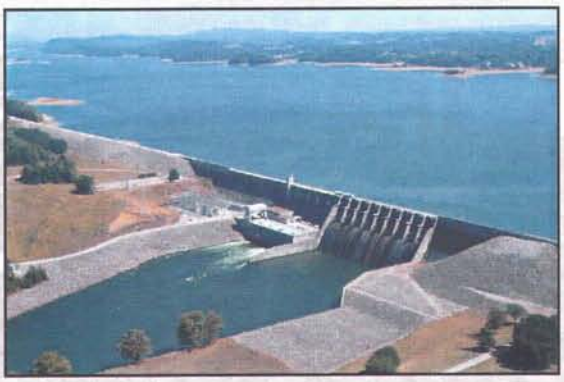
Environmental Assessment and Land Management Plan

Cherokee Reservoir



July 2001

ENVIRONMENTAL ASSESSMENT
CHEROKEE RESERVOIR LAND MANAGEMENT PLAN

RESOURCE STEWARDSHIP
Lower Holston River Watershed

TENNESSEE VALLEY AUTHORITY

July, 2001

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1. PURPOSE OF AND NEED FOR ACTION

1.1 Background

As a part of the effort to provide power to industries preparing for World War II, Cherokee Dam was completed on December 5, 1941, well ahead of schedule. The first power-generating unit was placed in operation April 16, 1942 (TVA, 1946). The Tennessee Valley Authority created the 6,760-foot long, 175-foot high dam at Holston River Mile 52.3. It is located about one-third of a mile upstream from State Highway 92 bridge between Rutledge and Jefferson City, 28 miles northeast of Knoxville, and 33 miles east of TVA's Norris Dam. Cherokee Dam takes its name from the Cherokee Tribe of Indians who at one time lived in large numbers throughout east Tennessee.

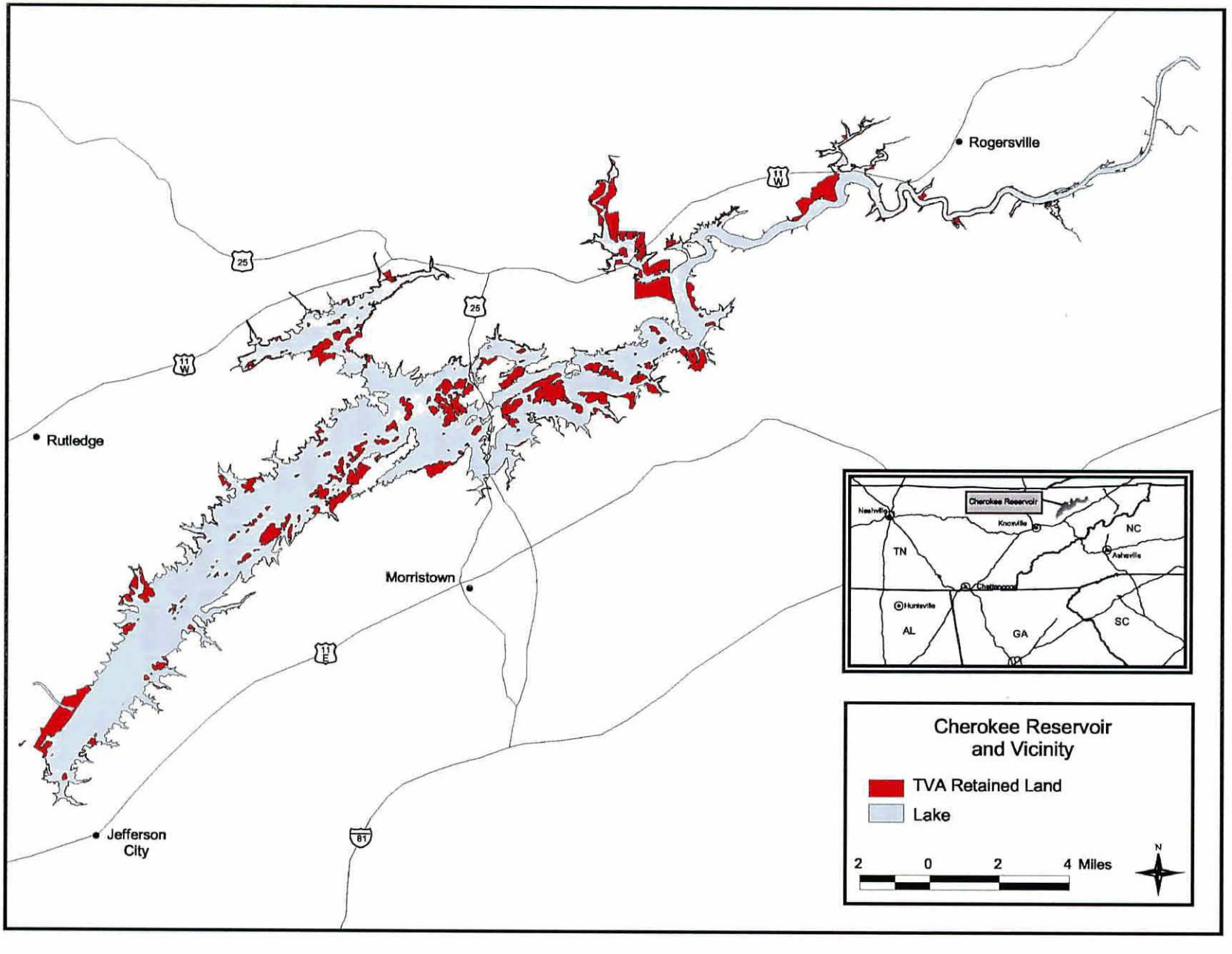
Cherokee Dam and Reservoir form an integral unit in the overall system of water control projects in the Tennessee Valley. As a multipurpose project, it provides power production, navigation, regional economic development, and recreation. It lies in portions of Jefferson, Hamblen, Grainger, and Hawkins Counties. Nearby communities include Jefferson City, Morristown, and Rogersville.

From the dam site, Cherokee Reservoir extends 54 river miles upstream to John Sevier Detention Dam and covers 31,240 acres at the top of the gates (summer pool), elevation 1,075-foot mean sea level (msl). At its winter pool elevation (1,020 msl), the reservoir covers about 12,360 acres. Cherokee Reservoir has a total of 336 miles of mainland shoreline (4 miles of John Sevier Fossil Plant property) and, at elevation 1075 msl, islands have 60 miles of shoreline. About 297 miles (75 percent) of shoreline are TVA-owned and 99 miles of shoreline is privately owned. The reservoir captures drainage from a watershed of 3,776 square miles in Tennessee, North Carolina, and Virginia. This watershed accounts for roughly 9 percent on the entire Tennessee River drainage basin (TVA, 1946).

Sales and transfers of land for economic, industrial, residential, or public recreation development has resulted in a current net balance of 8,187 acres of public land on Cherokee Reservoir. Approximately 75 percent of the shoreline remains undeveloped (TVA, 1998). See Figure 1.1-1.

Originally, TVA acquired 45,158 acres of land for the reservoir. TVA acquired fee title to 15,950 acres of land above the top of the gates of Cherokee Dam (elevation 1,075 msl). TVA acquired the right to flood (i.e., flowage easement) approximately 740 acres of private land (TVA, 1946).

Figure 1.1-1 Map of Cherokee Reservoir



Of the 15,950 acres of land above elevation 1075 msl, fee title was acquired to 4,785 acres with the grantor retaining the right of agricultural use, leaving 11,165 acres in complete custody of TVA (TVA, 1946). Third party agricultural rights remain today over most of the land where such rights were originally left outstanding.

1.2 Purpose and Need for Action

The purpose of this Environmental Assessment (EA) is to examine the impacts of reasonably likely future alternative uses of TVA's remaining land on Cherokee Reservoir. In order to systematically manage its land, TVA develops reservoir land management plans. These plans seek to integrate land and water resources issues in decision-making, provide for the optimum public benefit, and balance competing and sometimes conflicting resource uses. By providing a clear statement of how TVA manages its land and by identifying each parcel for specific purposes, TVA attempts to balance conflicting land uses and facilitate decision-making. Plans are approved by the TVA Board of Directors and adopted as agency policy to provide for long-term land stewardship and accomplish TVA responsibilities under the TVA Act of 1933.

Reservoir land management plans have been completed and implemented for seven mainstream reservoirs. These include Kentucky, Pickwick, Wheeler, Guntersville, Nickajack, Chickamauga, and Watts Bar Reservoirs. Also, more recently, five tributary reservoirs (i.e., Boone, Melton Hill, Tellico, Tims Ford Reservoirs, and the Bear Creek Projects) have been planned. TVA is now updating the plan for a selected mainstream reservoir (i.e., Guntersville Reservoir).

1.3 Other Pertinent Environmental Reviews or Documentation

Tennessee River and Reservoir System Operation and Planning Review (TVA, 1990). In December 1990, TVA completed an Environmental Impact Statement (EIS) addressing changes to the operation of its reservoir system, with emphasis on water quality and reservoir levels. In this EIS, TVA also addressed the environmental and socioeconomic consequences of changes in reservoir operations on land and shoreline development. Following completion of the review, TVA delayed the late summer drawdown of tributary reservoirs until August 1. It also began a system-wide program, now nearing completion, to improve water quality below dams.

Shoreline Management Initiative (SMI): An Assessment of Residential Shoreline Development Impacts in the Tennessee Valley (TVA, 1998). In 1999, TVA completed an EIS on residential shoreline development impacts throughout the Tennessee Valley. The Record of Decision (ROD) for SMI was signed on May 24, 1999. Under the Blended Alternative adopted in the

ROD, sensitive natural and cultural resource values of reservoir shorelines would be conserved and retained by: (1) preparing a shoreline categorization for individual reservoirs; (2) encouraging voluntary donations of conservation easements to properties over which TVA holds a flowage easement (i.e., property over which TVA has the right to flood) or other shoreland to protect scenic landscapes; and (3) establishing a policy that no additional residential access rights will be granted across public shorelines unless a "maintain and gain" proposal to prevent losses of public shoreline is implemented.

Noeton Management Unit - Cherokee Reservoir - Resource Management Plan and Environmental Assessment (TVA, 1999a). In June 1999, TVA completed an EA on plans to manage the 532-acre Noeton Management Unit on Cherokee Reservoir. TVA proposed numerous activities for management of forest, wildlife, and other resources over the next 25 years. The potential environmental impacts of three alternatives were evaluated in the EA. Alternatives included: Current Management (No Action Alternative, or Alternative A), No Management (Alternative B), and Proposed Resource Management Plan (Alternative C). Under any of the three alternatives, the EA found that impacts to ecological communities, sensitive natural resources, cultural resources, water quality, air quality, and visual resources would be insignificant. Alternative C, which included construction of a loop road and development of reservoir access sites, would result in improvements in the quality of available wildlife habitats, improved forest management, and better access for recreational users. Outdoor recreation activities, including hunting, fishing, bicycling, camping, and wildlife viewing, would be enhanced. Because of these benefits, TVA adopted Alternative C as its preferred alternative.

Agricultural Lands Licensing for 1999-2003 Crop Years - Northeast Region, Land Management - Boone, Cherokee, Douglas, Norris, and South Holston Reservoirs and the Clinchport River Access Site in Anderson, Campbell, Claiborne, Grainger, Hamblen, Hawkins, Jefferson, Sevier, Sullivan, Union, and Washington Counties, Tennessee and Scott and Washington Counties, Virginia (TVA, 1999c). In January 1999, TVA completed an EA on licensing of TVA land in the Northeast Region for agricultural use. TVA proposed to license 72 tracts totaling 1,029 acres for a 5-year cycle. The EA evaluates the potential environmental impacts of issuing all or a portion of the licenses (Action Alternative) and of not taking any action (No Action Alternative). Under the Action Alternative, TVA would re-license land for the 1999 through 2003 crop years. The majority (646 acres) would be licensed for hay crop production. The remainder would be licensed for hay/pasture (379 acres), garden space (10 acres), or row crops (4 acres).

Under the No Action alternative, the land would not be licensed for agriculture and would likely be allowed to revert to early successional vegetation. Under the Action Alternative, TVA determined that there would be no effect on cultural resources or endangered and threatened species. There would likely be insignificant water quality impacts and insignificant impacts to aquatic biota due to nonpoint source pollution from pasture land. Existing Agricultural Best Management Practices (BMPs), which are part of the agricultural license agreement, would protect wetlands, water quality, and aquatic life. Under the No Action Alternative, there would be no new impacts to environmental resources. Over time, vegetation growth and natural succession would result in some local improvements to water quality and aquatic ecology. After review of the EA, TVA found that the proposed licensing of 72 tracts for agricultural use would not have a significant impact on the quality of the environment. Because of the beneficial uses of these lands, TVA adopted the Action Alternative and licensed 217 acres of land for agricultural use on Cherokee Reservoir.

1.4 The Decision

The TVA Board of Directors will decide whether to adopt a new Cherokee Reservoir Land Management Plan (Plan) to guide the allocation and future use of TVA land on Cherokee Reservoir or continue the use of the existing Forecast System for making land use decisions.

1.5 Public Involvement and Issue Identification

In April 1999, an article was published in *TVA River Neighbors* announcing that land use planning was underway on Cherokee Reservoir. This publication was sent to over 20,000 people inside and outside the Tennessee Valley. Only five people responded by calling 1-800-TVALAND and asking to be placed on the mailing list. This 1-800 number is still available for anyone to call and request to be added to the mailing list. Based upon permits and other authorizations issued on the reservoir as well as stakeholder contacts, including peer agencies and local government officials, approximately 800 individuals and organizations were mailed notification of development of this Plan (see Section 4.2, List of Agencies and Persons Consulted).

During the summer of 1999, TVA sought comments from citizens and recreational users of Cherokee Reservoir in several ways. A questionnaire was sent to individuals requesting inclusion on the mailing list and other interested parties soliciting their comments about their valued and preferred uses of Cherokee lands. They were also asked about the watershed surrounding the reservoir and to identify important issues that need to be addressed over the life of the Plan. Questionnaires were distributed to various users on the reservoir as well as distributed to merchants (i.e., hunting, fishing, and specialty stores) and visiting fishermen, picnickers, and campers on the Cherokee Dam Reservation. A similar

questionnaire was developed for local county and city officials, area planning organizations, and other stakeholder groups, concerning land use on Cherokee Reservoir. Approximately 700 questionnaires were distributed in the area, and 187 survey responses (27 percent) were returned. The survey results are provided in Appendix A-2 (also see the questionnaire in Appendix I of the Scoping Results [Appendix A-2]).

Beginning on August 8, 1999, solicitation of public input included a public notice and other news releases in newspapers and other media outlets throughout the four-county region. Comments were requested by August 31, and none were received. The notice also invited interested citizens to a public meeting scheduled for August 26. This meeting, to discuss the land planning process and the status of TVA's efforts, was held in Morristown and attended by 21 people.

Various state and federal agencies were asked to participate in the Cherokee Land Planning Process by providing comments on the proposal to develop a plan. Agencies were also asked to provide information concerning proposed or ongoing activities affecting Cherokee Reservoir. These organizations include the U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, the Tennessee Wildlife Resources Agency (TWRA), and the Tennessee Division of Forestry. TVA staff also solicited input from representatives of organizations that use or are concerned with natural resource conservation issues on Cherokee Reservoir. These interest groups included the Tennessee Conservation League, Quail Unlimited, National Wildlife Federation, National Wild Turkey Federation, Ducks Unlimited, and Twin Lakes Beagle Club. Similarly, these groups were asked to participate in the planning process by providing information about proposed or ongoing activities and land use issues around Cherokee Reservoir.

In early April 2001, TVA released the Draft EA and Plan for public and agency review. Notification or the availability of the Plan or copies were sent to approximately 750 individuals, 18 agencies, and 14 other interested groups and organizations. Comments from the public were requested by May 16 and agencies were asked to comment by May 18. A public open house was held in Morristown on April 24. It was attended by 28 people representing Morristown city officials, TWRA, Cherokee Lake Users Association, Realtors, dock operators, and shoreline property owners. Responses from 28 individuals and organizations were received. One set of comments, in support of Alternative B, included a petition with 59 signatures from individuals in counties adjoining the reservoir. The majority of the comments were in support of Alternative B. The responses from these groups are provided in Appendix A-3.

Issue Identification – Initial internal scoping and historical information as well as comments from the general public, public officials, stakeholders, peer agencies, and focus groups were used to identify the following resources/issues that are considered in this EA:

- Visual Resources
- Cultural Resources
- Endangered and Threatened Species
- Terrestrial Ecology
- Wetlands and Riparian Areas
- Recreation
- Water Quality
- Aquatic Ecology
- Socioeconomics
- Navigation
- Prime Farmland

The following resources, also identified in scoping, are not likely to be among those affected by the proposed alternatives because of the location and nature of uses allocated:

- Floodplains
- Noise
- Air Quality

1.6 Necessary Federal Permits or Licenses

No federal permits are required to develop a reservoir land management plan. To the extent possible, site-specific information on reservoir resources has been characterized in this EA, and potential impacts on these resources were considered in making land use allocations. Agencies administering laws associated with the development of wetlands, protection of endangered species, and preservation of historic properties were consulted during this planning process. In the future when specific actions, such as construction of a dock, building, road, or walking trail, are proposed that could affect sensitive resources, additional environmental review would be necessary in conjunction with the permitting or other action being undertaken by TVA.

2. ALTERNATIVES, INCLUDING THE PROPOSED ACTION

This chapter describes the alternatives for implementing the proposed action and summarizes the environmental consequences associated with each alternative.

2.1 The Proposed Action

The proposed action is to formulate a new and comprehensive Plan for TVA land on Cherokee Reservoir. The Plan (Appendix A-1) is intended to provide a clear statement of how TVA would manage its land in the future, based on scientific, cultural, and economic principles. This Plan makes land allocations taking into account the presence of sensitive resources, and the issues and other concerns raised by stakeholders. Using the Plan, TVA also seeks to integrate management of land and water resources to optimize public benefits and to balance competing, and sometimes conflicting, resource uses. The Plan is intended to guide TVA resource management and property administration decisions for the next 10 years. It identifies the proposed range of uses for 149 parcels of TVA public land.

2.2 Alternatives

TVA is considering two alternatives for making land use decisions for the 8,187 acres of its land around Cherokee Reservoir. Under the No Action Alternate (Alternative A), TVA would continue to use the existing Forecast System (Forecast) of designated land uses. Under the Action Alternative (Alternative B), TVA would use the proposed land allocations in the Cherokee Plan to guide future land use decisions.

Agricultural Rights

Regardless of whether Alternative A or B is adopted by TVA, existing third party agricultural land use rights would remain outstanding over a substantial amount of the planned public land on Cherokee Reservoir. TVA does not monitor private individuals who chose to exercise these deeded rights. Such rights can be exercised without prior approval or authorization from TVA and, therefore, there is no federal control or responsibility. Pasture or hay production is generally the kind of agricultural use on lands where such rights are being exercised. Potential effects on terrestrial ecology, threatened and endangered species, and the environment in general that could result from the exercise of these rights cannot be anticipated nor can TVA be held responsible. The potential impacts resulting from the exercise of the retained agricultural rights would not differ between alternatives.

Significant Managed Areas

Regardless of whether Alternative A or B is adopted, Berry Island, currently designated as a research natural area under the Forecast System, would keep its designation (and be managed as a research natural area) for the life of this plan. Under Alternative B, the Allocation Alternative, TVA will expand the Berry Island ESA (Parcel 57) to include an additional 10.7-acre stand of old-growth hardwoods. Based on survey findings and data collected during this planning process, TVA's Regional Natural Heritage Project staff has recommended TVA Natural Areas designation for all or portions of six parcels totaling about 451 acres. Therefore, under Alternative B, portions of Parcels 36 (42 acres), 43 (9 acres), 59 (184 acres), 73 (90 acres), and 90 (26 acres) and all of Parcel 46 (100 acres) will be designated in the plan as Habitat Protection Areas (HPA) due to the presence of state-listed plant species, caves or other sensitive resources. The remainder of Parcel 90 surrounding the interior HPA will be further studied for potential designation as a TVA Small Wild Area during the resource management unit planning process.

Residential Shoreline

Regardless of whether Alternatives A or B is adopted by TVA, either planning strategy will be implemented consistent with the current TVA Shoreline Management Policy (SMP) (TVA, 1998). Therefore, a common feature of both alternatives is categorization of the residential and flowage easement shoreline. The amount and management of residential shoreline are the same under either alternatives.

In accordance with the SMP, the following three categories will be used:

- **Shoreline Protection** is designated for shoreline segments that support sensitive ecological resources, such as federally-listed threatened or endangered species, high priority state-listed species, wetlands with high function and value, archaeological or historical sites of national significance, and certain navigation restriction zones. Within this category, all significant resources would be protected.

- **Residential Mitigation** is intended for shoreline segments where resource conditions or certain navigation restrictions would require special analysis of individual development proposals, additional data, or specific mitigation measures. Requests for water-use facilities and other permissible shoreline development would be considered as long as the request is consistent with SMP provisions.

- **Managed Residential** is depicted along shoreline segments where no sensitive resources are known to exist. Requests for water-use facilities and other permissible shoreline development would be considered as long as the request is consistent with SMP provisions.

An environmental review would be completed for any proposed shoreline alteration that would affect TVA land or land rights below elevation 1080 msl. The most common proposals on residential access shoreline include dock, piers, ramps, shoreline stabilization, and vegetation management and removal.

In recent years, resource inventories for threatened and endangered species, wetlands, and cultural resources were conducted and the results used to categorize the residential access shoreline as shown in Table 2.2-1. Cherokee Reservoir has a total of 396 miles of shoreline from the dam to TVA's John Sevier Detention Dam; this includes 60 miles of island shoreline. Of this amount, 297 miles (75 percent) of shoreline are TVA-owned and "plannable," while 99 miles of shoreline are privately owned. TVA-owned islands, which are included in the Plan, have no residential access shoreline.

The 144 miles of residential access shoreline on Cherokee Reservoir includes the privately-owned land (Zone 1) over which TVA has flowage easements (i.e., the right to flood). Excluding islands, residential access (Zones 1 and 7) shoreline represents 43 percent of the 336 miles of total shoreline miles. Approximately 34 miles (24 percent) of the residential shoreline has historic resources or the potential for their occurrence; 40 miles (28 percent) has sensitive plant and/or animal habitat present; and 46 miles (32 percent) has wetland vegetation. Field survey results showed that 94 miles (65 percent) of residential access shoreline contain no known archaeological sites; 77 miles (53 percent) contain no known sensitive plants or animals; and 98 miles (68 percent) contain no known wetlands.

Depending on the vulnerability and national significance of these resources, the shoreline segments were placed in either the Shoreline Protection, Residential Mitigation, or Managed Residential Categories. Although a large percentage of residential access shoreline presently has sensitive resources, no historic properties listed on the *National Register of Historic Places* or eligible for such listing are known to be present. Sites on Cherokee known to have significant historic properties do not occur on residential access shorelines. No federally-listed plants and six species (11 new occurrences) of Tennessee state-listed plants were found on TVA land during field inventories. Although habitat capable of supporting some rare plants was found on some shoreline, no state-listed plants are known to be present. No federally-listed animals were found on residential access shoreline. Bald eagle, federally-listed as threatened, and all populations of state-listed animals found on Cherokee Reservoir are stable or increasing in east Tennessee and across the Tennessee Valley. Evidence of the federally endangered gray bat's use of reservoir land is limited to a single cave on Parcel 59. Areas of

wetland vegetation are typically very small and along the shore fringe or below summer pool elevation (1075 msl).

When the above mentioned three sensitive resource components are mapped, the result is that 63 miles (44 percent) of the total residential shoreline is categorized as Managed Residential, 81 miles (56 percent) is categorized as Residential Mitigation, and 0 (zero) miles (0 percent) is categorized as Shoreline Protection (Table 2.2-1). This represents about 24 percent and 19 percent of the total mainland reservoir shoreline, respectively.

Although the privately-owned land is not included, only about 3 percent (275 acres) of the TVA land would be available for residential access (Zone 7). Land allocated to Zones 3 and 4 would cover 58 percent of the mainland shoreline or 68 percent of the total reservoir shoreline.

Table 2.2-1 Existing Residential Shoreline Categorization

	Residential Access Shoreline		**Total Mainland Reservoir Shoreline**
Category	**Miles**	**Percent**	**Percent**
Shoreline Protection	0.00	0.00	0.00
Residential Mitigation	80.7	56.2	24.0
Managed Residential	62.9	43.8	18.7
Total	**143.6**	**100.00**	**42.7**

Although no shoreline has been designated to the Shoreline Protection category in the initial decision by TVA, it is possible some areas could be identified in the future during the life of the Plan. Should such shoreline be identified, docks and other alterations would not be permitted on lands within the Shoreline Protection category because of the occurrence of significant sensitive natural resources. By contrast, requests for docks or residential shoreline development in the Residential Mitigation or Managed Residential categories would be considered by TVA as long as the proposed construction is in compliance with SMP and other TVA policies. However, development restrictions or mitigation may be necessary along shoreline categorized as Residential Mitigation.

As new data are collected on the spatial location and significance of endangered species, wetlands, and cultural resources, TVA expects that adjustment to shoreline categorization boundaries may be necessary. Over time, some Shoreline Protection or Residential Mitigation areas could be moved into the Managed Residential category if new resource information warrants such a change. Similarly, some Managed Residential areas could be changed Shoreline Protection or Residential Mitigation areas if new information supports such a change.

Interested individuals and property owners should check with the Cherokee/ Douglas Watershed Team Office for the current status of an area.

2.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, TVA would continue to use the reservoir land use Forecast System. The Forecast for Cherokee Reservoir was developed by TVA staff in March 1962 (last updated in 1974). It has historically been used to guide land use decision-making and documents actual and prospective uses of TVA land surrounding the reservoir. When a proposal is received from an external applicant or an internal TVA organization, the proposed land use is evaluated for consistency with the Forecast. Along with potential environmental effects and need for use by TVA programs, forecast use is a consideration in review of land use proposals.

The Forecast System divides reservoir land into two categories: TVA-retained land and Surplused and Conveyed land. The Forecast designation categories are defined in Table 2.2.1-1. Certain land on Cherokee Reservoir has been surplused (no longer needed to fulfill agency mission or support programs) and conveyed (sold or transferred to others), while other land has been retained (still retained TVA fee-owned property) for various beneficial uses, including natural resources management, recreation, water-treatment facilities, sewer lines, pump station, and utility and highway rights-of-way. Under Alternative A, these uses of TVA land would continue.

Also, under Alternative A, 583 acres of Cherokee Reservoir land are unplanned and currently designated as "No Forecast." These areas represent land where TVA staff did not identify a prospective use or a program interest.

Table 2.2.1-1 Forecast Designation Definitions for Cherokee Reservoir

Forecast Designation	Definition
Dam Reservation	*Land managed to protect the integrity of the dam and associated switchyards and power lines.* Most TVA dam reservations provide a visitor reception building that overlooks the facilities. Day use recreational activities such as picnicking, fishing, hiking, and bird watching are encouraged. Campgrounds and boat-launching facilities are often available. Generally speaking, maintenance levels and care of the facilities are higher on dam reservation land than on other areas of the reservoir. Hunting and unregulated camping are generally prohibited on the reservations.
Public Recreation	*Land set aside for use by the general public for recreational activities.* This includes informal, dispersed activities such as hunting, hiking, fishing, and primitive camping, as well as more formal activities in developed areas such as parks, boat-launching areas, and campgrounds.
Reservoir Operations (*Islands*)	*Islands in the mainstream or tributaries used for informal, dispersed recreation and natural resource management projects.*
Reservoir Operations (*Mainland*)	*Generally narrow bands of shoreland retained by TVA for flood control and other reservoir operations purposes.* Although there are no outstanding rights to construct water-use facilities, TVA allowed backlying residential property owners to construct facilities on these lands until 1992. Since 1992, facilities have only been allowed on reservoir operations land in those areas where existing facilities have been permitted.
Power Transmission and Power Needs	*Land reserved for future power development or to maintain the integrity of existing power lines.* Interim wildlife enhancement projects are often implemented on these lands.
Commercial Recreation	*Land that TVA has reserved primarily for commercial use.* This use includes, but is not limited to, marinas, commercial boat docks, and campgrounds. Informal, dispersed recreational activities often occur on this land as an interim use.
Industrial	*Land that TVA identified as having potential for future industrial development.* Informal, dispersed recreational activities often occur on this land as an interim use.

Table 2.2.1-1 Forecast Designation Definitions for Cherokee Reservoir	
Forecast Designation	**Definition**
Small Wild Areas	*Land that TVA identified as having exceptional natural, scenic or aesthetic qualities that are suitable for low-impact public use.* Where appropriate, development could include foot trails, signs, parking areas, and primitive camping, and efforts can be undertaken to encourage public use and interpretation for visitors.

Table 2.2.1-2 summarizes the Forecast designation of the retained land tracts on Cherokee Reservoir. The Cherokee Reservoir Forecast designation map represents Alternative A, the "No Action Alternative."

Table 2.2.1-2 Summary of Forecast Designations for Cherokee Reservoir	
Forecast Name	**Acres**
Dam Reservation	540.6
Reservoir Operations	1,658.6
Public Recreation	4,317.5
Commercial Recreation	133.3
TVA Small Wild Area	13.5
Industrial	493.7
Power Transmission	446.6
No Forecast	583.1
Total:	**8,186.9**

2.2.2 Alternative B – Allocation Alternative

Alternative B for the proposed Cherokee Reservoir Land Management Plan was developed using information obtained from the public, existing and newly collected field data (both on land and resources conditions), and technical knowledge from TVA staff. It would allocate parcels of land into zones that emphasize allowing appropriate uses while conserving the natural environment around the reservoir and protecting sensitive resources. Each parcel of land was reviewed to determine its physical capability for supporting certain uses, suitable uses, and future land needs. Information on future land needs was gathered from meetings with the public, local and state officials, letters, and surveys. Based on this information, the Cherokee Reservoir Planning Team (see Appendix B-1 for

list of team members) allocated land parcels to one of six categories or planning zones. These are described in Table 2.2.2-1. Compatible public works/utilities projects proposed in any zone will not require an allocation change. A description of the planning process is included in Appendix A-1.

Table 2.2.2-1 Planned Land Use Zone Definitions

Zone		Definition
1	**Non-TVA Shoreland**	Shoreland located above summer pool elevation that TVA does not own in fee or land never purchased by TVA. TVA is not allocating private or other non-TVA public land. This category is provided to assist in comprehensive evaluation of potential environmental impacts of TVA's allocation decision. Non-TVA shoreline includes: • ***Flowage easement land***—Privately or publicly owned land where TVA has purchased the right to flood, limit structures, and/or other minor rights. Flowage easement rights are generally purchased to a contour elevation. All structures on TVA flowage easement land should have Section 26a permits. SMP guidelines addressing vegetation management do not apply. • ***Privately owned reservoir land***—This is land never purchased by TVA and may include, but is not limited to, residential, industrial, commercial, or agricultural land. This land, lying below the 500-year flood elevation, is subject to TVA's 26a approvals for structures.
2	**TVA Project Operations**	All TVA reservoir land currently used for TVA operations and public works projects includes: • ***Land adjacent to established navigation operations***—Locks, lock operations and maintenance facilities, and the navigation work boat dock and bases. • ***Land used for TVA power projects operations***—Generation facilities, switchyards, and transmission facilities and rights-of-way. • ***Dam reservation land***—Areas used for developed and dispersed recreation, maintenance facilities, Watershed Team offices, research areas, and visitor centers. • ***Navigation safety harbors/landings***—Areas used for tying off commercial barge tows and recreational boats during adverse weather conditions or equipment malfunctions. • ***Navigation day-boards and beacons***—Areas with structures placed on the shoreline to facilitate navigation. • ***Public works projects***—Includes fire halls, public water intakes, public treatment plants, etc. (These projects are placed in this category as a matter of convenience and may not relate specifically to TVA projects.) • ***Land planned for any of the above uses in the future.***

Table 2.2.2-1 (cont.) Planned Land Use Zone Definitions

Zone		Definition
3	**Sensitive Resource Management**	Land managed for protection and enhancement of sensitive resources. Sensitive resources, as defined by TVA, include resources protected by state or federal law or Executive Order and other land features/natural resources TVA considers important to the area view-shed or natural environment. Recreational activities such as hunting, wildlife observation, and camping on undeveloped sites may occur in this zone, but the overriding focus is protecting and enhancing the sensitive resource the site supports. Areas included are: • TVA-designated sites with potentially ***significant archeological resources.*** • TVA lands with ***sites/structures listed on or eligible for listing on the National Register of Historic Places.*** • ***Wetlands***—Aquatic bed, emergent, forested, and scrub-shrub wetlands as defined by TVA. • ***TVA land under easement, lease, or license to other agencies/individuals for resource protection purposes.*** • ***TVA land fronting land owned by other agencies/individuals*** for resource protection purposes. • ***Habitat Protection Areas***—These TVA Natural Areas are managed to protect populations of species identified as threatened or endangered by the U.S. Fish and Wildlife Service (USFWS), state-listed species, and any unusual or exemplary biological communities/geological features. • ***Ecological Study Areas***—These TVA Natural Areas are suitable for ecological research and environmental education by a recognized authority or agency. They typically contain plant or animal populations of scientific interest or are of interest to an educational institution that would utilize the area. • ***Small Wild Areas***—These TVA Natural Areas are managed by TVA or in cooperation with other public agencies or private conservation organizations to protect exceptional natural, scenic, or aesthetic qualities that can also support dispersed, low-impact types of outdoor recreation. • ***River corridor with sensitive resources***—A river corridor is a linear green space along both stream banks of selected tributaries entering a reservoir managed for light boat access at specific sites, riverside trails, and interpretive activities. These areas will be included in Zone 3 when identified sensitive resources are present. • ***Significant scenic areas***—These are areas designated for visual protection because of their unique vistas or particularly scenic qualities. • ***Champion tree site***— Areas designated by TVA as sites that contain the largest known individual tree of its species in that state. The state forestry agency "Champion Tree Program" designates the tree, while TVA designates the area of the sites for those located on TVA land. • ***Other sensitive ecological areas***—Examples of these areas include heron rookeries, uncommon plant and animal communities, and unique cave or karst formations. • ***Land planned for any of the above uses in the future.***

Table 2.2.2-1 (cont.) Planned Land Use Zone Definitions

Zone		Definition
4	**Natural Resource Conservation**	Land managed for the enhancement of natural resources for human use and appreciation. Management of resources is the primary focus of this zone. Appropriate activities in this zone include hunting, forest management, wildlife observation, and camping on undeveloped sites. Areas included are: • ***TVA land under easement, lease, or license*** to other agencies for wildlife or forest management purposes. • ***TVA land fronting land owned by other agencies*** for wildlife or forest management purposes. • ***TVA land*** managed for wildlife or forest management projects. • ***Informal recreation areas*** maintained for passive, dispersed recreation activities such as hunting, hiking, bird watching, photography, primitive camping, bank fishing, and picnicking. • ***Shoreline Conservation Areas***—Narrow riparian strips of vegetation between the water's edge and TVA's backlying property that are managed for wildlife, water quality, or visual enhancement purposes. • ***Wildlife Observation Areas***—Areas with unique concentrations of easily observable wildlife that are managed as designated public Wildlife Observation Areas. • ***River corridor without sensitive resources present***—A river corridor is a linear green space along both stream banks of selected tributaries entering a reservoir managed for light boat access at specific sites, riverside trails, and interpretive activities. River corridors will be included in Zone 4 unless sensitive resources are present (see Zone 3). • ***Islands of 10 acres or less.*** • ***Land planned for any of the above uses in the future.***
5	**Industrial/ Commercial Development**	Land managed for economic development purposes. Areas included are: • ***TVA land under easement, lease, or license to other agencies/individuals*** for industrial or commercial purposes. • ***TVA land fronting land owned by other agencies/individuals*** for industrial or commercial purposes. • ***Sites planned for future industrial use.*** Types of development that can occur on this land are: • ***Business parks***—TVA waterfront land which supports industrial or commercial development. • ***Industrial access***—Access to the waterfront by backlying property owners across TVA property for water intakes, wastewater discharge, or conveyance of commodities (i.e., pipelines, rail, or road). Barge terminals are associated with industrial access corridors. • ***Barge terminal sites***—Public or private facilities used for the transfer, loading, and unloading of commodities between barges and trucks, trains, storage areas, or industrial plants. • ***Fleeting areas***—Sites used by the towing industry to switch barges between tows or barge terminals which have both off-shore and on-shore facilities.

Table 2.2.2-1 (cont.) Planned Land Use Zone Definitions

Zone		Definition
		Minor commercial landing—A temporary or intermittent activity that takes place without permanent improvements to the property. These sites can be used for transferring pulpwood, sand, gravel, and other natural resource commodities between barges and trucks.
6	**Recreation**	All reservoir land managed for concentrated, active recreation activities that require capital improvement and maintenance, including: • ***TVA land under easement, lease, or license to other agencies/individuals*** for recreational purposes. • ***TVA land fronting land owned by other agencies/individuals*** for recreational purposes. • ***TVA land developed for recreational purposes*** such as campgrounds, day use areas, etc. • ***Land planned for any of the above uses in the future.*** Types of development that can occur on this land are: • ***Commercial recreation***, e.g., marinas, boat docks, resorts, campgrounds, and golf courses. • ***Public recreation***, e.g., local, state and federal parks, and recreation areas. • ***Greenways,*** e.g., linear parks located along natural features such as lakes or ridges, or along man-made features including abandoned railways or utility rights-of-way, which link people and resources together. • ***Water access sites***, e.g., boat ramps, courtesy piers, canoe access, fishing piers, vehicle parking areas, picnic areas, trails, toilet facilities, and information kiosks.
7	**Residential Access**	This includes TVA-owned shoreline where private water use facility applications (Section 26a) and other land use approvals for residential shoreline alterations are considered. Requests for residential shoreline alterations are considered on parcels identified in this zone where such use was previously considered and where the proposed use would not conflict with the interests of the general public. As provided in the SMP, residential access would be divided into three categories based on the presence of sensitive ecological resources. The categories are: (1) Shoreline Protection, for shoreline segments that support sensitive ecological resources, such as federally-listed threatened or endangered species, high priority state-listed species, wetlands with high function and value, archaeological or historical sites of national significance, or which contain navigation restrictions; (2) Residential Mitigation, for shoreline segments where resource conditions or navigation conditions would require special analysis and perhaps specific mitigation measures, or where additional data are needed; and (3) Managed Residential, where no sensitive resources are known to exist. Types of development/management that can occur on this land are: • ***Residential water-use facilities***, e.g., docks, piers, launching ramps/driveways, marine railways, boathouses, enclosed storage space, and nonpotable water intakes.

Table 2.2.2-1 (cont.) Planned Land Use Zone Definitions

Zone	Definition
	• ***Residential access corridors***, e.g., pathways, wooden steps, walkways, or mulched paths which can include portable picnic tables and utility lines. • ***Shoreline stabilization***, e.g., bioengineering, riprap and gabions, and retaining walls. • ***Shoreline vegetation management*** on TVA-owned residential access shoreland. • ***Conservation easements*** for protection of the shoreline. • ***Other activities***, e.g., fill, excavation, grading, etc.
Compatible public works/utilities projects proposed in any zone will not require an allocation change. **Commercial recreation uses, such as marinas and campgrounds, are included in Zone 6.** **Docks and other shoreline development are not permitted on land categorized as Shoreline Protection (See Section 2.2).**	

A basic premise of the reservoir land planning process is that land currently committed to a specific use would be allocated to that use unless there is an overriding need to change. Committed lands include those which have been transferred, leased, licensed, or under contract to others; land known to harbor sensitive resources, e.g., natural areas, etc.; TVA project lands such as the dam reservation or power lines; lands with outstanding landrights granted to third parties; or TVA-developed recreation areas. Agricultural licenses are considered an interim use of TVA land and are not committed. Some types of committed uses, that do not preclude the allocated use, can occur in any zone. Such committed uses often affect a smaller acreage, compared to the size of the parcel. For example, existing road, transmission, water, or other utility rights-of-way can occur in all zones. For planning purposes, a total of 4,203 acres of Cherokee Reservoir land is included in parcels where some or all land is committed. Table 2.2.2-2 summarizes the allocation of 1,756 acres of committed lands on Cherokee Reservoir. Individual committed parcels are listed in Appendix B-2.

The balance of Cherokee Reservoir land, 3,984 acres, was considered "plannable land," that is, land that was not previously committed to an existing use. Field data were collected on plannable land by technical specialists such as archaeologists, historic architects, wetland specialists, visual specialists, and biologists to identify areas containing sensitive resources. Based on field experience of TVA staff, data were collected primarily where land-use pressures would likely spur growth over the 10-year life of the Plan.

A key planning assumption of Alternative B was that areas identified as having sensitive resources would also be regarded as committed and would be placed into Zone 3, Sensitive Resource Management. However, if parcels with existing commitments (leases, licenses, contracts, etc.) contain sensitive resources, that parcel would remain zoned consistent with the committed use.

Table 2.2.2-2 Summary of Allocations of Committed Lands on Cherokee Reservoir

Number of Parcels	Allocation	Acres[1]
3	Zone 2 - Project Operations	541.8
1	Zone 3 - Sensitive Resource Management	13.5
12	Zone 4 - Natural Resource Conservation	165.5
0	Zone 5 - Industrial/Commercial Development	0.0
11	Zone 6 - Recreation	760.3
36	Zone 7 - Residential Access	275.1
	Total Acreage:	**1,756.2**

[1]Acreage may represent amount actually covered in license, lease, easement or other formal agreement.

A review of all plannable land was conducted by TVA. Experts were asked to rate each parcel high, medium, or low by a given set of criteria and to rank the parcels high, medium, or low depending on their customer needs. Stakeholder needs were identified during the scoping process to help determine the most suitable use for the land (see Cherokee Reservoir Scoping Report in Appendix A-2). Staff from various TVA organizations, including power, transmission, reservoir operations, resource stewardship, and economic development, then rated and ranked the parcels.

After the ranking exercise, the planning team and technical specialists met to allocate the plannable parcels to six of the seven planning zones. Non-TVA land was designated as Zone 1 (see definition, Table 2.2.2-1) and was not allocated to a planning zone. Using resource maps and all of the information collected during the planning process, including public input, the capability and suitability of each parcel were discussed. Allocation decisions were made by staff consensus.

These allocations were used to prepare the Alternative B, Cherokee Land Management Plan (Appendix A-1). The plan contains an explanation of the planning process, an overview of the reservoir's history and development, a description of each parcel, and maps of the proposed land plan. Table 2.2.2-3 summarizes the number of parcels and acreage allocated to each of the six zones. The Proposed Cherokee Plan map for Alternative B shows the location of each parcel (Exhibit 1 in map pocket).

Table 2.2.2-3 Summary of Proposed Land Use Allocations for Alternative B

Number of Parcels	Proposed Land Allocations	Acres
3	Zone 2 - Project Operations	541.7
18	Zone 3 - Sensitive Resource Management*	1,020.3
61	Zone 4 - Natural Resource Conservation	5,589.6
0	Zone 5 - Industrial/Commercial Development	0.0
31	Zone 6 - Recreation	760.3
36	Zone 7 - Residential Access	275.1
	TOTAL	**8,186.9**

[1]From the Sensitive Resource Management parcels, under Alternative B, six new TVA Natural Areas will be designated in the Plan and one others will be considered during the resource management unit planning process (see Section 2.2 Alternatives, Significant Managed Areas).

2.3 Comparison of Alternatives

In the Cherokee Reservoir Land Management Plan (Alternative B), TVA proposes to allocate 8,187 acres of land to six uses or zones. Under the current Forecast System (Alternative A), these lands (with the exception of 583 acres of "No Forecast" property) have been designated for seven uses as shown is Table 2.3-1.

The amount and management of residential access shoreline is the same under either alternatives. The acreage designated for dam reservation under Alternative A would remain virtually unchanged under Alternative B and is included in Zone 2, Project Operations. Approximately 34 percent (199 acres) of the "no forecast "acreage under the Forecast System would be allocated for future Residential Access (Zone 7). One hundred and thirty-two (132) acres designated for Commercial Recreation use under the Forecast System would be reallocated to Zone 4, Natural Resource Conservation. Five hundred and seventy-eight acres (578) designated for Public Recreation use under the Forecast System would be reallocated to Zone 3, Sensitive Resource Management. Substantial acreage from other designations under the Forecast System would be reallocated to Zones 3, 4, and 6 (Recreation).

Under Alternative A, the Forecast System would continue to be used to guide land use decisions and 4,331 acres (53 percent) of the TVA land acreage could be used for Public Recreation or Small Wild Area. Also, under this alternative, 3,856 acres (47 percent) of public land could be used for commercial recreation, industrial, and various forms of development.

Table 2.3-1 Comparison of Allocations for Alternatives A and B

Alternative A Forecast Designations	Alternative B - Proposed Zone Allocations						Alt. A Total Acres
	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	
Dam Reservation	540.6						**540.6**
Reservation Operations	0.1	171.0	1,411.9		6.6	69.0	**1,658.6**
Public Recreation		578.2	3,481.9		252.3	5.2	**4,317.6**
Commercial Recreation		0.5	132.0		0.8		**133.3**
TVA Small Wildlife Area		13.5					**13.5**
Industrial		236.9	112.9		142.4	1.5	**493.7**
Power Transmission	1.1	20.2	350.0		75.3		**446.5**
No Forecast			100.9		282.9	199.4	**583.1**
Alt. B Total Acres	**541.7**	**1,020.3**	**5,589.6**	**0.0**	**760.3**	**275.1**	**8,186.9**

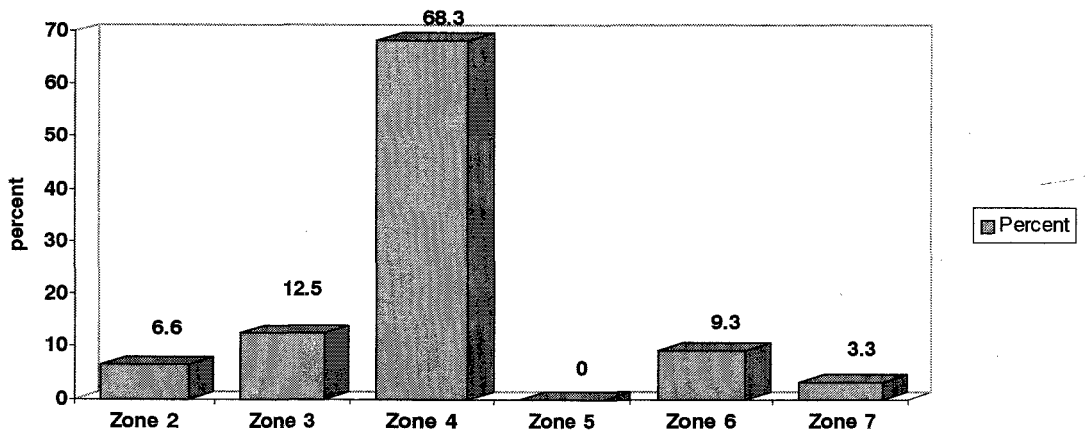
→*Alternative A acres are added horizontally with the total acres in the right hand column*
↓ *Alternative B acres are added vertically with the total acres along the bottom row*

Under Alternative B, 6,610 acres (81 percent) of TVA public land would be allocated to Sensitive Resource Management (Zones 3) or Natural Resource Conservation (Zone 4), (1,020 and 5,590 acres, respectively) where development would be very unlikely to occur. Under Alternative B, 68 percent of the Cherokee Reservoir public land would be allocated for Natural Resource Conservation, while no public land is allocated in the plan to Zone 5, Commercial/Industrial Development. Only about 3 percent of the TVA land would be available for Residential Access (Zone 7) and the amount of land available for recreational use would increase by about 18 percent compared to Alternative A. This might include additional developed or commercial recreation on land already used for recreational purposes.

Because more land (47 percent) under Alternative A could be subject to potentially intensive development compared to Alternative B, impacts on visual, wetlands/riparian ecology, recreation, water quality, and aquatic ecology, as well as terrestrial habitats, would be greater under Alternative A. Because the amount of land that could potentially be used for industrial use is larger under Alternative A, the socioeconomic effects of Alternative A would likely be small, but slightly greater than Alternative B. Under Alternative B, 81 percent of the TVA land acreage would be allocated to either Sensitive Resource Management or Natural Resource Conservation uses which would result in less impacts on the

surrounding environment (Figure 2.3-1). Under this alternative only 19 percent of the planned land could be subject to intensive development. Therefore, it is anticipated that adoption of Alternative B, would have less impacts on reservoir aesthetics, archaeological and historic resources, protected species of plants and animals, wetlands/riparian ecology, recreation, water quality, and aquatic ecology than Alternative A. Because of the emphasis on resource conservation, as well as a commitment to expand one and designate new TVA Natural Areas, anticipated effects on terrestrial ecology and significant managed areas would be beneficial. Conservation and protection of natural and cultural resources and expected increases in recreational use opportunities would also have some indirect positive impacts on socioeconomic interests. No impacts on navigation or prime farmland are expected and, therefore, would not differ between alternatives. TVA does not anticipate adverse effects on floodplains, community noise levels, or regional air quality from implementation of either alternative. The potential environmental effects of the two alternatives are summarized in Table 2.3-2 (Comparison of Potential Environmental Effects by Alternative) in the Plan Summary.

Figure 2.3-1 Cherokee Reservoir - Alternative B - Percent of Land Allocated by Zone



Proposed Land Allocation by Zone	Acres	Percent
Zone 2 - Project Operations	541.7	6.6
Zone 3 - Sensitive Resource Management	1,020.3	12.5
Zone 4 - Natural Resource Conservation	5,589.6	68.3
Zone 5 - Industrial/Commercial Development	0.0	0.0
Zone 6 - Recreation	760.3	9.3
Zone 7 - Residential Access	275.1	3.3
Total	**8,186.9**	**100.0**

[1]Non-TVA land was designated as Zone 1 and was not allocated to a specific use.

2.4 The Preferred Alternative

The preferred alternative is Alternative B. This Cherokee Plan honors previous land use commitments and allocates uncommitted TVA land to zones that allow for a balance of development, while emphasizing stewardship and conservation of important sensitive and natural resources.

3. AFFECTED ENVIRONMENT AND POTENTIAL EFFECTS

The existing environment affected by the proposed actions and the potential environmental consequences of each alternative action are described in this chapter.

3.1. Visual Resources

The physical, biological, and cultural features seen in the landscape give reservoir lands their distinct visual character and sense of place. Varied combinations of these elements make the scenic resources of any portion identifiable and unique. Areas with the greatest scenic value such as islands, bluffs, wetlands, or steep forested ridges, generally have the least capacity to absorb visual change without substantial devaluation. In the planning process, scenic values of reservoir lands were assessed to help identify areas for resource conservation and scenic protection.

Four broad visual characteristics were considered, and the results combined to determine the scenic importance. Scenic attractiveness is the measure of outstanding or unique natural features, scenic variety, seasonal change, and strategic location. Scenic integrity is the measure of human modification and disturbance of the natural landscape. Scenic visibility has two interrelated components; viewing distance and human sensitivity. Viewing distance indicates scenic importance based on how far an area can be seen by observers and the degree of visible detail. Human sensitivity is the expressed concern of people for the scenic value of the lands under study.

3.1.1. Affected Environment

Among the scenic resources of Cherokee Reservoir, the water body itself is the most distinct and outstanding aesthetic feature. The horizontal surface provides visual balance and contrast to the islands, bluffs, and wooded hillsides. The reservoir provides harmony and creates mystery as it weaves around the ridges and bends, constantly changing views seen from the water. It also provides unity, serving as a visual ribbon that links the other landscape features together. Middle-ground views across the water provide a tranquil sense of place that is satisfying and peaceful to most observers.

Islands are another important visual feature. They provide scenic accents and attractive visual reference points throughout the reservoir. Rock bluffs are also distinct scenic elements, which only occur along a few sections of the mid- to upper-end of the reservoir. Other important scenic features include the tranquil secluded coves and steep, wooded ridges that occur around the upper reservoir. Steep slopes along the shoreline rise mostly undisturbed to wooded skylines, with some ridge tops reaching more than 900 feet above the water. Substantial

elevation changes provide a dramatic contrast to the surrounding lake and gently sloping countryside. Generally, the upper end of the reservoir offers very good scenic value and high integrity.

The lower portions of Cherokee Reservoir exhibit a broad, open feeling with views of long reservoir expanses stretching for distances exceeding 13 miles. The shoreline land base between Panther Creek State Park and the dam and from the dam upstream on the northern shore of the reservoir to just beyond Highway 25E is gently rolling as it stretches back from the reservoir's edge. The land use varies from open pasture land and row crops to small stands of mixed pine and hardwood timber. Numerous islands, and shallow areas that become islands at lower reservoir levels, add to the scenic variety throughout this portion of the reservoir. These features afford the reservoir user an undeveloped land base on which to picnic, camp, and hike. Scenic value is good and integrity is moderately high.

A wide variety of residences and associated water-use facilities can be seen on much of the shoreline and back-lying land base. Housing types vary from camper trailers and mobile homes to small cabins and second homes as well as large, upscale, permanent residences. Scenic value is fair, but human alteration results in moderately low scenic integrity.

As the southern shoreline extends from Panther Creek State Park upstream to the Highway 25E bridge, it becomes ridge-like and, for the most part, hardwood forest covered with a smaller mixed component of pine and cedar. A mixture of residences exist along this shoreline but are subordinate in the view-shed as seen by the reservoir user. Along the northern shore, where scenic value is very good, the large embayment formed by German Creek extends back a few miles from the main body of the reservoir. It affords the boater direct views of Clinch Mountain as it stretches upland and back-lying Highway 11W. German Creek embayment is one of the more attractive visual resources on the reservoir, since much of its surrounding shoreline is publicly-owned and scenic integrity is high. Views of Cherokee Reservoir and the German Creek embayment are the predominant middle ground view from the Highway 25E overlook atop Clinch Mountain.

Traveling upstream from the Highway 25E bridge crossing, the reservoir narrows. A number of attractive bluffs and sections of shoreline strongly accented with limestone outcroppings, highlight the landscape. Here, the scenic value is very good. However, five existing transmission lines create noticeable visual impacts as the natural scenic resources become more expansive. As the boater passes between Prophet Ridge and Stony Mountain, the shoreline land base becomes that of much higher ridge land and the reservoir continues to narrow. The Cherokee Reservoir shoreline having the greatest scenic value is found passing upstream from Mile 91.5 to approximately Mile 96. The Holston River passes between the river knobs on the left descending bank and Potato Hill and a long ridge of TVA land on the right bank. Here, where scenic integrity is high, the boater

experiences the feeling of passing through a river gorge in this section of reservoir. The upper reaches of the reservoir beyond Malinda Bridge become quite shallow and narrow, and boating is generally limited to fishermen when the water level is adequate.

Cherokee Reservoir ends at John Sevier Detention Dam where the scenic integrity nearing the plant is low. This power plant and the hydro plant incorporated within Cherokee Dam are the only industrial-type facilities of consequence with shoreline locations on the reservoir. A number of commercial docks and campgrounds as well as public parks and reservoir access facilities afford the public access and viewing along the reservoir.

The wide range of reservoir water levels resulting from flood control and power generation create the most prominent changes on tributary reservoirs such as Cherokee. The low winter water levels associated with tributary reservoirs expose a "bathtub ring," i.e., barren draw-down zone, around the shoreline. While this is a necessary operational factor, the more scenic views of and from the reservoir are generally during the late spring to summer months when higher reservoir levels occur. The variety of scenic resources viewed by the public on and around Cherokee Reservoir are characteristic of the east Tennessee area and the region in general.

3.1.2. Environmental Consequences

Visual consequences are evaluated in terms of the visible differences between an existing landscape and proposed actions, based on the scenic values, viewing distances, and viewing points available to the general public. This helps identify potentially substantive changes in scenic character based on commonly held perceptions of landscape beauty, and the aesthetic sense of place. Most human alterations around Cherokee Reservoir have added visual discord to the natural landscape. However, a significant amount of natural shoreline, wooded hillsides, bluffs and islands remain undisturbed. The goal of visual resource management is to balance and hopefully dilute the visual discord with sufficient undisturbed natural landscape to preserve the attractive scenic qualities of the reservoir setting. Management practices such as scenic protection in strategic locations, visual assessment by project, and avoidance or mitigation for future development can help accomplish this goal.

The importance of scenery management has been confirmed during public scoping. The public comments indicate that TVA should place a high priority on preservation of natural areas, wetlands, and public lands with unique features. Their comments suggest that TVA should place a high priority for shoreline erosion protection and have no TVA involvement in timber production or industrial development. Questionnaire respondents specifically expressed preferences for the scenic beauty and lack of development. They indicated that the natural scenery was the next most important issue for the reservoir area.

These responses indicate a public appreciation of aesthetics, along with a clear desire to encourage preservation of the area's natural resources and scenic attractiveness.

The development standards implemented through TVA's SMP limit the size of docks, which will help minimize increasing visual congestion on the reservoir. In addition, TVA encourages conservation easements to protect resources and scenic values along the shoreline. As this policy is implemented, these easements will also help lessen cumulative visual impacts.

Alternative A: (No Action) - Under the No Action Alternative (Forecast System), there would continue to be no established provision to allocate selected lands based upon visual resource conservation concerns. A slow but noticeable decline in scenic resources, aesthetic quality, and visual landscape character could be expected as residential, commercial, and industrial development demands continue to increase. Actions of TVA and others would be evaluated to determine potential visual effects prior to land use approval. Where TVA has custody of the land, this process would prevent serious visual disruptions or loss of scenic resources. Approval of some activities may also require avoidance or mitigation measures that reduce visual impacts.

Otherwise, Forecast System uses would likely continue to be administered with some 3,856 acres (47 percent) of public land being subject to various forms of development. Sections of highly scenic shoreline as well as those of more common, less unique, visual quality would be continually at risk from approval of these uses.

Frequently, lands that are most sought after for commercial and residential development are also those with the greatest scenic qualities and the most desirable for public conservation. Alteration of lands with the least capacity to absorb visual change could occur. Under Alternative A, the cumulative effect of additional development could reduce the overall scenic attractiveness of Cherokee Reservoir, which would negatively impact the visual landscape character and aesthetic sense of place. In this event, the scenic integrity of the predominantly rural reservoir would decrease.

Adoption of Alternative A would likely result in long term negative impacts, which include gradual losses of visual resources, scenic attractiveness, and undeveloped natural areas, as well as negative changes in the aesthetic sense of place. Scenic integrity would probably decrease as patchy development spreads within views from the reservoir.

Alternative B: (Allocation Alternative) - Under this alternative, the land management plan would enhance conservation and protection of scenic resources. The plan would provide for preservation of the most scenic areas, and would balance continued development with sufficient areas of undisturbed shoreline to retain the attractive natural character.

Lands with distinctive visual characteristics such as islands, rock bluffs, steep wooded ridges, and wetlands would be placed in Zones 3 or 4, Sensitive Resource Management and Natural Resource Conservation, respectively. About 1,020 acres on 18 parcels would be allocated to Zone 3, where visual qualities and scenic value were principal considerations for most parcels. Another 61 parcels totaling 5,590 acres would be allocated to Zone 4, which includes lands with attractive but less unique scenic qualities and little visible alteration. Activities that involve little visible change, such as recreational hiking, picnicking, bank fishing, and some selective forest management (e.g., pine beetle salvage) could take place in both Zones 3 and 4. Some development with more visible modifications could take place in Zone 4 areas, as long as the location and appearance remained subordinate to the desired visual characteristics. A total of 6,610 acres (81 percent) of publicly held reservoir acreage would be allocated to Zones 3 and 4. Management and protection of the scenic landscape character would provide direction for any land use decisions affecting these parcels. Visual impacts would also be considered in decisions affecting the use of parcels in other zones.

Adoption of Alternative B would likely have an increasingly beneficial impact over time. The land management plan would provide for protection of scenic resources and preservation of natural areas, as development grows around Cherokee Reservoir. Scenic integrity would remain moderate or higher in selected areas. Consequently, implementation of Alternative B would provide significant protective management of visual resources, which would help preserve the aesthetic sense of place and scenic landscape character of the reservoir.

3.2. Cultural Resources

3.2.1. Archaeological Resources

Affected Environment

For at least 12,000 years, the Holston River Valley has been an area for human occupation that became more intense through succeeding cultural periods. In the east Tennessee Ridge and Valley Region, archaeological investigations have documented the presence of the cultural/temporal traditions, from the Paleo-Indian, the Archaic (8000-12000 BC), the Woodland (1200 BC-AD 1000), and the Mississippian (AD 1000-1500) to the Protohistoric-Contact Period (AD 1500-1750). The Paleo-Indian Period (10,000-8000 BC) represents the earliest documented human occupation of the area. The historic era cultural traditions also include the Cherokee (AD 1700-present), European- and African-American (AD 1750-present) occupations.

Archaeological research within the Cherokee Reservoir area has included small scale surveys along Poor Valley Creek (Faulkner, 1972), Fall Creek Campground (Ahlman et al., 1997), and Fall Creek Dock and Campground (Ahlman, 2000). A reservoir-wide survey was conducted by the University of Tennessee from 1996 to 1999 (TVA, 1998). Most information concerning settlement and land use patterns

in the area is derived from more extensive research to the south in the Tennessee River and Little Tennessee River Valleys (Chapman, 1985 and Davis, 1990) and in nearby North Carolina (Keel, 1976) and Virginia.

Pursuant to the National Historic Preservation Act (NHPA) of 1966 and the Archaeological Resources Protection Act (ARPA) of 1979, TVA protects significant archaeological resources and other historic properties located on TVA lands or affected by TVA undertakings. An historic property is defined, under 36 CFR § 800.16 (l), as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the *National Register of Historic Places*."

Pursuant to regulations implementing the NHPA, TVA conducts inventories of its lands to identify historic properties. For the undertaking addressed in this EA, the Area of Potential Effect (APE) is the 8,187 acres of retained TVA lands being planned as well as those private or non-TVA lands which may be affected by an undertaking on TVA fee land. The APE, as defined in 36 CFR § 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." In 1999, TVA contracted with the University of Tennessee to conduct a Phase I cultural resources survey of approximately 1,660 acres of TVA land located above elevation 1075 msl on Cherokee Reservoir. This survey included 172 miles of shoreline.

Investigations in support of this plan occurred over nearly 1,660 acres of Cherokee Reservoir land and 420 archaeological resources were identified (Table 3.2.1-1). Existing data, including survey results from SMI (TVA, 1998), along with these recent survey results were reviewed by TVA staff. Four hundred and twenty (420) archaeological resources were identified within and along Cherokee Reservoir (Frankenberg, et al., 2000). For the preparation of the report, *Archaeological Reconnaissance Survey of Tennessee Valley Authority Lands on the Cherokee Reservoir*, surveyors discovered 416 archaeological resources (sites), of which 280 were identified as occurring on TVA land. TVA staff recommended to the Tennessee State Historic Preservation Officer (SHPO) that sixty of these sites be determined to be ineligible for listing in the National Register of Historic Places (NRHP); 355 were recommended to be potentially eligible for listing; and only 1 was recommended to be eligible for listing. Further investigations of potentially eligible archaeological sites would be required to determine whether they are eligible for listing in the NRHP.

Table 3.2.1-1. Recorded Archaeological Resources By Zones (Acres and % of Zone Surveyed)

ZONE	ACREAGE	ACREAGE SURVEYED	% OF ZONE SURVEYED	NUMBER OF RECORDED ARCHAEOLOGICAL RESOURCES*	% OF RECORDED ARCHAEOLOGICAL RESOURCES
1		0	0%	144	34%
2	541.7	0	0%	4	1%
3	1,020.3	741.0	73%	55**	13%
4	5,589.6	682.1	12%	130***	31%
5	0.0	0	0%	0	0%
6	600.9	236.3	39%	16**	4%
7	275.1	0	0%	75***	18%
Total	**8,027.5**	**1,659.37**	**21%**	**420**	**100%**

* Survey data collected for the Shoreline Management Initiative (TVA, 1998).
** One site is present on one parcel in each zone.
*** One site is present on two parcels in each zone.

Environmental Consequences

Under either Alternative A or B, TVA would use the phased identification and evaluation procedure set forth in 36 CFR §800.4(b)(2) of the Advisory Council on Historic Preservation regulation for implementing Section 106 of the NHPA. These regulations establish a process to identify, evaluate, and assess effects on historic properties, and to determine the appropriate course of action prior to an undertaking.

The results of archaeological testing on Cherokee Reservoir will be reviewed prior to undertaking site-specific ground-disturbing activities under either alternative. Archaeological resources within these areas will be avoided whenever possible. If avoidance is not possible, then consultation with the Tennessee Historical Commission, State Historic Preservation Officer (SHPO) will be initiated, and proper procedures will be followed to minimize or mitigate any adverse effects on historic properties. Under either Alternative A or B, TVA will take necessary steps to ensure compliance with regulatory requirements of NHPA and the ARPA. Under either alternative, the cumulative impacts to significant archaeological resources would be minimized by avoidance of the resource or by mitigation through data recovery excavations pursuant to 36 CFR §800.

Alternative B would incorporate the phased identification, evaluation, and treatment procedure to effectively preserve historic properties (see April 30, 2001 letter from Herbert L. Harper, Executive Director and Deputy State Historic Preservation Officer, Tennessee Historical Commission in Appendix A-3). Early

identification of cultural resources and consideration of these resources in the land allocation process reduces the likelihood that soil disturbing activities would be permitted to occur in areas known to contain historic properties. This would, in turn, facilitate compliance with Section 106 of the NHPA. All soil-disturbing activities that occur on parcels which contain historic properties would be reviewed by a TVA archaeologist. Under Alternative B, 81 percent of the TVA land acreage would be allocated to Sensitive Resource Management and Natural Resource Conservation uses which would generally be less impacting on the surrounding environment. Under this alternative, only 19 percent of TVA land could be used for more intensive development.

Under Alternative B, 43 percent of the known archaeological resources would occur in Zone 3, Sensitive Resource Management and Zone 4, Natural Resource Conservation. Because uses of land in Zones 3 and 4 would be focused on resource protection, conservation and enhancement, archaeological resources would likely be unaffected. Approximately 23 percent of the archaeological resources are located in Zone 2, Project Operations, Zone 6, Recreation, and Zone 7, Residential Development. The remaining 34 percent of the sites are located on non-TVA land (designated as Zone 1), below elevation 1080 msl. No land is proposed to be allocated to Zone 5, Commercial/Industrial Development.

All proposed undertakings affecting TVA land or over which TVA holds landrights would require review under Section 106 of the NHPA prior to the implementation. Although only 21 percent of the land proposed under Alternative B has been surveyed for archaeological resources, 27 percent of proposed development land in Zones 5, 6, and Zone 7 has been investigated. These zones would have the most potential for development. The identification of archaeological resources within Zones 6 and 7 will enable these resources to be effectively avoided. Eighteen percent of the recorded archaeological resources occur in Zone 7, while only 4 percent occur in Zone 6. Regardless of how the land is allocated, if impacts to archaeological resources could not be avoided, then further investigations would be required to determine the resources' eligibility for inclusion in the NRHP.

Under Alternative B, management of land in Zones 3 and 4 would be guided by resource unit management plans, developed and reviewed with public input, that would provide for a long-term conservation strategy (see Other Pertinent Environmental Reviews or Documentation in Chapter 1).

3.2.2. Historic Resources

Affected Environment

Pursuant to Section 106 of the NHPA, TVA protects important historic properties located on TVA lands or affected by its undertakings. Such properties and other structures over 50 years old (including farm houses, communities, resorts, fortifications, churches, and cemeteries) occur on or very near TVA land on Cherokee Reservoir. The current status of any of these non-federal sites or structures could change based upon the actions of the property owner or acts of nature.

Using criteria of the NRHP, these properties were classified as historic, field inspected, and identified on the reservoir maps. Those historic structures that were listed eligible or potentially eligible for listing in the NRHP and could be affected by implementation of activities in this plan are identified below. There are 13 such sites within the area that were field surveyed. All, except one of these structures, are located on private land adjoining TVA public land. The one exception is the Civil War entrenchment on the knoll overlooking the former Bean Station site. All other historic structures are on the access roadways leading to TVA land.

The following is a listing of the 13 historic structures on or near TVA land. They are further classified as follows:

- HS-2 Listed on the National Register of Historic Places
- HS-3 Eligible for listing on the National Register of Historic Places
- HS-4 Potentially eligible, needs further evaluation

1. HS-3 - This structure is a house adjacent to Parcel 90. This is a well maintained house built during the 1930s to early 1940s. The property adjoins and overlooks the waterfront and is on the roadway accessing this parcel.

2. HS-3 - The Needmore Historic District is south of Parcel 60. This small community of a dozen or so historic houses is located along roadways which provide access to TVA land. The community is at the terminus of an inlet which partially borders this parcel.

3. HS-3 - This structure is a house adjacent and a along roadway leading to Parcel 87. This two-story frame house probably dates to the second quarter of the 19th century and has a log smokehouse.

4. HS-3 - The Mooresburg Historic District occurs on an inlet adjacent to Parcels 80 and 81. This community is a collection of historic houses, churches, and stores located on crossroads passing and leading to TVA land along the reservoir.

5. HS-3 - This structure is a house adjacent to portions of Parcel 78. It is a large substantial two-story house. It dates to about 1920, is restored and well maintained. It has a log smokehouse and once was part of a large farm complex.

6. HS-3 - This structure is a house adjacent to another portion of Parcel 78. Marble Hall is a large substantial one-and-a-half-story house. It dates to about 1890 and is well maintained.

7. HS-3 - Lake View Missionary Baptist Church is surrounded by a portion of Parcel 77. Located on private land, the site contains a frame church and early cemetery dating to the 1870-1880s.

8. HS-3 - This structure is a house adjacent to portions of Parcel 75. This mid-19th century two-story building is well maintained.

9. HS-3 - These structures include a farmhouse and farm, near and adjacent to Parcel 104. This substantial colonial revival farmhouse was built in 1927. It is an active farm with early barns. The original homeplace site is located just across the road on Parcel 104 and was removed prior to impoundment of the reservoir.

10. HS-3 - These structures include a country store and operator's house near portions of Parcel 104 and 105. This historic country store dates to about the 1920s to 1930s and lies along old unimproved U.S. Highway 11.

11. HS-2 - Tate Springs Spring House is listed on the National Register. This mineral springs resort was established prior to the Civil War. As indicated by listings in the railroad guides, it gained popularity in the 1880s. It is a 19th century octagonal two-story frame structure near Parcels 108.

12. HS-3 - The Tate Springs Historic District encompassed the grounds and remaining buildings of former mineral springs resort complex. It includes three, 19th century houses, an early 20th century hotel, and other buildings near Parcels 108, 109, and 110.

13. HS-3 - This feature is a Civil War earthen works. This parcel is an island at full reservoir pool elevation, but needs additional protection from opportunistic looters and vandals.

Environmental Consequences

There is a potential for these sites to be impacted by development actions on adjacent TVA land. Adverse effects would likely result from actions that would change the visual setting of the surrounding environment of these sites, increase noise or road traffic, or increase development (i.e., changes to the physical

landscape). Some sites are more sensitive to potential effects than others. Effects may be potentially greater if Alternative A were adopted because of the increased amount of industrial, commercial, developed recreation, and other types of development (about 3,856 acres or 47 percent) that could be accommodated. Under Alternative B, 81 percent of the TVA land acreage would be allocated to Sensitive Resource Management and Natural Resource Conservation. Under this alternative, only 19 percent of the TVA land could be used for more intensive development in Zones 2, 6, and 7.

However, regardless of whether Alternative A or B is adopted, all actions proposed to occur on TVA land or over which TVA holds landrights would be reviewed for potential effects on these historic structures. Proposed actions on TVA land affecting historic structures would also require SHPO review in accordance with the PA mentioned above. Pursuant to Section 106 of the NHPA, mitigation and/or modification of the action may be necessary to protect the historic resource from adverse effects.

3.3. Threatened and Endangered Species

3.3.1. Affected Environment

3.3.1.1. Plants

Prior to the 1999 field surveys, a protected plant review of the TVA Regional Natural Heritage Project database was conducted for species reported from Grainger, Hamblen, Hawkins, and Jefferson Counties. The results of the review suggest that no federally-listed plants but, 11 state-listed plants (30 occurrences) are known to occur from these counties (Table 3.3.1.1-1). This list, combined with regional information on additional species likely to occur on Cherokee Reservoir lands, provided a focus for field surveys.

No federally-listed plant species and six species (11 new occurrences) of Tennessee state-listed plant species were found during field inventories. Table 3.3.1.1-2 provides a list of all state-listed plant species presently known from Cherokee Reservoir land and their current status.

Table 3.3.1.1-1 Listed Plant Species Known to Occur in the Vicinity (Grainger, Hamblen, Hawkins, and Jefferson Counties) of Cherokee Reservoir

Common Name	Scientific Name	Federal Status	Tennessee State Status
Alabama grapefern	*Botrychium jenmanii*	N/A	SC
American ginseng	*Panax quinquefolius*	N/A	SC-CE
Appalachian bugbane	*Cimicifuga rubifolia*	N/A	T
Butternut	*Juglans cinerea*	N/A	T
Cliff-green	*Paxistima canbyi*	N/A	E
Moss phlox	*Phlox subulata*	N/A	T
Roundleaf bitter-cress	*Cardamine rotundifolia*	N/A	T
Spike-rush	*Eleocharis intermedia*	N/A	SC
Spreading rockcress	*Arabis patens*	N/A	E
Wild ginger	*Hexastylis contracta*	N/A	T
Witch-alder	*Fothergilla major*	N/A	T

E: Endangered
T: Threatened
SC: Special Concern
SC-CE: Special Concern-Commercially Exploited

Table 3.3.1.1-2 Listed Plant Species Currently Known From Cherokee Reservoir Land Planning Parcels Surveys

Common Name	Scientific Name	Federal Status	State Status
American barberry	*Berberis canadense*	N/A	SC
American ginseng	*Panax quinquefolius*	N/A	SC-CE
Appalachian bugbane	*Cimicifuga rubifolia*	N/A	T
Moss phlox	*Phlox subulata*	N/A	T
Pink lady's-slipper	*Cypripedium acaule*	N/A	E-CE
Pursh's wild-petunia	*Ruellia purshiana*	N/A	SC

E-CE: Endangered-Commercially Exploited
T: Threatened
SC: Special Concern
SC-CE: Special Concern-Commercially Exploited

American barberry

This member of the barberry family is typically found on rocky, wooded slopes, bluffs, creek-banks, and roadsides. Early in the 1900s, this species was partially eradicated by campaigns to exterminate the genus because it is the alternate host for the black rust fungus that infects wheat. American barberry occurs on a rocky, wooded piece of TVA property along with two other state-listed plant species.

American ginseng

American ginseng favors shady, moist woods, especially under American beech and sugar maple. This species is protected because it is frequently harvested from the wild for use in the commercial herb trade. In addition, suitable habitat for this plant is becoming increasingly rare due to general habitat loss. American ginseng was found at several locations on TVA land on Cherokee Reservoir.

Appalachian bugbane

A member of the buttercup family, this species is typically found on rich, well-drained, loamy soils, in a closed canopy of mixed hardwoods. This species is threatened by erosion as a result of logging and other clearing activities. One individual plant of Appalachian bugbane and a small population were found on TVA land.

Moss phlox

Also known as moss pink, this species is found on dry, rocky slopes and clearings. Threatened by invasion of exotic plant species and grazing, a small population of this species exists on TVA land.

Pink lady's-slipper

This showy orchid is frequently harvested by plant diggers, but rarely survives being transplanted. The species is exceedingly difficult to nursery-propagate. Several individuals were found on TVA land.

Pursh's wild-petunia

Found on dry or rocky upland wooded slopes, this species was found on three parcels of TVA land. Habitat destruction from invasive exotics and development are the greatest threats to this species.

3.3.1.2. Terrestrial Animals

The various plant communities on Cherokee Reservoir provide suitable habitat for a variety of federal- and state-listed terrestrial animals. These diverse communities include pine forest, upland and bottomland hardwood forest, wetland, and open-field habitats. In addition to distinctive vegetated communities, many features such as caves, cliffs, and sinkholes along the reservoir provide unique habitats for rare species of wildlife.

Prior to initiating surveys, staff reviewed TVA Regional Natural Heritage Project database to identify federal- and state-protected terrestrial animals as well as caves and heronries from counties adjacent to Cherokee Reservoir. Thirteen listed terrestrial animal species, 28 caves, and four colonial nesting wading bird sites

were reported from these counties (Table 3.3.1.2-1). Three terrestrial animals are federally protected under the ESA and the remaining 10 are protected by the state of Tennessee.

Table 3.3.1.2-1 Records of Rare Terrestrial Animals Known to Occur in Grainger, Hamblen, Hawkins, and Jefferson Counties

Common Name	Scientific Name	Federal Status	State Status
	Amphibians		
Black-bellied salamander	*Desmognathus quadramaculatus*	—	In Need of Management
	Birds		
Common raven	*Corvus corax*	—	Threatened
Bald eagle	*Haliaeetus leucocephalus*	Threatened	In Need of Management
Common barn owl	*Tyto alba*	—	In Need of Management
	Mammals		
Eastern big-eared bat	*Corynorhinus rafinesquii*	—	In Need of Management
Gray bat	*Myotis grisescens*	Endangered	Endangered
Indiana bat	*Myotis sodalis*	Endangered	Endangered
Woodland jumping mouse	*Napaeozapus insignis*	—	In Need of Management
Allegheny woodrat	*Neotoma magister*	—	In Need of Management
Hairy-tailed mole	*Parascalops breweri*	—	In Need of Management
Southeastern shrew	*Sorex longirostris*	—	In Need of Management
Common shrew	*Sorex cinereus*	—	In Need of Management
Southern bog lemming	*Synaptomys cooperi*	—	In Need of Management

Terrestrial animal surveys were conducted from April through September 1999. Table 3.3.1.2-2 presents the protected terrestrial animals and sensitive ecological areas which were observed during 1999 field surveys.

Table 3.3.1.2-2 Listed Terrestrial Animals and Sensitive Ecological Areas Observed During Surveys of Lands Planning Parcels on Cherokee Reservoir, 1999

Common Name	Scientific Name	Federal Status	State Status
Bald eagle	*Haliaeetus leucocephalus*	Threatened	In Need of Management
Great egret	*Casmerodius albus*		In Need of Management
Southeastern shrew	*Sorex longirostris*		In Need of Management

Sensitive Ecological Areas	County	Number of Occurrences on TVA Land
Heronry	Hamblen	2
Cave	Hamblen	3

Bald eagle

Bald eagle populations continue to increase in Tennessee; however, nesting eagles are uncommon in east Tennessee. Large, middle-aged to mature deciduous woodlands adjacent to lakes and reservoirs provide both nesting habitat for residents and wintering roosting habitat for migrant bald eagles. These birds regularly perch on snags adjacent to water when foraging. Suitable bald eagle nesting and foraging habitat occurs on Cherokee Reservoir, especially along the upper end. An active bald eagle nest is known from TVA lands near the confluence of Poor Valley Creek. No other nests are known to occur on TVA land.

During surveys conducted in the late summer of 1999 (September 9), staff observed two adult bald eagles and one young-of-the-year foraging along the mudflat of a peninsula in the vicinity of Holston River Mile 87.2. Later, two adult bald eagles, possibly the same pair, were also observed roosting on a steep wooded portion of a bluff locally know as White Cliff Area.

Great egret

Great egrets are uncommon colonial nesting birds in Tennessee; however, their distribution and population numbers are increasing. This species breeds predominately in the western part of the state, but recent records indicate that nesting activity is increasing in eastern Tennessee as well. Like other colonial nesting birds, human intrusion and disturbance can cause negative effects on local populations. Several areas associated with reservoir land, including mature woodlands, islands, coves, and shallow water areas, provide beneficial breeding

and foraging habitat. Nesting of this bird was not confirmed on any TVA land. A large colony of great blue herons (*Ardea herodius*) and black-crowned night-herons (*Nycticorax nycticorax*), containing 75 to 100 nests, was identified on an island in Cherokee Reservoir in the vicinity of Dayboard 12. This heronry, and another, found along the wooded shoreline on the right bank, opposite Horseshoe Bend near HRM 99, could potentially be used by great egrets in the future.

Southeastern shrew

This shrew is found in a variety of habitats including moist forests and wetlands. Southeastern shrews were found on a few parcels of TVA land. Data collections indicate that this mammal is abundant in preferred habitat. Suitable habitat for this species is also found elsewhere around the reservoir.

Caves

Caves represent very specialized habitats and a number of federal- and state-listed species reported from the Tennessee Valley inhabit caves. For example, caves are used as roosting and maternity sites by federally-endangered gray bats. Federally-endangered Indiana bats and state-listed eastern big-eared bats utilize caves as winter roosts. Caves are also used by the state-listed Allegheny woodrat and common barn owl. Investigations of reported cave openings resulted in the identification of four new caves. Two of these caves occur on TVA land in the White Cliff area. Another is located on an island just downstream from the mouth of German Creek at Holston River Mile (HRM) 69.1. The other cave occurs on steep, privately-owned shoreland near the Lakemont Subdivision.

Heronries

Heronries are sites used by colonial nesting wading birds. Several species of birds may nest in the same heronries during a season. Birds that occupy these colonies are generally sensitive to disturbance, especially during the nesting season. Shoreline trees and shallow waters and streams adjoining many Cherokee Reservoir parcels provide suitable foraging and nesting sites for herons. Four previously active heron colonies were surveyed in 1999 and found to be inactive. As mentioned above, one new heron colony, estimated to contain 75 to 100 nesting pairs of great blue herons and black-crowned night-herons, was found on a TVA island (at Dayboard 12). Another, with only four nests in two trees, was found along the wooded shoreline near HRM 99.

Other Rare Animal Habitats

No populations of other rare animals listed in Table 3.3.1.2-1 were found during 1999 field surveys. However, suitable habitat exists on Cherokee Reservoir for many rare and uncommon species. Suitable habitat for federally-endangered bats, including the gray bat (*Myotis grisescens*) and Indiana bat (*Myotis sodalis*), is

found along the reservoir. Gray bats roost in caves and cave-like ecosystems year-around and forage primarily over aquatic habitats. Large quantities of quano and ceiling stain, somewhat indicative of a gray bat colony hibernating or maternity site, were found in a small cave in the White Cliff area. This suggest at least some seasonal or transient use, however, no gray bats were observed. Forested areas characterized by mature trees, hollow trees, and snags are suitable habitat for woodland species of bats including the Indiana bat and state-listed eastern big-eared bat (*Corynorhinus rafinesquii*). Suitable habitat for woodland species of bats is fairly common on larger forested parcels on Cherokee Reservoir.

Early successional habitats around the reservoir, such as some pasture land and old fields, provide suitable foraging habitat for common barn owls (*Tyto alba*). Rock outcrops, bluff habitats, and caves provide suitable habitat for the Allegheny woodrat (*Neotoma magister*). Cliffs with rock overhangs provide suitable nesting habitat for the common raven (*Corvus corax*). Woodland jumping mice (*Napaeozapus insignis*) may be found along the reservoir in mature woodlands and wetlands. Damp woodlands and wetlands provide habitat for the southern bog lemming (*Synaptomys cooperi*) and the common shrew (*Sorex cinereus*).

Several other rare species, not currently known from the surrounding area, may occur in suitable habitat around Cherokee Reservoir. Forested habitats along the reservoir provide suitable habitat for the Cooper's hawk (*Accipter cooperii*), sharp-shinned hawk (*Accipter striatus*), and smoky shrew (*Sorex fumeus*). Early successional habitats potentially provide habitat for northern harrier (*Circus cyaneus*), vesper sparrow (*Pooecetes gramineus*), lark sparrow (*Chondestes grammacus*), Bewick's wren (*Thryomanes bewickii*), Bachman's sparrow (*Aimophila aestivalis*), eastern slender glass lizard (*Ophisaurus attenuatus longicaudus*), and meadow jumping mouse (*Zapus hudsonius*). Wetland and riparian areas are suitable habitat for four-toed salamander (*Hemidactylium scutatum*), great egret (*Casmerodius albus*), little blue heron (*Egretta caerulea*), snowy egret (*Egretta thula*), least bittern (*Ixobrychus exilis*), river otter (*Lutra canadensis*), and star-nosed mole (*Condylura cristata parva*). Caves along the reservoir may also provide suitable habitat for state-listed eastern small-footed bats (*Myotis leibii*).

3.3.1.3. Aquatic Animals

Staff review of the TVA Regional Natural Heritage Project database revealed that no state-or federally-listed aquatic animals are currently known from areas on or adjacent to Cherokee Reservoir properties. There are pre-impoundment records of several fish and mussels from the Holston River and its tributaries (Table 3.3.1.3-1). Where they occur, these species are now protected by state and federal law. However, because of the habitat changes resulting from impoundment, each of these species is believed to be extirpated from the reservoir itself. The turgid blossom and green blossom pearlymussels are believed to be extinct (Bogan and Parmalee, 1983; Parmalee and Bogan, 1998).

In addition, there are also pre-impoundment records for two state-listed and one federally-listed fish species from the main channel of the Holston River (Cherokee Reservoir). Although a single pre-impoundment specimen of the slender chub from the area now covered by the reservoir indicates that the species formerly occurred in the Holston River (Etnier and Starnes, 1993), it has recently been taken only from the Clinch and Powell Rivers of the Tennessee River system, in southwestern Virginia and northeastern Tennessee. Despite intensive collecting effort aimed at this species by TVA, TWRA, and the University of Tennessee, the species has not been collected since the mid- to late-1980s. The blue sucker and highfin carpsucker are unlikely to occur in the reservoir. However, individuals may occasionally be found in the Cherokee tailwater portion of the Holston River, below the dam.

Table 3.3.1.3-1 Pre-impoundment Records of State-and Federally-Listed Mussels and Fish Reported from Cherokee Reservoir Area

Common Name	Scientific Name	Federal Status	Tennessee State Status
	Mussels		
Dromedary Pearlymussel	*Dromus dromas*	Endangered	Endangered
Yellow-blossom Pearlymussel	*Epioblasma florentina florentina*	Endangered	Endangered
Green Blossom Pearlymussel	*Epioblasma torulosa gubernaculum*	Endangered	Endangered
Turgid Blossom Pearlymussel	*Epioblasma turgida*	Endangered	Endangered
Fine-rayed Pigtoe	*Fusconaia cuneolus*	Endangered	Endangered
Birdwing Pearlymussel	*Lemiox rimosus*	Endangered	Endangered
Cumberland Monkeyface	*Quadrula intermedia*	Endangered	Endangered
	Fish		
Slender Chub	*Erimystax cahni*	Threatened	Threatened
Highfin Carpsucker	*Carpiodes velifer*	In Need of Management	None
Blue Sucker	*Cycleptus elongatus*	In Need of Management	None

3.3.2. Environmental Consequences

3.3.2.1. Plants and Terrestrial Animals

Field survey results confirmed that no federally-listed plants occur on the TVA land, but six species (11 new occurrences) of Tennessee state-listed plants were found. Animals observed during field surveys are among populations generally increasing in the Cherokee Reservoir area and the eastern Tennessee Valley.

Suitable habitats for other rare animals also exist on TVA land. Since field surveys were conducted in 1999, osprey (*Pandion haliaetus*), double-crested cormorant (*Phalacrocorax auritus*), and grasshopper sparrow (*Ammodramus savannarum*), have been de-listed from state protection. Bald eagle (*Haliaeetus leucocephalus*) has been down-listed from "Threatened" to "In Need of Management" in Tennessee. No other animals reported from Hamblen, Hawkins, Grainger, and Jefferson Counties and identified in Table 3.3.1.2-1, were found during field surveys.

Regardless of whether Alternative A or B is adopted, any action on TVA land that could effect federally-endangered plants or animals would be reviewed. Pursuant to provisions of the Endangered Species Act (ESA) of 1973, as amended, TVA would consult with the U.S. Fish and Wildlife Service prior to implementing an action or issuance of approvals that could effect listed species. It is TVA policy, where practicable, to avoid or minimize adverse effects on state-listed species. The effects of adoption of Alternative A would not differ from those expected under Alternative B.

Under Alternative B, however, 81 percent of the TVA land acreage would be allocated to either Zone 3 or Zone 4. Under this alternative, only 19 percent could be subject to more intensive development. Based on field surveys, all known sensitive plant communities and animal populations have been allocated to Zone 3 (13 percent of the TVA land), where development would be unlikely. Management in Zone 3 would focus upon protection and enhancement of ecological function and would provide a high level of protection. Therefore, no direct or indirect adverse impacts to rare plants or animals are anticipated.

Also, under Alternative B, TVA would also expand the Berry Island ESA (Parcel 57) to include an additional 10.7-acre stand of old-growth hardwoods. Portions of Parcels 36, 43, 59, 73, and 90 and all of Parcels 46 is proposed to be designated in the plan as Habitat Protection Areas (HPA) due to the presence of state-listed plant species, caves or other sensitive resources. The remainder of Parcel 90 surrounding the interior HPA will be further studied for potential designation as a TVA Small Wild Area during the resource management unit planning process. Designation of additional TVA Natural Areas would have beneficial environmental effects.

About 5,590 acres (68 percent) of Cherokee Reservoir land is allocated to Zone 4. Management in Zone 4 would focus upon enhancing the quality of resources and outdoor recreational uses such as hiking, hunting, and wildlife observation. Zone 4 land, as well as land in Zone 3, is also the focus of TVA's resource management unit planning efforts. Zone 4 land may have a few scattered individual state-listed plants or suitable animal habitats, but no known sensitive animal occurrences. However, because of additional environmental review and careful planning associated with natural resource and public use management, sensitive resources would not likely be directly or indirectly adversely affected (see Other Pertinent

Environmental Reviews or Documentation in Chapter 1). Where appropriate, land would also be managed to control of invasive exotic species and to enhance rare species habitats.

Therefore, adoption of Alternative B, would have less overall potential for negative effects on rare species, particularly plants, and present opportunities for management and enhancement. However, regardless of whether Alternative A or B is adopted, restrictive land uses anticipated on land in Zones 3 and 4 (81 percent of the TVA land), coupled with ESA-related reviews of federal actions on other TVA land, would afford rare plants and animals additional protection. Negative cumulative effects would be unlikely under Alternative B because less land would be used to accommodate development and, under either alternative, TVA public land represents a small fraction of land across the region with similar habitat. Therefore, such resource conservation uses would not cause or contribute a local or regional negative trend.

3.3.2.2. Aquatic Animals

Although several protected species of mussels and fishes are known to have occurred under pre-impoundment conditions of the Holston River, they are now believed to be extirpated or extinct. No state- or federally-protected aquatic animals are currently known from aquatic habitats in the vicinity of the Cherokee Reservoir land parcels. Therefore, adoption of Alternative A or Alternative B would not impact any known individuals or populations of protected aquatic animals.

3.4. Terrestrial Ecology and Other Significant Managed Areas

Terrestrial Ecology

3.4.1. Affected Environment

Cherokee Reservoir occurs within the Great Valley of East Tennessee, an area described geographically as the Appalachian Ridge and Valley Physiographic Province (Fenneman, 1938). This physiographic province is characterized by long ridges and intervening valleys that generally run in a southwestern-to-northeastern direction. More specifically, Cherokee Reservoir is located within the oak-hickory forest region of the Southern Appalachian Ridges and Valleys land resource area (USDA Forest Service, 1969).

The lands north of Cherokee Reservoir consist primarily of agricultural farmlands and forested ridges, with Clinch Mountain being the most prominent geographic feature. Natural resources on TVA land have been affected historically by agricultural activities, residential development, and rights granted for the construction and improvement of highways, bridges, and other infrastructure. Hamblen County is more densely developed from the perspective of residential

and industrial use compared to other counties adjacent to the reservoir. Jefferson, Hawkins, and Grainger Counties are primarily agricultural and rural residential counties.

The 8,187 acres of TVA fee-owned land surrounding Cherokee Reservoir can be divided into three broad community types: (1) Forest Lands, (2) Open Lands, and (3) Wetland/Riparian Areas. Approximately 5,478 acres of the TVA lands surrounding Cherokee Reservoir were inventoried during the 1980s. Wildlife habitat development activities such as creating forest openings and seeding logging roads, were implemented in conjunction with some forest prescriptions to improve wildlife habitat diversity. The following major forest cover types occur on TVA land: (1) hardwood forests (2,489 acres or 45 percent), (2) mixed forests (1,159 acres or 21 percent), (3) pines forests (1,560 acres or 29 percent), (4) cedar forests (188 acres or 3 percent), and (5) other (83 acres or 2 percent).

Past land use has played a major role in creating the present mosaic of forest conditions. This pattern strongly reflects constraints associated with local topography; the flatter areas were farmed, while the more hilly areas largely remained forested. Because much of the land was in agricultural use at the time it was purchased by TVA, and was allowed to regenerate to forest cover. Over 65 percent of the present forest cover is 40-80 years old. This is especially true for the typical old-field type forest stands which are dominated by this age class -- pine types (84 percent), mixed forest types (72 percent), and red cedar (96 percent). The hardwood forests are generally older with 49 percent being 80 years or older.

Although a variety of hardwood types are present, upland hardwood comprises over 92 percent of the hardwood stands. Typical species that occur in these stands are white oak, black oak, southern red oak, hickories, red maple, and beech. Because of the advanced age, most of the upland hardwood stands are small sawtimber and large sawtimber size. Other hardwood types include cove, northern, bottomland, and mixed hardwood. Typical species in these types include yellow-poplar, sugar maple, white ash, chinkapin oak, beech, black willow, sycamore, and persimmon. Pine stands are dominated by Virginia pine, primarily from old-field succession, which accounts for 80 percent of the pine. Other pine types include planted loblolly pine (10 percent), shortleaf pine (7 percent), white pine, and various mixtures of yellow pines. Mixed forest stands include cedar-hardwood, pine-cedar, pine-hardwood, and pine-cedar-hardwood. These types have various mixtures of red cedar, Virginia and shortleaf pine, elm, oaks, hickories, red maple, and other hardwoods. Also a result of old-field succession, eastern red cedar occurs on poorer, rocky sites, that were either marginal farmlands or were heavily depleted of soil nutrients.

The remaining 2,709 acres of TVA land surrounding Cherokee Reservoir include unmanaged forest areas, open lands (managed and unmanaged agricultural fields), reverting old fields, and riparian/wetland areas along streams and the reservoir

shore. Unmanaged forest areas that have not been inventoried include a variety of situations (riparian areas, islands, peninsulas, etc.) that range from small scattered patches of less than 2 acres to tracts that exceed 150 acres. Forest types and conditions in these areas are similar to those inventoried on other Cherokee Reservoir land.

Open lands on Cherokee Reservoir are composed of managed TVA land licensed to individuals for agricultural purposes and TVA land farmed by individuals who own the outstanding agricultural rights over selected parcels. Thirteen active agricultural licenses for pasture or hay production currently exist on 217 acres in six parcels. Over the years, many of the licensed areas have been managed for improved wildlife habitat along with improved agricultural use practices. Various stages of transitional habitat for resident wildlife have been created along field boarders, fence rows, and wood lots on these tracts. TVA open lands have been managed to improve habitat through a combination of prescribed burning, mowing, disking, food plots, fescue grass conversion (to native warm season grasses), and maintenance of various early successional stages. Outstanding agricultural rights remain over most of the land where they were original retained by the landowners prior to TVA acquisition.

Riparian areas along streams and reservoir shores include forested buffer strips, reverting old fields, shoreline fringe wetlands, and mowed lawns adjacent to residential areas. TVA establishes and promotes riparian vegetation on its land along streams and reservoir shorelines to provide wildlife habitat, curb nonpoint source pollution, minimize shoreline erosion, and protect water quality. The wetland communities found on Cherokee Reservoir make up the smallest percentage of the community types considered and are addressed in Section 3.5.

The forested uplands, open lands, and riparian/wetland community types surrounding Cherokee Reservoir provide a broad range of habitats capable of supporting a wide array of terrestrial wildlife species. Mammals commonly found in these habitats include gray and fox squirrels, white-tailed deer, woodchucks, and white-footed mice. Bird species using these habitats throughout the year include eastern wild turkey, various woodpeckers, eastern bluebirds, song sparrows, and northern cardinals. Migrant neotropical songbirds such as yellow-billed cuckoos, red-eyed vireos, yellow-throated warblers, and indigo buntings may be observed during spring and summer. Eastern box turtles, black rat snakes, and five-lined skinks are common reptiles which also utilize these widely-varied habitats.

3.4.2. Environmental Consequences

Along much of Cherokee Reservoir's shoreline, strips of TVA land (below elevation 1080 msl) lie between the reservoir shoreline and private residential land. Additional residential access shoreline also occurs on private land where TVA does not own or sold to elevation 1075 msl. Combined, this residential

access shoreline makes up 43 percent of the total reservoir shoreline. Along the TVA public land portion of this shoreline, the back lying private property landowners have access rights and, therefore, they can request TVA approval for construction of water-use facilities and implementation of vegetation management plans. Also, TVA will use various incentives for landowners to plant vegetation on private shoreland. Any such requests are reviewed for potential impacts on terrestrial ecology.

Regardless of whether Alternative A or B is adopted, all requests for water-use facilities along residential access shoreline, must be reviewed in accordance with TVA's SMP guidelines which were developed to minimize impacts on terrestrial ecology. These effects were evaluated in SMI (TVA, 1998). On agency land TVA's management focuses on resource conservation, protection, and wildlife habitat enhancement and environmental effects are avoided, minimized, or mitigated. Measures to minimize effects include 1) limiting harvesting timber to less than 20 acres in size, 2) conducting controlled burns in accordance with Tennessee open burning regulations, and 3) implementing BMPs for disturbance associated with open land habitat management, including licensed agricultural land.

Alternative A (No Action) - Under Alternative A, 4,331 acres (53 percent) of TVA land is forecast for public recreation and small wild areas. Most public recreation lands and small wild areas are managed for informal type uses, such as hiking, hunting, wildlife viewing, fishing, and primitive camping. Other than natural succession, these lands under Alternative A would remain relatively unchanged and there would be minimal or no effects on wildlife populations and general terrestrial ecology. As succession progressed, there would likely be a decrease in animal species dependent on early successional or transitional habitat types and an increase in forest dwelling species.

Under Alternative A, the remaining 3,856 acres (47 percent) of TVA land is forecast for potentially more intensive uses and development, such as industrial sites, power transmission needs, residential access and commercial recreation. If such development occurs, the potential exists for shifts in land use and vegetation patterns and a corresponding change in the terrestrial animal and plant communities. The extent of these changes would depend on the intensity and type of development that actually occurs. Alternative A has the potential to cause greater effects on terrestrial ecology on TVA lands compared to Alternative B. However, some of these effects on terrestrial ecology would be minimized though TVA's review process and subsequent mitigation. Overall, impacts would be minor and regionally insignificant. Because of the small percentage of TVA land on Cherokee Reservoir compared to the region, selection of Alternative A would be unlikely to have adverse cumulative effects or significantly negatively influence region trends in terrestrial ecology.

Alternative B: (Allocation Alternative) - Under Alternative B, 79 parcels of TVA land totaling 6,610 acres would be allocated to either Zone 3, Sensitive Resource Management, or Zone 4, Natural Resource Conservation. This comprises 81 percent of TVA land on Cherokee Reservoir. If Alternative B is adopted, TVA's management of this land would be guided by resource unit management plans that would provide a long-term management strategy. Management objectives for land incorporated in unit plans are developed with stakeholder inputs and effects of planned activities are evaluated in a separate environmental review (see Section 1.3 Other Pertinent Environmental Reviews or Documentation). Based upon stakeholder needs, the types of activities planned would emphasize forest resource and wildlife habitat management, sensitive species protection, and enhancement of recreational use opportunities. Development of access facilities such as trails, lake access, and wildlife viewing areas on units are intended to support dispersed recreational activities. These types of low-impact management activities would result in beneficial effects on terrestrial ecological resources. These activities also support TVA's efforts to compliment the purposes and objectives of Executive Orders 13112 (Invasive Species) and 13186 (Migratory Birds).

Under Alternative B, the remaining 19 percent (1,577 acres) of TVA land on Cherokee Reservoir would be allocated to Zone 2, Project Operations (542 acres), Zone 6, Recreation (760 acres), and Zone 7, Residential Access (275 acres). No land is allocated to Zone 5, Industrial/Commercial Development. Regardless, any new actions or development on these areas are subject to site specific environmental review to minimize additional impacts to terrestrial ecology. TVA's SMP would apply along residential access shoreland.

Selection of Alternative B, the Allocation Alternative, would have a beneficial effect on the terrestrial ecology because of a long-term commitment to resource management on 81 percent of TVA lands. Any negative effects from management activities on this TVA land would be minor, temporary, and regionally insignificant. Development pressures on privately-owned forests and open land in the region are likely to increase. However, by maintaining as much as 68 percent of TVA land in forests, implementation of the Allocation Alternative could help offset some local negative effects of development and forest fragmentation on nearby private lands.

Because of the small acreage of TVA property in the region, TVA's choice of Alternative B for management of its reservoir lands would be unlikely to influence regional trends in forest fragmentation. Similarly, because this land would be managed with an emphasis on conservation, it represents a small fraction across adjoining counties, and less land would likely be used to accommodate development under Alternative B, TVA management activities would not cause or contribute to negative regional resource trends. Therefore, selection of Alternative B would be not likely to have negative cumulative effects or negatively influence region terrestrial ecological trends.

Significant Managed Areas

3.4.3. Affected Environment

Field surveys on Cherokee Reservoir land were conducted between April and November of 1999. The purpose of the surveys was to evaluate land for its scenic and aesthetic qualities, ecological significance, and suitability for designation as a TVA Natural Area. Such areas, based on distinct criteria, were then recommended for designated as a Small Wild Area (SWA), Ecological Study Area (ESA), Habitat Protection Area (HPA), or Wildlife Observation Area (WOA).

Small Wild Areas are sites with exceptional natural, scenic, or aesthetic qualities, which are suitable for low-impact public uses such as walking, hiking, interpretive trails development, handicapped access, etc. Ecological Study Areas consist of sites judged suitable for ecological research or environmental education or study. Habitat Protection Areas are generally established to protect populations of species that have been identified as threatened or endangered by the USFWS or that are rare in the state in which they occur. Unusual or exemplary biological communities or unique geological features also receive protection in this category. Wildlife Observation Areas are sites that have concentrations of watchable wildlife including such species as shorebirds, songbirds, hawks or monarch butterflies (particularly during migration), white-tailed deer, wild turkey, raccoons, or other animals.

There are three significant managed areas on Cherokee Reservoir. Panther Creek State Park is managed for public recreation. Mossy Creek, a small urban natural area, is managed for compatible public use as a WOA. Berry Island is a TVA ESA, managed largely for resource conservation and protection.

Panther Creek State Park, 6 miles west of Morristown, is located on land transferred to the state of Tennessee and managed by the TDEC for public recreation. It contains a trail system, picnic and camping areas, and a swimming pool. The park fronts Cherokee Reservoir and TVA land below elevation 1080 msl. TVA also owns two islands, totaling about 159 acres, which front the park (Parcel 22). These islands were not included in the transfer, however, TVA granted the state recreation easement over them and additional land below elevation 1075 msl to manage and regulate its use. Regardless of the outcome of this land plan, TVA decisions will not affect how the Panther Creek State Park is managed.

The TVA/TWRA Mossy Creek WOA is located on TVA land (Parcels 5 and 6) in the Mossy Creek embayment in Jefferson City. The Mossy Creek area includes a 23-acre natural wetland impounded by beaver dams. Development currently underway include construction of an information kiosk, an amphitheater, walkways, and development of a habitat management plan. Viewing blinds,

osprey platforms, and trails have been constructed. Mossy Creek WOA provides a natural area within an urbanizing landscape for ecological research, education, recreation, open space, and wildlife habitat. Users include Carson-Newman College, local schools, civic groups, and residents and visitors to the area.

The TVA Berry Island ESA was designated as a Ecological Study Area/Research Natural Area in 1973 based on the presence of a stand of old-growth eastern red cedar trees. The area was discovered by TVA foresters seeking areas of special research value under a national program for identifying Research Natural Areas on federal lands and was subsequently designated as a TVA ESA and a Federal Committee on Ecological Reserves Research Natural Area. The area was also submitted by TVA for consideration as a Society of American Foresters' Natural Area (TVA, 1986).

The 16-acres ESA (Parcel 57) is located near the center of the 138-acre Berry Island. Eleven acres of the ESA is an old growth forest stand and 5 acres is a young, near pure stand of red cedar. Large oaks, including specimens up to 4.5 feet in diameter, are also present in this forest stand. Berry Island is accessible when reservoir levels are down in fall and winter. Prior to 1973, most of Berry Island was grazed by livestock under third-party agricultural rights. The agricultural rights for the 16-acre ESA were purchased by TVA in 1974, and the area was fenced to exclude livestock. Agricultural rights are still outstanding over the remainder of the island, but no grazing has occurred in recent years.

Outside of Panther Creek State Park, there is very little public land in the vicinity of the Cherokee Reservoir that has been set aside or managed for passive, non-motorized public recreation (hiking, mountain-biking, bird-watching, nature photography, etc.) in a natural setting. While there are many forested acres of TVA land on Cherokee Reservoir, much of it does not include improved trails or is not managed specifically for passive recreational activities.

Based on survey findings and data collected during this planning process, TVA's Regional Natural Heritage Project staff recommended TVA Natural Areas designation for all or portions of six parcels totaling about 451 acres. Portions of Parcels 36, 43, 59, 73, and 90 qualify for designation as Habitat Protection Areas (HPA) due to the presence of state-listed plant species, caves or other sensitive resources. Because of the presents of similar resources, all of Parcels 46 also qualifies to be designated in the plan as a HPA. The remainder of Parcel 90 is proposed to be further studied for potential designation as a TVA Small Wild Area. None of the land field surveyed was determined to have characteristics warranting consideration for WOA or ESA designation.

3.4.4. Environmental Consequences

Regardless of whether Alternative A or B is adopted, Berry Island, currently designated as a research natural area under the Forecast System, would keep its designation (and be managed as a research natural area) for the life for this plan.

Under Alternative A, 4,331 acres (53 percent) of the TVA land acreage could be used for Public Recreation or Small Wild Area (SWA) which would cause less impact on the surrounding environment. Ninety-four percent of the Public Recreation land remains allocated to Zones 3 or 4 (81 percent of the total under Alternative B), but about 252 acres of it are allocated to Zone 6, Recreation. This acreage could be used for developed recreation (or potential commercial recreation, if part of an existing recreation area) which would have a greater effect compared to its Forecast use. However, under this alternative, some 47 percent of the land base could be subject to more intensive development. Therefore, less land would be available for managed areas and more development could occur. Less land would be incorporated into natural areas and effects of development would be greater compared to Alternative B.

Under Alternative B, the Allocation Alternative, TVA would also expand the Berry Island ESA (Parcel 57) to include an additional 10.7-acre stand of old-growth hardwoods. Based on survey findings and data collected during this planning process, TVA's Regional Natural Heritage Project staff has recommended TVA Natural Areas designation for all or portions of six parcels totaling about 451 acres. Portions of Parcels 36 (42 acres), 43 (9 acres), 59 (184 acres), 73 (90 acres), and 90 (26 acres) qualify for designation as Habitat Protection Areas (HPA) due to the presence of state-listed plant species, caves or other sensitive resources. All of Parcels 46 (100 acres) also qualifies to be designated in the plan as a HPA. The remainder of Parcel 90 is proposed to be further studied for potential designation as a TVA Small Wild Area during the resource management unit planning process.

Expansion of the Berry Island ESA (Parcel 57), to include an additional 10.7-acre stand of old-growth hardwoods, is proposed. This stand is dominated by black oaks, southern red oaks, chinquapin oaks, and tulip poplars. The age of some of the oaks exceeds 110 years, and the diameters of the largest trees range from 26 to over 40 inches. Because the old-growth hardwoods are disjunct from the old-growth cedars, the recommendation for expansion includes a buffer area that lies in between the two stands.

Parcels recommended for HPA designation also meet some of the characteristics desirable for other types of natural areas. Parcel 36, Boatman Mountain, has areas of mature forest and a sense of solitude; however, the topography of the parcel is steep and access is limited. Parcels 43 and 46, Three-Knob Island and Johnson Ridge, respectively, contain areas of high quality mature forest dominated by large diameter American beech, sugar maple, and oaks. Parcel 59, Whites Cliff, meets

the aesthetics, solitude, and ecological integrity criteria, but is inaccessible from public roads. Parcel 73, Goat Mountain vicinity, meets the solitude and ecological integrity criteria; however, trail construction and maintenance was deemed to be difficult due to the steep topography combined with the size of the parcel.

The interior portion of Parcel 90, Beech Ridge, is recommended for HPA; while the exterior buffer area meets the criteria and is recommended for SWA designation. Therefore, Parcel 90, which totals 86 acres, would potentially contain both a HPA and a SWA. This area contains a high quality mature forest dominated by American beech, basswood, and sugar maple on the north-facing slope. On the south-facing slope is a mid-age, diverse forest of oaks, hickory, sugar maple, magnolia, sassafras, white ash, tulip poplar, redbud, and flowering dogwood. The site has good road access, a small parking pull-off, and appears to be favorable for trail construction. The designation of a SWA on a portion of Parcel 90 would provide an easily accessible public area where people can enjoy a hike on a safe, maintained trail in a quiet, forested setting in any season of the year.

Part of Parcel 134 contains mature trees and good topography for trail development, but has no access from a public road. It meets some of the selection criteria for SWA designation, but lacked the important access criteria, and, thus, is not recommended for SWA designation at this time.

Because more land could potentially be developed under Alternative A, less opportunity would exist to expand TVA Natural Areas onto additional land compared to Alternative B. TVA proposes to add up to an additional 451 acres of land into the program under Alternative B. Therefore, effects on the environment from adding new natural areas would be beneficial. Once designated, these areas are routinely monitored and managed to minimize potential adverse alterations. Because of the low-impact types of uses associated with designated natural areas, as well as the public benefits of providing for long-term recreational use, positive effects under Alternative B are expected to be more beneficial than Alternative A.

3.5. Wetlands/Riparian Ecology

3.5.1. Affected Environment

Executive Order (E.O.) 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 the Tennessee Water Quality Control Act of 1977. For this reason, for most substantial projects that could effect wetlands, TVA coordinates its reviews with the U.S. Army Corps of Engineers and TDEC, Division of Water Pollution Control.

While identifying wetlands in the field, staff used the USACE delineation manual (Environmental Laboratory, 1987) criteria. These wetlands were then classified using the system developed by Cowardin et al., 1979 or according to their hydrogeomorphic (HGM) properties. The HGM classification groups wetlands that have similar functions as a result of their geomorphic setting, water source, and hydrodynamics (Brinson, 1993).

The following wetland descriptions are based on field surveys conducted between March and September 1999 on Cherokee Reservoir. Forty-one wetland areas were identified and are generally described below. Nine of these wetlands in locations primarily above elevation 1075 msl (summer pool) were identified on Parcels 45, 46, 59, 66, 73, and 90. These wetlands range in size from 0.4 to 4.5 acres, with an average of 1.86 acres and are identified and briefly described in Table 3.5.1-1. Wetlands were identified on or near (i.e., in the pool below elevation 1075 msl) the following Parcels: 11, 36, 45, 46, 47, 48, 59, 66, 73, 74, 90, 106, and 134. Thirty-three (33) of the wetlands are palustrine scrub-shrub (PSS1) and palustrine emergent (PEM1) wetlands located below elevation 1075 msl, the reservoir's pool area and/or along the shoreline.

The PEM1 and PSS1 wetlands below the summer pool elevation and on the shoreline range in size from approximately 0.02 to 1.5 acre, with an average of 0.3-acre. The dominant vegetation consists of scattered clumps or individuals of the woody species persimmon (*Diospyros virginiana*), buttonbush (*Cephalanthus occidentalis*), and black willow (*Salix nigra*). The dominant ground cover species include coreopsis (*Coreopsis tinctorum*), cocklebur (*Xanthium strumarium*), tickseed sunflower (*Bidens frondosa*), and cinquefoil (*Potentilla norvegica*). Other commonly occurring herbaceous species include smartweeds (*Polygonum hydropiperoides* and *P. lapathifolium*), St. John's wort (*Hypericum mutilum*), buttonweed (*Diodea virginica*), and yellow cress (*Rorippa* sp.). These wetlands are intermittently inundated. When the reservoir is at full summer pool, these areas are inundated. However, in years when the reservoir water level does not reach elevation 1075 msl (such as in 1999), these wetlands may be some distance away from the water. The substrate consists primarily of shale fragments and fine gravel.

Table 3.5.1-1 Wetlands Identified on Cherokee Reservoir, April-November 1999

*Wetland Identification Number**	*Wetland Type*	*Physical Location*	*Area (Acreage)*
11-1	PEM1C	Depression or sinkhole below elevation 1075 msl between mainland and island	0.16
36-1	PSS/PEM1C	Below elevation 1075 msl	0.51
36-2	PSS/EM1C	Below elevation 1075 msl	0.13

Table 3.5.1-1 Wetlands Identified on Cherokee Reservoir, April-November 1999

*Wetland Identification Number**	*Wetland Type*	*Physical Location*	*Area (Acreage)*
36-3	PSS/EM1C	Below elevation 1075 msl	0.12
45-1	POWH; PSS/PEM1C	Ponded area at head of embayment; stream riparian zone; shoreline	2.14
45-2	PSS1C	Below elevation 1075 msl	0.46
45-3	PSS1C	Below elevation 1075 msl	0.09
45-4	PSS1C	Below elevation 1075 msl	0.50
45-5	PSS1C	Below elevation 1075 msl	0.21
45-6	PSS1C	Below elevation 1075 msl	0.14
46-1	PFO/PEM1C	In stream riparian zone and below elevation 1075 msl	0.38
46-2	PSS1C	Below elevation 1075 msl	0.23
47-1	PSS1C	Below elevation 1075 msl	0.08
47-1	PEM/PSS1C	Below elevation 1075 msl	0.82
47-2	PSS1C	Below elevation 1075 msl	0.09
47-3	PEM1C	Sinkhole below elevation 1075 msl	0.15
47-4	PSS1C	Below elevation 1075 msl	0.03
47-5	PSS1C	Below elevation 1075 msl	0.04
47-6	PSS1C	Along shoreline below elevation 1075 msl	0.02
48-1	PSS1C	Below elevation 1075 msl	0.04
48-2	PSS1C	Below elevation 1075 msl	0.05
48-3	PSS1C	Below elevation 1075 msl	0.06
59-1	PSS1C	Below elevation 1075 msl	1.06
59-2	PFO1B	Forested sinkhole	1.25
59-3	PEM1A	Three sinkholes separated from reservoir, but filled with water from reservoir at summer pool and higher levels through swallowholes and seepage	3.93
59-4	PFO1C	Stream riparian zone between sinkholes and reservoir	0.40
59-5	PEM/PSS1C	Below elevation 1075 msl	0.95
66-1	PEM/PFO1A	In floodplain of Dodson Creek	4.53
73-1	PSS/PEM1C	On shoreline and below elevation 1075 msl	1.67
73-2	PSS/PEM1C	Below elevation 1075 msl	1.22
73-3	PSS1C	Below elevation 1075 msl	0.32
74-4	PSS1C	Below elevation 1075 msl	0.17
90-1	PEM/PSS1C	In stream and seep area in open area at northwest end of parcel	2.17
90-2	PFO/PEM1C	On shoreline and below elevation 1075 msl	0.32
106-1	PSS1C	Below elevation 1075 msl	0.08
134-1	PSS1C	Below elevation 1075 msl	0.07

Table 3.5.1-1 Wetlands Identified on Cherokee Reservoir, April-November 1999

*Wetland Identification Number**	*Wetland Type*	*Physical Location*	*Area (Acreage)*
134-2	PSS/PEM1C	Below elevation 1075 msl	1.51
134-3	PSS1C	Below elevation 1075 msl	0.07
134-4	PSS1C	On shoreline at seep area and below elevation 1075 msl	0.09
134-5	PSS1C	Below elevation 1075 msl	0.07
134-6	PSS1C	Below elevation 1075 msl	0.14

*Wetland Identification Number includes the parcel number and a sequential individual wetland number.
EM = Emergent
PEM1 = Palustrine emergent
PFO = Palustrine forested
POWH = Palustrine Open-water
PSS1 = Palustrine scrub-shrub

See Amundsen (1994) for a discussion of dynamic characteristics typically associated upper Tennessee River Valley reservoir riparian zones as it relates to their history, development, and hydric expression based on water level fluctuations.

3.5.2. Environmental Consequences

Regardless of whether Alternative A or B is adopted, all wetlands would be protected from adverse alteration through compliance with provisions of E.O. 11990 and TVA's implementing procedures. Consistent with these procedures, TVA will, to the extent practicable, take measures to either avoid adverse impacts to wetlands, including minimizing, or mitigating unavoidable effects on wetlands from permitting activities, use or disposal of its lands..

Under Alternative B, 81 percent of the TVA land acreage would be allocated to either Zone 3, Sensitive Resource Management (13 percent), or Zone 4 (68 percent), while only 19 percent could be used for more intensive development. Because of their sensitivity to effects of disturbance, land where wetlands are known to occur were allocated to Zone 3. This would tend to reduce the potential for direct and indirect effects. In addition, the 33 wetlands that are at or below elevation 1075 msl would not likely be directly or indirectly adversely affected by activities on TVA land because, where practicable, buffer zones would be maintained along the shoreline.

Consistent with TVA's SMP, residential shoreline development would be considered where adverse effects could be avoided or minimized. Any activities along the shoreline, such as docks or boat ramps, associated with residential

development (including Zone 7), are not likely to be approved in wetland areas without appropriate mitigation. This would include wetland areas fronting private land (Zone 1) that would be reviewed under Section 26a when permits are requested. Therefore, anticipated effects on wetlands would be minor and regionally insignificant. Because no anticipated net loss of wetlands would occur over the life of the plan, no negative cumulative effects or adverse effects on regional trends are expected.

3.6. Recreation

3.6.1. Affected Environment

Cherokee Reservoir's central location to the people of Jefferson, Hamblen, Hawkins, and Grainger Counties makes it an attractive day trip and weekend destination for residents of these counties and beyond. Location and reservoir access heavily influence popularity, recreation use patterns, and recreation activities occurring on the reservoir. Among adjoining counties, Hamblen County contain the most residential and industrial/commercial development.

Cherokee Reservoir is a clear water reservoir with about 75 percent of its shoreline undeveloped (TVA, 1998). Predominant land uses are forests and pasture. Residential development continues to occur, i.e., "open" shoreline, on about 144 miles (43 percent) of the Cherokee Reservoir's mainland shoreline. By 1994, about 60 miles (44 percent) of this shoreline had already been developed (TVA, 1998). About 99 miles (30 percent) of mainland shoreline, which totals 396 miles, are privately owned.

Developed access for the general public is provided by commercial and public facilities on approximately 1,057 acres of the 8,187 acres of TVA public land. There are ten commercial marinas and/or campgrounds. In addition, there are two county parks, one state park, and the Cherokee Dam Reservation which provide land-based facilities and access. There is a total of 25 boat ramps around the reservoir. Ten ramps are provided by commercial operators and 15 ramps are provided by public agencies (Table 3.6.1-1).

Undeveloped access is readily available around most of Cherokee Reservoir's shoreline (including 60 miles of island shoreline). Informal and dispersed recreation activities such as primitive camping, bank fishing, hunting, nature study, wildlife observation, and other forms of outdoor recreational activities occur on TVA land around the reservoir. Private reservoir access is available to about 850 shoreline homeowners and offered from one community dock facility. Some of these residential developments are scattered along about 45 miles (15 percent) of TVA public shoreline.

Table 3.6.1-1 Cherokee Reservoir Access Areas - Public and Commercial Parks, Docks, and Campgrounds with Boat Ramps

				Availability	
Parcel # (Private land)	**Name**	**Operator**	**Number of Boat Ramps**	**Summer Only**	**All Year**
1	Cherokee Dam Reservation	TVA	1		X
7	Bryd Springs Branch Access Area	TWRA	1 (gravel)	X	
12	Black Oak Boat Dock	Commercial	1		X
22	Panther Creek State Park	State of Tennessee	1		X
27	Kidwells Ridge Access Area	TWRA	1		X
40	Cherokee Park (Hamblen County Dock)	Hamblen County	2		X
--[1]	Lakeside Marina	Commercial	1		X
41	County Line Access Area	TWRA	1		X
54	Fall Creek Dock and Campground	Commercial	1		X
54	Greenlee's Fall Creek Campground	Commercial	1		X
64	Malinda Ferry Bridge	TWRA	1	X	
77	Quarryville Access Area	TWRA	1		X
--[1]	Cherokee Marina	Commercial	1	X	
82	Poor Valley Creek Access Area	TWRA	1	X	
100	Oak Grove Access Area	TWRA	1		X
123	German Creek Access Area	TWRA	1		X
124	German Creek Boat Dock	Commercial	1	X	
140	Lambdin Branch Access Area	TWRA	1 (gravel)	X	
145	Greenlee's May Springs Campground	Commercial	1		X
145	Grainger County Park	Grainger County	1		X
--[1]	Cedar Hill Boat Dock	Commercial	1	X	
--[1]	John Sevier Steam Plant	TVA	1		X
--[1]	Gilmore Boat Dock	Commercial	1		X
--[1]	Card'nal Cove Boat Dock	Commercial	1		X

According to the results of a TVA survey conducted as a part of the Cherokee Plan public scoping, the average user makes 40 visits to the reservoir each year (see Appendix A-2 - Scoping Results in the Plan). As expected, the most popular recreation activities are water-oriented. Boating, water skiing, jet skiing, and swimming are very popular. The increasing popularity of water-based activities is further supported by the increase in boater registrations in Tennessee. Boater registration has increased at an average rate of 15 percent per year from 1962 through 1998. This is a considerably faster rate of increase than the population growth rate during the same period. Expansion of three marinas and development of one new marina in the last 3 years is another indicator of the increase in boating popularity on the reservoir. However, fishing pressure on Cherokee Reservoir has decreased 3 percent from an estimated 503,000 hours in 1988 to 486,000 hours in 1998.

It is anticipated that the increasing demand for outdoor recreation opportunities would continue over the 10-year horizon for the Cherokee Plan. It would be reasonable to assume that the minimum increase in recreational demand would likely be around 8 percent, the same as the U.S. Census Bureau's projected increase in population growth from 1999-2010 (see Table 3.9.1-2 in Socioeconomics Section).

3.6.2. Environmental Consequences

From a dispersed recreation perspective, there is little practical difference between Alternatives A and B. All of the land that are currently being used for primitive camping, bank fishing, mountain biking, horseback riding, and hunting has been included in Zones 3 or 4 and all of these activities would continue.

Under either Alternatives A or B, there is some potential for loss of informal and dispersed recreation opportunities because sensitive resources have been identified where informal recreation is taking place. Under either alternative, where these conditions exist, recreational use would be monitored to determine if there are any adverse impacts; and, if so, TVA would determine steps needed to management and protect the affected resource(s).

Alternative A (No Action) - Under Alternative A, a large portion of TVA's retained, plannable land is designated for Public Recreation and Commercial Recreation (4,317 acres and 133 acres, respectively). In addition, 13 acres is forecast for Small Wild Areas. Under the forecast system, this land could be used indefinitely for informal recreation activities such as primitive camping, bank fishing, and hunting. However, these same lands are subject to requests for developed recreation activities by other public agencies and private individuals. From the perspective of future developed recreation opportunities, Alternative A would provide more flexibility for meeting this demand over the next ten year.

Regardless of the alternative, recreation development proposals would be subject to individual environmental reviews. However, under the Forecast System (Alternative A), virtually all of the 4,450 acres designated for Public Recreation and Commercial Recreation could be considered for more intensive recreational development. Although several large tracts do not have adequate land access and some are too small to support developed recreation, there would be some tracts for which TVA could receive requests to develop. Therefore, it is feasible that the demand for developed recreation facilities during the 10 year planning horizon could be met on land that has not previously been developed. Because a greater amount of land could potentially be developed under Alternative A, anticipated effects of this alternative would be greater than those expected under Alternative B.

Alternative B (Allocation Alternative) - Under Alternative B, no new land would be allocated for Zone 6, Recreation. Approximately 760 acres of committed TVA land, which has been licensed, leased, or transferred for recreational use purposes (i.e., committed land), are already included in Zone 6. TVA anticipates that any demand for additional developed recreation facilities could be met at existing commercial areas, public parks, or on private lands.

Existing recreation areas have not yet been developed to their full potential. For example, Fall Creek Dock and Campground and May Springs Recreation Areas (Parcels 54 and 145), which were leased to the private (commercial) operators in 1998 and 1999, respectively, are developing 150 additional campsites and 160 additional boat slips. These developments should be completed and available for use by 2003. In addition, there is the possibility of adding additional facilities Panther Creek State Park and Cherokee Park in Parcels 22 and 40, respectively. Several tracts of land licensed or transferred to TWRA could have parking areas expanded, as well as ramps paved. Finally, several of the marinas on Cherokee Reservoir have the potential of expanding and improving their facilities.

Under Alternative B, future demand would be met on land already being used for recreation or on private land. However, as explained above, there is expansion potential at those areas currently being used for developed recreation. The effects of expansion at existing areas would be expected to be minor and regionally insignificant. Furthermore, based upon available reservoir access areas, private docks, and anticipated increase in boating traffic from additional slips presently under construction at May Springs, TVA anticipates that any incremental increase in the use capacity would be insignificant.

3.7. Water Quality

3.7.1. Affected Environment

Watershed Description

The Holston River watershed is relatively highly populated with substantial industrial development. Runoff from this area is controlled by Watauga Reservoir on the Watauga River and South Holston Reservoir on the South Fork Holston River. Downstream from these reservoirs, the Watauga and South Holston Rivers merge in Boone Reservoir; immediately downstream from Boone Dam is Fort Patrick Henry Reservoir. A few miles downstream from Fort Patrick Henry Dam, the South Fork and North Fork Holston Rivers merge to form the Holston River.

The John Sevier Reservoir, which supplies cooling water to John Sevier Fossil Plant, is formed by the John Sevier Detention Dam. This is a low dam, only about 20 feet in height, at HRM 106.3. The timing and volume of flows into Cherokee headwaters (which back up to John Sevier Dam) are influenced by these upstream dams, primarily Fort Patrick Henry.

The remainder of the watershed consists of the minor tributaries draining directly into the reservoir and its tailwater. Primary land use in the Holston River watershed is forest (52 percent), pasture (34 percent), surface water (3 percent), and cropland (2 percent).

Hydrologic Unit

Hydrologic Unit Codes (HUCs) are assigned by the U.S. Geological Survey. The Holston River Watershed is divided into six cataloging units that lie within three states: 1) Holston River (06010104), 2) North Fork and South Fork Holston (060101102), and 3) Watauga River (06010103) in Tennessee; 4) the Middle and South Fork Holston (06010102) and 5) the North Fork Holston (06010101) in Virginia; and 6) part of the Watauga River basin in North Carolina (06010103). TVA plans and manages cooperative watershed projects, for a variety of beneficial purposes, that are prioritized based on water quality conditions of watersheds. HUCs or watersheds that drain into Cherokee Reservoir are ecologically rated as good, fair, or poor (Figure 3.7.1-1).

TVA monitors water resource conditions in the Holston River and other watersheds across the Tennessee Valley. This includes the collection of pertinent data by HUC number, the primary stream or stream reach draining the HUC, condition of the HUC, the primary resource issues associated with the respective HUC rating, and TVA land within that HUC. Ratings are based on the best professional judgment of TVA specialists after consideration of Index of Biotic Integrity (IBI) sampling results, condition of aquatic habitats in the watersheds, and predominant adjoining land uses. Although both systems use three levels of designation, HUC ratings (i.e., good, fair, or poor) are not directly comparable to

state water quality designations which identify streams as either impaired, partially impaired, or unimpaired for various use categories. Approximately 26 percent of the TVA land in HUCs adjoining Cherokee Reservoir rated fair, and 74 percent poor. By comparison, the approximate acreage of HUCs comprising the entire Holston River watershed includes only 2 percent good, 70 percent fair, and 28 percent poor.

Climate

Mean annual precipitation in the Holston River watershed ranges from 40.1 inches to 49.5 inches. Mean monthly precipitation is relatively constant with a tendency toward maximum rainfall in March and minimum rainfall in October (TVA, 1979). The mean annual air temperature at the National Weather Service station in the Johnson City, Bristol, Kingsport or Tri-cities area is 55.5° F. Mean monthly temperatures range from 34.0° F in January to 74.4° F in July.

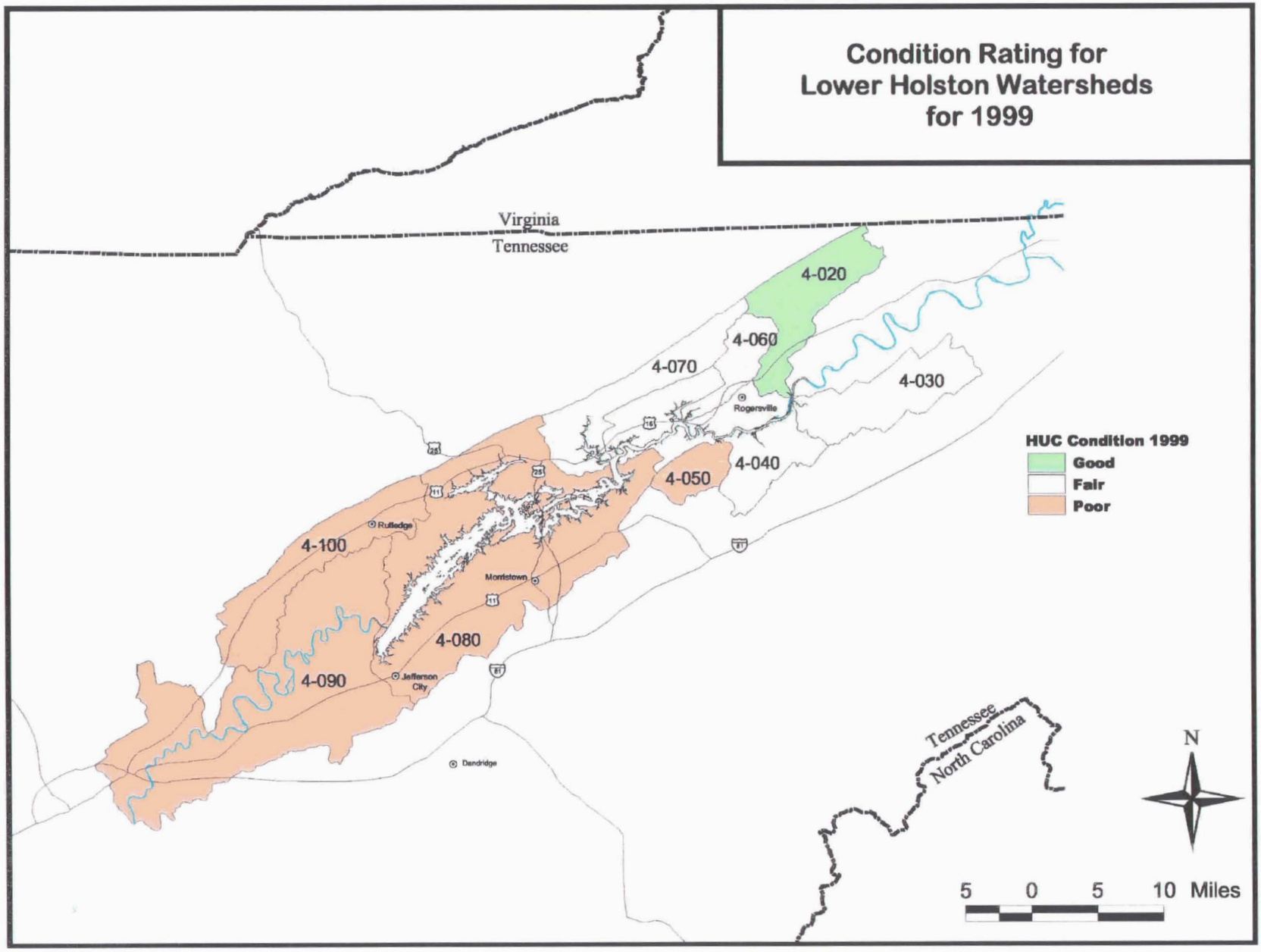
Reservoir Description

Reservoir depth ranges from 163 feet near the dam (forebay -- area of the reservoir nearest the dam) to more riverine conditions upstream near John Sevier Dam. The normal fluctuation between full summer pool and winter pool is about 53 feet. The average daily discharge rate is about 4,600 cubic feet per second with an average retention time of approximately 162 days (TVA, 1999b).

General Water Quality Characteristics

Like other deep storage reservoirs with long retention times, Cherokee Reservoir exhibits strong vertical stratification during summer months. The hypolimnetic oxygen deficit (i.e., low oxygen concentration at various locations in the water column) in this reservoir is one of the worst of all reservoirs in the TVA system. This phenomenon has been well documented in numerous past studies (TVA, 1999b). To remedy the resultant dissolved oxygen (DO) problem in the tailwater below the dam, TVA first established a minimum flow regime in November 1988. Beginning during the summer of 1995, efforts were also made to increase the oxygen content of deep forebay waters by the use of surface water pumps, liquid oxygen injection, and turbine venting, aided with hub baffles (TVA, 1996b).

Figure 3.7.1-1 HUC Condition Map for the Lower Holston Watersheds



Recent TVA Water Quality Monitoring and Results

TVA's reservoir and stream monitoring programs were combined with fish tissue and bacteriological studies in 1990 to form an integrated Vital Signs Monitoring Program (VSMP). This program is designed to systematically monitor reservoir ecological conditions and focuses on: (1) physical and chemical characteristics of waters, (2) physical and chemical characteristics of sediment, (3) benthic macroinvertebrate community sampling, and (4) fish assemblage sampling.

Two Cherokee Reservoir sites are included in the VSMP. The forebay sampling location is at HRM 53.0 and the mid-reservoir transition zone location is at HRM 76.0 (TVA, 1999b). In 1998, the VSMP rating of the overall ecological condition of Cherokee Reservoir was "poor," quite similar to results seen in previous years. The consistent problems, low DO and high chlorophyll (at the mid-reservoir site), occurred again in 1998. Table 3.7.1-2 shows water quality ratings from monitoring data (TVA, 1997 and 1999b) and reports ratings for all years using current scoring criteria which allows a more valid comparison over the years (TVA *RiverPulse* publications for 1992 and 1993 reported fair sediment ratings at some locations that would rate good using current scoring criteria).

Table 3.7.1-2 Cherokee Reservoir Water Quality Ratings, Based on Vital Signs Monitoring Program Data

Location & Elements Monitored	Monitoring years (no samples taken in 1997)					
	1992	1993	1994	1995	1996	1998
Forebay (HRM 53.0)						
Dissolved Oxygen	Poor	Poor	Poor	Poor	Poor	Poor
Chlorophyll	Good	Good	Fair	Good	Good	Fair
Sediment	Good*	Good*	Good	Good	Fair	Fair
Mid-reservoir (HRM 76.0)						
Dissolved Oxygen	Poor	Poor	Poor	Poor	Poor	Poor
Chlorophyll	Fair	Good	Poor	Poor	Poor	Poor
Sediment	Fair	Good*	Fair	Fair	Fair	Fair

*These ratings changed from Fair to Good using current scoring criteria.

Cherokee Reservoir sampling indicates acceptable nutrient levels at the forebay in most years, but levels have been consistently elevated at mid-reservoir in recent years (the level seen there was among the highest observed in the Valley in 1998). These high nutrient levels, combined with the reservoir's depth and long retention time, are contributing factors to consistently low DO levels (TVA, 1999b). Sampling of Cherokee Reservoir sediments indicates good conditions at the forebay through 1995, but chlordane has been detected in subsequent samples. Chlordane has been consistently detected in mid-reservoir sediment samples in recent years, but has not caused elevated levels in fish (TVA, 1999b).

There are no swimming advisories for Cherokee Reservoir. Only one of the ten samples collected in 1998 at the swimming beach at Cherokee Dam contained high levels of fecal coliform bacteria; bacteria levels in samples collected there in previous years have been consistently low. However, the state of Tennessee advises against water contact in the lower 5 miles of Turkey Creek, between Morristown and the reservoir.

Recent Evaluations by the State of Tennessee

In the state of Tennessee's water quality assessment report known as the 305(b) Report, listed Cherokee Reservoir as fully supporting designated stream use classifications. The state 303(d) list, established as part of the Total Maximum Daily Load (TMDL) Program, includes two Cherokee tributaries. The goals of the TMDL Program are to restore pollution-impacted waters to a condition that meets criteria for the designated uses of the water body. TDEC priority TMDL streams confluent to Cherokee Reservoir are Turkey and Mossy Creeks, which are impaired by sewage collection system failure and mining, respectively (TDEC, 1998).

3.7.2. Environmental Consequences

Effects on water quality would potentially be greater if Alternative A were adopted because of the increased amount of industrial, business, commercial, residential, and other development that could be accommodated. Under this alternative, the extent to which land uses under the existing Forecast System might affect water quality would depend on the nature and extent of potential development. Future land use and development on this land could be more intensive and extensive. Although no industrial and less recreational development is anticipated under Alternative B, additional residential, industrial, and recreational developments around the reservoir under either alternative would have the potential to result in some degree of increased soil erosion, runoff of agricultural/lawn chemicals, sewage/septic loading, and an increase in currently unknown contaminants if additional point source permits are issued. Negative impacts to water quality associated with these activities also include increased turbidity, levels of substances toxic to aquatic life, bacteriological content, and further increases in nutrient loading which is already occurring in the reservoir.

Under either Alternative A or B, use of vegetated buffer zones and other BMPs would minimize some damaging effects of riparian vegetation removal associated with development. Future developments proposed on TVA land in Zones 2, 6, and 7 would be reviewed by TVA, consistent with SMP, and adverse water quality impacts associated with land use and shoreline facilities development would be avoided, minimized, or mitigated. New facilities with permitted discharges would be required to meet NPDES permit limits as well as possible future TMDL limits.

Because vegetative buffers and other BMPs would be implemented in association with shoreline and other development activities and the likelihood of development occurring over the extent of land allocated for such use is low under Alternative A, direct, indirect, and cumulative effects on water quality are expected to be locally minor, short-term, and regionally insignificant.

Under Alternative B, any of the proposed uses of Zone 3 or 4 land would allow for protection of water quality either due to less development or ensured use of BMPs to avoid or minimize negative impacts. No land is allocated into Zone 5, Industrial/Commercial Development and no new land (i.e., land not presently used for public or developed recreation purposes) would be used for recreation (Zone 6) under Alternative B. TVA's SMP established standard to minimize these effects on residential access shoreline (Zone 7).

Although water quality impacts resulting from uses of TVA land would be minimized under either alternative with proper controls, Alternative B limits more intensive development. Because vegetative buffers and other BMPs would be implemented in association with development activities and much more land would be used for resource management and protection, direct, indirect, and cumulative effects on water quality under Alternative B, are also expected to be locally minor, short-term, and regionally insignificant.

3.8. Aquatic Ecology

3.8.1. Affected Environment

Aquatic habitat in the littoral (near-shore) zone is greatly influenced by underwater features, topography, and back-lying land use. Underwater features include the presence of woody stumps, debris, rock, logs, or other structure. Underwater topography at Cherokee Reservoir varies from moderately steep, with scattered small bluffs near the river channel, to typically shallower in embayments, coves, and areas further from the river channel and tributary stream channels. Numerous islands are found throughout the reservoir. Undeveloped shoreline (roughly 75 percent of the reservoir) is mostly wooded, so fallen trees and brush provide woody cover in those areas. Woody habitat is usually reduced on land where back-lying property is largely residential or agricultural.

Use of the TVA public land below elevation 1,080 msl by third parties with access rights has historically negatively influenced the amount of vegetation on some shoreline. As a result, residential development on private land adjoining TVA shoreland has resulted in a loss of riparian woody vegetation. In some cases, clearing of trees and brush may have accelerated shoreline erosion, resulting in the placement of seawalls or other shoreline stabilization. Shorelines lacking woody vegetation (where habitat would have been poor prior to development) still can provide suitable habitat; in fact, aquatic habitat can actually be improved by placement of riprap or construction of fixed docks on some of these sites.

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

In November 1999, TVA conducted a survey of Cherokee Reservoir to develop a Shoreline Aquatic Habitat Index (SAHI) score which provides an indication of the quality of aquatic habitat conditions in near-shore areas. Scoring parameters (metrics) included seven physical habitat parameters important to Tennessee Valley reservoir resident sport fish populations which rely heavily on shoreline areas for reproductive success, juvenile development, and adult feeding. Field methods and the SAHI rationale are described in Appendix G of the SMI final EIS (TVA, 1998). The overall average SAHI score for Cherokee was 21.1 (of a possible 35), which indicates generally "fair" shoreline aquatic habitat within the reservoir.

Of the 396 miles of mainstream and island shoreline included in the SAHI survey, 23 percent of the habitat rated "good," 45 percent rated "fair," and 14 percent rated "poor." Eighteen percent of the shoreline could not be rated because of inaccessibility.

Benthic Community – Benthic macroinvertebrates include lake bottom-dwelling animals including readily visible insect larvae, aquatic worms, snails, crayfish, and mussels. Samples for the presence of these organisms were taken in two areas of Cherokee Reservoir in 1994, 1995, 1996, and 1998, as part of TVA's VSMP; however, both areas were not sampled in all years. Areas sampled included the forebay at HRM 53.0, and a mid-reservoir transition station at HRM 76.0.

Bottom-dwellers are included in aquatic monitoring programs because of their importance to the aquatic food chain, and because they have limited capability of movement, thereby, preventing them from avoiding undesirable conditions. As shown in Table 3.8.1-1, the benthic community in the two areas of Cherokee Reservoir rated from poor to good at various times in comparison to other Ridge and Valley ecoregion reservoirs. The consistently fair rating at the forebay, largely a result of low species diversity, reflects the low DO levels consistently found there. The mid-reservoir benthic community has also consistently suffered from low species diversity (TVA, 1999b).

Table 3.8.1-1 Cherokee Reservoir Benthic Community Ratings, Based on Vital Signs Monitoring Data

Station	Monitoring years				
	1994	1995	1996	1997	1998
Forebay (HRM 53.0)	Good	Fair	Fair	NS	Fair
Mid-Reservoir (HRM 76.0)	NS	NS	Poor	NS	Fair

NS = No samples taken.

Fish Community – The VSMP included annual fish sampling at Cherokee Reservoir from 1990 through 1996 and in 1998 (no samples were taken in 1997). The electrofishing and gill netting sampling stations correspond to those described for benthic macroinvertebrate sampling. Fish are included in aquatic monitoring programs because they are important to the aquatic food chain and because they have a long life cycle which allows them to reflect conditions over time. Fish are also important to the public for aesthetic, recreational, and commercial reasons. Monitoring results for each sampling station are analyzed to arrive at a Reservoir Fish Assemblage Index (RFAI) rating which is based primarily on fish community structure and function. Also considered in the rating is the percentage of the sample represented by omnivores and insectivores, overall number of fish collected, and the occurrence of fish with anomalies such as diseases, lesions, parasites, deformities, etc. (TVA, 1999b).

The VSMP fish community monitoring results are shown in Table 3.8.1-2. These data compare Cherokee to other Ridge-and-Valley ecoregion reservoirs. Overall results indicate that the Cherokee fish assemblage has been consistently in the "fair" range at the mid-reservoir station, as well as at the forebay, since 1994.

Table 3.8.1-2 Cherokee Reservoir Fisheries Assemblage Index, Based on Vital Signs Monitoring Data

Station	Monitoring years								
	1990	1991	1992	1993	1994	1995	1996	1997	1998
Forebay (HRM 53.0)	Fair	Good	Fair	Good	Fair	Fair	Fair	NS	Fair
Mid-Reservoir (HRM 76.0)	Fair	Fair	Fair	Fair	Fair	Fair	Fair	NS	Fair

NS = No samples taken.

In TVA's most recent fish collections at Cherokee in the fall of 1998, overall species diversity was good, as was the incidence of anomalies. Low scores were obtained at both stations in occurrence of omnivores and insectivores, as well as intolerant species in the sample. Higher scores were evident for total number of species, number of piscivore species, sunfish and sucker species, and very low

occurrence of anomalies. As shown in Table 3.8.1-3, 26 fish species including the *striped x white bass* and *walleye x sauger* hybrids were collected. More abundant species in the overall sample were gizzard shad, bluegill, largemouth bass, and black crappie (TVA, 1999b).

Table 3.8.1-3 Fish Species Collected During Cherokee Reservoir Vital Signs Monitoring, Fall 1998

	Forebay (HRM 53.0)	Mid-Reservoir (HRM 76.0)
Longnose gar	X	-
Gizzard shad	X	X
Threadfin shad	-	X
Common carp	X	X
Spotfin shiner	X	-
River carpsucker	X	X
Quillback carpsucker	X	X
Smallmouth buffalo	X	X
Golden redhorse	X	-
Channel catfish	X	X
Flathead catfish	X	X
Brook silverside	X	X
White bass	X	X
Striped bass	X	X
Striped x White bass hybrid	X	X
Green sunfish	X	-
Warmouth	X	X
Bluegill	X	X
Smallmouth bass	X	X
Spotted bass	X	-
Largemouth bass	X	X
White crappie	X	X
Black crappie	X	X
Walleye	X	X
Walleye x Sauger hybrid	X	-
Freshwater drum	X	X

TWRA creel data indicate that black bass (i.e., smallmouth, spotted, and largemouth bass), striped bass, crappie, and catfish are the most sought after sport fish in Cherokee Reservoir. TWRA electrofishing sampling during the spring of 1998 found that the percentage of largemouth bass over 15 inches in the sample has increased, possibly a reflection of recent regulation changes. Bass tournament results have usually supported TWRA's findings concerning the abundance and size structure of the largemouth bass population. The striped bass fishery, which accounts for 27 percent of the angling effort for intended species, is maintained by annual stocking, but the *striped x white bass* hybrid (Cherokee bass) is the result of natural reproduction. Both white and black crappie are taken by anglers, with black crappie dominating the catch. Channel catfish are the catfish species taken in highest numbers, but blue catfish have the potential of becoming a popular fishery due to abundant forage and the growth capacity of the species (TWRA, 1999).

A Sport Fishing Index (SFI) has been developed to measure sport fishing quality for various species in Tennessee and Cumberland Valley reservoirs (Hickman, 1999). The SFI is based on the results of fish population sampling by TVA and state resource agencies and results of angler success as measured by state resource agencies (i.e., bass tournament results and creel surveys). In 1998, Cherokee rated better than average only for striped bass and channel catfish; the SFI rating was below average for black bass species, crappie, walleye/sauger, white bass, and bluegill.

There are no fish consumption advisories in effect for Cherokee Reservoir.

3.8.2. Environmental Consequences

To the extent practicable, preservation of natural conditions on TVA shoreline is important on Cherokee Reservoir because about 43 percent of the mainland shoreline is open to residential access and 30 percent of this shoreline is privately-owned. Under some circumstances, construction of docks and piers, while having short-term negative impacts, can increase fish habitat. Fixed docks and piers, especially those with pilings driven into the substrate, provide shade and cover for fish and aquatic invertebrates (White, 1975). Fixed docks, when combined with habitat improvements such as anchored brush, rock aggregations, log cribs, and/or other forms of cover, can actually enhance the shoreline aquatic habitat.

Impacts to aquatic resources are directly related to changes of the existing natural shoreline conditions. Aquatic resources can be impacted by changes to shoreline (riparian) vegetation and land uses, including the presence of vegetation, on back-lying lands. Therefore, there would likely be some minor degradation of aquatic habitats associated with continued development along the reservoir shoreline under either Alternative A or B.

Effects on aquatic ecology would potentially be greater if Alternative A were adopted because of the increased amount of industrial, business, commercial, residential, and other development that could be accommodated.

Under this alternative, the extent to which land uses under the existing Forecast System might affect aquatic ecology would depend on the actual nature and extent of development. Future land use and development on this land could be more intensive and extensive. Although no industrial and less recreational development is anticipated under Alternative B, additional residential, industrial, and recreational developments around the reservoir under either alternative would have the potential to result in some degree of increased soil erosion, runoff of agricultural/lawn chemicals, sewage/septic loading, and an increase in currently unknown contaminants if additional point source permits are issued on the reservoir. Increased turbidity, levels of substances toxic to aquatic life, bacteriological content, and further increases in nutrient loading which is already occurring in the reservoir, would negatively impact aquatic life and the ecological health of the reservoir.

Under either Alternative A or B, use of vegetated buffer zones and other BMPs would minimize some damaging effects of riparian vegetation removal associated with development. Future developments proposed on TVA land in Zones 2, 6, and 7 would be reviewed by TVA, consistent with SMP, and adverse impacts on aquatic life associated with land use and shoreline facilities development would be avoided, minimized, or mitigated. New facilities with permitted discharges would be required to meet permit limits as well as possible future TMDL limits.

Because vegetative buffers and other BMPs would be implemented in association with shoreline and other development activities and the likelihood of development occurring over the extent of land allocated for such use is low under Alternative A, direct, indirect, and cumulative effects on water quality are expected to also be locally minor, short-term, and regionally insignificant.

Adoption of Alternative B would provide a better opportunity to protect or enhance aquatic habitats by allocating 6,610 acres or 81 percent of the TVA land to Zones 3 and 4. Any of the proposed uses of this land would allow for the protection or enhancement of aquatic habitats by preserving natural shoreline conditions. The present extent of woody shoreline cover on this land would be expected to be maintained or increased in the future as natural succession continues. Forest management (or other resource manipulation activities on Zone 4 lands) would not adversely impact aquatic resources if properly planned and conducted so that the riparian zone and associated littoral aquatic habitats are protected.

The management of Zone 3 and 4 land, under Alternative B, would be guided by resource unit management plans, developed and reviewed with public input, that would provide for a long-term management strategy. This would allow avoidance

or minimization of potential adverse effects on aquatic ecology that could result from implementation of resource protection and conservation activities.

Land allocated to Zones 3 and 4 includes 494 acres of land previously designated for industrial use under Alternative A. Depending on the type and intensity of development, use of this land could potential result in emissions to the aquatic environment that could negative effect aquatic life. Under Alternative B, 760 acres of recreation lands in Zone 6 would remain available for expanded recreational use opportunities. Expanded recreation facilities and use on existing lands could allow access for bank fishing and fish habitat enhancement opportunities. Under this alternative, no land is allocated into Zone 5, Industrial/Commercial Development.

Some temporary minor negative impacts to the aquatic environment could occur under either alternative, but such impacts would be rendered insignificant with proper planning and use of protective and mitigative measures during development. Because aquatic habitat on Cherokee Reservoir is considered only "fair" overall, impacts to aquatic habitats would be a major consideration in future decisions affecting TVA lands under either alternative. However, Alternative B better defines suitable activities for each parcel of TVA land and would likely result in fewer impacts.

Because vegetative buffers and other BMPs would be implemented in association with development activities and the likelihood of development occurring over the extent of land allocated for such use is higher under Alternative A, direct, indirect, and cumulative effects on aquatic ecology are expected to be locally minor and regionally insignificant.

3.9. Socioeconomics

3.9.1. Affected Environment

The Cherokee Reservoir is located between the Knoxville and Kingsport-Bristol-Johnson City, Tennessee, Standard Metropolitan Areas.

Population

The 1999 population of the four counties in the Cherokee area is estimated by the U. S. Bureau of the Census to be 169,633, a 16.9 percent increase over the 1990 population of 145,156 (Tables 3.9.1-1 and 3.9.1-2). This growth rate is faster than that of the state, which is estimated to have grown by 12.4 percent, and much faster than of the nation, at 9.6 percent. Jefferson County, located just to the east of the Knoxville metropolitan area, had the fastest growth rate at 36.6 percent. Projections suggest that the area is likely to grow more slowly than the state and the nation over the next 20 years, although Jefferson County is expected to continue to grow faster.

Table 3.9.1-1 Population and Population Projections 1980-2020

	1980	1990	1999	2010	2020
Grainger County	16,751	17,095	20,219	21,691	23,332
Hamblen County	49,300	50,480	54,201	56,163	57,069
Hawkins County	43,751	44,565	50,109	54,521	58,801
Jefferson County	31,284	33,016	45,104	50,173	56,435
Area Total	141,086	145,156	169,633	182,548	195,637
Tennessee	4,591,023	4,877,203	5,483,535	6,062,695	6,593,194
United States (000)	226,542	248,791	272,691	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; U. S. projections from U. S. Census Bureau, Population Division, Population Projections Program.

Table 3.9.1-2 Percent Change in Population

	1980-1990	1990-1999	1999-2010	2010-2020	1980-2020
Grainger County	2.1	18.3	7.3	7.6	39.3
Hamblen County	2.4	7.4	3.6	1.6	15.8
Hawkins County	1.9	12.4	8.8	7.9	34.4
Jefferson County	5.5	36.6	11.2	12.5	80.4
Area Total	2.9	16.9	7.6	7.2	38.7
Tennessee	6.2	12.4	10.6	8.8	43.6
United States (000)	9.8	9.6	10.0	8.4	43.4

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; U. S. projections from U. S. Census Bureau, Population Division, Population Projections Program.

Labor Force and Unemployment

In 1999, the civilian labor force of the area was 88,620 (Table 3.9.1-3). Of these, 4,020 were unemployed, for an unemployment rate of 4.5 percent. Unemployment rates did not vary much among the counties, from 4.2 percent in Jefferson County to 5.3 in Hawkins County. The overall rate was slightly higher than the state and national rates. All of the four counties were higher than the state, and all except Jefferson were higher than the nation.

Table 3.9.1-3 Labor Force Data, Residents of Cherokee Area, 1999

	Civilian Labor Force	Unemployment	Unemployment Rate
Grainger County	10,210	440	4.3
Hamblen County	30,610	1,310	4.3
Hawkins County	23,940	1,260	5.3
Jefferson County	23,860	1,010	4.2
Area Total	88,620	4,020	4.5
Tennessee	2,818,800	113,500	4.0
United States (000)	139,368	5,880	4.2

Source: Tennessee Department of Labor and Workforce Development, Employment Security Division

Jobs

In 1998, the Cherokee Reservoir area had over 84,000 jobs, an increase of 20 percent over the level in 1989. This represents a faster rate of growth than in the nation, but a little slower than the state. Grainger and Hawkins Counties both grew faster than the state. Grainger and Hawkins grew at a rates of 27.2 percent and 23.5 percent, respectively, compared to the state rate of 22.0. Over 48 percent of the jobs in 1998 were in Hamblen County, over 22 percent in Hawkins, over 20 percent in Jefferson, and 9 percent in Grainger.

Manufacturing is a much larger part of the economy of the Cherokee Reservoir area counties than in the state or the nation. Close to one-third (32.3 percent) of jobs in the area are manufacturing, compared to 15.8 percent statewide and 12.2 nationally. Manufacturing's share of total employment is larger than the state in all four counties, ranging from 18.3 percent in Jefferson County, slightly higher than the state, to 38.9 percent in Hamblen County. Nationally, as production has become more efficient and the economy moves more and more to a service economy, manufacturing employment has declined, decreasing by 2.1 percent between 1989 and 1998. The state of Tennessee has been following that trend, but at a slower pace, with a decline of 0.5 percent from 1989 to 1998. In contrast, the Cherokee area counties had an increase of 5.9 percent during this same time period. Jefferson County had a loss of 22.7 percent while the three other counties had increases; Hawkins County had a very large increase of 39.2 percent.

The Cherokee Reservoir area has a smaller proportion of its workers in the service sector, 17.8 percent in 1998, than does the state or the nation, with 28.2 percent and 31.1 percent, respectively, in 1998. All four of the Cherokee area counties are below the state average, with Jefferson the highest at 22.4 percent. However, services employment grew slightly faster from 1989 to 1998 than in the state, and much faster than nationally. The four counties as a whole grew by 44.3 percent, with Jefferson County at 69.4, compared to the state at 43.5 and the nation at 34.2.

Table 3.9.1-4 Employment, Cherokee Area

	1989	1998	Percent Change
Total Employment			
Grainger County	5,913	7,520	27.2
Hamblen County	34,671	40,655	17.3
Hawkins County	15,263	18,844	23.5
Jefferson County	14,167	17,136	21.0
Area Total	70,014	84,155	20.2
Tennessee	2,753,529	3,357,985	22.0
United States (000)	137,240.8	160,198.7	16.7
Manufacturing			
Grainger County	1,738	2,048	17.8
Hamblen County	15,437	15,832	2.6
Hawkins County	4,428	6,164	39.2
Jefferson County	4,055	3,135	- 22.7
Area Total	25,658	27,179	5.9
Tennessee	534,526	531,717	- 0.5
United States (000)	19,992.5	19,568.5	- 2.1
Services			
Grainger County	695	1,098	58.0
Hamblen County	5,378	7,286	35.5
Hawkins County	2,034	2,746	35.0
Jefferson County	2,270	3,846	69.4
Area Total	10,377	14,976	44.3
Tennessee	660,060	947,101	43.5
United States (000)	37,170.9	49,897.7	34.2

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

Occupation Patterns

The Cherokee Reservoir area has a smaller proportion of its workers in managerial and professional jobs than the state average. The area also has a smaller proportion of its workers in technical, sales, and administrative support positions. Conversely, it has a higher share of its workers in blue-collar jobs at all skill levels, but especially as operators, fabricators, and laborers. The four counties in the Cherokee area are very similar with regard to occupational distribution, although in Grainger County the differences as compared to the state are even more pronounced.

Table 3.9.1-5 Occupation of Workers (Percent Distribution), 1990

	Grainger	Hamblen	Hawkins	Jefferson
Managerial and Professional	10.0	17.0	15.6	17.5
Technical, Sales, Administrative	18.0	26.9	22.7	25.2
Service Occupations	10.4	11.8	11.8	12.2
Farming, Forestry, Fishing	5.7	1.6	3.2	3.8
Precision Production, Craft, Repair	17.3	14.4	16.7	14.8
Operators, Fabricators, Laborers	38.5	28.3	30.0	26.5
	Area Total	Tennessee	U. S.	
Managerial and Professional	15.9	22.6	26.4	
Technical, Sales, Administrative	24.3	30.1	31.7	
Service Occupations	11.7	12.4	13.2	
Farming, Forestry, Fishing	3.0	2.2	2.5	
Precision Production, Craft, Repair	15.5	12.2	11.3	
Operators, Fabricators, Laborers	29.5	20.5	14.9	

Income

Per capita personal income in the Cherokee Reservoir area increased by 49.3 percent from 1989 to1998. This was slightly faster than the national growth rate of 46.5, but below the state rate of 53.9 percent. Hamblen County, at 61.0 percent and Grainger County, at 54.0 percent exceeded the state growth rate; in contrast, Jefferson County experienced a slow rate of 35.8 percent.

Table 3.9.1-6 Per Capita Personal Income ($)

	1989	1998	Percent Change
Grainger County	10,601	16,328	54.0
Hamblen County	14,234	22,913	61.0
Hawkins County	12,746	18,703	46.7
Jefferson County	13,153	17,868	35.8
Cherokee Area	13,103	19,564	49.3
Tennessee	15,883	24,437	53.9
United States	18,566	27,203	46.5

Environmental Justice

The minority population in the area, at 4.1 percent of the total in 1999, is well below the state average of 18.9 percent and the national average of 28.1 percent. Minority population is defined as nonwhite persons and white Hispanics; nonwhite Hispanics are already included in the nonwhite estimate and so are not counted again as Hispanic. None of the four counties has a minority population share close to the state and national averages, with Hamblen the highest at 6.1

percent. Overall, the poverty level in the area, at 15.0 percent, is about the same as the state, at 14.7 percent, and somewhat higher than the national rate of 13.8 percent. Rates by county vary from a low of 13.8 percent in Hamblen County to a high of 18.4 percent in Grainger County.

Table 3.9.1-7 Minority Population, 1999, and Poverty, 1995

	Population	Minority Population			Poverty
	Total	Nonwhite	White Hispanic	Percent Minority	% Below Poverty Level
Grainger County	20,219	211	102	1.5	18.4
Hamblen County	54,201	3,000	332	6.1	13.8
Hawkins County	50,109	1,148	290	2.9	15.8
Jefferson County	45,104	1,611	228	4.1	14.1
Area Total	169,633	5,970	952	4.1	15.0
Tennessee	5,483,535	978,861	58,148	18.9	14.7
United States	272,690,813	48,080,016	28,561,362	28.1	13.8

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

3.9.2. Environmental Consequences

Potential socioeconomic impacts could arise from use of reservoir lands for industrial or commercial use and from the construction of water-use facilities. Effects may also occur if recreational or scenic values attract people from outside the area. Additional impacts may occur if residential development is attracted to areas on or near the reservoir. These types of developments tend to have environmental effects that would be greater under Alternative A compared to Alternative B. Regardless of the alternative adopted, land use proposals would receive appropriate environmental review when specific plans are presented for TVA approval.

Alternative A: (No Action) - Under Alternative A, 494 acres of land are designated for industrial use. This land could accommodate important industrial development. Even small tracts could be used to provide water access for industrial development on back-lying properties. The extent of impacts on the local economy and the environment from use of any of these tracts for industrial use would vary greatly, depending on the type of use and specific plans. However, due to the lack of commercial navigation, inaccessibility, topography, potentially sensitive resources, and the value of the land for recreation and conservation purposes, as well as sentiments of the public, it is somewhat unlikely that much would be used for major or important industrial or commercial purposes.

This alternative also designates 4,318 acres of land for Public Recreation. Such designation allows informal, dispersed activities such as hunting, hiking, fishing, and primitive camping. Most use of this type is by people who live in the general

area, close enough that visits do not require overnight accommodations. However, there is and would continue to be some usage by persons from outside the area. This type of usage has a positive impact on income and employment in the area; however, this impact is not likely to be an important component of income in the area. In additional to informal recreation, these properties, with TVA approval, could also be developed for more formal activities such as parks, boat-launching areas, and campgrounds. Also, 133 acres are forecast for Commercial Recreation, allowing for more developed and intensive use such as marinas, commercial boat docks, and campgrounds. Much of the use of these more developed areas also would be local in nature, but some users would be from outside the area and their spending would have a small but positive impact on income in the area. Because constraints to major industrial/commercial developments such as lack of commercial navigation and its reduce probability, as well as environmental commitments likely to be associated with TVA approval of such use, environmental effects would likely be minor and insignificant.

Land for which no forecast was made includes 583 acres, which includes land potentially available for residential use. Although exceptions may be allowed under the maintain and gain policy option of TVA's current SMP, residential access is generally available over TVA land only where access rights exist and private flowage easement. Therefore, only about 275 acres or 144 miles of shoreline would likely be used to accommodate residential development. This land could be used to provide residential access to the reservoir, thereby encouraging residential development along and near the shoreline. Although the residents of most such development would be persons who would otherwise live elsewhere in the area, some retirees could be attracted to the development. Attraction of retirees would result in some population increase and associated increases in local income and spending. Building of water access facilities might also have some positive impact on the local economy.

Some of the remaining Forecast System land, such as reservoir operations or dam operations property, could be used for informal recreation purposes, attracting primarily users from the local area and surrounding counties. Such uses would have only small impacts on income and employment in the local area.

Because of the amount of land that could potentially be used to accommodate both industrial and commercial development, socioeconomic and environmental impacts of Alternative A would likely be greater than Alternative B. However, because overall socioeconomic impacts of adoption of Alternative A would likely be positive (but still relatively small), it is anticipated that impacts would be locally minor. Associated environmental effects would be locally minor and regionally insignificant.

Alternative B: (Allocation Alternative) - Under Alternative B, no land would be allocated to Zone 5, Industrial/Commercial Development. Private land with industrial/commercial development potential occurs around the reservoir that is

probably suitable for such use. Under this alternative, TVA could consider requests for the use of suitable land to provide reservoir or river access for minimum width utility corridors. These requests would be reviewed on a case by case basis similar to other types of TVA and public works projects included in Zone 2. Such corridors would be sited to avoid land known to have sensitive resources, including Zone 3; larger parcels of resource conservation land (Zone 4), as well as recreation land (Zone 6), and TVA public residential access land (Zone 7). Therefore, there could be potentially large economic effects, but minor environmental impacts from use of land for this purpose.

About 760 acres of land are allocated for Zone 6, Recreation. This land would be available for development and would require capital expenditures and maintenance. Construction of facilities and use of the property for such purposes would have some positive impacts on income and employment in the area. Depending on the type of development, much of the use is likely to be by residents of the local area or adjoining counties, which would limit the economic impact.

Land, totaling 275 acres, would be designated for Zone 7, Residential Access. Consistent with TVA's SMP, these areas could be used for residential access under either alternative. Effects would be essentially the same as in Alternative A. Generally, these are narrow strips along the reservoir that could provide access for residents on adjacent or back-lying properties. Residents of such developments typically would be persons who would otherwise live elsewhere in the area. However, some retirees might be attracted to these developments. To the extent that retirees are attracted from outside the area, there would be some increase in population and in local income and spending. Building of water access facilities might also have some positive impact on the local economy.

Most of the remaining land under Alternative B would be allocated to Sensitive Resource Management or Natural Resource Conservation. These areas may be used for informal recreation, largely by residents of the local area or surrounding counties. Such activities would have small and positive, but not important, impacts on the local economy. Protection and good management of such lands would, however, enhance the scenic and environmental qualities of the area, thereby making it more attractive to potential residents and visitors. This attraction would have some indirect positive impacts on income and employment in the area. Creation of TVA Natural Areas on land allocated to Zones 3 and 4 would have beneficial effects and management activities on these areas would have insignificant environmental impacts.

Except for the potential use of TVA land to facilitate access (i.e., minimum width corridor), to the reservoir, which could have greater economic effects, overall socioeconomics impacts of adoption of Alternative B would likely be positive, but small. If reservoir access is provided, appropriate environmental reviews would be conducted and the corridor would be sited so that effects are minor. Therefore,

it is anticipated that environmental impacts would be locally minor and regionally insignificant.

3.9.2.1. Environmental Justice

About 494 acres of industrial land was forecast (Alternative A) for Cherokee Reservoir but, for various reasons, would be somewhat unlikely to be developed over the life of this plan. No industrial/commercial land is allocated under Alternative B. Residential development and tourism would positively affect the local economy. As discussed in Section 3.9.1, the minority population of the Cherokee Reservoir area is very small, but the share of persons below the poverty level is slightly higher than the state and the nation. Per capita personal income in the area increased from 1989 to1998. This was slightly faster than the national, but below the state growth rate. Overall, the poverty level in the area is about the same as the state, but somewhat higher than the national rate.

Although positive, TVA expects that the economic effects of either alternative would be small. Because these benefits would be small, no disproportionate adverse effects on minority or low-income populations are expected. Any major development project that might be proposed in the future under either alternative could have positive impacts. However, any such development that required TVA approval would receive environmental review, including potential environmental justice effects, before they could be approved.

3.10. Navigation

3.10.1. Affected Environment

There is no commercial navigation on Cherokee Reservoir. However, TVA installs and maintains navigation aids on land surrounding the reservoir to assist recreational boaters. There are 29 dayboards located at intervals on the Holston River between Cherokee Dam and HRM 96.2 that provide boaters information on river mile locations. Where possible, the dayboards are located so that boaters can travel in a straight line of sight from one dayboard to the next. Five onshore directional signs mark the entrance of large creeks into the reservoir. Directional signs show the name of the creek and point in the upstream direction of the creek.

Directional signs mark the entrances to Panther Creek, German Creek (subdivision tract), Ray Creek and German Creek, and Poor Valley Creek. A directional sign on a large island that is part of Parcel 29 near German Creek shows the direction to the Cherokee Dam. Maintenance is performed once a year to replace missing or damaged navigation aids and vegetation is removed from the immediate vicinity of the signs to ensure that they are visible to boaters. Navigation aids, consisting of dayboards, are located prominently along the shoreline (Table 3.10.1-1). Five dayboards are located on former TVA land or land where TVA only purchased flowage easement.

Table 3.10.1-1 Navigation Aids Locations By Dayboard Number, Parcel Number, and Land Ownership

Dayboard Number	Parcel Number	Bank (Right or Left Descending)	Located on Island or Mainland	TVA or Private Land
1	2	Left	Island	TVA
2	11	Left	Island	TVA
3	14	Left	Island	TVA
4	18	Left	Mainland	TVA
5	--	Left	Mainland	Private Flowage
6	145	Right	Mainland	TVA
7	23	Right	Island	TVA
8	22	Left	Mainland	TVA
9	23	Right	Island	TVA
10	138	Right	Mainland	TVA
11	24	Left	Island	TVA
12	29	Left	Island	TVA
13	29	Left	Island	TVA
14	--	Right	Mainland	Private Flowage
15	29	Left	Island	TVA
16	29	Left	Island	TVA
17	29	Left	Island	TVA
18	36	Left	Mainland	TVA
19	43	Right	Island	TVA
20	40	Left	Mainland	TVA
21	46	Right	Mainland	TVA
22	--	Left	Mainland	Private Flowage
23	49	Right	Island	TVA
24	55	Left	Mainland	TVA

Table 3.10.1-1 (cont.) Navigation Aids Locations By Dayboard Number, Parcel Number, and Land Ownership

Dayboard Number	Parcel Number	Bank (Right or Left Descending)	Located on Island or Mainland	TVA or Private Land
25	--	Right	Mainland	Private Flowage
26	59	Left	Island	TVA
27	78	Right	Mainland	TVA
28	--	Left	Mainland	Private Flowage
29	73	Right	Mainland	TVA

3.10.2. Environmental Consequences

Under either Alternative A or B, there would be no environmental impacts associated with the continued maintenance of navigation aids used by recreational boaters. Parcels, or small portions thereof, containing navigation aids are allocated in Alternative B to Zone 2, Project Operations, to ensure their continued use for this purpose.

The main concerns related to navigation under either alternative is to maintain access needed to continue providing for repairs or replacements of the signs along the shoreline and visibility of the signs. Because navigation aids are located along the shoreline, the construction of water-use structures associated with residential development or marinas would have the greatest potential for impacting these structures. Requests for docks, boathouses, fishing piers, and launching ramps within 50 feet of navigation aids will be reviewed by TVA and potential effects evaluated. The Section 26a process would ensure that water-use facilities constructed along the shoreline would not reduce visibility of the signs or compromise their placement on the shoreline. Industrial and commercial developments that do not involve the placement of structures in the reservoir would have no impact on navigation aids.

Increased residential and recreational development would likely increase the number of recreational boats and other types of pleasure craft on the reservoir. It is expected that enforcement by TWRA of Tennessee's boating safety regulations would ensure that boating on Cherokee Reservoir continues to be safe despite any increase in residential development.

No commercial navigation occurs and no new recreation areas would likely be developed outside areas presently used for that purpose. In accordance with SMP, no net increase in residential access shoreline is likely to occur. Therefore, TVA anticipates potential effects on navigation on Cherokee Reservoir, under either alternative, would be minor and insignificant.

3.11. Prime Farmland

3.11.1. Affected Environment

Prime farmland soils, as defined by the U.S. Department of Agriculture, are those soils that have the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. They 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 already be converted to urban or built-up land.

The conversion of farmland and prime farmland soils to industrial and other non-agricultural uses essentially precludes farming the land in the foreseeable future. Creation of the Federal Farmland Protection Policy Act of 1981 provides that all federal agencies evaluate land prior to taking actions that permanently convert land to a non-agriculture land use. In order to assist in evaluating prime farmland impacts, agencies may complete Form AD 1006, *"Farmland Conversion Impact Rating,"* with assistance from the Natural Resource Conservation Service.

The soils in Grainger, Hamblen, Hawkins, and Jefferson Counties in east Tennessee differ widely in character and in the conditions associated with productivity and adaptations for use. Soils in the Cherokee Reservoir area, developed from various parent material from shale to limestone, is covered by a layer of colluvial material from the surrounding mountains and hills. The portion of Cherokee Reservoir land located in Jefferson County contains 20 different soil classifications. None of these soils is classified as prime farmland. The Grainger County portion contains 84 different soil mapping units in 31 soil series. Only Sequatchie fine sandy loam is classified as prime farmland soil. The Hamblen County portion contains 58 soil mapping units in 24 soil series. Five of these soils are classified as prime farmland. The majority of the prime farmland soils, about 25 percent, are located in the Hawkins County segment of the reservoir (Table 3.11.1-1).

Twenty-two parcels of TVA land on Cherokee Reservoir contain prime farmland soils (Table 3.11.1-2). The total extent of prime farmland in these parcels covers approximately 254 acres. Form AD 1006 is completed for parcels greater the 10 acres. There are 17 parcels of TVA land that contain prime farmland and are more than 10 acres in size. Only eight of these parcels have more than 10 percent of its acreage classified as prime farmland. These are Parcels 66 (95 percent), 68 (25.3 percent), 71 (37.6 percent), 72 (45.8 percent), 73 (12.8 percent), 75 (10.8 percent), 76 (15.1 percent), and 109 (20.0 percent).

Table 3.11.1-1 Soils in Cherokee Reservoir Area Classified as Prime Farmland

County	Soils
Jefferson	None
Grainger	Sequatchie fine sandy loam
Hamblen	Emory, Greendale, Hamblen, and Leadvale silt loams Monongohela very fine sandy loam
Hawkins	Cloudland, Ealy, Holston, Sequatchie, Sewanee, Sullivan, Taft, and Whitwell loams; Altavista , Emory, Etowah, Greendale, Hamblen, Lindside, Melvin, Shouns, Staser, Statler, and Whitesburg silt loams; and Sensabaugh gravelly loam

Table 3.11.1-2 Parcels Which Contain Prime Farmland Soils with Corresponding Acreage

Parcel Number	Acres in Parcel	Acres of Prime Farmland	% of Parcel
28	243.6	8.9	3.6
36	157.9	5.5	3.5
49	456.5	12.7	2.8
62	26.4	0.9	3.4
64	6.5	0.9	13.8
66	38.4	36.5	95.0
68	297.0	75.0	25.3
69	27.4	1.6	5.8
71	14.9	5.6	37.6
72	119.0	54.5	45.8
73	129.1	16.5	12.8
75	3.7	0.4	10.8
76	58.2	8.8	15.1
77	2.5	0.02	0.8
78	21.1	1.0	4.7
80	934.3	19.9	2.1
82	21.6	0.5	2.3
84	189.9	0.8	0.4
87	20.7	1.0	4.8
108	2.4	0.03	1.3
109	1.5	0.3	20.0
118	151.0	2.3	1.5
Total	**2,923.6**	**254.1**	**8.7**

There are presently 13 tracts on Cherokee Reservoir licensed to local farmers. These tracts of land, which contain a total of 217 acres, occur in portions of six parcels (Table 3.11.1-3). One (2-acre tract) of these parcels on the dam reservation (Parcel 1) is licensed for pasture. Twelve agriculture licenses are for hay, however, small portions of two of these tracts have been approved for pasture and row crop use (Parcels 80 and 145, respectively). All these tracts have agricultural BMP provisions incorporated into the contracts. None of these tracts contains prime farmland soils.

Table 3.11.1-3 Existing Agriculture Licenses

Parcel Number	Number of Licenses in Parcel	Alternative A	Alternative B
1	6	Dam Reservation	Project Operations
54	1	No Forecast, Industry	Zone 6 Recreation
80	2	Public Recreation and Power Transmission	Zone 4 Natural Resource
89	1	Reservoir Operations and Public Recreation	Zone 4 Natural Resource
91	1	Reservoir Operations and Public Recreation	Zone 4 Natural Resource
145	2	Public Recreation	Zone 6 Recreation

3.11.2. Environmental Consequences

Form AD 1006, "Farmland Conversion Impact Rating," would be completed to evaluate the significance of prime farmland conversion if a site which contains prime farmland soils, is larger than 10 acres, and is to be permanently converted to a non-agricultural land use. The rating is based on soil characteristics as well as site assessment criteria, such as agriculture and urban infrastructure, support services, farm size, compatibility factors, on-farm investments, and potential farm production loss to the local community and county. Consideration must be given to alternative means that minimize impacts on farmland for sites rated high, i.e., receiving 160 total points or more. Because of provisions of the Federal Farmland Protection Policy Act of 1981, such an evaluation would be conducted by TVA regardless whether Alternative A or B is adopted. Along with SMP standards on residential access shoreline, independent environmental reviews would be conducted by TVA on projects requiring land use or Section 26a approval. A more detailed examination of the potential effects of each alternative is presented below.

Alternative A (No Action) - With the exception of Parcels 64, 75, 77, 108, and 109 (which are less than 10 acres), Form AD 1006 would be completed for all parcels listed in Table 3.11.2-2 prior to any conversion of land for non-agricultural use. For example, Form AD 1006 would be completed and a rating derived for the site before it is considered for industrial use.

If the parcels designated for Public Recreation continue to be undeveloped, no rating is completed. Based on the rating of the individual parcels, certain development actions could have potential impacts on prime farmland. For example, if commercial development were permitted on Parcels 68 or 72, which are large parcels containing one-quarter or more of their acreage in prime farmland, such land could be adversely affected. Approval of an industrial development proposal on Parcel 54 could impact the current agriculture license for this tract. The other licenses are on tracts designated by Forecast System to be Public Recreation, thus would not be affected by this action (Table 3.11.1-3).

Table 3.11.2-2 Distribution of Prime Farmland Soils on TVA-owned Land on Cherokee Reservoir for Alternatives A & B

Parcel Number	No Action :Alternative A Designation	Allocation: Alternative B Designation
28	Public Recreation	Zone 4 Natural Resource Conservation
36	Reservoir Operations and Industry	Zone 3 Sensitive Resource Management
49	Reservoir Operations, Public Recreation	Zone 4 Natural Resource Conservation
62	Reservoir Operations, No Forecast	Zone 7 Residential Access
64	Public Recreation	Zone 6 Recreation
66	Reservoir Operations	Zone 3 Sensitive Resource Management
68	Reservoir Operations, Public Recreation	Zone 4 Natural Resource Conservation
69	Reservoir Operations, No Forecast	Zone 7 Residential Access
71	Reservoir Operations	Zone 3 Sensitive Resource Management
72	Public Recreation and Reservoir Operations	Zone 4 Natural Resource Conservation
73	Public Recreation	Zone 3 Sensitive Resource Management
75	No Forecast	Zone 7 Residential Access
76	Public Recreation and Reservoir Operations	Zone 4 Natural Resource Conservation
77	No Forecast	Zone 6 Recreation
78	No Forecast	Zone 7 Residential Access
80	Power Transmission and Public Recreation	Zone 4 Natural Resource Conservation
82	Public Recreation	Zone 6 Recreation
84	Public Recreation	Zone 4 Natural Resource Conservation
87	Reservoir Operations and Public Recreation	Zone 4 Natural Resource Conservation
108	No Forecast	Zone 6 Recreation
109	No Forecast	Zone 7 Residential Access
118	Reservoir Operations	Zone 4 Natural Resource Conservation

Because of the potential for an increased amount of developmental uses of TVA land occurring under Alternative A, effects could potentially be greater than those anticipated under Alternative B. Except for the potential of converting prime farmland on small parcels, because TVA would adhere to the provisions of the Federal Farmland Protection Policy Act, effects are expected to be minor and regionally insignificant.

Alternative B (Allocation Alternative) - The majority of the parcels with prime farmland have been zoned for Sensitive Resource Management and Natural Resource Conservation, Zones 3 and 4, respectively (Table 3.11.2-2). These would require no further evaluation. Parcels 62, 69, 78, and 82 would need to be evaluated prior to transferring (or approval of conversion of land uses) the land for use as non-agricultural land. The small amount of prime farmland in either of these parcels, from 0.5 to 1.6 acres, would probably result in a rating below the score of 160 (which triggers further consideration for protection of the prime farmland).

With the exception of Parcels 1, which is allocated to Project Operations, and 54 and 145, which are allocated to Recreation, all the parcels which contain tracts for agriculture licenses are allocated to Zone 4 (Table 3.11.1-3). These licenses would not be affected by implementing activities typically associated with natural resources management. Because Alternative B would not likely result in approval of activities with the potential to cause prime farmland conversion or loss of land in agricultural use and more land would be conserved; thus, this alternative would have less direct effects than Alternative A. Except for the potential of converting prime farmland on small parcels, overall effects of adoption of Alternative B would not differ from Alternative A and would also be insignificant.

3.12. Other Issues

3.12.1. Floodplains

The 100-year floodplain on Cherokee Reservoir is the area inundated by the 100-year flood event. The level of flooding has a 1 percent probability of occurring in any year. The 100-year flood elevation on Cherokee Reservoir is 1,075.0 feet msl at the dam (HRM 52.3). This elevation is used throughout the reservoir. The 500-year or "critical action" floodplain on Cherokee Reservoir is also the area below elevation 1,075.0 feet msl.

Any fill material placed between elevations 980.0 feet msl and 1,073.0 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 1,030.0 feet msl and 1,075.0 feet msl would be subject to the requirements of the *TVA Flood Control Storage Loss Guideline*. All development subject to flood damage must be located above elevation 1,075.0.

Any development proposed in the 100-year floodplain is subject to the requirements of Executive Order 11988 (Floodplain Management). The first step is to determine if the activity is covered under TVA's "Class Review of Certain Repetitive Actions in the 100-Year Floodplain" (see Memorandum from Mohamed T. El-Ashry to Those Listed, August 13, 1981). As a result of this review, TVA has already determined that there were no practicable alternatives to several actions that would avoid siting in the floodplain. A set of review criteria were also established to ensure that natural and beneficial floodplain values are not significantly affected by the repetitive actions. If these criteria are followed, adverse floodplain impacts would be minimized.

If an activity is not a repetitive action in the 100-year floodplain, EO 11988 requires the applicant and the initiating TVA organization to evaluate alternatives to the floodplain siting which would either identify a better option or support and document a determination of "no practicable alternative" to siting within the 100-

year floodplain. Land in Zone 2 is virtually all above the 100-year flood elevation for Cherokee Reservoir. Some of the land being allocated to Zones 6 and 7 is within the 100-year floodplain. However, there is no practicable alternative to making such allocations. The small acreage in Zone 6 that is within the floodplain is contiguous with the existing recreation areas on upland sites; likewise, lands in Zone 7 (residential access) are by definition on the shoreline providing access to the water. Further, development that could impact lands in the 100-year floodplain would include measures to minimize impacts to the floodplain. Such measures could include location of the project above the flood elevation, flood-proofing the project, constructing and designing the project to make structures withstand flood damage, or other appropriate measures.

Under either Alternative A or B, any development proposed in the 100-year floodplain would be subject to the requirements of EO 11988. Case-by-case evaluations would verify compliance with EO 11988. On a comparative basis, Alternative B would have far less impacts on floodplains since a substantial portion of the land (6,610 acres or 81 percent) would be allocated to Zones 3 and 4 in which there would be no development.

3.12.2. Noise

There are no federal or state standards for community noise. Many municipal governments have statutes limiting the level of noise that can be emitted within their jurisdictions. The main purpose of statutes is to reduce the disturbance to adjacent residents. In 1974, the U.S. Environmental Protection Agency (USEPA) published community noise guidelines recommending levels of community noise designed to protect the health and welfare of the public (USEPA, 1974). Although the guidelines are not standards, they are frequently used to evaluate the potential effects of intruding community noise from new sources.

Other approaches to evaluating the potential effects of intruding community noise are also used. However, in lieu of known specific new sources of community noise, this EA compares the likely general effects based on the change in land uses associated with Alternative A and B. In general, the amount of land available under each allocation for development is a measure of the potential for noise effects. Under either alternative, TVA would evaluate each significant future land action capable of causing noise pollution, e.g., capable of annoying neighboring residences or greater than 10 dBA (decibels) above background, to determine its potential for causing community-level noise effects. Summaries of land use allocations for Alternatives A and B are found in Tables 2.2.1-2 and 2.2.2-2, respectively.

Alternative A (No Action) - The Forecast System land designations within which development of specific, new noise sources might occur are the SMP "grandfathered" Reservoir Operations, which includes privately-owned flowage easement shoreline (144 miles, including 275 acres of TVA public shoreland); the

Commercial Recreation (133 acres), and Industrial Development (494 acres). "Grandfathered" Reservoir Operations land includes residential development; Commercial Recreation covers marinas; and Industrial comprises a range of potential manufacturing and processing operations.

Noise from single-family residences usually comes from recreational (boating and personal watercraft), landscaping, and transportation sources. These are common noises currently found around the reservoir. The level of these noises depends on the density of residences in an area. Multi-family residences, such as condominiums, would generate the same type of noises but at higher levels in the local area. Under this alternative, TVA would make the same amount of land, 275 acres, available for residential access. Individual requests for single-family housing access to the reservoir would not be further evaluated because its effects on noise levels are typically minor. However, requests for large developments of single-family housing or multi-family housing would evaluated for its effects on community noise levels.

Possible development of marinas, boat docks, and campgrounds on the Commercial Recreation land would likely increase, to some extent, the levels of recreational and transportation noise generated in the respective areas. Similarly, all of these possible developments would be evaluated for their effects on community noise levels. The amount of land, 133 acres, designated for this use limits the size and number of potential new facilities.

Industrial operations may generate noise from a very wide array of operations that are typically very noisy. Sometimes the operations are in buildings, but other times the operations are outside. All requests for industrial development would be evaluated for its effects on community noise levels. The land designated for industrial use (494 acres) under this alternative is large enough for development of a large or several medium-size operations.

Because more land could be used to develop new and potentially greater sources of noise, it is expected that the effects of Alternative A would be greater than Alternative B. However, TVA would evaluate each significant future land action capable of contributing major new sources to determine its potential for causing community noise effects. Because TVA would evaluate the effects of proposed major new developments that would substantially contribute to background noise emissions and minimize or mitigate adverse effects, noise impacts under Alternative A are expected to be individually minor and cumulatively insignificant.

Alternative B (Allocation Alternative) - Allocations of land under Alternative B, zones with the potential to generate noise are: Zone 5, Industrial/Commercial Development (0 acres), Zone 6, Recreation (760 acres), and Zone 7, Residential Access (275 acres). Except for Industrial/Commercial Development requests for which no land is allocated under Alternative B, the allocation of land to zones

with the potential to generate noise is similar for both alternatives. TVA would evaluate each significant future land action capable of contributing major new sources to determine its potential for causing community noise effects. Because TVA would evaluate the effects of proposed major new developments that would substantially contribute to background noise emissions and minimize or mitigate adverse effects, noise impacts under both alternatives are expected to be individually minor and cumulatively insignificant.

3.12.3. 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. Knox County, which is about 10 miles to the west-southwest of Cherokee Dam, had been a nonattainment area for ozone, but has achieved attainment of the 1-hour ozone standard and currently is in maintenance status for that pollutant. In July 1997, USEPA promulgated new, more restrictive standards for ozone and particulate matter. These new standards, upon being challenged, were remanded by the U.S. Supreme Court to EPA for further analysis and review.

In addition, Prevention of Significant Deterioration (PSD) regulations protect 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).

There are four PSD Class I Areas within 62 miles of Cherokee Reservoir. The closest one is the Great Smoky Mountains National Park, about 25 miles to the southeast at the nearest point. The others, all in North Carolina, are Joyce Kilmer/Slickrock National Wilderness Area, about 52 miles to the southwest at the nearest point; Linville Gorge National Wilderness Area, about 55 miles to the southeast at the nearest point; and Shining Rock National Wilderness Area, about 60 miles to the southeast at the nearest point.

Regardless of the alternative, any new industrial or commercial facilities will be required to meet applicable federal and state requirements in effect at the time. Any facilities on TVA land or facilities in the surrounding area with potentially significant air pollutant emissions will be required to obtain an air quality permit from the state of Tennessee. The permit application and review process will evaluate the magnitude of air emissions from the proposed source and from existing sources, meteorological factors that affect dispersion of the pollutants,

and the potential for effects on areas with special air quality requirements such as nonattainment areas and PSD Class I Areas.

Regardless of the alternative, TVA would review and evaluate development proposals and, as needed, recommend measures to avoid or minimize direct, indirect, and cumulative air emissions impacts. Even during some residential access related construction, pollution from fuel combustion, fugitive dust emissions, and increased vehicle traffic could cause some minor and temporary air quality degradation in the vicinity of the reservoir. However, state air pollution rules require construction projects to use reasonable precautions to prevent fugitive dust emissions. After construction is completed, normal residential activities such as using wood stoves, fireplaces, and gas-powered groundskeeping equipment and increased traffic would contribute somewhat to deterioration in local air quality, but would have little or no impact on regional air quality.

Under either alternative, effects from site preparation and construction activities and from post-construction traffic and minor source operations would be similar for both residential and most industrial developments.

Alternative A (No Action) - Under Alternative A, the Forecast System would remain in place and any proposed industrial facilities, commercial facilities, or residential access would continue to be evaluated on a case-by-case basis. No facilities are anticipated that would be inconsistent with meeting air quality standards and PSD regulations. Therefore, local or regional air quality would not be significantly deteriorated as defined by regulations.

Alternative B (Allocation Alternative) - Under Alternative B, no land is allocated to Zone 5, Industrial/Commercial Development, so no new facilities would likely be approved. Proposals for residential access on land allocated to Zone 7, Residential Access, would be evaluated on a case-by-case basis but, consistent with SMP, would likely be limited to established residential areas and represent no net increase in shoreline development.

Adoption of either alternative would have insignificant effects on air quality. However, because adoption of Alternative B would reduce the acreage where potentially intense development could occur from 47 percent to 19 percent, and effectively preclude future industrial/commercial development on the TVA land, it would likely have less effects on air quality in the long run.

3.13. Adverse Environmental Impacts Which Cannot be Avoided Should the Allocation Alternative be Implemented

Sensitive natural and cultural resources such as endangered species and National Register-eligible archaeological properties would be protected under both alternatives. Some local adverse cumulative effects to biological resources may occur for those land allocations that lead to additional development of the

reservoir land, especially in Hamblen and Jefferson Counties where development pressures on adjacent lands are moderately high and population is increasing. However, for the overall watershed and east Tennessee region, these effects would likely be insignificant because of the small acreage of habitat loss expected to result over the life of the plan and the general abundance of those habitats in the watershed.

3.14. Relationship Between Short-term Uses and Maintenance and Enhancement of Long-term Productivity

Most reservoir lands are proposed to be placed in Zones 3 or 4, which would maintain the long-term productivity of these lands for forest, wildlife, recreation, and natural resource management. Therefore, the majority of the allocations would maintain long-term productivity. No land is allocated for Zone 5, Industrial/Commercial Development. Any commercial recreation development would be accommodated on land already used for recreation purposes. For those allocations that commit reservoir lands to other types of development, e.g., Zone 7, residential access, there would be a loss of biological productivity. Overall, such development would result in an enhancement of long-term economic productivity as long as the desirable features that allowed shoreline development to take place were maintained. In accordance with TVA's SMP, safeguards that would be incorporated into development proposals would likely help to maintain the clean water and other amenities that attracted waterfront development.

3.15. Irreversible and Irretrievable Commitments of Resources Involved in the Allocation Alternative

Under Alternative A, more than 490 acres of land is designated for Industrial Use, while Alternative B allocates no land for Zone 5, Industrial/Commercial Development. For those allocations that converted reservoir lands to residential or commercial recreation development, the land is essentially permanently changed and not available for agriculture, forestry, wildlife habitat, or natural areas. This irreversible commitment of land would be greater in magnitude under Alternative A than Alternative B.

The irretrievable use of nonrenewable resources (i.e., fuel, energy, and construction materials) would occur for those allocations that allowed development of reservoir properties. However, some of these nonrenewable resources would likely be used anyway as demand for the residential and recreational developments, as well as improved public infrastructure proposed to be located along TVA shoreline were met elsewhere in the region.

3.16. Cumulative Impacts

This environmental assessment tiers to the SMI FEIS (TVA, 1998) for its analysis of cumulative effects of residential shoreline development. This reservoir system-wide evaluation also includes those effects anticipated to occur on 275 acres (144 miles) of residential access property on Cherokee Reservoir.

In 1989, counties surround Cherokee Reservoir contained more than 380,500 acres of timberlands, or roughly 46 percent of their total combined area. Nearly 89 percent of these forests occur on privately-owned, non-corporate lands. During the period from 1989 to 1999, net annual growing stock averaged 15.5 million cubic feet, while removals averaged only 3.1 million cubic feet in Grainger, Hawkins, and Jefferson Counties (Schweitzer, 2000). Except for Hamblen, these counties remain largely distinctly rural in character, and in non-urbanizing areas, forests are not being rapidly converted to non-forest uses. Highway and municipal waterline extension projects, along with any growth-inducing impacts, could potentially affect tributary streams of the Holston River (Cherokee Reservoir). Likely development of new office parks, commercial developments, and residential areas in Jefferson City, Morristown, and Rogersville could also indirectly affect Cherokee Reservoir resources.

As described in the *Noeton Management Unit Cherokee Reservoir - Resource Management Plan and Environmental Assessment* (TVA, 1999a), TVA will be harvesting approximately 100 acres of pine and small hardwood trees on this 532-acre unit over a 25-year period (Parcel 96). Eighty acres will be allowed to revert to mature hardwood forest, while the remaining 20 acres will be maintained as permanent wildlife openings. TVA has conducted similar removal of some 17 acres of pine forest and creation of 5 acres of permanent wildlife openings on its land in the Poor Valley Creek drainage.

Past land use has played a major role in creating the present mosaic of forest conditions on Cherokee Reservoir. About 68 percent of the TVA land is forested, and over 65 percent of the present forest cover is 40-80 years old. The various plant communities on Cherokee Reservoir provide suitable habitat for several federal and state-listed terrestrial plant and animals. Except for these habitats, including the TVA Berry Island ESA, all of the other ecological community types occurring on the TVA lands surrounding Cherokee Reservoir are generally widely distributed in the eastern Tennessee Valley region.

No federally-listed plants are known to occur, while 11 state-listed plants (30 occurrences) are known from surrounding counties. No federally-listed plant species and six species (11 new occurrences) of Tennessee state-listed plant species were found on TVA land. Twelve protected terrestrial animal species, 28 caves, and four colonial nesting wading bird sites were reported from counties surrounding Cherokee. Two heronries, three caves, one containing evidence of gray bats use, occur on TVA land. One bald eagle nest occurs on TVA land in the

Poor Valley Creek area. Bald eagle and two species of bats are protected under the ESA, and the remaining 9 rare animals known from the surrounding counties are protected by the state of Tennessee. No state- or federally-protected aquatic animals are currently known from habitats in the vicinity of the Cherokee Reservoir land parcels. Under Alternative B, portions of Parcels 36, 43, 59, 73, and 90 and all of Parcel 46 will be designated in the plan as Habitat Protection Areas (HPA) due to the presence of state-listed plant species, caves or other sensitive resources. The remainder of Parcel 90 surrounding the interior HPA will be further studied for potential designation as a TVA Small Wild Area during the resource management unit planning process.

Regardless of the alternative adopted, Berry Island would keep its designation (and be managed as a research natural area) for the life for this plan. Under Alternative B, TVA will also expand the Berry Island ESA (Parcel 57) to include an additional 10.7-acre stand of old-growth hardwoods.

Also, under Alternative B, the Preferred Alternative, 81 percent of the TVA land acreage would be allocated to either Zone 3, Sensitive Resource Management, or Zone 4, Natural Resource Conservation, which generally have less impacts on the surrounding environment. Under this alternative, only 19 percent could be used for more intensive development. However, no TVA land is allocated for industrial or commercial development and no commercial recreation development is expected to be approved on land not currently used for recreation purposes Future private water-use facilities, public works, and TVA land use proposals would be reviewed for compliance with applicable environmental laws and regulations.

Under Alternative B, 81 percent of the TVA land would be allocated to the Zone 3 (13 percent) or Zone 4 (68 percent), where development would be unlikely. Management in Zone 3 would focus upon protection and enhancement of ecological function and would provide a high level of protection for the integrity of the significant natural features contained within them. Management in Zone 4 would focus upon management of natural resources to enhance the quality of outdoor recreational uses such as hiking, hunting, and wildlife observation. These, as well as some Zone 3 lands, are also the focus of TVA's resource management unit planning efforts. Where appropriate, management would be implemented to enhance habitats for rare species.

Therefore, adoption of Alternative B, would have less overall potential for negative effects on rare plants and present opportunities for management and enhancement. Future land uses anticipated on sensitive and resource conservation parcels, coupled with minimal development on other parcels, would afford rare plants and animals additional protection, so no direct or indirect impacts are anticipated. Cumulative effects would also be unlikely because less land would be used to accommodate development, and, therefore, such use would not cause or contribute a local or regional negative trend.

Other than relatively small-scale timber harvests from private non-industrial forest lands in the Cherokee Reservoir area, TVA is unaware of any other major demands for forest resources in this general area. However, the continuing industrial, commercial, and residential development in the area, especially near Morristown and at lakeside subdivisions, could impact these terrestrial habitats. Because of its conservation emphasis, implementation of Alternative B, would neither cause nor contribute to adverse trends on forests and associated ecological communities and affect a very small amount of forest lands in the region. Therefore, TVA has determined that the incremental and cumulative effects of adoption of Alternative B, when added to the past, present, and reasonably foreseeable future actions, are regionally insignificant. Similarly, insignificant cumulative effects are expected on protected species, wetlands, water and air quality, aquatic communities, socioeconomic, prime or other important farmland, and recreation, visual and historic resources. Additionally, no long-term effects on regional biodiversity are anticipated from implementation of Alternative B.

3.17. Commitments

1. All land-disturbing activities shall be conducted in accordance with Best Management Practices as defined by Section 208 of the Clean Water Act and implementing regulations to control erosion and sedimentation. Forest management activities will be conducted in accordance with practices prescribed for forestry. Best Management Practices for agriculture, including maintenance of vegetative buffers, will be included in agricultural licenses.
2. Timber harvests will be less than 20 acres in size.
3. Visual and water quality enhancement buffers, between 50 feet and 100 feet wide, will be provided to screen timber harvest areas from public thoroughfares and shorelines and to minimize the potential for sediments or other nonpoint source pollutants to enter Cherokee Reservoir.
4. Controlled burns will be conducted in accordance with Tennessee open burning regulations.
5. TVA will conduct a phased identification and evaluation approach to identify cultural resources. All land-disturbing activities will be reviewed by a qualified archaeologist. Following identification and evaluation efforts, TVA will prepare the appropriate findings related to historic properties for review by the State Historic Preservation Officer and consulting parties for each ground-disturbing activity.
6. TVA will monitor the Civil War earthen works on Parcel 119 to ensure that public uses are not adversely affecting historic properties.
7. TVA will monitor the impacts of informal recreational use on the heron rookery on Parcel 29 to ensure that heron nesting is not adversely affected.

4. SUPPORTING INFORMATION

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4.2. List of Agencies and Persons Consulted

The Draft EA was distributed to the following federal, state, and local agencies. Copies were provided to three local libraries and the TVA Resource Stewardship, Cherokee-Douglas Watershed Team Office, for the public to review.

Federal Agencies

U.S. Army Corps of Engineers
U.S. Fish and Wildlife Service
U.S. Department of the Interior
    Office of Environmental Policy and Compliance

State Agencies

Tennessee Department of Economic and Community Development
Tennessee Wildlife Resources Agency
Tennessee Commission of Indian Affairs
Tennessee Department of Agriculture
    Tennessee Division of Forestry
Tennessee Department of Transportation
    Environmental Planning and Permits Division
Tennessee Department of Environment and Conservation
    Commissioner's Office
        Environmental Policy Office
        Division of Recreation Services
        Division of Water Pollution Control
        Division of Water Supply
        Division of Groundwater Protection
        Division of Natural Heritage
        Tennessee Historical Commission
        Panther Creek State Park

Local Agencies

First Tennessee Development District
East Tennessee Development District
Cherokee Lake Users Association

Other Conservation Organizations

Tennessee Conservation League
Tennessee Ornithological Society
Tennessee Citizens for Wilderness Planning
Tennessee Forestry Association
Foothills Land Conservancy
The Wildlife Society, Tennessee Chapter
Davey Crockett Chapter of Quail Unlimited
Twin Lakes Beagle Club

Area Public Libraries and Courthouses

Hamblen County Courthouse
Morristown-Hamblen Library
Hawkins County Courthouse
Rogersville Public Library
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4.3. Acronyms and Abbreviations

ADT	Average Daily Traffic
APE	Area of Potential Effect
ARPA	Archaeological Resources Protection Act
BMPs	Best Management Practices
BSA	Boy Scouts of America
ca.	Circa
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	cubic feet per second
DO	Dissolved Oxygen
EA	Environmental Assessment
EDR	Environmental Decision Record
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Ecological Study Area
FCER	Federal Committee on Ecological Reserves
FEIS	Final Environmental Impact Statement
FFPPA	Federal Farmland Protection Policy Act
GIS	Geographic Information System
HGM	Hydrogeomorphic
HRM	Holston River Mile
HUC	Hydrologic Unit Code
IBI	Index of Biotic Integrity
IDT	Interdisciplinary Team
m	meters
MOA	Memorandum of Agreement
msc	maximum shoreline contour
msl	mean sea level
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NPDES	National Pollution Discharge Elimination System

NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
P	Palustrine
Plan	Reservoir Land Management Plan
PCBs	polychlorinated biphenyls
PSD	Prevention of Significant Deterioration
QU	Quail Unlimited
RFAI	Reservoir Fish Assemblage Index
RM	River Mile
ROD	Record of Decision
SAF	Society of American Foresters
SAHI	Shoreline Aquatic Habitat Index
SCS	Soil Conservation Survey
SFI	Sport Fishing Index
SHPO	State Historic Preservation Officer
SIC	Standard Industrial Classification
SMC	Species of Management Concern
SMI	Shoreline Management Initiative, TVA
SMP	Shoreline Management Policy, TVA
SMZ	Shoreline Management Zone
SS	scrub-shrub
TDEC	Tennessee Department of Environment and Conservation
TDOT	Tennessee Department of Transportation
TMDL	Total Maximum Daily Load
TVA	Tennessee Valley Authority
TWRA	Tennessee Wildlife Resources Agency
U. S.	United States
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
VSMP	Vital Signs Monitoring Program

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