branch Primitive Area), and J. P. Coleman State Park are managed for recreation. Three of the areas, Lauderdale County State WMA, Seven Mile Island State WMA, and Key Cave National Wildlife Refuge, are managed for recreation and resource management. Two areas, Old First Quarters TVA SWA and the Rockpile National Recreation Trail, are managed for low impact public use such as hiking. Several areas (Cooper Falls TVA HPA, Coffee Bluff TVA HPA, Sandstone Outcrops/Pickwick Lake Protection Planning Site, East Port Bluffs, Key Cave Aquifer Hazard Area, Alabama Cave Fish Designated Critical Habitat, and Wilson Dam Tailwaters Restricted Mussel Harvest Area) are managed and/or monitored for federal- and/or state-protected species.

Pickwick Landing State Resort Park

This highly developed park, just above Pickwick Landing Dam, focuses on golfing and water sports. Facilities include a championship golf course and pro shop, a full service marina, public swimming beaches, playgrounds and play fields, and picnic shelters. Fishing is one of the most popular activities at the resort. Accommodations range from modern cabins and an inn to both developed and primitive camp sites including Bruton Branch Primitive Area. The park is owned and managed by the Tennessee Department of Environment and Conservation, Division of State Parks.

J. P. Coleman State Park

A very popular destination during the summer months, this 1,500-acre developed park focuses on water sports. Facilities include a marina, lodge, cabins, developed and primitive camping sites, and a day use area. The park is nestled in a forest of hardwoods and pines, on ridges overlooking Indian Creek, visible from a network of nature trails winding through the forest.

Lauderdale County State Wildlife Management Area

This 11,106-acre area is managed by the ADCNR, Division of Wildlife and Freshwater Fisheries. Although primarily used to hold big and small game hunts, camping and hiking are also permitted on this land.

Seven Mile Island State Wildlife Management Area

This 4,685-acre area is a maze of islands, shallow water, sloughs, wetlands, swamps, riverine forests, cliffs, caves, and reverting agricultural land. ADCNR administers hunts

in the area, primarily for waterfowl. Other outdoor activities, such as hiking and camping, are also permitted.

Key Cave National Wildlife Refuge

This area is not on TVA public land on Pickwick Reservoir, but is adjacent and connected to land on the reservoir. USFWS purchased the area directly behind Key Cave to provide greater protection to the federal-listed species found in Key Cave.

Natchez Trace Parkway

This unit of the U.S. National Park System (NPS) features a two-lane highway that follows an historic route from Nashville, Tennessee, to Natchez, Mississippi. These parklands preserve important examples of natural and cultural heritage. In addition, the NPS manages the area to provide a quality recreation and educational experience for visitors via campgrounds, horse, bike, and hiking trails, and picnic pavilions located along the route and by offering interpretive programs at various stops.

Old First Quarters TVA Small Wild Area/Potential National Natural Landmark

The 25 acres of the SWA were set aside to preserve this area's natural features, including abundant populations of spring wildflowers and woodland birds. The NPS has listed the area and a buffer zone as a possible National Natural Landmark (NNL). The NNL program was established by the NPS in the 1970s to identify nationally significant examples of ecologically pristine or near pristine landscapes.

Rockpile National Recreation Trail

This trail spurs off of a mile-long loop trail in Old First Quarters, hugging the shoreline until it reaches a parking lot near Wilson Dam. The NPS recognizes National Recreation Trails as contributing to the National Trails System.

Cooper Falls TVA Habitat Protection Area

Representing the southern extent of the Highland Rim physiographic province in Mississippi, this 75-acre area affords habitat for many species with a limited distribution in the state and also provides winter habitat for bald eagles. A sheer limestone bluff features Cooper Falls cascading into Pickwick Reservoir. Upland hardwoods and pines surround the falls.

Coffee Bluff TVA Habitat Protection Area

This 250-acre area contains the entrances to eight caves, including Key Cave (discussed above) and Collier Cave, which houses a bachelor colony of federal-listed endangered gray bats. The area is presently managed in cooperation with the ADCNR and the USFWS. While the primary focus is to provide habitat for federal-listed endangered species, the area is also managed for wetland and upland wildlife management, waterfowl management, and visual protection.

Sandstone Outcrops/Pickwick Lake Protection Planning Site

This narrow stretch of sandstone bluffs and deep ravines provide a floral habitat characteristic of the Tennessee Valley but found at no other locale within Mississippi. Golden eagles also use the spot as wintering habitat. Most of the approximately 1,800-acre area is under public ownership, divided among TVA and various state agencies. Protection Planning Sites are compiled by the Mississippi Protection Planning

Committee, a cooperative effort of government land managers and private individuals knowledgeable about the biota of the state.

Eastport Bluffs

This landscape of hills and outcroppings represents a unique geologic formation in Mississippi that supports many rare plants. Vegetation is primarily second growth deciduous forest and mixed deciduous forest. The Mississippi Natural Heritage Program has cited the area for its ecological significance.

Key Cave Aquifer Hazard Area

This site, a large sinkhole or plain behind Key Cave, has multiple owners, both private and federal. Management practices that promote high water quality are encouraged because this site delineates the main water recharge area for Key Cave. Key Cave provides habitat for two federal-listed endangered species, the Alabama cave fish and the gray bat.

Alabama Cave Fish Designated Critical Habitat (Key Cave)

Key Cave is the only known location of the federal-listed endangered Alabama cave fish, and, therefore, in 1977 the USFWS designated this cave as critical habitat necessary for its survival. Key Cave also contains a maternity colony of federal-listed endangered gray bats. It is believed that a healthy bat population plays an important role within the nutrient cycle related to the aquatic life of the cave.

Wilson Dam Tailwaters Restricted Mussel Harvest Area

This section of the Tennessee River provides habitat for several federal-listed endangered aquatic mollusks. This is a restricted area in which the ADCNR prohibits the taking, catching, killing, or attempt to take, catch, or kill freshwater mussels.

3.5 Water Quality

The water quality in Pickwick Reservoir is affected by many factors, both from TVA public land along the reservoir and from land use practices throughout the reservoir's drainage area. Pickwick Reservoir is a relatively long reservoir (53 miles) and has only two major (>200 square miles) tributaries. Cypress Creek (215-square-mile drainage) enters Pickwick Reservoir near Florence, Alabama, below Wilson Dam. Bear Creek flows into Pickwick Reservoir near TRM 225 and drains approximately 945 square miles. Most water (approximately 95 percent) entering Pickwick Reservoir comes from Wilson Reservoir, so overall water quality in Pickwick is strongly affected by waters outside its own immediate drainage area. Water quality in the Bear Creek and Yellow Creek embayments of Pickwick Reservoir are, however, strongly affected by local runoff conditions, as these embayments are typically not influenced by main channel waters. Yellow Creek does receive some influence from the main channel when water is drawn through the embayment to assist barge traffic through the Tenn-Tom Waterway. This would primarily occur during drier seasons when lower water volumes flow from the Yellow Creek watershed.

Water quality in Pickwick Reservoir is considered good based on TVA's Reservoir Vital Signs Monitoring Program (TVA, 1992; TVA, 1993; TVA, 1994; TVA, 1995; TVA, 1996; TVA, 1997c; TVA, 1998d; TVA, 1999c). TVA monitors four locations on Pickwick Reservoir. The forebay region is sampled near Pickwick Landing Dam (TRM 207.3).

The Transition Zone is sampled near Waterloo at TRM 230.0. The inflow is sampled at TRM 253, near the upper end of Seven Mile Island. The Bear Creek embayment is sampled near mid-embayment at Bear Creek Mile 8.4. Overall, conditions at three of the four sampling locations generally score good (see Table 3.5-1). The location in the Bear Creek embayment usually scores fair to poor, overall. Fish and benthic communities usually score good at main channel stations. Fish score good and benthics fair at the Bear Creek station. Dissolved oxygen (DO) levels are usually good at all stations; however, the Bear Creek station occasionally shows some stratification and DO declines, particularly during drier summers (lower flow). Sediment quality at all stations is usually good; however, historically, high levels of mercury in sediments produced fair and poor ratings in the Transition Zone and Forebay stations in the early 1990s. Recent samples show a continuing decline in sediment mercury levels at both of these stations. High levels of mercury were historically discharged from industries in the quad-cities area; however, changes in state environmental regulations and industrial waste treatment have significantly reduced mercury contamination in Pickwick Reservoir.

Table 3.5-1. Water Quality Ratings, Vital Signs Monitoring Data						
	Monitoring Years					
	1991	1992	1993	1994	1996	1998
Pickwick Forebay						
Fish Community	good	poor	good	good	fair	good
Benthic Community	good	good	good	good	good	good
Dissolved Oxygen	good	good	good	good	good	good
Chlorophyll	good	fair	fair	fair	poor	fair
Sediment	poor	fair	good	good	fair	good
Pickwick Transition Zone						
Fish Community	fair	fair	good	good	good	fair
Benthic Community	good	good	good	good	good	good
Dissolved Oxygen	good	good	good	good	good	good
Chlorophyll	good	poor	fair	good	poor	good
Sediment	fair	fair	good	good	good	good
Pickwick Inflow						
Fish Community	fair	fair	good	good	good	good
Benthic Community	fair	fair	good	good	fair	fair
Dissolved Oxygen	NS	good	fair	good	good	NS
Chlorophyll	NS	NS	NS	NS	NS	NS
Sediment	NS	NS	NS	NS	NS	NS

Table 3.5-1 (cont.). Water Quality Ratings, Vital Signs Monitoring Data						
	Monitoring Years					
	1991	1992	1993	1994	1996	1998
Pickwick Embayment (Bear Creek)						
Fish Community	NS	good	good	good	good	fair
Benthic Community	NS	fair	fair	fair	fair	fair
Dissolved Oxygen	NS	NS	fair	good	fair	good
Chlorophyll	NS	fair	poor	fair	poor	poor
Sediment	NS	fair	fair	good	good	good

NS-Not Sampled

The only water quality parameter measured during the Vital Signs project that has shown a declining trend is chlorophyll levels. Chlorophyll levels at both the forebay and embayment locations are indicating a trend toward fair to poor levels in recent sampling periods. An overall trend of increasing chlorophyll levels is demonstrated by the graphs in Figures 3.5.1 and 3.5.2. A similar trend has not been shown at the Transition Zone location (see Figure 3.5.3). Linear regression of chlorophyll data was determined using Statistical Analysis Systems (SAS) least square estimates ($y=mx+b$) with no data transformations. Graphs were drawn using Microsoft Excel trend line with results comparable to those developed through SAS. Although a trend of increasing chlorophyll levels is noted, this trend is not statistically significant. Increases in chlorophyll levels usually indicate increases in nutrient loading which could eventually lead to an overall decline in water quality in the reservoir. Increased human use and development in the lower portion of Pickwick Reservoir and an increase in the poultry industry in the Bear Creek watershed (TVA, 2000b) could contribute to such a trend. Increased fertilizer and septic system runoff combined with loss of riparian buffers in residential developments, as well as discharges of untreated wastes from recreational boats, on lower Pickwick can provide additional nutrients.

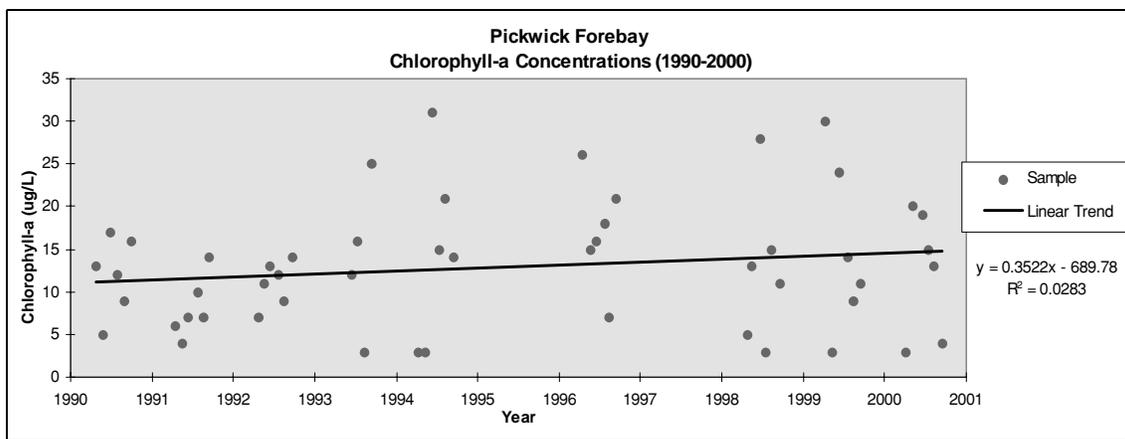


Figure 3.5.1. Chlorophyll Trends in Pickwick Forebay

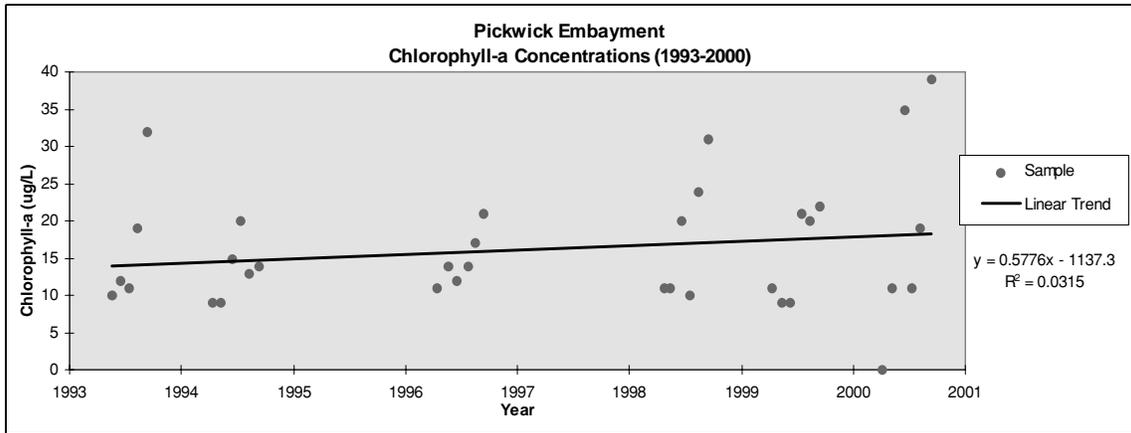


Figure 3.5.2. Chlorophyll Trends in Bear Creek Embayment

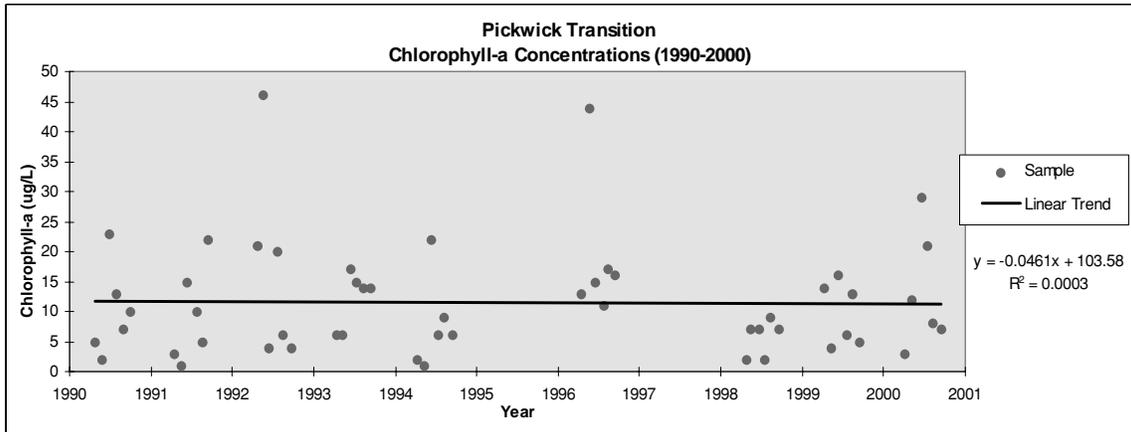


Figure 3.5.3. Chlorophyll Trends in Pickwick Transition Zone

3.6 Aquatic Ecology

Streams in this region of the Tennessee Valley are characterized by coarse chert gravel and sand substrates interspersed with bedrock areas, moderate gradients, clear waters, and moderate to low productivity, and, thus, little aquatic vegetation except near spring sources (Etnier and Starnes, 1993). Aquatic habitat in the littoral (near shore) zone is greatly influenced by underwater topography and back-lying land use. Underwater topography in Pickwick Reservoir varies from moderately steep land with scattered small bluffs near the river channel to shallow embayments and coves further from the main river channel in larger embayments, such as Yellow Creek and Bear Creek. Natural shoreline is mostly wooded, and fallen trees and brush provide woody cover. In residential development areas, habitats typically include man-made features, such as shoreline stabilization structures (e.g., seawalls or riprap) and water use facilities.

In 2000, aquatic plants colonized an estimated 400 acres on Pickwick Reservoir. Areas with the greatest abundance of plants were Second Creek embayment and small sloughs near Waterloo, areas around the Wright community, the Bruton Branch area,

portions of Yellow Creek embayment, and small areas of Bear Creek embayment. The most common aquatic plants on Pickwick Reservoir are spiny-leaf naiad, southern naiad, coontail, and small pondweed. Shoreline property owners in Second Creek and the Waterloo area, Bruton Branch, and Bear Creek embayment reported that aquatic plant growth in the vicinity of docks and piers was impacting access and activities such as swimming and bank fishing. TVA provides technical assistance to shoreline property owners by identifying nuisance aquatic plants, providing information on how to control aquatic plants with hand tools and mechanical methods, and advising them on rules and regulations regarding the use of herbicides in public waters. On other TVA reservoirs, aquatic plant management plans have been developed through the stakeholder group process that involves a wide range of reservoir users including homeowners, anglers, boaters, tourism councils, local governments, environmental groups, and state and federal agencies.

A shoreline survey was conducted on Pickwick Reservoir in February and March of 2001, to determine the reservoir's Shoreline Aquatic Habitat Index (SAHI) score. The SAHI score is an indication of the quality of aquatic habitat adjacent to the shoreline. Scoring is based on seven physical habitat parameters (i.e., riparian zone condition, amount of canopy cover along the shoreline, bank stability, substrate composition, amount of fish cover within the fluctuation zone, habitat diversity, and degree of slope) important to Tennessee River Valley reservoir's resident sport fish populations. Aquatic populations rely heavily on shoreline areas for reproduction success, juvenile development, and/or adult feeding. Field methods and an explanation of the SAHI process are described in the SMI EIS (TVA, 1998a). The overall average SAHI score for Pickwick Reservoir was 27.03 out of a possible 35 points, with seven being the minimum possible score, which indicates a "good" aquatic habitat condition exists along its shoreline. Sixty-five percent of the shoreline habitat scored good; 33 percent scored fair; while only two percent fell into the poor category.

Results of four cove rotenone surveys conducted on Pickwick Reservoir in 1975 resulted in the capture of 50 species of fish (TVA Summaries of Fish Standing Stock in Tennessee Valley Reservoirs). Collection activities for Vital Signs monitoring on Pickwick Reservoir in 1998 resulted in the capture of 22 species of fish, taken with gill nets and electrofishing gear in the forebay area of the reservoir. Ratings from TVA's Vital Signs monitoring conducted from 1991 to 1998 for fish and benthic communities ranged from fair to good for both communities (see Table 3.5-1). A description of the sampling areas is found in Section 3.5.

Pickwick Reservoir is rich in benthic fauna with a mussel sanctuary starting at the base of Wilson Dam and going downstream to the head of Seven Mile Island. Pickwick contains numerous state- and federal-listed mussel and snail species that are described in the Aquatic Threatened and Endangered Species Section (see Section 3.3.3). Based on historic and recent fisheries data collected in the reservoir, it appears that Pickwick Reservoir is maintaining a diverse and healthy fish community.

3.7 Wetlands and Floodplains

3.7.1 Wetlands

EO 11990 (Protection of Wetlands) directs federal agencies to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. In addition, activities in wetlands are regulated under the authority of the federal Clean Water Act and various state water quality protection regulations.

Wetlands are defined by TVA Environmental Review Procedures (TVA, 1983) as:

“Those areas inundated by surface or groundwater with a frequency sufficient to support, and under normal circumstance, do or would support a prevalence of vegetation or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, mud flats, and natural ponds.”

Wetlands are typically transitional ecosystems between terrestrial and aquatic communities. Wetlands in this region are typically associated with low-lying, poorly drained areas that are linear in feature and associated with the floodplain areas of streams or rivers. In the reservoir area, wetlands represent a small percentage of the landscape relative to uplands, mainly due to the geology of the region (Hefner, et al., 1994).

Pickwick Reservoir wetlands were identified and classified using the USFWS National Wetlands Inventory (NWI) mapping conventions and the system developed by Cowardin, et al. (1979).

Wetlands occurring in Pickwick Reservoir and its tributaries are in the palustrine system (P), and the forested (FO), scrub-shrub (SS), and emergent (EM) subsystems. In the forested and scrub-shrub wetlands, the vegetation class is “broad-leaved deciduous,” which is designated by the number 1. In the emergent wetlands, the vegetation class is “persistent,” designated by the number 1, and “non-persistent,” designated by the number 2. The term “persistent” refers to herbaceous vegetation with aboveground parts that persist through the non-growing season, such as the dry remains of cattail and sedges. “Non-persistent” vegetation dies back completely to ground level during the non-growing season. The hydrologic regimes in these wetlands were judged to include temporarily flooded (A), and seasonally flooded (C), although it is possible that other hydrologic regimes, such as saturated (B) and semi-permanently flooded (F), occur.

The functions of wetlands associated with Pickwick Reservoir include shoreline stabilization, retention of sediments, removal or transformation of contaminants, nutrient cycling, provision of fish and wildlife habitat, and provision of plant species and community diversity. A brief description of wetland functions follows:

Shoreline stabilization

The roots of trees, shrubs, and herbaceous vegetation, and the organic litter layer on the ground, help to stabilize the shoreline soil against erosion that could result from boat

wakes and storm runoff. This function is important throughout the reservoir, but is particularly important to preserve in those areas along the main shoreline which are subject to wave action from boats and increased runoff from developed areas.

Retention of sediments

Vegetation and the litter layer in the wetlands aid in the removal and retention of eroded soil and particulates that wash toward the reservoir from adjacent upland areas and in tributary streams. This function is particularly important where surrounding land uses could result in increased erosion and runoff, including farming operations and land development.

Retention and transformation of contaminants and nutrients

Contaminants and nutrients in dissolved and particulate form can be carried into the reservoir in storm runoff. Potential contaminants could include fertilizers and pesticides from agricultural, residential, and urban areas, excess nutrients and pathogenic bacteria from animal waste and septic system leachate, and oil and grease from roads and watercraft. Through various chemical, biological, and physical means in wetland soils, these contaminants and nutrients can be sequestered, transformed into other chemical form, or assimilated by plants.

Nutrient cycling

Nutrients are contributed to the system internally in leaf litter, plant debris, and animal waste and remains. These nutrients are cycled internally and either taken up by plants in the wetland or exported out of the wetland.

Provision of fish and wildlife habitat

Wetlands provide habitat for a large number of mammal, bird, amphibian, reptile, fish, and invertebrate species. Wetlands are essential habitat for migratory and nesting waterfowl, and many shorebird and songbird species. Many species are wetland-dependent for a part or all of their life-cycle. Other species may not use the wetlands directly, but are dependent on wetlands as a source of carbon and energy. An example of this would be aquatic invertebrates which use the organic material exported from wetlands.

Provision of plant species and community diversity

Wetland plant communities consist primarily of species that can grow under low-oxygen, saturated soil conditions. Although some of the species can grow outside of wetlands, most cannot grow in dry situations. The destruction of wetlands results in local removal of commonly occurring species from the landscape, and thus, over time, can lead to a reduction in the amount of plant, community, and landscape diversity in the local area or region.

Floodflow alteration

Important functions of riverine wetlands are those associated with floodflow alteration. These functions include short- and long-term storage of flood waters and energy reduction. This function is also important for the export of organic carbon. Plant and other organic material produced in the wetland is exported out of the wetland during flood events.

General trends in wetland loss in Mississippi, Alabama, and Tennessee indicate that palustrine forested wetlands have suffered a net loss in acreage over the last ten years, primarily due to agricultural development. Additional losses are due to transportation impacts and the growth of urban/suburban development associated with continued population growth (Hefner, et al., 1994). Prior to impoundment, the Tennessee River system had extensive areas of forested wetlands that were lost as dams were constructed and these floodplain areas were inundated. Depending upon topography, forested wetlands have developed over time in the riparian and floodplain zones now affected by reservoir operations. Emergent and scrub-shrub wetlands have also developed in the embayments and mouths of tributary streams. These wetlands, located on TVA parcels along Pickwick Reservoir and its tributaries, are part of the overall resource assessment for this EIS.

In general, forested wetlands comprise the majority of wetland area associated with Pickwick Reservoir. Extensive areas of forested wetlands occur in the Seven Mile Island area (Parcel 32) and are also found in the floodplains and riparian zones of Second Creek (Parcel 16), Malone Creek (Parcel 57), Yellow Creek (Parcels 134 and 135), Colbert Creek (Parcel 26), Little Bear Creek (Parcel 44), Panther Creek (Parcel 9) and its tributaries, Indian Creek (Parcel 121), and Mulberry Creek (Parcel 55). There is also a unique palustrine forested (PF) wetland dominated by bald cypress trees located in the Coffee Slough area behind Seven Mile Island (Parcel 30). This is the easternmost occurring locale of naturally occurring bald cypress trees on the Tennessee River system.

Palustrine emergent and scrub-shrub wetlands are less common and are commonly found at the head of embayments and where smaller tributary streams enter the reservoir. There are significant areas of emergent wetlands found in Malone Creek (Parcel 57), Little Bear Creek (Parcel 44), and Yellow Creek (Parcels 134 and 135).

Typical wetland plant species in the study area include cherrybark oak, sycamore, sweetgum, cypress, box elder, alder, river birch, rose mallow, buttonbush, *Itea*, giant cut-grass, soft rush, cattail, alligator weed, and water willow.

As stated in Section 2.2.2, this EIS includes two action alternatives that differ in the land use zone category assigned to three parcels (see Tables 2-3 and 2-4). A description of each of these parcels is presented below.

Parcel 37

NWI maps indicate a small forested wetland (PFO1C) at the northern edge of this parcel. Field surveys confirm that while there are small areas (approximately one acre) of a forested wetland present, earth-moving activities and the presence of exotic plants have severely compromised both the extent and functions of this wetland.

Parcel 53

This parcel extends along the shoreline of the Tennessee River and up the east shore of the embayment of Mulberry Creek. Wetlands dominated by water willow and alligator weed are present in and along this embayment. The entire parcel is forested. There are some small areas of forested wetland (PFO1A), particularly on the upstream end of this section. River birch, box elder, silver maple, water oak, and sycamore are the

dominant trees along the shore and bottomlands. A few cypress trees are also present in these areas.

Parcel 156

There are no wetlands indicated along the sections of shoreline fronting Parcel 156.

3.7.2 Floodplains

The 100-year floodplain on Pickwick Reservoir is the area that would be inundated by a 100-year flood event. The 100-year flood elevation for the Tennessee River varies from elevation 419.0 feet above msl at Pickwick Landing Dam (TRM 206.7) to elevation 434.9-feet msl at the upper end of Pickwick Reservoir at TRM 259.4 (downstream of Wilson Dam). A tabulation of the 100-year flood elevations is included in Appendix G.

The Flood Risk Profile (FRP) elevation varies from elevation 419.0-feet msl at Pickwick Landing Dam (TRM 206.7) to elevation 437.2-feet msl at the upper end of Pickwick Reservoir at TRM 259.4. The FRP is used to control residential and commercial development on TVA public land. For Pickwick Reservoir, the FRP elevations are equal to the 500-year flood elevations. A tabulation of FRP elevations is also included in Appendix G.

Any fill material placed between elevations 408.0- and 414.0-feet msl would be subject to a charge for lost power storage. Generally, the quantity of fill required for residential projects such as shoreline stabilization and boat ramps would not result in a charge for lost power storage. Any material placed between elevations 408.0-feet msl and the TVA FRP Elevation would be subject to the requirements of the *TVA Flood Control Storage Loss Guideline* (TVA, 1999b). All development subject to flood damage must be located above the TVA FRP Elevation at that location.

3.8 Land Use and Prime Farmland

3.8.1 Land Use

Use of TVA public land is initiated by submittal of a formal request (land use application) accompanied by information necessary for TVA reviewers to make sound judgment for the best use of the public land. The request is reviewed for consistency with the allocated uses which have been documented in a Board-approved Land Management Plan (currently, the 1981 Pickwick Reservoir Land Management Plan), and is reviewed for site-specific environmental considerations and administrative requirements. Major public land use proposals are presented to the public for their input, and formal TVA Board of Directors' review is necessary before the land use can be approved.

TVA considers the use of TVA public land for agriculture to be a short-term use of the properties. Agriculture licenses can be compatible with Zones 2, 3, 4, 5, 6, and 7. For example, hay crops can be an effective way to manage archeological sites, open fields for certain wildlife species, and reduce maintenance costs for mowing areas of land on recreation, industrial, and residential sites. Current agricultural licenses on Pickwick Reservoir land are listed in Table 3.8-1.

Table 3.8-1. Current Agriculture Licenses on Pickwick Reservoir				
Parcel	Agriculture License No.	Licensed Use	Acres Licensed	Expiration Date
1	1092.2	hay	33 +/-	12/31/2001*
29	1092.1	hay	87 +/-	12/31/2006
51	1091.4	hay	5 +/-	12/31/2006
84	1091.8	hay	27 +/-	12/31/2006
99	1091.6	row crop	70 +/-	12/31/2006
101	1091.7	hay	18 +/-	12/31/2006
101	1091.7	row crop	19 +/-	12/31/2006

* Projected to be renewed in December 2002.

3.8.2 Prime Farmland

In general, the soils surrounding the reservoir are silt loams which have developed from limestone, alkaline shale, or Coastal Plain marine sediments. Many of these soils are classified as prime farmland soils. Prime farmland soils, as defined by the USDA, are soils that have the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. These soils have properties needed for the economic production of sustained high yields of crops. Prime farmland soils may presently be in use as cropland, pasture land, range land, forest land or other uses but cannot be urban or built-up land. The conversion of farmland and prime farmland to industrial and other nonagricultural uses essentially precludes farming the land in the foreseeable future. Creation of the Farmland Protection Policy Act (FPPA) in 1981 addressed this possibility and set guidelines which require that all federal agencies evaluate land prior to permanently converting to a nonagriculture land use. Under the FPPA, a federal agency must identify and take into account the adverse effects of federal programs on the protection of farmlands. This is done by completing a *Form AD 1006*, "Farmland Conversion Impact Rating," with assistance from the Natural Resources Conservation Service (NRCS). Sites receiving a score greater than 160 must be given further consideration for prime farmland protection.

According to the State Soils Geographic database (STATSGO) statistics, about 75 percent of the soils on the TVA public land surrounding the Pickwick Reservoir are prime farmland soils. STATSGO classifies soils according to large areas of soil associations and not on a soil mapping unit (USEPA, 1994). For areas which have the potential to be converted and are subject to the FPPA, the soil mapping units of the county soil survey must be used for determining prime farmland classifications. Appendix E contains a list of all the soil mapping units, along with descriptions, within the project area.

Land used for agriculture in the affected counties comprises less than half of the total acreage. Percentage in the respective counties are: Lauderdale, 48 percent; Colbert, 34 percent; Hardin, 32 percent; and Tishomingo, 19 percent. This information was

extracted from the USEPA BASINS database (USEPA, 1994). The majority of the land mass in Colbert, Hardin, and Tishomingo Counties contains forest land.

3.9 Cultural Resources

Cultural resources/historic properties include, but are not limited to, prehistoric and historic archaeological sites, historic sites that were the location of important events where no material remains of the event are present, and historic structures. These resources are both finite and nonrenewable and, in many situations, are the only window into the past; therefore, protection, preservation, and management of these fragile resources are important.

Under the National Historic Preservation Act (NHPA), TVA conducts inventories of its land to identify historic properties. For the undertaking addressed in this EIS, the area of potential effects (APE) is all TVA fee land described in the 1981 Plan and private or other non-TVA land which may be affected by an undertaking on TVA fee land. The APE, as defined in 36 CFR Part 800.16(d), is “the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if such properties exist.” For the proposed action in this EIS, the APE is the approximately 19,238 acres of committed and uncommitted TVA public land proposed for planning.

3.9.1 Archaeological Resources

Archaeological resources could include, but are not limited to, remains of surface or subsurface structures, such as domestic cooking or ceremonial structures, earthworks, fortifications, cooking or fragmentary tools, weapons and weapon projectiles, containers, ceramics, human remains, rock carvings or rock paintings, and all portions of shipwrecks.

Archaeological research has occurred periodically in the Pickwick Reservoir area before and since the development of the reservoir in 1930s. Research within the Pickwick Reservoir area began in the late nineteenth century when C. B. Moore and others made archaeological expeditions up the Tennessee River. Immediately prior to the impoundment of the reservoir a survey and excavation program was undertaken between 1936-1939 (Webb and DeJarnette, 1942). The survey of the reservoir in 1936 identified 323 archaeological sites in Colbert and Lauderdale Counties, Alabama; Tishomingo County, Mississippi; and Hardin County, Tennessee. During the investigations, excavation of 19 sites was undertaken. Little research was undertaken in the Pickwick Reservoir area between this time and the 1970s. In the 1970s and 1980s, investigations were conducted by Auburn University at Seven Mile Island, and these sites identified later became part of the Seven Mile Island Archaeological District (listed on the National Register of Historic Places[NRHP]).

TVA routinely conducts inventories of TVA public land to identify historic properties in response to federal legislation. In the mid-1980s, TVA contracted with the University of Alabama to conduct a survey of archaeological resources for approximately 17,000 acres located above summer pool level and on land within the Pickwick Reservoir (Meyer, 1995). The survey involved both systematic and opportunistic methods that employed pedestrian survey and systematic shovel testing from existing humus to culturally sterile subsoil. A recent shoreline management zone survey by the University

of Alabama involved the inspection of exposed shoreline by means of systematic pedestrian survey to inventory archaeological resources in areas where residential and commercial development are probable (Spry and Hollis, 1997).

Over 725 archaeological resources have been identified on TVA public land surrounding Pickwick. The eligibility of these previously recorded sites is currently unknown. The eligibility of these or other resources for the NRHP would be determined when specific actions are proposed that could potentially affect historical properties. This review would be undertaken in accordance with Section 106 of the NHPA of 1966.

3.9.2 Historic Structures

The acquisition of land for the Pickwick Reservoir by TVA resulted in the removal of most structures and other man-made features. Very few structures remained, though many historic structures do remain on adjacent non-TVA land.

Initially, white settlement in the early nineteenth century developed into an agricultural economy with farmsteads and small towns. Transportation networks revolved along the Tennessee River. Towns grew and prospered, and a plantation economy developed. Towns became river ports, and many ferry crossings were established. The later development of the railroad resulted in rail lines following the river valley. On Pickwick Reservoir, the rail line is along the south side of the river and continues west where the river turns to flow north at Bear Creek. The Civil War brought destruction and economic devastation to the area. Following this war, development was slow. Agriculture, commerce, industry, and the river and rail systems gradually expanded. The coming of TVA and the development of Pickwick Reservoir (1934-1938) resulted in further significant changes of the region.

Historic structures (and other man-made features) remain from all these historical periods. Partial cultural surveys were conducted for both the 1981 Plan as well as the proposed Plan. These historic structures on TVA public land are identified in Table 3.9-1. As the table shows, very few features are found on TVA public land, with the exception of Pickwick Landing Dam Reservation. Due to their age and architectural character, Pickwick Landing Dam and Powerhouse are considered historically significant. Nothing remains of the former construction village.

Farms, houses, and towns representing these periods are found adjacent to much of the TVA public land. Some are listed on the NRHP, and more are eligible. There are several former ferry crossings which have retained their identity. Following are known historic sites listed under the affected parcels.

Parcel 1

Pickwick Landing Dam and Powerhouse was built between 1934-38. It was the fourth of TVA's nine mainstream dams.

Parcels 11-14

Former river port town of Waterloo, with a number of historic structures remaining.

Table 3.9-1. Historic Structures/Sites on TVA Public Land on Pickwick Reservoir			
Name	Parcel	National Register Status	Description
Pickwick Landing Dam and Powerhouse	1	Probably Eligible	Pickwick 1934-38, one of TVA's nine mainstream dams
Natchez Trace Parkway	25, 26, 27, 60	Probably Eligible	Historic Parkway crosses reservoir with visual vistas to these parcels
Old Muscle Shoals Canal and Lock No. 1	36	Potentially Eligible	Remnants of old Muscle Shoals Canal and of Lock No. 1 of Wilson Dam
Keller Quarry Stones	41	Potentially Eligible	Large quarry stones presumed for Muscle Shoals and/or Colbert Shoals Canals
Colbert Shoals Canal	26, 61, 63, 66	Probably Eligible	1891 U.S. Army Corps of Engineers built Colbert Shoals Canal, now underwater
Riverton	67, 68	Potentially Eligible	Portions of former river port town streets and features now under water
White Sulphur Springs Cabins	156	Probably Eligible	Nine historic cabins of TVA program providing lake cabin lots

Potentially Eligible: These sites need further historic research to determine if they are eligible for listing on the NRHP.

Probably Eligible: These sites are likely to be eligible for listing on the NRHP, pending further consultation with the State Historic Preservation Officers.

Parcel 36

Remnants of the old Muscle Shoals Canal and the later Lock No. 1 of the Wilson Dam complex exist along the north side of this parcel. The U.S. Army Corps of Engineers (USACE) initiated work on the Muscle Shoals Canal in 1871.

Parcel 41

Immediately upstream from the mouth of Little Bear Creek is the former Keller Quarry Landing. There is a stack of large quarried stones, presumably unused from the Muscle Shoals and/or Colbert Shoals Canals. Though most are possibly on private land, portions are on TVA public land.

Parcels 25, 26, 27, 60

Where the Natchez Trace Parkway (Parkway) crosses Pickwick Reservoir, there are visual vistas on portions of these tracts. The Parkway, established May 18, 1938, is operated by the NPS. It was designated a National Scenic Byway-All American Road - 1995. Those TVA Parcels that are visible from the Parkway need to be given visual considerations.

Parcels 61, 62, 63, and 66

Along the left shore of the reservoir, generally under water, is the Colbert Shoals Canal, initiated by USACE in 1891 and opened for commercial traffic in 1911. The canal starts at Beech Branch, just downstream from the Natchez Trace, and continues downstream for eight miles, culminating at the Riverton Lock, just upstream of Riverton, Alabama. A concrete structure is still visible on an island and presumed to be part of the Riverton Lock complex. The canal system was constructed of carefully dressed large stone blocks and presently remains intact below the surface of the water along the shoreline.

Parcels 67 and 68

Former river port town of Riverton, with portions of former streets submerged. A number of historic structures remain.

Parcels 116 and 117

Former river port town of Eastport, with a number of historic structures remaining.

Parcel 156

The White Sulphur Springs cabin group. There are nine cabins on the original 23 lots. These cabins were built in the 1940s and early 1950s (one replaced a burned cabin in the 1970s). These are historically important as a remaining example of a TVA program providing lake cabin lots and as good examples of period resort cabin architecture. See section 2.2.2 for further details.

3.10 Air Quality

National Ambient Air Quality Standards establish safe concentration limits in the outside air for six pollutants: particulate matter, sulfur dioxide, carbon monoxide, ozone, nitrogen dioxide, and lead. These standards are designed to protect public health and welfare. An area where any air quality standard is violated is designated as a nonattainment area for that pollutant, and emissions of that pollutant from new or expanding sources are carefully controlled. All counties that surround Pickwick Reservoir and their surrounding counties are in attainment. However, in July 1997, USEPA promulgated new, more restrictive standards for ozone and particulate matter. These new standards include an 8-hour standard for ozone that would supersede the old 1-hour standard. The EPA is moving forward to develop implementation guidance for both of these standards, and expects to promulgate designations for the 8-hour ozone standard by 2004. There is a likelihood that some of the counties which surround Pickwick Reservoir may not attain the new standards for ozone and particulate matter if these new standards are eventually implemented after collection of the requisite air monitoring data.

In addition, Prevention of Significant Deterioration (PSD) regulations that restrict emissions and any significant reduction in ambient air quality include protection of national parks and wilderness areas that are designated PSD Class I air quality areas. A new or expanding major air pollutant source is required to estimate potential impact of its emissions on the air quality of any nearby Class I area, as specified by the state or local air regulatory agency, with input from the federal land manager(s) having jurisdiction over the given Class I area(s). The only PSD Class I area within 125 miles of Pickwick Reservoir is Sipsey Wilderness Area, about 25 miles to the south-southeast of the upper end of Pickwick Reservoir.

3.11 Navigation

The commercial navigation channel on Pickwick Reservoir extends from the Pickwick Lock and Dam at TRM 206.7 upstream to the Wilson Lock and Dam at TRM 259.4. The commercial channel was prepared prior to impoundment of the reservoir to provide a year-round channel with a minimum 11-foot depth suitable for towboats and barges with a 9-foot draft. The U.S. Coast Guard maintains the navigation channel buoys and onshore daybeacons marking the commercial navigation channel. Navigation safety

landings and harbors (see Table 3.11-1) have been established at various places along the reservoir to provide safe locations for commercial tows to tie off and wait during periods of severe weather, fog, or equipment malfunction. There are public and private use barge terminals (see Table 3.11-2) on Pickwick Reservoir which handle barge shipments of various commodities.

TVA maintains secondary navigation channel markers and aids for seven tributary channels (approximately 15 miles) for recreational boaters and channel markers or boat hazard buoys at four locations. Secondary navigation channel markers consist of buoys and onshore dayboards which mark the navigable limits of the channel.

Table 3.11-1. Navigation Safety Landings and Harbors		
Parcel*	TRM	Type of Landing or Harbor
Lock	259.1R	Federal Mooring Cells - Wilson Lock
59	239.1L	1 st Class Landing
62	232.7L	1 st Class Landing
64	229.8L	1 st Class Harbor
119	222.6L	2 nd Class Harbor
125	218.7L	1 st Class Harbor
139	215.5L	1 st Class Landing (Federal Mooring Chains)
155	210.8L	1 st Class Landing
155	209.0L	1 st Class Harbor (Federal Mooring Cells)
Lock	207.1L	Federal Mooring Cells - Pickwick Lock

*Under Alternatives B and C, Parcels 62, 64, 119, 125, 139, and 156 are allocated to Zone 4, Natural Resource Conservation, and Parcel 59 to Zone 5, Industrial/Commercial Development. All of these allocations are compatible with these safety landings and harbors.

Table 3.11-2. Barge Terminals				
Tennessee River Mile	Name	Type of Use	Handling Capabilities	Comments
207.8L	Hardin County Port	Public Owned/ Public Use	Dry Bulk-Loading/ Unloading	
215.1L	Muscle Shoals Marine-Fleeting	Private Owned/ Private Use	Fleeting	448.3R Tenn-Tom
215.1L	Yellow Creek State Inland Port Authority	Public Owned/ Public Use	Dry Bulk-Loading/ Unloading	448.2R Tenn-Tom
215.1L	Ergon, Inc.-Yellow Creek	Private Owned/ Private Use	Liquid-Loading/ Unloading	448.2R Tenn-Tom
215.1L	Tri-State Commerce Park	Public Owned/ Private Use	Roll-On, Roll-Off	446.2L Tenn-Tom
238.8L	Cherokee Nitrogen	Private Owned/ Private Use	Dry Bulk-Loading, Liquid-Loading/ Unloading	
245.3L	TVA Colbert Fossil Plant	Public Owned/ Private Use	Dry Bulk-Unloading/ Liquid-Unloading	

Table 3.11-2 (cont.). Barge Terminals				
Tennessee River Mile	Name	Type of Use	Handling Capabilities	Comments
247.4L	Black Eagle Mineral, LLC	Private Owned/ Public Use	Dry Bulk-Loading/ Unloading	
247.9L	Gold Kist Farms	Private Owned/ Private Use	Dry Bulk-Loading/ Unloading	
252.4L	Murphy Oil, U.S.A.	Private Owned/ Private Use	Liquid-Unloading	
253.4L	Estes Oil Company	Private Owned/ Private Use	Liquid-Loading/ Unloading	Inactive
256.6R	AMCOR	Public Owned/ Private Use	Dry Bulk-Unloading	Florence Harbor
256.6R	F & L Sand and Gravel	Public Owned/ Private Use	Dry Bulk-Loading/ Unloading	Florence Harbor
256.6R	Florence-Lauderdale County Port	Public Owned/ Public Use	Dry Bulk-Loading/ Unloading	Florence Harbor
256.6R	Lauderdale County Co-op	Public Owned/ Public Use	Dry Bulk-Loading/ Unloading	Florence Harbor
256.6R	Tennessee Southern Railroad Company	Public Owned/ Private Use	Dry Bulk-Loading/ Unloading	Florence Harbor
256.6R	Muscle Shoals Marine-Fleeting	Public Owned/ Private Use	Fleeting	Florence Harbor
257.9R	Southern Ready Mix	Private Owned/ Private Use	Dry Bulk-Unloading	

3.12 Recreation

Major tributaries include Yellow Creek (Tennessee-Tombigbee Waterway), Bear Creek, Spring Creek and Cypress Creek. Recreation facilities are provided on and adjacent to the reservoir by federal, state, county, municipal, and commercial entities (see Table 3.12 1). Facilities include 12 campgrounds, 21 boat ramps, seven marinas, and three locations with a resort lodge and/or rental cabins.

The Natchez Trace Parkway, a unit of the NPS, Department of the Interior, crosses Pickwick Reservoir at TRM 236.6 and Parkway mile marker 328. It was designated an All-American Road in 1995. In 1983, Congress designated the Parkway as the corridor for the Natchez Trace National Scenic Trail. The Parkway was established to commemorate the original Natchez Trace, a primitive trail stretching 500 miles through the wilderness from Natchez, Mississippi, to Nashville, Tennessee. The original trace followed old American Indian trails and was used by boatmen; traders; and explorers returning to the eastern U.S. after sailing down the Mississippi River; as a federal postal road; and for troop movements during the War of 1812. In 1934, the U.S. Congress commissioned the NPS to survey the old Indian trail known as Natchez Trace and plan a national road along this route. The Parkway was officially established in 1938.

The Tenn-Tom Waterway intersects Pickwick Reservoir at TRM 215.0 via Yellow Creek embayment. It provides opportunities for recreational boating and commercial barge traffic. The waterway provides a direct route to the Gulf of Mexico from the upper Mississippi, Ohio, and Tennessee Rivers. Facilities along the waterway include fishing, camping, wildlife observation, and full-service marinas.

Table 3.12-1. List of Recreation Areas and Associated Facilities							
Facility Location	Camping	Boat Ramp	Marina	Lodging/Cabins	Swim Beach	Picnic	Trails
Pickwick Landing Dam Reservation TRM 206.7	Yes	Yes	No	No	No	Yes	No
Pickwick Landing State Resort Park TRM 207.6L	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bruton Branch State Recreation Area TRM 210.0R	Yes	Yes	No	No	No	No	Yes
Aqua Yacht Harbor TRM 215.1L (448.9R Tenn-Tom)	No	Yes	Yes	No	No	No	No
Grand Harbor Marina (previously known as Tenn-Tom Marina) TRM 215.1L (449.8R Tenn-Tom)	No	Yes	Yes	No	No	No	No
Goat Island Recreation Area TRM 215.1L (446.5R Tenn-Tom)	Yes	Yes	No	No	No	Yes	No
USACE - Public Access Area TRM 215.1L (443.5R Tenn-Tom)	No	Yes	No	No	No	Yes	Yes
J. P. Coleman State Park (Mississippi) TRM 220.0L	Yes	Yes	Yes	Yes	No	Yes	No
Eastport Marina TRM 224.8L	No	Yes	Yes	No	No	Yes	No
Colbert County Park TRM 225.0L (4.5R Bear Creek)	Yes	Yes	No	No	No	Yes	No
Mill Creek Boat Dock TRM 225.0L (7.3L Bear Creek)	Yes	Yes	Yes	Yes	No	No	No
Margerum Boat Ramp TRM 225.0L (14.2R Bear Creek)	No	Yes	No	No	No	No	No
Waterloo Boat Ramp TRM 227.2R	No	Yes	No	No	No	No	No
Waterloo Boat Dock and Campground TRM 227.3R (0.5R Second Creek)	Yes	Yes	No	No	No	Yes	Yes
Waterloo Campground TRM 227.3R (1.0L Second Creek)	Yes	No	No	No	No	Yes	No
Brush Creek Park TRM 231.0R	Yes	Yes	No	No	No	Yes	No
Natchez Trace Parkway - Colbert Ferry Park TRM 236.5L	Yes	Yes	No	No	Yes	Yes	Yes
Natchez Trace Parkway - Lauderdale Park TRM 236.7R	No	No	No	No	No	Yes	No
Cane Creek Boat Ramp TRM 244.0L	No	Yes	No	No	No	No	No
Pride Boat Ramp TRM 246.9L	No	Yes	No	No	No	No	No
Spring Creek Boat Ramp TRM 252.1L (0.3R Spring Creek)	No	Yes	No	No	No	No	No
Sheffield Riverfront Park TRM 253.7L	No	Yes	No	No	No	Yes	Yes
Florence Harbor / McFarland Bottoms Park TRM 256.2R	Yes	Yes	Yes	No	Yes	Yes	Yes

ADCNR manages two WMAs along the reservoir for natural resources management and public recreation purposes. These include Lauderdale WMA, located in Lauderdale County near Waterloo, with 8,211 acres managed for big game and small game, and Seven Mile Island WMA, located in Lauderdale County near Florence, with 4,685 acres managed for waterfowl and small game.

3.13 Visual Resources

The resources that are identifiable from the tailwaters of Wilson Dam to the headwaters of Pickwick Landing Dam render diversity and contribute to the reservoir area's sense of place. These resources include naturally scenic and highly valued landscapes.

The process for identifying areas that are visually significant is difficult and can become subjective. Through an exacting process that begins with identifying the landscape character as a whole, specific areas can be judged comparatively. Professional assessment, using defined methodology and judgment, identifies the uniqueness, and scenic value and consideration is given to the fact that people value highly scenic landscapes.

In recognizing areas for resource conservation and scenic protection, aspects of each area must be evaluated, and when considered as a whole, determine an area's visual resources. These aspects are:

- **Scenic Attractiveness**, the principal indicator of inherent beauty found in the landscape, is comprised of unique natural features, vegetation patterns, cultural features, surface water characteristics, and seasonal characteristics.
- **Scenic Integrity**, the measure as to what degree the landscape character has been altered by human activity.
- **Landscape Visibility** consists of a subset of interrelated characteristics including: the viewing distance, the duration of view, the degree of discernible detail available, the number of viewers, and the relative sensitivity indicating the scenic importance of the area.
 - Viewing distance can affect how observers view an area based on the degree of visible detail, and can be classified into three ranges:
 - ⇒ Foreground distance - within one-half mile of the observer.
 - ⇒ Middleground distance - from one-half mile up to four miles from the observer
 - ⇒ Background distance - beyond four miles from the observer
 - Human sensitivity involves the number of viewers, the frequency and duration of views, and expressed public concern for scenic values of the land under study.

The Pickwick Reservoir is, in landscape character, similar to other reservoirs in the Tennessee River system. There are elements that unify the river system in character and landform, yet there are areas within the Pickwick Reservoir that have distinguishing characteristics.

On land surrounding Pickwick Reservoir, development is concentrated near cities, metropolitan areas, and recreational facilities. The primary source for visual character alteration around the reservoir is in the residential developments on the lower end and in some of the larger embayments. As the landscape around the reservoir has evolved, areas remain that are naturally scenic, and commonly perceived as having high scenic attractiveness and high scenic integrity.

The body of water itself is a prominent visual resource. The form and color of the reservoir provide balance and repetition, which contribute to the character of the area. The horizontal plane that the reservoir creates allows for balance and visual continuity, while contrasting with the shoreline. These elements give the area variety, unity, and harmony which can be appealing.

The undisturbed shoreline adds to the visual character of the reservoir by contrasting the horizontal plane that is formed by the reservoir with strong vertical lines that frame views by observers. A wide variety of colors seen in the forested areas, in the foreground and middleground areas, add to diversity and enhance views. The uninterrupted tree canopies seen in many areas, provide balance and repetition. Rock outcroppings are evident along many areas of the shoreline, sometimes forming small to medium-size bluffs that are distinct and visually prominent.

Islands scattered throughout the reservoir contribute to the visual character of the reservoir by creating focal points and visual accents. Their position, in relation to the shoreline, create depth and help to frame views and define scale. There are seven identified islands, and many smaller, unidentified ones.

Other important visual features include secluded coves with vegetation and wildlife populations. Undisturbed, isolated shoreline areas add to the scenic beauty and help to retain the sense of place. The scenic views and attractive physical features are described in Appendix F. The descriptions include the scenic integrity and scenic value ratings for each section.

3.14 Socioeconomic Impacts

Population

The 2000 population of the four counties in the Pickwick Reservoir area is estimated by the U.S. Bureau of the Census to be 187,691, a 9.4 percent increase over the 1990 population of 171,643 (Tables 3.14-1 and 3.14-2). This growth rate is slightly slower than that of the states home to Pickwick Reservoir, at 11.1 percent, as well as slower than the nation, at 13.1 percent. Of the three counties, Hardin County in Tennessee had the fastest growth rate, 13.0 percent, followed by Lauderdale County, Alabama, 10.4 percent, Colbert County, 6.4 percent, and Tishomingo County, Mississippi, 8.4 percent. Projections indicate that the area will grow faster than the states and the nation over the next 20 years.

Table 3.14-1. Population and Population Projections, 1980-2020					
	1980	1990	2000	2010	2020
Hardin County (TN)	22,280	22,633	25,578	27,456	29,385
Tishomingo County (MS)	18,434	17,683	19,163	20,767	22,505
Colbert County (AL)	54,519	51,666	54,984	57,311	58,934
Lauderdale County (AL)	80,546	79,661	87,966	97,137	107,264
Area Total	175,779	171,643	187,691	202,671	218,088
Tennessee	4,591,023	4,877,203	5,689,283	6,166,000	6,515,000
Mississippi	2,520,770	2,768,619	2,844,658	2,972,000	3,089,000
Alabama	3,894,025	4,040,389	4,447,100	4,794,000	5,090,000
States Total	11,005,818	11,686,211	12,981,041	13,932,000	14,694,000
United States (100s)	226,542	248,791	281,421	299,862	324,927

Source: Historical data from the U.S. Census Bureau; state and county projections from University of Tennessee, Center for Business and Economic Research, *Population Projections for Tennessee Counties and Municipalities*, March 1999 and TVA projections, 2001; U.S. projections are the middle series from the U.S. Census Bureau, Population Division, Population Projections Program.

Table 3.14-2. Percent Change In Population					
	1980-1990	1990-2000	2000-2010	2010-2020	1980-2020
Hardin County (TN)	1.6	13.0	7.3	7.0	31.9
Tishomingo County (MS)	-4.1	8.4	8.4	8.4	22.1
Colbert County (AL)	-5.2	6.4	4.2	2.8	8.1
Lauderdale County (AL)	-1.1	10.4	10.4	10.4	33.2
Area Total	-2.4	9.4	8.0	7.6	24.1
Tennessee	6.2	16.7	8.4	5.7	41.9
Mississippi	9.8	2.8	4.5	3.9	22.6
Alabama	3.8	10.1	7.8	6.2	30.7
States Total	6.2	11.1	7.3	5.5	33.5
United States	9.8	13.2	6.6	8.4	43.4

Labor Force and Unemployment

In 2000, the civilian labor force of the three-county area was 88,365, as shown in Table 3.14-3. Of these, 5,274 were unemployed, yielding an unemployment rate of 6.0 percent. Unemployment rates across Hardin, Tishomingo, Colbert, and Lauderdale Counties were 5.8, 7.6, 6.3, and 5.5 percent, respectively. The four-county rate exceeded that of the states, at 6.0 percent, and the national rate of 4.0 percent.

Table 3.14-3. Labor Force Data, Residents of Pickwick Reservoir Area, 2000			
	Civilian Labor Force	Unemployment	Unemployment Rate (%)
Hardin County (TN)	11,970	690	5.8
Tishomingo County (MS)	9,500	720	7.6
Colbert County (AL)	25,514	1,606	6.3
Lauderdale County (AL)	41,381	2,258	5.5
Area Total	88,365	5,274	6.0
Tennessee	2,798,400	110,200	3.9
Mississippi	1,326,300	75,300	5.7
Alabama	2,154,273	99,092	4.6
States Total	6,278,973	284,592	4.5
United States	140,863,000	5,655,000	4.0

Sources: Tennessee Department of Employment Security; Mississippi Employment Security Commission; Alabama Department of Industrial Relations

Jobs

In 1999, the four-county Pickwick Reservoir area had 92,988 jobs, an increase of 16.7 percent over the level in 1989, as shown in Table 3.14-4. This represents a slightly faster rate of job growth than in the three home states, 23.0 percent, as well as the nation, 19.3 percent. Three of the counties exceeded a 23 percent job growth rate, with Tishomingo County showing the greatest rate of growth, at 24.7 percent. Colbert County lagged far behind the other counties at only 3.4 percent. Over 46 percent of the jobs in the area in 1999 were in Lauderdale County, Alabama.

Manufacturing employment in the Pickwick Reservoir area increased from 1989 to 1999 by 8.0 percent, in contrast to declines experienced in the three-state area (2.2 percent) and the nation (3.7 percent), as shown in Table 3.14-5. Tishomingo County showed the greatest increase at 23.1 percent, followed by Lauderdale County (0.1 percent), Hardin County (-2.4 percent), and Colbert County (-31.6 percent).

Manufacturing is a larger share of the economy of the Pickwick Reservoir area counties than in the home states or the nation. Over 19 percent of the jobs in the area are manufacturing, compared to 15.7 percent in the three states, and 11.8 percent nationally. Tishomingo County has 36.3 percent of its jobs in manufacturing, followed by Hardin County at 25.7, Lauderdale County at 16.9 percent, and Colbert County at 15.7 percent. But as with the nation and the three states, manufacturing employment as a share of total employment has declined from 1989 to 1999 in the three-county Pickwick Reservoir area. The greatest decline occurred in Colbert County, dropping from 23.9 percent to 15.7 percent. Hardin and Lauderdale County also experienced a decline in manufacturing employment share, while Tishomingo counties also experienced a decline in manufacturing employment share, while Tishomingo County's percentage of manufacturing employment remained nearly constant.

Table 3.14-4. Total Employment			
	1989	1999	Percent Change
Hardin County (TN)	9,924	12,254	23.5
Tishomingo County (MS)	7,032	8,768	24.7
Colbert County (AL)t	27,923	28,988	3.4
Lauderdale County (AL)	34,811	42,978	23.5
Area Total	79,690	92,988	16.7
Tennessee	2,753,529	3,437,587	24.8
Mississippi	1,195,967	1,493,441	24.9
Alabama	2,019,441	2,409,612	19.3
States Total	5,968,937	7,340,650	23.0
United States	137,240,800	163,757,900	19.3

Note: Includes full and part-time employment, both wage and salary employees and proprietors.
 Source: U.S. Bureau of Economic Analysis, Regional Economic Information System.

Table 3.14-5. Manufacturing Employment			
	1989	1999	Percent Change
Hardin County (TN)	3,221	3,144	-2.4
Tishomingo County (MS)	2,586	3,184	23.1
Colbert County (AL)	6,665	4,560	-31.6
Lauderdale County (AL)	7,230	7,240	0.1
Area Total	13,037	13,568	4.1
Tennessee	534,526	525,207	-1.7
Mississippi	250,708	250,824	0.1
Alabama	396,583	379,469	-4.3
States Total	1,181,817	1,155,500	-2.2
United States	19,992,500	19,252,700	-3.7

Note: Includes full and part-time employment, both wage and salary employees and proprietors.
 Source: U.S. Bureau of Economic Analysis, Regional Economic Information System.

Occupation Patterns

As shown in Table 3.14-6, the Pickwick Reservoir area (as of 1990) has a smaller proportion of its workers in managerial and professional jobs (18.6 percent) than the three states (22.4 percent) or the nation (26.4 percent). This pattern also holds true for technical, sales, and administrative workers. Conversely, the four-county area has a higher percentage of workers in precision production, craft, and repair, as well as operators, fabricators, and laborers. Operators, fabricators, and laborers constitute 34.4 percent, 22.4 percent, 36.0 percent, and 24.4 percent of workers in Hardin, Lauderdale,

Tishomingo, and Colbert Counties, for a four-county average of 25.9 percent, compared with 20.8 percent for the four states and 14.9 percent for the nation.

Table 3.14-6. Occupation of Workers (Percent Distribution, 1990)					
Occupation	Hardin	Colbert	Lauderdale	Tishomingo	Area Total
Managerial and Professional	13.6	18.5	20.9	14.8	18.7
Technical, Sales, Administrative	22.7	26.6	26.8	21.1	25.2
Service Occupations	10.7	12.3	11.7	9.2	11.2
Farming, Forestry, Fishing	4.0	1.9	2.1	2.5	2.5
Precision Production, Craft, Repair	14.7	16.3	16.1	16.5	15.9
Operators, Fabricators, Laborers	34.4	24.4	22.4	36.0	26.6
Occupation	Alabama	Mississippi	Tennessee	States Total	United States
Managerial and Professional	22.7	21.5	22.6	22.4	26.4
Technical, Sales, Administrative	29.4	28.3	30.1	29.5	31.7
Service Occupations	11.9	12.3	12.4	12.2	13.2
Farming, Forestry, Fishing	2.3	3.4	2.2	2.5	2.5
Precision Production, Craft, Repair	13.0	13.0	12.2	12.6	11.3
Operators, Fabricators, Laborers	20.7	21.6	20.5	20.8	14.9

Source: U.S. Bureau of the Census, Census of Population 1990

Income

Per capita income in the Pickwick Reservoir area (\$20,278) trailed the three states (\$23,590) and the nation (\$28,546), as of 1999. Per capita personal income in the area increased by 51.4 percent from 1989 to 1999 (see Table 3.14-7). This trailed the three state increase of 59.5 percent, and the national increase of 53.8 percent. Hardin County had the greatest increase at 79.5 percent, followed by Tishomingo (57.2 percent), Colbert (51.3 percent), and Lauderdale (44.2 percent).

Table 3.14-7. Per Capita Personal Income			
	1989	1999	Percent Change
Hardin County (TN)	11,281	20,246	79.5
Tishomingo County (MS)	10,759	16,908	57.2
Colbert County (AL)	14,260	21,575	51.3
Lauderdale County (AL)	14,587	21,036	44.2
Area Total	13,657	20,664	51.3
Tennessee	15,883	25,548	60.9
Mississippi	12,540	20,686	65.0
Alabama	14,899	22,972	54.2
States Total	14,786	23,590	59.5
United States	18,566	28,546	53.8

Source: U.S. Department of Commerce, Bureau of Economic Analysis

3.15 Environmental Justice

Minorities account for 12.7 percent of the population in the Pickwick Reservoir area (Table 3.15-1). This is far below the three state and the national levels, which are 27.9 and 30.9 percent respectively. Minority population is defined as nonwhite persons and white Hispanics (nonwhite Hispanics are included in the nonwhite figure). None of the counties has a minority population that approaches the three state or national percentages. Colbert County is the greatest at 19.1 percent. Overall, the poverty level in the four-county area at 14.3 percent is lower than the three state average of 15.5 percent, but higher than the national figure of 13.3 percent.

Table 3.15-1. Minority Population, 2000, and Poverty, 1997					
	Population	Minority Population			Poverty
	Total	Nonwhite	White Hispanic	Percent Minority	Percent Below Poverty Level
Hardin County (TN)	25,578	1,301	178	5.1	18.3
Tishomingo County (MS)	19,163	971	125	5.7	13.9
Colbert County (AL)	54,984	10,159	355	19.1	13.5
Lauderdale County (AL)	87,966	10,223	503	12.2	13.3
Area Total	187,691	22,654	1,161	12.7	14.3
Tennessee	5,689,283	1,125,973	57,380	20.8	13.6
Mississippi	2,844,658	1,098,559	18,191	39.3	18.1
Alabama	4,447,100	1,284,292	36,989	29.7	16.2
States Total	12,981,041	3,508,824	112,560	27.9	15.5
United States	281,421,906	69,961,280	16,907,852	30.9	13.3

Source: Estimates by the U.S. Bureau of the Census