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Note:

Please see the Glossary in Chapter 5 for the meaning of unfamiliar words.

Ownership Categories on 10,995 Miles of TVA Reservoir Shoreline

- Flowage easement shoreland
- TVA-owned residential access shoreland
- TVA-owned-and-jointly-managed shoreland
- TVA-owned-and-managed shoreland

CHAPTER 1

PURPOSE OF AND NEED FOR ACTION

1.1 Background for Shoreline Management Initiative (SMI)

Tennessee Valley Authority (TVA) was established in 1933 as a federal corporation with a broad mission of fostering the physical, socioeconomic, and social development of the Tennessee Valley region. Under the TVA Act (U.S. Congress, 1933, as amended), one of TVA's most important responsibilities is managing the Tennessee River system for navigation, flood control, and—consistent with these purposes—power generation.

However, other benefits of the Tennessee River system have become increasingly important to the people of the region and especially those who live and work on the reservoir system. For example, a 1993 Gallup poll (*TVA Lake Users Study*, Larsen, 1993b) showed that TVA reservoirs are used for recreation by two-thirds of all people who live around them. Other people come from around the region and, frequently, from around the world, to take advantage of the recreational opportunities these reservoirs provide.

The public has entrusted TVA to manage 265,000 acres of land around 30 reservoir projects spanning seven states. People throughout the Valley and visitors from other places highly value these public lands and waters. These special resources are viewed as national treasures which provide benefits that are becoming scarce or nonexistent in many other parts of the country.

People who visit TVA lakes for the first time are impressed by the scenery, abundance of fish and other wildlife, clean water, and easy recreational access to many miles of undeveloped public shoreline. For these reasons, people keep returning, and use of these lakes and public lands is rapidly increasing. This has prompted the public to express concerns about how increased use, especially those activities associated with shoreline development, may change the resources that are so important to them.

Many people have asked TVA to place high priority on conservation of important resources when permitting docks and other shoreline alterations. Some believe the quality of public lands and waters can be best maintained by stopping all development and keeping the shoreline just like it is today. Others call for managed growth so that residential shoreline development is guided by environmentally responsible principles. Still others believe that development should be allowed to proceed with minimal standards or requirements. To determine how to best respond to these and many other diverse issues, TVA began the Shoreline Management Initiative (SMI).

As public use of TVA reservoirs has increased, so has residential shoreline development. Under Section 26a of the TVA Act, no obstruction affecting navigation, flood control, or public lands may be constructed or maintained along or in the Tennessee River system without TVA approval. This potentially affects construction activities in and along the entire Tennessee River and its tributaries, which include 10,995 miles of shoreline along 30 reservoirs *(Figure 1.1-1)*.

From 1988 to 1997, TVA approved almost 19,000 applications for residential shoreline alterations, such as docks, piers, boathouses, retaining walls, vegetation management, and other projects *(Figure 1.1-2)*. Over this time frame, the number of permits issued each year increased from 1,530 in 1988 to 2,190 in 1997. This amounts to an increase in the number of permits of approximately 6 percent per year. If current trends continue, TVA estimates that over half of the shoreline could be developed within the next 25 years. It is possible that this level of intensified land use could have an adverse impact on shoreline and aquatic ecology, water quality, scenic beauty, and other valuable resources, unless a comprehensive and well-defined strategy is established to steer future development.

TVA began SMI primarily to address growing public concern about how increases in residential shoreline development would affect the shoreline resources. TVA agreed that it was time to review its existing permitting practices with the public and establish a policy which would better protect shoreland and aquatic resources, while allowing adjacent residents reasonable access to the water.

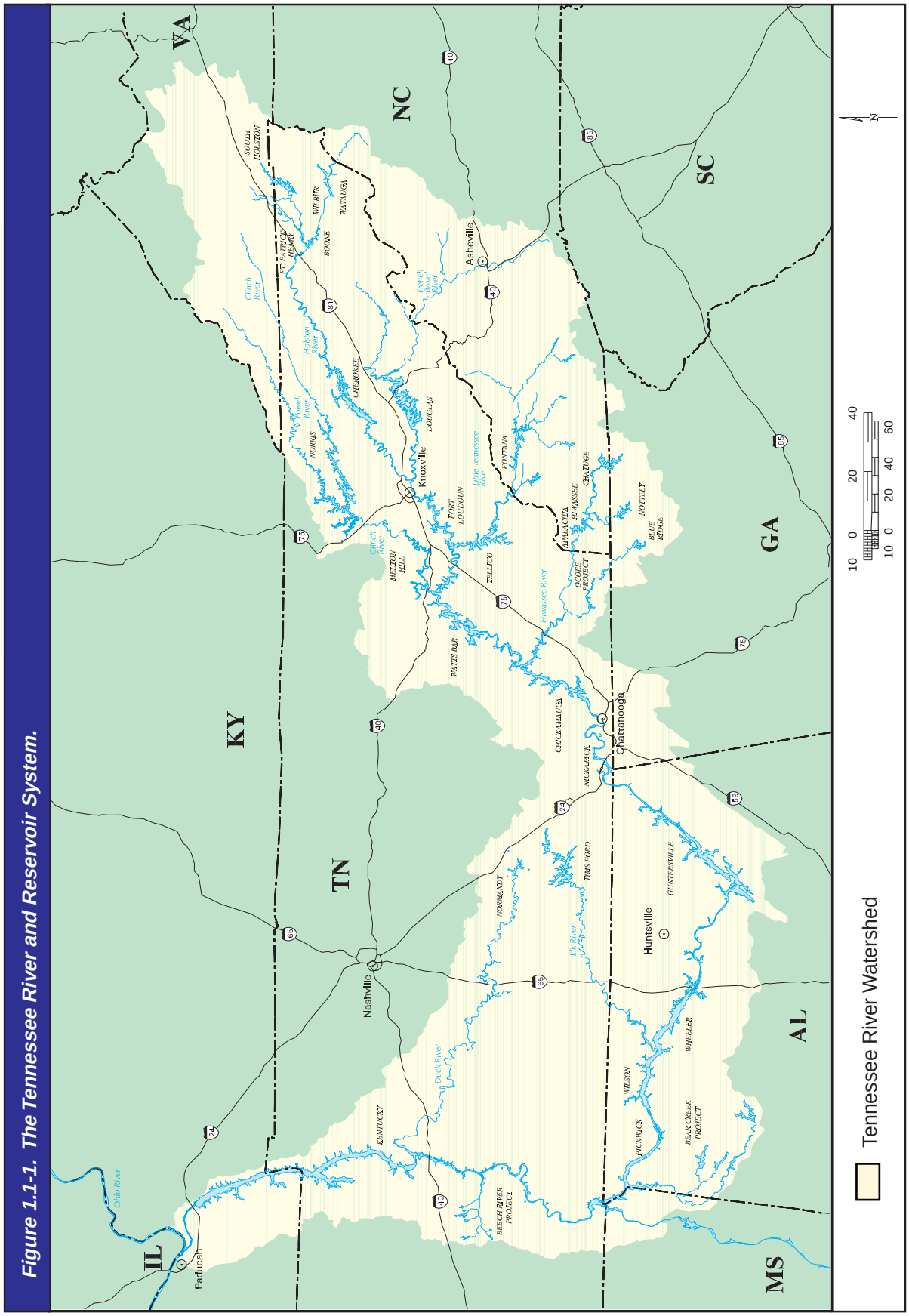
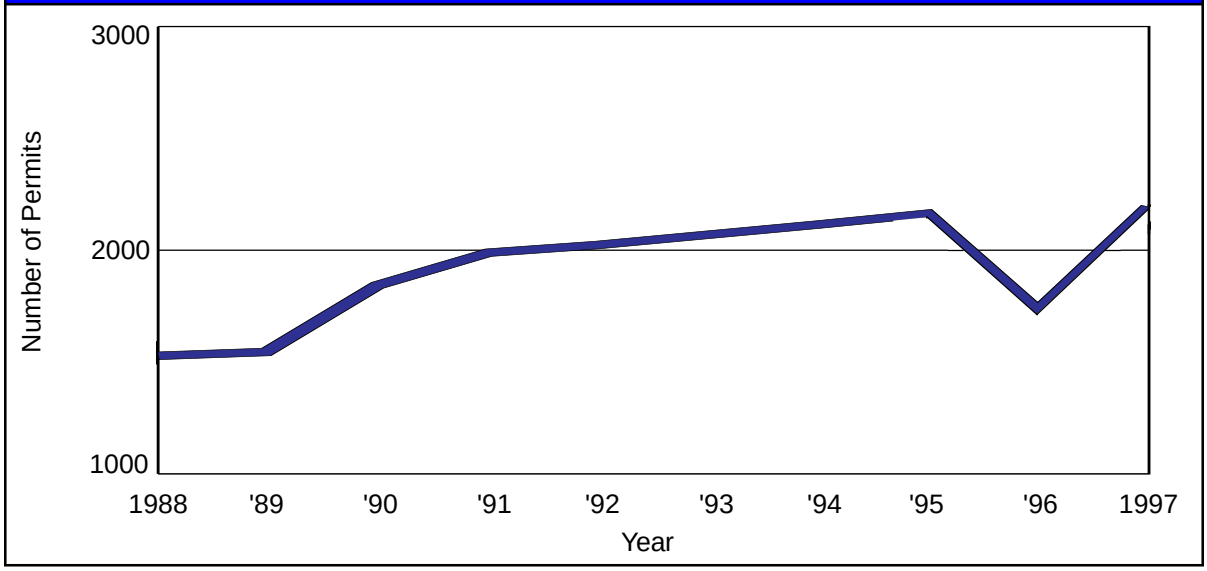


Figure 1.1-1. The Tennessee River and Reservoir System.

Figure 1.2-2. Residential Shoreline Alteration Permits.[1]



[1]TVA implemented permit processing fees in 1995. In addition, the permit record-keeping system was modified in 1996, and other administrative changes were made in the process at that time. TVA believes these changes contributed substantially to the 1996 decline in permits. Based on long-term trends since 1988 and 1997 data, it is assumed that the number of annual permits will continue on an upward trend.

In addition, the SMI policy and associated standards would help TVA:

- Refine its stewardship role to better serve the public and protect the natural resources surrounding the Tennessee Valley reservoirs, and

- Handle the increased volume of TVA 26a permit requests in a way that protects public interests. Almost 19,000 individual requests were approved between 1988 and 1997. Other federal and state agencies have expressed concern about shoreline development. In 1978, the U.S. Army Corps of Engineers (USACE) encouraged TVA to adopt a policy similar to its own regarding cumulative impacts of minor "permissible improvements" to the shoreline. USACE indicated,

  > The continuing development of the shoreline of TVA lakes has led to an increase in environmentally adverse alterations in the form of retaining walls, channel excavations, shoreline excavations, and boat launching ramps. As the number of these alterations continues to increase, we become more concerned with the cumulative impact such individually minor activities may eventually have on the overall ecology, productivity, aesthetics, and public usage of all lakes throughout the Tennessee River Basin (Tener, 1978).

In 1993 the U.S. Fish and Wildlife Service (USF&WS), commenting to the Nashville District of USACE, stated:

> We firmly believe that structures, dredging, shoreline modifications, and associated land clearing/maintenance on all reservoir lands under the jurisdiction of the United States Government should be carefully regulated. Specifically, we believe that permit applications involving development on TVA-regulated reservoirs should disclose direct and indirect impacts of proposed development-related activities, as well as the cumulative impacts of existing projects (Barclay, 1993).

Likewise, in 1993 the Tennessee Wildlife Resources Agency (TWRA) raised concerns about shoreline development in a letter to TVA, stating:

> TWRA has long worried about the proliferation of various shoreline development activities for the cumulative impacts they have on fish and wildlife resources, their privatization effects, and the negative aesthetics their visual results impose (Sherry, 1993).

In response to these and other concerns, TVA initiated SMI to review existing permitting practices with the public and establish a policy to better protect shoreline and aquatic resources, while allowing adjacent residents reasonable access to the water.

1.2 Objectives of SMI

SMI was launched in 1994. Its six principal objectives are to:

- Respond to public issues and concerns regarding future shoreline alterations.
- Review existing permitting practices with the public and establish a Valleywide policy to guide future TVA permitting decisions about residential shoreline alterations.
- Examine environmental, social, and economic effects of anticipated residential shoreline alterations at a system-wide level.
- Determine the level of environmental protection (policies and practices) to appropriately conserve shoreline resources.
- Improve the management of the 10,995 miles of shoreline by identifying areas appropriate for future residential shoreline alterations.
- Promote TVA's integrated resource management and water quality objectives.

1.3 Geographical Scope

The Tennessee River system (see *Figure 1.1-1)* has its headwaters in the mountains of western Virginia and North Carolina, eastern Tennessee, and northern Georgia. Two rivers, the Holston and the French Broad, join at Knoxville to form the Tennessee River. Below this point, the river flows southwest through the state of Tennessee, gaining water from three other principal tributaries — the Little Tennessee, the Clinch, and the Hiwassee Rivers, in that order. The Tennessee continues flowing southwest into Alabama as far south as Guntersville and then westward, picking up water from the Paint Rock, Flint, and Elk Rivers, in its course through the Muscle Shoals area in northern Alabama. At the northeast corner of Mississippi, the river turns north, recrosses the state of Tennessee, and continues to Paducah, Kentucky, where it enters the Ohio River. During the river's second passage through Tennessee, it is joined by another large tributary, the Duck River.

The Tennessee River system drainage area covers 40,910 square miles — about equal to the area of Ohio or four-fifths of the area of England. This area lies mostly in the state of Tennessee, with portions in six other states —Alabama, Georgia, Kentucky, Mississippi, North Carolina, and Virginia.

This final environmental impact statement (FEIS) is *programmatic*, meaning that it examines standards and other aspects of TVA's residential shoreline development policy on a broad scale— the entire TVA reservoir system. In this FEIS TVA proposes to replace existing permitting guidelines with a new policy for permitting residential shoreline alterations along 10,995 miles of shoreline on 30 reservoirs (or reservoir projects) in the Tennessee River system. These reservoirs are listed in *Table 1.3-1* and ranked by the total number of shoreline miles. They are also separated into *mainstream* reservoirs on the Tennessee River and *tributary* reservoirs on the tributary streams or rivers which flow into the Tennessee River. References in this document to *reservoirs* include both of these groups unless otherwise specified.

For the purpose of this analysis, TVA defines the *shoreline* as the line where the water of a TVA reservoir meets the shore at the normal summer pool elevation. (See Glossary in Chapter 5 for the

definition of this and other technical terms.) In this FEIS, shoreline is measured in miles. Estimates of reservoir shoreline mileage were produced, using TVA's Geographic Information System (GIS) with field data collected by TVA in 1994 (refer to Sections 1.4.5 and 3.3).

Table 1.3-1. Reservoirs Included in the SMI EIS.

Reservoir	Miles of Shoreline
Mainstream Reservoirs	
Kentucky	2,064.3
Wheeler	1,027.2
Guntersville	889.1
Chickamauga	783.7
Watts Bar	721.7
Pickwick	490.6
Fort Loudoun	378.2
Nickajack	178.7
Wilson	166.2
Total Mainstream	**6,699.7**
Tributary Reservoirs	
Norris	809.2
Douglas	512.5
Cherokee	394.5
Tellico	357.0
Tims Ford	308.7
Bear Creek Project	271.6
Fontana	237.8
Melton Hill	193.4
South Holston	181.9
Hiwassee	164.8
Chatuge	128.0
Boone	126.6
Ocoee Project	109.5
Watauga	104.9
Nottely	102.1
Beech River Project	82.3
Normandy	75.1
Blue Ridge	68.1
Apalachia	31.5
Fort Patrick Henry	31.0
Wilbur	4.8
Total Tributary	**4,295.3**
Total Shoreline	**10,995.0**

Source: TVA Land Management Offices, 1994

There are 9 mainstream and 21 tributary reservoirs or reservoir projects. Mainstream reservoirs represent 61 percent (6,700 miles) and tributary reservoirs 39 percent (4,295 miles) of the total shoreline. All mainstream and 16 tributary reservoirs are multipurpose. *Multipurpose* means that the reservoirs and associated land base provide opportunities for recreation, fishery and wildlife management, water supply, wastewater disposal, resource protection, and economic development, in addition to navigation, flood control, and power production. Two multipurpose reservoirs —Beech River and Bear Creek — are designated as “projects” in that each comprises a system of smaller reservoirs and a floodway for local flood relief, water supply, water quality, and recreation. Five tributary reservoirs — Apalachia, Blue Ridge, Fort Patrick Henry, Ocoee Project, and Wilbur — were built or acquired by TVA for the single purpose of power production. Although these reservoirs do provide other incidental uses and public benefits, power production has first priority in their operating strategies. In this FEIS, the three Ocoee dams are collectively referred to as the Ocoee Project.

The 30 reservoir projects included within the scope of this FEIS are those where TVA, under Section 26a of the TVA Act, has permitting jurisdiction over proposed obstructions. This jurisdiction extends along the Tennessee River and its tributaries. Great Falls Reservoir, Bristol Flood Control Project, and Nolichucky Reservoir are not within the scope of this FEIS for the following reasons:

- Great Falls Reservoir is located outside of the TVA watershed.
- Likewise, the Bristol Flood Control Project is not part of the TVA reservoir system.
- Nolichucky Reservoir impounds a tributary to the Tennessee River; however, it is not navigable due to excessive siltation. Therefore, demand for residential shoreline development along Nolichucky Reservoir is almost nonexistent now.

If shoreline development requiring TVA approval were proposed on any of these

reservoirs, the action would be subject to a separate National Environmental Policy Act (NEPA) review.

The shoreline of Land Between The Lakes National Recreational Area (LBL) is not included in the scope of this FEIS. The LBL shoreline is covered under the current *Natural Resources Management Plan for Land Between The Lakes* (TVA, 1994d) and its accompanying EIS document (TVA, 1994b).

1.4 TVA Shoreline Management — Past and Present

To better demonstrate the need to which TVA is responding, this section provides a brief history of TVA's influence on and responsibility for permitting of residential shoreline development by examining the following:

- TVA's regulatory authority under Section 26a of the TVA Act.
- The roles and responsibilities of other agencies.
- Influence of past land acquisition and disposal policies.
- TVA's lands planning process.
- Current TVA practices and shoreline ownership patterns.

1.4.1 TVA's Regulatory Authority Under Section 26a

Section 26a of the TVA Act (U.S. Congress, 1933, as amended) requires that TVA approval be obtained prior to construction, operation, or maintenance of any dam, appurtenant works, or other obstruction affecting navigation, flood control, public lands, or reservations along or in the Tennessee River or its tributaries. Obstructions may include such things as boat docks, piers, boathouses, rafts, buoys, floats, boat-launching ramps, fills, nonnavigable houseboats, as well as other structures.

This section of the TVA Act is extremely important because it is designed to ensure that construction along the shoreline and in the waters of the Tennessee River system does not adversely impact or compromise TVA's capability for managing the river system. Typically, TVA reviews and approves over 2,500 construction permits each year to ensure compatibility of the proposed construction activity with flood control, navigation, reservoir recreation, power generation, land management, and environmental protection mandates. Section 26a approvals are federal actions and, therefore, TVA addresses environmental impacts of these actions under NEPA and other federal laws.

Typical commercial and public facilities requiring Section 26a permits include barge terminals, water intake or discharge structures, mooring cells, bridges, culverts, commercial docks, and marinas. Of the 2,500 Section 26a permit requests which TVA approves annually, about 2,190, or more than 85 percent, are for the construction of private docks or other alterations fronting waterfront residential property.

1.4.2 Roles and Responsibilities of Other Agencies

USACE has the authority under Section 10 of the Rivers and Harbors Act (1899) and Section 404 of the Clean Water Act to review projects that result in the removal of or the deposition of material in the navigable waters of the United States. This authority is nationwide, including the TVA reservoirs. The USACE also operates the navigation locks and maintains the commercial navigation channel on the Tennessee River system. Although TVA and the USACE address different responsibilities under their permit requirements, TVA does have a Memorandum of Understanding with the USACE, which directs both agencies to coordinate and cooperate in their respective shoreline permitting programs. Therefore, an applicant for a shoreline construction permit on a TVA reservoir need only submit an application to TVA, and TVA will notify the USACE. The U.S. Environmental Protection Agency (EPA) reviews TVA's environmental impact statements for adequacy.

State agencies, such as the Tennessee Wildlife Resources Agency, have ownership of or management responsibility for some of the land on TVA reservoirs. Enforcement of state boating safety laws and establishment of "no-wake zones" also fall under state jurisdiction. In addition, the states are responsible for issuing water quality permits under Section 401 of the Clean Water Act. Point-source

discharges and storm water discharges are regulated by EPA through the National Pollutant Discharge Elimination System (NPDES), but each state operates its own program under the guidance and approval of EPA. The NPDES program requires facility owners or operators to obtain permits to discharge pollutants from any point source into waters of the United States. Septic tank systems are regulated by individual states.

1.4.3 Influence of Past Land Acquisition and Disposal Policies

Arthur Morgan, Chairman of the TVA Board in the 1930s, viewed public land ownership as a tool to promote social objectives. Consequently, early TVA reservoir land acquisition policy advocated an aggressive lands purchase program and envisioned TVA as a comprehensive regional planning agency. Tracy Augur, early TVA land planner, stated the following:

> The reservoirs created by TVA are substantial assets in themselves, quite apart from the utility of the stored water for navigation, flood control, and power purposes. Since they are created with public funds, their value belongs to the public and not private owners of abutting land. In order to assure this value for the public, it is essential that the shores be in public ownership and under the same general jurisdiction as the water (Augur, 1939).

TVA land purchases at Norris, the agency's first reservoir construction project, reflect the early strength of these policies. At Norris TVA acquired a 1,000-foot "protective strip" around the shoreline and purchased an additional 120,000 acres of land. Morgan viewed the land as an outdoor laboratory where the agency could conduct widely ranging resource management demonstrations. However, Morgan's idealistic vision was short-lived and steadily eroded during the late 1930s as TVA began developing additional reservoir projects. The protective strip narrowed from 1,000 feet at Norris (1933) to only 50 feet at Watts Bar (1939). In 1940 the purchase of flowage easements (flood protection rights) at Watts Bar began to replace the purchase of the land for public ownership. These easements left the property in private ownership and gave TVA the right to flood the shoreline and to prevent the construction of structures that would adversely affect flood control. By 1941 flowage easements were the rule, not the exception, for TVA's Fort Loudoun Reservoir project.

The 1940s to Early 1950s

In 1944 the TVA Board recognized the changed direction in TVA's lands policy by approving the report, *Review of Reservoir Land Policy for the Kentucky Project*, by A. S. Jandrey (1944). In his report Jandrey argued that TVA's land use planning and development objectives could best be met by transferring TVA land to other public bodies or by returning "surplus" reservoir property to private ownership. Instead of using reservoir lands for demonstration, Jandrey advocated a public information program designed to develop pride in the reservoirs as a public property.

Jandrey also recommended adoption of the reservoir forecast system. In the forecast system, TVA would identify the tracts required to meet specific activities as defined in the TVA Act or by TVA Board policy, rather than planning for the long-term use and management of public lands. All other lands would be declared surplus and sold at public auction.

With the approval of Jandrey's report, TVA undertook an extensive program of land reviews, forecasts, and public auction sales. This process accelerated rapidly during the late 1940s and reached its peak during the Eisenhower Administration. Ultimately, approximately 338,000 acres of public reservoir land were either transferred to other public agencies or sold to the private sector. Some were sold with deed restrictions that limited what could be done on the property or that gave TVA the right to do certain things on the land.

TVA typically sold the land adjoining the reservoir down to a contour called the "maximum shoreline contour." This is a contour elevation approximately 5 feet higher than the top of the dam gates on most reservoirs. Based on this practice, the land from the maximum shoreline contour to the water remained in TVA ownership. However, in almost all cases TVA included language in the sale deeds which gave the purchaser expressly stated or implied rights to cross the TVA strip of land and to ". . .

construct, operate, and maintain, in accordance with plans approved in advance by TVA, water-use facilities on or over the adjoining land lying between the maximum shoreline contour elevation and the adjacent waters of the lake . . .”

TVA identified the land remaining in TVA ownership between the maximum shoreline contour and the water as “marginal strip property” and subsequently developed a specific policy statement to address its use and development by adjoining private property owners. TVA also applied the provisions of this marginal strip policy to properties designated in the forecast system as "reservoir operations" parcels. These are typically narrow bands of property retained by TVA for flood control and other reservoir operations purposes. Although there are no outstanding rights to construct water-use facilities, TVA decided to accept permit applications for docks and other shoreline uses on these properties. The marginal strip policy did not apply to other TVA reservoir project lands that were not encumbered by private access rights.

The Late 1950s

As the amount of TVA reservoir lands diminished, TVA turned to cooperative efforts with state and local institutions to achieve its broader land use and regional development objectives. However, in the late 1950s several factors influenced a reexamination of TVA’s basic reservoir land use policies. With the regional economy shifting from agricultural to industrial, the development of waterfront industrial sites was seen as a major factor in promoting future economic growth. Also, emerging urbanization and suburbanization were placing increased pressures and demands on TVA reservoirs and lands. And, finally, TVA was encouraged to increase its level of activity in promoting development in smaller tributary watersheds where economies were especially depressed.

The 1960s to Mid-1970s

In the early 1960s, urbanization and suburbanization continued placing increased pressures and demands on TVA land. Also, TVA was being encouraged to increase promotion of development in smaller tributary watershed counties where the economy had not kept pace with mainstream reservoir counties. Throughout the 1960s and early 1970s, TVA took a more active and direct role in addressing the region's land use and development issues. TVA reversed its long-standing policy of actively disposing of lands on completed reservoir projects. It returned to a policy of acquiring a protective strip in fee simple (meaning full and complete) ownership around new projects. These policies were followed at Melton Hill, Tims Ford, Bear Creek, Beech River, and—to some extent—Tellico Reservoir.

In sharp contrast to the previous 20 years, the rationale for TVA land acquisition focused on residential, recreational, and industrial development needs, rather than only on flood control, navigation, and power. The uses of land acquired for broader regional development purposes would be determined in a joint planning effort with state and local agencies. Local watershed development authorities were formed to assist in planning and carrying out major parts of the development program. Under this joint approach, economic development plans for approximately 38,000 acres of reservoir land were prepared by TVA and cooperating partners. Subsequently, much of this land was sold to the tributary agencies because TVA viewed the actual development of these properties as a local responsibility.

1.4.4 TVA’s Lands Planning Process

The Mid-1970s to Late 1980s

TVA began to realize that reliance on deed restrictions applied to sold lands, flowage easements, and permits to control reservoir development had failed to achieve the quality and type of land use and the level of development desired. There was increasing concern that suitable waterfront land for recreation, navigation, and industrial development would not be available to meet the public use and economic development needs of future generations.

By the mid-to-late 1970s, many federal agencies, including TVA, changed their priorities to react to increasing public concern about negative socioeconomic, environmental, and land use impacts generated from rapid urban growth and development. TVA shifted its public land management to a

strategy based on growth management, taking direct action to improve the planning for and management of the remaining 265,000 acres of public lands (excluding Land Between The Lakes) controlled by the agency.

TVA accommodates a greater diversity of land uses on its reservoir shoreland than many other federal land-managing agencies. To better allocate its increasingly scarce but critical public land resources, TVA initiated a comprehensive reservoir land management planning process in 1979. This process differed from the former forecast system in two ways.

The first difference was the formal incorporation of public views, issues, and concerns relating to the use and protection of natural and cultural resources located on public reservoir land. The public became a stakeholder, working with TVA to help formulate reservoir planning goals and objectives. Many persons committed their time from the beginning of the process through plan completion. Since 1979 TVA has planned over 126,000 acres of land for seven of the nine mainstream reservoirs — Chickamauga (TVA, 1989), Guntersville (TVA, 1983a), Kentucky (TVA, 1985b), Nickajack (TVA, 1990a), Pickwick (TVA, 1981), Watts Bar (TVA, 1988), and Wheeler (TVA, 1995f). An additional 50,000 acres on these seven reservoirs remain in long-term commitments for wildlife, recreational, industrial, and residential shoreline access. Over 1,775 persons have participated in 37 public workshops, providing more than 6,600 comments and concerns relating to the uses of public reservoir lands.

The second major difference related to the analysis of detailed resource data (i.e., natural, physical, and socioeconomic) and less tangible social needs and desires of reservoir users and adjacent property owners. Using these data with a GIS, TVA first identified, through established criteria, purposes for which the land could be used (capability) based on physical site characteristics such as land cover, soils, slope, and erosion hazard. Each tract was rated excellent, good, fair, or poor. Next, TVA identified activities for which the land should be used (suitability), incorporating public values, environmental considerations, adjacent land uses, political/community considerations, infrastructure (railroad, utilities, etc.), and other socioeconomic data. The same tracts were then ranked high, medium, or low for suitability. Through discussion, negotiation, and direction offered by reservoir goals and objectives, TVA identified one or more compatible uses for each multipurpose tract of public land. The "reservoir operations" designation instituted with the forecast system in the 1940s was not used in the plans. The plans defined whether additional shoreline development would be considered on the former reservoir operations parcels. However, marginal strip lands were not included in the land use plans.

Reservoir plans are developed to meet a 10-year planning horizon. The plans guide land use and resource management decisions on the reservoir. The plans help to reduce land use conflicts, yet provide alternative sites for future development. Revisions to the Board-approved plans are possible; however, justification for a proposed change in allocation is normally the responsibility of the party requesting the land use change and requires TVA Board approval.

1.4.5 Current TVA Practices and Shoreland Ownership Patterns

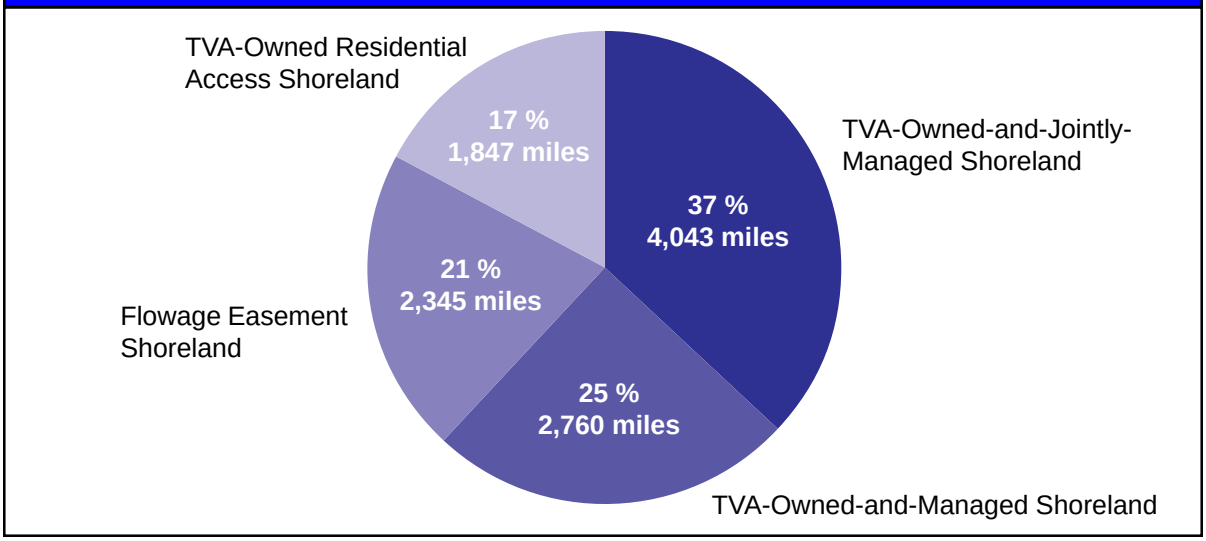
Since the mid-to-late 1980s, land use pressures have been shifting from commercial, navigational, and industrial focus to private residential shoreline development. This has been due in part to:

- Escalating waterfront land values,
- Increased environmental regulations on industry,
- Public pressure not to develop additional waterfront public land for industry and commerce, and
- Limited availability of TVA sites capable and suitable for such use.

With the focus moving from TVA's larger tracts of multipurpose reservoir land to the narrower marginal strip of properties, pressures to protect water quality and aesthetic resources have increased significantly. In response to these pressures, TVA decided in 1992 that docks and other shoreline development would no longer be permitted on undeveloped reservoir operations parcels where access rights for such use do not exist. Since 1992, TVA has evaluated proposals for additional development along developed reservoir operations shorelines to determine whether any additional construction would be permitted, based upon planned uses, environmental concerns, and extent of current development.

TVA's current shoreline management practices and associated landrights can be generally explained in the context of four categories, which are shown in *Figure 1.4-1*. Note that the mileage estimates in this figure represent the total amount of shoreline within each ownership category. These shoreline mileage landrights data were compiled in 1994 by TVA's Land Management Offices, using readily available data from property ownership maps, reservoir land management plans (for seven main-stream reservoirs), and other sources. Shoreline ownership categories were generally delineated on topographic maps. These maps were digitized, and miles of shoreline in various ownership categories were calculated. It is important to note that these categories are only broadly descriptive. The property rights affecting specific tracts of land can vary substantially. The number of shoreline miles in each of the four landrights categories is estimated for each reservoir in *Table 1.4-1*.

Figure 1.4 -1. Ownership Patterns on 10,995 Miles of TVA Reservoir Shoreline.



Exhaustive searches of deeds, property descriptions, and other legally recorded information were not conducted because of the time and expense involved. As additional individual reservoir plans are prepared, TVA will use specific landrights data which better delineate parcels with outstanding access rights. TVA will also map the extent of reservoir operations parcels where shoreline development proposals will be considered. These more exhaustive landrights data will be more precise than the information available for this FEIS, and therefore some variation may occur from the data presented in this FEIS for individual reservoirs.

In addition to the compilation of more detailed landrights information, better delineation of additional subdivisions to be developed by local watershed development authorities could affect the shoreline mileage estimates. TVA has long-standing contractual arrangements with other agencies, providing for economic development of project lands on Tims Ford, Bear Creek, Tellico, and Beech River Reservoirs. It is not possible at this time to determine the level of additional development that may be pursued by these agencies on these projects. This determination will be made as land management plans are developed and updated for these reservoirs. These plans will be prepared with environmental and public review and will take into account decisions made as a result of this FEIS to the extent allowed by terms and conditions of existing contracts.

Although there may be some reservoir level changes in the landrights data presented in *Table 1.4-1*, the overall effect on the Valleywide percentages for each category is not expected to increase or decrease by more than 1 or 2 percent. Therefore, TVA has concluded that the data presented in this FEIS is fully adequate for a regional, programmatic assessment. A more detailed discussion of

Table 1.4-1. Miles of Shoreline by Reservoir and Ownership Category.[1]

Reservoir	Flowage Easement Shoreland		TVA-Owned Residential Access Shoreland		TVA-Owned-and-Jointly-Managed Shoreland		TVA-Owned and-Managed Shoreland		Total Shoreline Miles	Sum of Flowage Easement and TVA-Owned Residential Access Shoreland	
	Miles	% of Total Shore.	Miles	% of Total Shore.	Miles	% of Total Shore.	Miles	% of Total Shore.	Miles	Miles	% of Total Shoreline
Apalachia	0.0	0	0.0[2]	0	28.3	90	3.2	10	31.5	0.0[2]	0[2]
Bear Creek Project	0.0	0	0.0[3]	0	271.6	100	0.0	0	271.6	0.0[3]	0[3]
Beech River Project	0.0	0	56.4	69	24.4	30	1.5	2	82.3	56.4	69
Blue Ridge	14.6	21	11.4	17	37.4	55	4.7	7	68.1	26.0	38
Boone	102.3	81	0.3	0	2.3	2	21.7	17	126.6	102.6	81
Chatuge	60.8	48	18.8	15	31.8	25	16.6	13	128.0	79.6	62
Cherokee	2.1	1	170.2	43	147.3	37	74.9	19	394.5	172.3	44
Chickamauga	7.2	1	241.5	31	331.5	42	203.5	26	783.7	248.7	32
Douglas	448.5	88	6.4	1	22.4	4	35.2	7	512.5	454.9	89
Fontana	19.3	8	0.0	0	216.6	91	1.9	1	237.8	19.3	8
Fort Loudoun	304.3	80	12.9	3	41.4	11	19.6	5	378.2	317.2	84
Fort Patrick Henry	8.2	26	7.2	23	9.4	30	6.2	20	31.0	15.4	50
Guntersville	50.5	6	62.8	7	412.7	46	363.1	41	889.1	113.3	13
Hiwassee	0.0	0	20.3	12	141.0	86	3.5	2	164.8	20.3	12
Kentucky	710.7	34	226.2	11	461.9	22	665.5	32	2,064.3	936.9	45
Melton Hill	0.0[4]	0	62.1	32	79.8[4]	41	51.5	27	193.4	62.1[4]	32
Nickajack	98.0	55	0.0	0	35.6	20	45.1	25	178.7	98.0	55
Normandy	0.0	0	11.2	15	6.1	8	57.8	77	75.1	11.2	15
Norris	130.4	16	230.4	28	206.4	26	242.0	30	809.2	360.8	45
Nottely	53.8	53	5.0	5	36.4	36	6.9	7	102.1	58.8	58
Ocoee Project	0.0	0	0.0[2]	0	109.5	100	0.0	0	109.5	0.0[2]	0[2]
Pickwick	4.3	1	114.0	23	163.3	33	209.0	43	490.6	118.3	24
South Holston	43.4	24	4.8	3	123.2	68	10.5	6	181.9	48.2	26
Tellico	0.0	0	110.4	31	147.3	41	99.3	28	357.0	110.4	31
Tims Ford	0.0	0	47.7	15	259.6	84	1.4	0	308.7	47.7	15
Watauga	47.5	45	2.7	3	49.7	47	5.0	5	104.9	50.2	48
Watts Bar	74.9	10	265.5	37	83.0	12	298.3	41	721.7	340.4	47
Wheeler	11.3	1	154.1	15	560.1	55	301.7	29	1,027.2	165.4	16
Wilbur	0.0	0	0.0	0	1.9	40	2.9	60	4.8	0.0	0
Wilson	153.1	92	4.7	3	1.3	1	7.1	4	166.2	157.8	95
Total Miles	**2,345.2**		**1,847.0**		**4,043.2**		**2,759.6**		**10,995.0**	**4,192.2**	
% of Total Shoreline		**21**		**17**		**37**		**25**	**100**		**38**

[1]The sum of individual percentages may differ from the total by ±1 percent due to rounding. Percentages less than 0.5 are shown as 0 percent, unless otherwise noted.

[2]A negligible amount of residential shoreline exists.

[3]Complete data were not available for this study; it is estimated that residential shoreland encompasses less than 15 miles.

[4]Approximately 53 miles of Melton Hill shoreline is federal land managed by the Department of Energy as part of the Oak Ridge Reservation; although flowage easement rights exist, it is classified in the jointly managed category because of the federal ownership.

ownership patterns as they relate to existing shoreline conditions (i.e., developed versus undeveloped) can be found in Section 3.4.

Flowage Easement Shoreland

Flowage easement shoreland represents 21 percent of the total, or 2,345 miles of shoreline. These are privately owned lakeshore properties where TVA has the right to flood the land as part of its reservoir operations. Ownership of this private shoreland typically extends down to and often under the water. Owners of flowage easement shoreland are required to obtain TVA's permission before constructing structures or placing other obstructions within flowage easements or on the water. In some instances, TVA owns access rights within flowage easements to allow walking and incidental public recreation along the shoreline.

Wilson Reservoir ranks highest in the proportion of flowage easement land, with 92 percent being in private ownership *(Table 1.4-1)*. On Wilson, these flowage easements were acquired from the USACE when the reservoir became TVA property in 1933. More than 50 percent of the shoreline is privately held on two other mainstream and three tributary reservoirs: Douglas (88 percent), Fort Loudoun (80 percent), Boone (81 percent), Nickajack (55 percent), and Nottely (53 percent). The greatest number of shoreline miles under flowage easement are on Kentucky (711 miles), followed by Douglas (449 miles), and Fort Loudoun (304 miles). Sixteen reservoirs have less than 10 percent flowage easement land, with 10 of these having no flowage easement.

TVA-Owned Residential Access Shoreland

TVA-owned residential access shoreland represents 17 percent of the total, or 1,847 miles of shoreline. This is TVA-owned shoreland where the adjoining private property owner has legal (i.e., deeded) access rights across TVA land. Also included in this category are shorelines classified in TVA reservoir plans and forecasts as available for shoreline alteration permits, although the adjacent private property owner does not actually have legal access rights. In each case, the property owner may apply for TVA permits to construct private water-use facilities — such as docks and piers — along the shoreline.

Lands in this category, often referred to as *marginal strip lands*, include the narrow bands of public property retained by TVA during the large-scale land disposals of the 1940s and 1950s (see Section 1.4.3). TVA currently allows docks, bank stabilization, boathouses, and other structures, as well as predefined private activities, within this shoreland. Additionally, TVA permits limited removal of understory vegetation and certain species of trees under 3 inches in diameter. For a detailed explanation of TVA's existing guidelines related to this shoreland, see Appendix A.

Reservoirs with the highest proportion of shoreline in the residential access shoreland category include four tributaries — Beech River Project (69 percent), Cherokee (43 percent), Melton Hill (32 percent), and Tellico (31 percent) — and one mainstream reservoir — Watts Bar (37 percent). Watts Bar Reservoir also has the greatest number of miles in this category, with 266 miles, followed by Chickamauga (242 miles), Norris (230 miles), and Kentucky (226 miles). Fourteen reservoirs have less than 10 percent of shoreline in this category.

The sum of TVA-owned residential access shoreland and privately owned properties with flowage easement is 4,192 miles, or 38 percent of the total shoreline. Collectively, these two categories represent the total amount of reservoir shoreline currently available for residential access and potential shoreline development. On mainstream reservoirs, this ranges from a high of 95 percent on Wilson to 13 percent on Guntersville. Of tributary reservoirs, Douglas and Boone have the highest percentage of shoreline available for residential access (89 percent and 81 percent, respectively). One tributary (Wilbur) has no shoreline available for residential access; two other tributaries (Apalachia and Ocoee Project) have a negligible amount of shoreline available, and the shoreline mileage is shown as 0 in the table. *Table 1.4.1* shows one other tributary project (Bear Creek) with no shoreline available for residential access. However, as indicated in the footnote, the landrights survey

for Bear Creek is incomplete, and it is estimated that there are less than 15 miles of TVA-owned residential access shoreland on that reservoir.

TVA-Owned-and-Jointly-Managed Shoreland

TVA-owned-and-jointly-managed shoreland represents 37 percent of the total, or 4,043 miles of shoreline. This is TVA-owned shoreline that adjoins land sold, transferred, or otherwise conveyed to developers, entrepreneurs, or local, state, or federal agencies for commercial recreation, public recreation, industrial development, or natural resource management. Owners of land adjacent to the shoreline have typically been granted access rights across the TVA property for purposes consistent with the use of the conveyed land. As part of the conveyance agreement, TVA typically reserved the right to approve any change in use of the conveyed land.

TVA is receiving an increasing number of requests to convert these properties to residential use. Recent examples include a request from Tellico Reservoir Development Agency (TRDA) to convert the 1,060-acre Bat Creek Peninsula from industrial to residential use (Rarity Bay) and a request from the U.S. Department of Agriculture Forest Service to convert 1,275 acres of national forest on Fontana Reservoir to residential development. TVA approved these requests contingent on adoption of management plans that provide for shoreline protection.

Eight tributary reservoirs — Apalachia, Bear Creek Project, Blue Ridge, Fontana, Hiwassee, Ocoee Project, South Holston, Tims Ford — and one mainstream reservoir — Wheeler — have more than 50 percent of total shoreline in this category. Wheeler also has the greatest number of TVA-owned-and-jointly-managed shoreline miles (560), followed by Kentucky (462 miles) and Chickamauga (332 miles). Four reservoirs — Boone, Douglas, Normandy, and Wilson — have less than 10 percent in this category.

TVA-Owned-and-Managed Shoreland

TVA-owned-and-managed shoreland makes up 25 percent of the total, or 2,760 miles of shoreline. This is TVA-owned shoreline where there are no outstanding access rights affecting its future use. This is the principal category of land that has traditionally been addressed by TVA in preparing reservoir land management plans. Developers are increasingly requesting use of these properties for residential shoreline development. For example, TVA recently authorized residential shoreline alterations along Watts Bar Reservoir shoreline in this category as part of the Swan Harbour development, contingent on the developer's adoption of a management plan for shoreline protection and development.

Three mainstream reservoirs — Guntersville, Pickwick, and Watts Bar — have slightly more than 40 percent of their shoreline in this category. By contrast, TVA owns very little land in this category on Fort Loudoun (5 percent) and Wilson (4 percent). The greatest number of miles in this category are found on Kentucky (666). Of the tributary reservoirs, TVA owns and manages the greater proportions of Normandy (77 percent) and Wilbur (60 percent). However, TVA owns and manages less than 10 percent of the shoreline on 13 reservoirs.

1.5 Other Pertinent Environmental Reviews or Documents

1.5.1 TVA's Reservoir Land Management Plans

In 1979 TVA implemented a comprehensive land management planning process to define suitable uses for its multipurpose reservoir land. To date, plans have been completed for seven mainstream reservoirs: Pickwick, Guntersville, Kentucky, Watts Bar, Nickajack, Chickamauga, and Wheeler. TVA intends to develop plans for the remaining reservoirs. Existing reservoir land management plans do not address resource conditions along or prescribe the management of TVA-owned residential access shoreland.

1.5.2 Environmental Assessment

A 1,060-acre parcel on the Bat Creek Peninsula of Tellico Reservoir was part of project lands transferred to TRDA in 1982. At the time of transfer, the land was designated for industrial development. In 1992 TRDA requested a change in designation from industrial to residential. TVA approval was required for such a change in designation, and TVA prepared an environmental assessment on the proposal (*Change in Land Use Designation to Allow Residential Development of the Bat Creek Peninsula, Tellico Reservoir, Loudon and Monroe Counties, Tennessee* [TVA, 1994a]). Potential impacts to the shoreline resulting from residential shoreline alterations (specifically, the effects of private water-use facility construction and related uses) were addressed. TVA approved the land use change and chose an alternative which stipulated that the developer comply with specific shoreline development standards and land use designations determined by TVA as necessary to ensure environmental protection.

1.5.3 Environmental Impact Statements

***Tennessee River and Reservoir System Operation and Planning Review (Lake Improvement Plan)* (TVA, 1990b)**

In December 1990 TVA completed an EIS addressing changes to TVA reservoir operations for maintaining minimum flows below dams, for increasing dissolved oxygen, and for delaying summer lake level drawdowns. In this EIS, TVA also addressed the environmental and socioeconomic consequences of changes in reservoir operations on land and shoreline development.

TVA concluded that delaying summer drawdowns on tributary reservoirs would make them more attractive for shoreline development and other beneficial uses. It was also concluded that holding lake levels higher would not significantly accelerate problems related to cumulative impacts. However, TVA recognized the need to monitor the cumulative impacts of shoreline development on tributary reservoirs in its Record of Decision (TVA, 1991).

***Supplemental Environmental Impact Statement for the TVA Aquatic Plant Management Program* (TVA, 1993)**

A supplemental EIS was completed to cover TVA's aquatic plant management activities. Aquatic plant management alternatives evaluated were:

- No control.
- The current aquatic plant management program, which uses water-level manipulations and herbicides labeled by EPA to control excessive plants in designated areas of reservoirs.
- Biological control (grass carp).
- Mechanical control (harvesting).
- Physical control (barrier mats).

Of these alternatives the current aquatic plant management program was selected because it best met program objectives and had minimal adverse effects on the environmental and socioeconomic resources within the Tennessee Valley region. A commitment was made in the supplemental EIS to develop specific plans for each of TVA's reservoirs where aquatic vegetation impacts reservoir use. The public was involved in the preparation of these plans. Reservoir action plans have been completed for Chickamauga/Nickajack (TVA, 1994c), Guntersville (TVA, 1997a), Kentucky (TVA, 1997b), Pickwick/Wilson (TVA, 1997c), Watts Bar/Melton Hill/Fort Loudoun/Tellico (TVA, 1997d), and Wheeler (TVA, 1997e).

1.6 Decisions to Be Made

Using the extensive public comments along with environmental and socioeconomic analyses documented in this FEIS, TVA will choose a residential shoreline development policy encompassed by the following four management options. Should TVA:

- Assume a more limited, compliance-oriented role in its permitting of docks and other residential shoreline alterations?
- Maintain its current permitting guidelines?
- Adopt a policy that establishes construction and land use standards for residential shoreline alterations?
  or
- Assume a minimum-disturbance position with respect to future residential shoreline alterations?

In addition, TVA must decide whether to

- Limit residential shoreline development (docks, boathouses, bank stabilization, etc.) to areas with existing access rights, or
- Make additional shoreland available for residential access.

TVA's Board of Directors will make these decisions after release of the FEIS.

1.7 The Scoping Process and Public Review of the DEIS

1.7.1 Scoping

In addition to federal and state agency concerns (Section 1.1), the decision to develop and implement SMI was influenced by results from a 1993 Gallup poll, *TVA Land Management and Use Study* (Larsen, 1993a). Gallup interviewed by telephone a random sample of 1,575 lake users who lived in counties surrounding TVA reservoirs. A second interview was conducted on-site with a random sample of 1,422 adults who were using TVA-managed reservoirs and facilities. Participants in these polls stated that:

- The environment should be TVA's first priority (61 percent).
- TVA should retain ownership of lakefront land (84 percent).
- TVA should preserve undeveloped land (69 percent).
- The size and number of piers should be limited (77 percent).
- Stronger regulations should control shoreline use (76 percent).
- TVA should acquire enforcement power (81 percent).

The following four distinct avenues were used in the SMI scoping process to solicit public input.

Public and Peer Agency Meetings

In June and July of 1994, 13 public meetings were held throughout the Valley. These meetings were advertised through local newspapers and announced on the radio. TVA registered 1,251 participants in these meetings and asked them four questions:

- What is most important to you about TVA shorelines?
- What environmental issues or other aspects of shoreline use associated with residential development should TVA include in this policy analysis?
- What changes should be made in the way TVA shorelines are protected, used, or developed?
- Are there any other points you would like to bring into consideration?

In addition to public meetings, TVA conducted a peer agency scoping meeting on August 3, 1994. The purpose of this session was to gain insight from other professionals who hold a stake in the management of TVA reservoir shoreland. Federal agencies represented were USF&WS and USACE. Attending

state agencies included the Kentucky Department of Environmental Protection, Tennessee Department of Agriculture, Tennessee Department of Environment and Conservation, and TWRA.

***Shoreline Management Initiative* Booklet (TVA, 1994e)**

A booklet explaining the purpose and need for this initiative was distributed. Within this publication was a form soliciting public input. The comment period was from June 1 through October 15, 1994. TVA received 342 comment forms.

The form requested basic information (name, address, and telephone number). Introductory questions were identical to those included on the public meeting registration card. Respondents were also asked the same four questions used in small group sessions conducted at the public meetings.

1-800-TVA-LAND Messages

1-800-TVA-LAND is a toll-free telephone line that provides concerned citizens access to TVA land resource professionals. This service was expanded to receive responses pertaining to TVA's management of the shoreline. This mechanism was advertised at the public meetings, in the *Shoreline Management Initiative* booklet, and in special interest group newsletters. More than 333 calls were received during public scoping.

Letters

TVA also received 77 letters during the public scoping comment period between June 1 and October 15, 1994.

1.7.2 Public Review of the DEIS

In 1996 TVA released the SMI DEIS *An Assessment of Residential Shoreline Development Impacts in the Tennessee Valley* (TVA,1996a) and gave citizens several ways to provide comments.

Public Meetings

Public meetings were held at 13 Valley locations identified by TVA as being generally convenient to most residents. Additional meetings were requested at other locations, and as a result, TVA conducted three more meetings. A total of 16 public meetings were held from July through September 1996. Notices of these meetings and information on the DEIS were sent to all who attended the 1994 public scoping meetings; to others who provided comments in 1994 by writing letters, calling 1-800-TVA-LAND, or returning the SMI booklet forms; and to others who had expressed an interest in SMI. Over 2,700 citizens attended the 1996 public meetings, with 460 persons speaking. In addition, about 1,500 people responded by letters, questionnaires, and other means.

Evaluation Forms

Public meeting attendees were asked to fill out a brief survey evaluating the format and other aspects of the public meeting. Many citizens used these forms to provide additional substantive comments.

SMI DEIS *Public Involvement Questionnaire* (TVA, 1996b)

TVA provided a questionnaire as another way citizens could comment on the DEIS. The questionnaire was mailed to everyone who received meeting notices and information on the DEIS. It was also made available to public meeting attendees.

Letters

Citizens were also invited to provide comments by letter.

Comment/Response Volume

The deadline for providing comments on the DEIS was originally August 31, 1996. In response to requests for more time to study the DEIS, TVA expanded the comment period until October 15, 1996.

More than 9,400 comments, suggestions, and issues were received from public meeting speakers, letters, questionnaires, and other sources. These comments were instrumental in developing the Blended Alternative and in preparing this FEIS. The complete listing of public comments and TVA responses can be found in Volume II of the FEIS.

1.8 Resource Issues

For the purposes of this FEIS, an *issue* is defined as a question or subject of widespread public interest related to the potential environmental and socioeconomic impacts of the proposed management alternatives. Many issues were identified during the public involvement process and are documented in the booklet *Shoreline Management Initiative — Summary Report of Public Comments* (TVA, 1995e) and in the comment/response volume of the FEIS. Issues considered to be within the scope of this study were divided into either resource issues or other public issues which are addressed in Section 1.9.

Efforts were made to address impacts quantitatively. Based upon public input, measurement indicators were developed to gauge the effects of the alternatives on each resource. These indicators are used consistently throughout the document and provide the reader a basis for comparison of the alternatives. In a few cases, data were not available and impacts were assessed qualitatively. The following is a summary description of the resource issues and their measurement indicators.

1.8.1 Shoreline Vegetation

Plant communities surrounding TVA reservoirs are important to the ecology, socioeconomics, and aesthetics of the reservoir area. Preservation of scenic beauty, protection of water quality and other natural resources, and maintenance/improvement of wildlife habitat were among the most important issues identified during the public involvement process. All resources are directly affected by manipulation of shoreline vegetation. Residential shoreline development alters shoreline vegetation by reducing the area of forest, shrub/brushland, and cropland, reducing the diversity of plant species, and increasing the area of mowed lawns.

Indicators:

- Forest area within 25 feet of shoreline
- Total wooded area within 25 feet of shoreline
- Forest area within 1/4 mile of shoreline
- Tract size of contiguous forests within 1/4 mile of shoreline

1.8.2 Wildlife

Preservation of wildlife and wildlife habitat was another issue important to SMI participants. Wildlife populations are dependent upon the quantity, quality, distribution, and variety of plant communities surrounding TVA reservoirs. Some shoreline plant communities, especially upland forests and forested wetlands, support very high, diverse, and regionally important wildlife populations. Populations of many species using these habitats are declining. Residential shoreline development, through its effects on vegetation, reduces populations of many species and increases populations of a few very adaptable species.

Indicators:

- Forest wildlife populations
- Wintering waterfowl habitat suitability

1.8.3 Endangered and Threatened Species

TVA reservoirs and adjacent lands support several plants and animals listed as endangered or threatened under the Endangered Species Act of 1973, as amended. Changes in land use and in

water quality are major causes of the historic population declines of listed species. Residential shoreline development could result in further population declines or slow the recovery of listed species.

TVA is obligated to protect listed species and determine if its activities are likely to affect these species. The preservation of listed species was also mentioned by SMI participants. TVA will continue to consider potential impacts to listed species during site-specific reviews of residential shoreline developments over which it has control, regardless of the selected alternative.

Indicator:
- Potential habitat loss from indirect and cumulative effects

1.8.4 Soils

Shoreline erosion is a topic of great concern to most users of TVA reservoirs, as evidenced by SMI public comments. Eroded soils and other sediments can clog streams, rivers, and reservoirs and alter water chemistry. Sedimentation can smother aquatic organisms, alter feeding and spawning habitats, and suffocate fish eggs deposited on the substrate. Residential shoreline construction activities (i.e., docks and other shoreline alterations) and associated disturbance or removal of vegetation increase the potential for shoreland soil erosion and impact shoreline bank stability.

Indicators:
- Potential for shoreland soil erosion
- Shoreline bank stability index

1.8.5 Wetlands

Wetlands along TVA reservoir shorelines are highly productive and biologically diverse ecosystems. In addition to habitat for fish and wildlife resources, wetlands also provide multiple functions and values, such as shoreline stabilization and erosion control, improved water quality, and recreational opportunities.

Executive Order 11990 (Protection of Wetlands) directs federal agencies to take such actions as may be necessary to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. Section 404 of the Clean Water Act, administered by USACE and EPA, also applies to many waterfront construction activities, including wetlands alterations.

Residential shoreline development could result in filling, draining, or altering wetlands. Therefore, increasing development could adversely impact the functions and values of wetlands occurring along TVA reservoir shorelines.

Indicator:
- Potential loss of wetlands functions and values

1.8.6 Floodplains/Flood Control

Floodplains along TVA reservoirs are used to store flood waters until the flood crest has subsided and the reservoir returns to the normal operating level. In addition, floodplains provide or support many values and benefits, including natural wetlands and wildlife habitat, improved water quality, storm water management, recreational opportunities, and aesthetic quality.

Executive Order 11988 directs federal agencies to minimize adverse impacts to floodplains. Compliance with this executive order should prevent an increase in flood damage from residential shoreline development and ensure that the reservoir system can be operated for flood control benefits. However, shoreline development could negatively impact natural and beneficial floodplain values. The amount of shoreland made available for development would directly relate to the level of potential impacts.

Indicator:
- Potential loss of natural and beneficial floodplain values

1.8.7 Aquatic Habitat

Reservoirs are extremely important as spawning and nursery areas for many sport, commercial, and prey fish species, including black bass, crappie, catfish, buffalo-fish, shad, sunfish, minnows, and shiners. Shorelines provide cover for fish and habitat for aquatic insects and crayfish that serve as food for many fish species. Many SMI participants identified protection of aquatic resources and habitats as important considerations, especially regarding impacts to sport fisheries.

Increased residential shoreline development could reduce the amount of quality aquatic habitat available for sustaining fisheries resources and aquatic organisms. If reductions reach threshold levels, fish populations would be adversely impacted.

Indicator:
- Comparison of Shoreline Aquatic Habitat Index (SAHI) scores. The SAHI measures seven conditions (cover, substrate, bank stability, canopy cover, forested buffer strips, diversity of habitat, and amount of dredging) important to maintenance of desirable sport fish population levels.

1.8.8 Water Quality

TVA reservoirs support numerous human uses, as well as a diversity of fish, freshwater mussels, and other aquatic organisms. Multipurpose reservoir uses include recreation (such as swimming, wading, fishing, and boating), drinking-water supplies, industrial water supplies, flood protection, generation of electricity, navigation, propagation and growth of aquatic life, irrigation, wildlife conservation, and livestock watering.

The quality of water determines if aquatic organisms can survive and whether desired human uses can be accommodated. SMI participants urged TVA to do more to protect the water quality of its reservoirs. Participants are concerned with water pollution issues related to shoreline development, including lawn fertilizer and chemical runoff, sewage/septic tank runoff, siltation of the aquatic environment, and turbidity from shoreline erosion. Water quality in the Tennessee River is generally considered good. However, increased residential shoreline development could increase the number of local areas not providing desirable uses or not adequately supporting aquatic life.

Indicators:
- Amount of nutrient (total phosphorus) added to reservoirs from development
- Potential for additional reservoir sites not meeting state water quality criteria for recreation due to bacterial contamination

For changes in shoreline bank stability which could result in water quality changes and physical impacts to aquatic habitat, see Sections 1.8.4, 2.10.4, 3.8.10, and 4.6.3.

1.8.9 Recreational Use of Shoreline

During SMI public involvement, several recreation resource issues were identified, including the need for additional recreational opportunities such as camping, hunting, fishing, water recreation, hiking, and wildlife viewing. Residential shoreline development would primarily affect public recreational use (especially informal) of lands that are currently undeveloped.

Indicator:
- Number of day-use, informal camping, and hunting opportunities lost

1.8.10 Aesthetic Resources

According to the *An Analysis of the Outdoor Recreation and Wilderness Situation in the United States: 1989 - 2040* (USDA Forest Service, 1989), *aesthetics* refers to the effect that the interaction of all senses has with the environment. In the context of SMI, *aesthetics* refers to the degree of compatibility among natural resources and residential shoreline development.

Many SMI participants stated that they wanted TVA to preserve the shoreline's natural beauty (aesthetics). The visual quality of the environment is important for ensuring the quality of outdoor experiences. Residential shoreline development would affect the visual quality of reservoir shorelines.

Indicators:
- Water-use facility design preference scores
- Density preference scores
- Amount of residential shoreline development preference scores
- Shoreline vegetation alterations preference scores

1.8.11 Cultural Resources

Under federal law (National Historic Preservation Act of 1966 and the Archaeological Resources Protection Act of 1979), TVA is mandated to protect significant cultural resources, including archaeological and historic sites, located on TVA lands or affected by TVA actions. Shoreline soil-disturbing activities — such as dredging or construction of docks, piers, and retaining walls — could affect important cultural resources. As residential shoreline development increases, so does the probability that such resources would be disturbed or require mitigation.

Indicator:
- Number of cultural sites potentially disturbed or mitigated

1.8.12 Socioeconomics

Public comments varied widely about the social and economic effects of residential shoreline development. Some SMI participants believe development would improve the local economy. Others felt that managed growth could achieve environmental protection, protect property values, promote tourism, and provide other economic benefits. Still others preferred minimal development to preserve and protect the environment.

Population growth along the shoreline may be affected by land availability, land use standards, and land prices. Income and employment would be influenced by population growth and by the income levels of those persons who purchased property along and near the reservoir. Property values could be enhanced by the type and extent of standards for shoreline land use, as well as by relative land scarcity.

Indicators:
- Population
- Income and employment
- Property values

1.8.13 Navigation

The TVA Act (1933, as amended) mandated the development of a 9-foot commercial navigation channel on the Tennessee River from Knoxville, Tennessee, to Paducah, Kentucky. Section 26a review would ensure that the construction of private water-use facilities would not encroach upon the commercial navigation channel or marked recreational channels. However, increased demand for residential shoreline development could result in the loss of essential navigation safety harbors and landings.

Indicator:
- Potential loss of navigation safety harbors and landings

1.9 Other Public Issues Related to SMI Raised During Scoping

During scoping, the public identified the following additional issues. While these concerns will not be discussed in Chapters 3 and 4, provisions for addressing them have been incorporated into the alternatives (Chapter 2).

1.9.1 Education and Communication

Some participants felt TVA should increase its efforts to educate and communicate with the public regarding shoreline management issues. Specific suggestions included:

- Make more information available on TVA regulations/policies and the permitting process.
- Provide educational programs pertaining to environmental problems.
- Provide guidelines for protecting/enhancing TVA shorelines and adjoining property.

Other suggestions included:

- Provide information about other land management issues and recreational opportunities.
- Supply a list of regulatory agencies and their responsibilities as they relate to shoreline and reservoir management.

In broad terms, education and communication comments fell into one of two groups:

- Those recommending education as a vehicle for mitigating a larger concern — for example, programs designed to correct environmental problems or suggestions on how to modify the shoreline without creating adverse environmental impacts.
- Those encouraging TVA to better inform the public — for example, what are TVA's permitting requirements?

Other public agencies expressed interest in forming networks and committees to jointly develop a manual of best management practices to guide the activities of developers and other property owners.

1.9.2 Enforcement/Patrol

Some participants also indicated support for enforcement authority by TVA. Some people requested more stringent enforcement of regulations for protection of the environment, land-based recreation and land use, residential water-use facilities, watercraft, and development activities. Increased patrols were suggested as a means of controlling encroachments and other unauthorized shoreland uses. TVA was also asked to enforce existing regulations uniformly and to acquire legislative authority to impose fines and issue court citations when regulations are not followed.

1.9.3 Land Use Rights

Some respondents indicated that TVA should recognize the rights of property owners and give them more overall discretion in how they choose to manage the shoreline. Numerous property owners wanted TVA to protect their ability to:

- Maintain/enhance the shoreline.
- Construct water-use facilities.
- Have access to the shoreline and water.

1.9.4 Design Standards

Some participants commented that TVA should set standards for private water-use facilities and modifications to the shoreline, including minimizing or prohibiting the cutting of trees, limiting boat dock protrusions, restricting the amount of shoreline available for development, and addressing the control of erosion.

1.10 Remaining Public Issues Raised During Scoping

The issues listed below were also identified during public scoping, and TVA recognizes these issues as important concerns. They were not addressed in as much detail as SMI's primary issues because they are not directly related to SMI's goal of identifying ways to better protect shoreline and aquatic resources, while allowing reasonable residential access to the shoreline. The majority of these issues are already being addressed, at least in part, or have been addressed by TVA. See Appendix B and the comment/response volume for discussions of these issues and the appropriate TVA telephone numbers for obtaining more information. Cumulative effects from these issue areas were appropriately taken into account in impact assessments.

1.10.1 Fluctuating Water Levels

Some participants preferred more stable water levels for longer periods of time. Fluctuating water levels were believed to cause shoreline erosion, impede recreational pursuits, and inconvenience private water-use facility owners.

1.10.2 Litter/Trash Prevention and Control

It was suggested that TVA provide more cleanup programs to remove trash/litter along the shoreline and waterways.

1.10.3 Industrial Development, Commercial Recreation, and Public Recreation Land Use Decisions

Some people were concerned about the adverse impacts caused by increased industrial development. Support for increased commercial recreation was also expressed by some participants.

1.10.4 Natural Resource Management Along Nonresidential Shoreline

Some of the public was concerned about current agricultural practices and clearcutting forests along reservoir shoreline. Participants also felt that TVA should provide more hunting opportunities and control nuisance wildlife species on its lands.

1.10.5 Aquatic Plant Management

Some participants called for TVA to control milfoil and other aquatic vegetation.

1.10.6 Water-Surface Zoning

Some participants requested that TVA establish special use zones to accommodate such activities as boating, fishing, skiing, and hunting.

1.10.7 No-Wake Zones

Some participants requested that TVA establish no-wake zones to protect the shoreline from erosion due to wave action from motor boats and to increase public safety.

1.10.8 Incompatible Recreational Uses

Some persons were concerned about improper or incompatible recreational uses. The examples mentioned were large, fast-moving watercraft, unregulated informal camping, jet skis, and off-road motor vehicles.

1.10.9 Public Recreational Facilities

Some participants asked that TVA provide additional public recreational facilities and improve existing ones.

1.10.10 Public Land Boundaries Marking

It was noted that TVA should mark its boundaries so that people would know when they were on TVA land.

1.10.11 Navigation Hazards

Some respondents were concerned about partially submerged and floating debris and asked that TVA remove and/or mark these hazards.

1.10.12 Mosquito Control

Some people were concerned about the health hazards posed by mosquitoes and asked that TVA provide more control of these insects.

1.10.13 Nonresidential Pollution Sources

Some participants were concerned about and wanted to know what TVA was doing to prevent and control nonresidential sources of pollution (i.e., industrial, agricultural, commercial).

1.11 Issues Raised During Public Review of the DEIS

Release of the DEIS for public review gave SMI participants the opportunity to comment further on issues raised during public scoping and subsequently discussed in the DEIS. These comments also reflect additional issues and concerns which surfaced during the public meetings or as part of the review process.

The public comments and TVA responses can be found in Volume II of this FEIS. Comment topics are as follows:

- SMI Project
- Environmental Review and Public Involvement Process
- Development Issues
- Standards and Permitting
- Access Rights and Grandfathering
- Alternatives
- Promoting and Recognizing Stewardship
- Resource Issues
- Fees
- Other Public Issues (trash, lake levels, pollution, aquatic plants, mosquitoes, TVA operations)
- Tabular Results from Public Involvement Questionnaire