Document Type: EIS-Administrative Record
Index Field: Final Environmental Document
Project Name: Watts Bar Reservoir Land Management Plan
Project Number: 2004-1

ERRATA SHEET

TENNESSEE VALLEY AUTHORITY

WATTS BAR RESERVOIR LAND MANAGEMENT PLAN (WBRLMP)
LOUDON, MEIGS, RHEA, AND ROANE COUNTIES, TENNESSEE

ENVIRONMENTAL IMPACT STATEMENT

The subject environmental impact statement (EIS) stated that at least six parcels on Watts Bar Reservoir were affected by the December 2008 Kingston ash spill. Impacts to environmental resources and private and public property were being assessed at the time the final EIS was published. The area of these six parcels (Parcels 184, 187, 188, 189, 12-45, and 12-51) totaled about 134 acres above mean summer pool elevation. The continued appropriateness of the current allocation of these affected parcels would be reevaluated through the recovery planning process.

Since the release of the final EIS, Parcel 189a was determined to include several islands (totaling 8 acres) located upstream of the spill site on the Emory River. This location was not impacted by the spill; therefore, these islands should not have been part of the affected area. Furthermore, there are three additional parcels (Parcels 185, 186, and 153) totaling 58.4 acres that were affected by the Kingston ash spill. The total revised area of the parcels impacted by the spill is 184 acres (see Table 1 below). The locations of these parcels are shown in Figure 1 below.

Table 1. Parcels Affected by the Kingston Ash Spill

Parcel	Affected Acreage	Modified Alternatives					
		A		B		C	
		Zone	Acres	Zone	Acres	Zone	Acres
12-45	1.6	6	1.6	6	1.6	6	1.6
12-51	1.2	6	1.2	6	1.2	6	1.2
153	40.6	7	40.6	7	40.6	7	40.6
184	28.8	7	28.8	7	28.8	7	28.8
185	4.1	4	4.1	4	4.1	4	4.1
186	13.7	3	13.7	3	13.7	3	13.7
187	56.8	4	56.8	4	56.8	4	56.8
188	25.3	3	25.3	3	25.3	3	25.3
189a	11.9[1]	4	22.2[2]	4	19.9	4	19.9
Total	184.0						

[1] Only 11.9 acres of the original Parcel 189 were affected. The remaining acreage is associated with upstream islands, and these will remain as planned under Parcel 189. The affected parcel will be referred to as 189a for future planning.

[2] Acreage is different for No Action and Action alternatives because 2.3 acres were transferred to Parcel 159 after significant wetlands were identified.

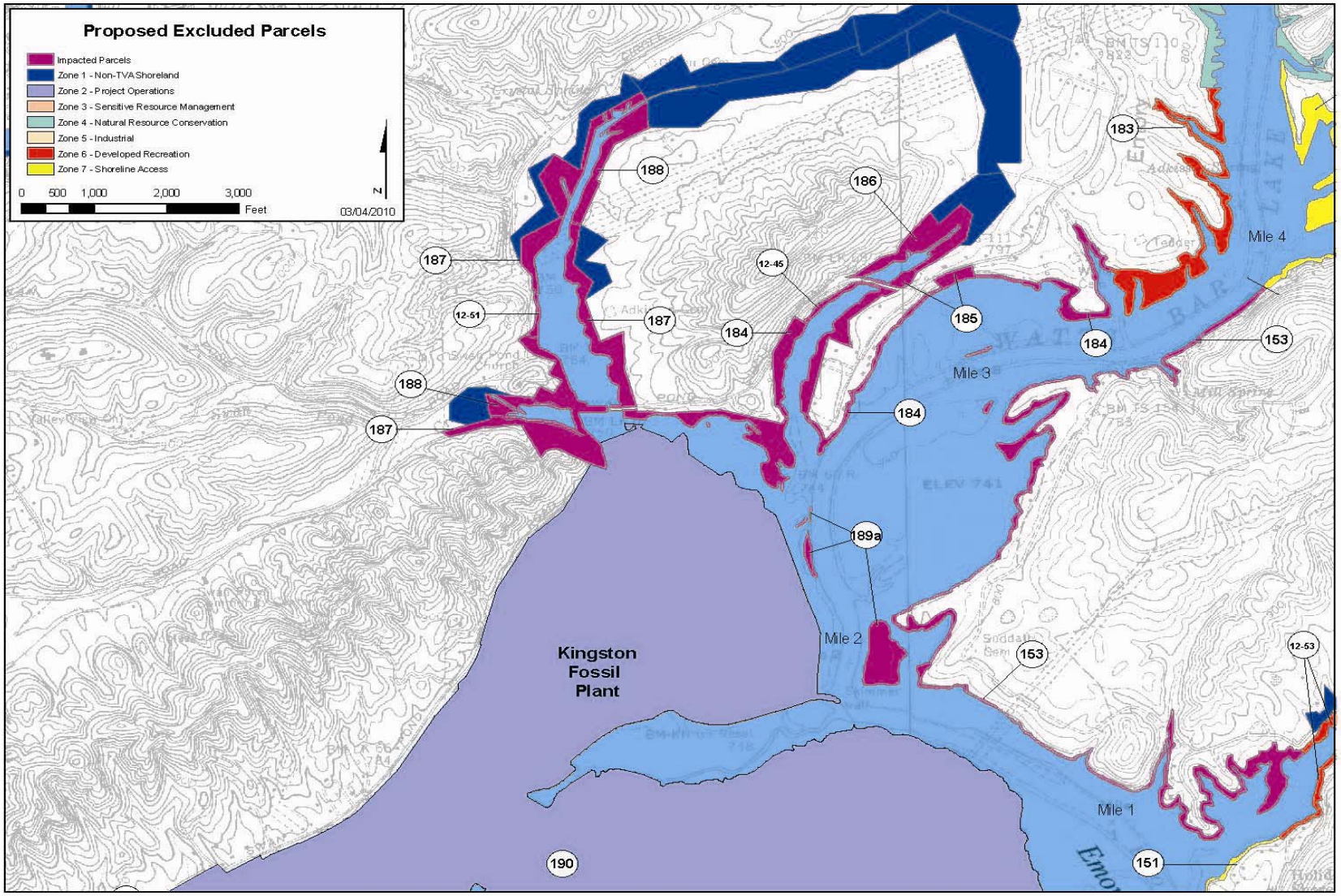

Figure 1. Excluded Parcels Near Kingston Fossil Plant

On November 19, 2009, the TVA Board of Directors approved the 2009 WBRLMP, which excluded all or parts of the nine parcels mentioned above that were affected by the December 2008 Kingston ash spill. The appropriate future uses of these parcels will be determined during the recovery planning process. Because of these changes, the total acreage considered in the WBRLMP is not 16,220 acres, as reported in the EIS, but rather, 16,036 acres. This change slightly reduces the amount of land available for planning (about 1 percent), but it does not affect the planning process for the vast majority of public lands around Watts Bar Reservoir.

After the release of the final EIS, the TVA Board of Directors clarified its authority regarding future requests for allocation changes of certain shoreline parcels from Zone 5 or 6 to Zone 7. The Board will reserve the right to review and approve such changes. Because the exercise of this allocation authority is an administrative action, it would have no effect on the physical environment, the planning process, or the stated goals of the WBRLMP.

Most of the changes necessary to accommodate the 184-acre reduction occur in various tables throughout the document; however, some changes in the document text are necessary. An updated map of the Kingston Fossil Plant area (i.e., Figure 1 in this document) is provided. Table 2 lists the locations in the document where updates are necessary.

Table 2. Errata for Watts Bar Reservoir Land Management Plan EIS

Page	Paragraph	Line	Delete:	Replace with or Add:
Cover Sheet	Abstract: First	2	"a total of 16,220 acres"	"a total of 16,036 acres"
S-1	Second	4	"approximately 16,220 acres"	"approximately 16,036 acres"
S-3	Second	2	"about 16,220 acres"	"about 16,036 acres"
1	Fourth	3	"about 16,220 acres"	"about 16,036 acres"
3	First	5	"about 16,220 acres"	"about 16,036 acres"
3	Third	2	"approximately 16,220 acres"	"approximately 16,036 acres"
5	Second	All	Original Paragraph	Replacement Paragraph 1
5	Third	All	Original Paragraph	Replacement Paragraph 2
30	Second	All	"without any further TVA Board approval"	"with TVA Board approval"
31	First	2	"1,552 acres"	"1,549 acres"
32	Table 2.1-3	Row 46 Col. 4	"19.9"	"9.0"
32	Table 2.1-3	Row 46 Col. 7	"Decrease in Acreage"	"Decrease Acreage to Create Parcel 189a"
33	First	4	"about 8,900 acres"	"about 8,800 acres"
33	Sixth	7	"nearly 2,400 acres"	"nearly 2,200 acres"
34	First	4	"3,472 acres of land"	"3,433 acres of land"
34	First	5	"3,309 acres"	"3,236 acres"
34	First	7	"1,998 acres"	"1,995 acres"
34	Second	8	"3,780 acres of land"	"3,741 acres of land"
34	Second	9	"3,857 acres"	"3,784 acres"
34	Second	13	"1,552 acres"	"1,549 acres"
34	Fourth	1	"2,300 acres"	"2,200 acres"
34	Fourth	3	"approximately 1,400 to 1,500 acres"	"approximately 1,200 to 2,100 acres"
35	Table 2.2-1	All	Original Table 2.2-1	Revised Table 2.2-1
36	Table 2.2-2	All	Original Table 2.2-2	Revised Table 2.2-2
72	Fifth	1	"manages 16,220 acres"	"manages 16,036 acres"
78	Fourth	5	"approximately 16,220 acres"	"approximately 16,036 acres"
79	Second	14	"within the 16,220 acres"	"within the 16,036 acres"

Page	Paragraph	Line	Delete:	Replace with or Add:
97	First	6	“Approximately 14 percent (2,303 acres)”	“Approximately 14 percent (2,241acres)”
100	Third	2	“31 percent (5,098 acres)”	“31 percent (5,025 acres)”
103	Second	4	“42 percent (6,800 acres)”	“42 percent (6,700 acres)”
103	Fourth	1	“53 percent (8,600 acres)”	“53 percent (8,500 acres)”
103	Fourth	4	“47 percent (7,600 acres)”	“47 percent (7,500 acres)”
104	Second	2	“55 percent (8,900 acres)”	“55 percent (8,800 acres)”
105	Sixth	2	“management of 16,220 acres”	“management of 16,036 acres”
105	Sixth	3	“land (9.5 percent) for Zone 5”	“land (9.6 percent) for Zone 5”
111	Second	3	“Six thousand seven hundred eighty-one acres or 42.1 percent”	“Six thousand six hundred sixty-nine acres or 41.6 percent”
111	Fourth	5	“7,637 acres, or 47 percent”	“7,525 acres, or 47 percent”
112	First	1	“8,878 acres, or 55 percent”	“8,766 acres, or 55 percent”
118	Fourth	2	“developed recreation (1,998 acres)”	“developed recreation (1,995 acres)”
118	Sixth	2	“3,857 acres”	“3,784 acres”
118	Sixth	3	“1,552 acres”	“1,549 acres”
119	Second	6	“5,098 acres”	“5,025 acres”
119	Second	13	“1,351 acres”	“1,348 acres”
122	Table 4.8-3	All	Original Table 4.8-3	Revised Table 4.8-3
123	Second	4	“1,687 acres”	“1,633 acres”
124	Fourth	5	“about 381”	“about 446”
124	Fourth	6	“about 446 acres”	“about 548 acres”
127	Fourth	2	“367 acres”	“357 acres”
129	Second	4	“1,998 acres or 12 percent”	“1,995 acres or 12 percent”
129	Second	5	“1,552 acres”	“1,549 acres”
129	Second	7	“1,351 acres”	“1,348 acres”
130	First	2	“1,998 acres, 1,552 acres, and 1,351 acres”	“1,995 acres, 1,549 acres, and 1,348 acres”
130	First	4	“3,309 acres, 3,857 acres, 5,098 acres’’	“3,236 acres, 3,784 acres, 5,025 acres”
131	Table 4.11-1	All	Original Table 4.11-1	Revised Table 4.11-1
132	First	1	“3,309 acres”	“3,236 acres”
133	First	2	“557 acres more”	“548 acres more”
133	Sixth	2	“5,098 acres”	“5,025 acres”
136	Three	3	“450 fewer acres”	“1,187 fewer acres”
136	Three	4	“1,545 acres compared to 1,072 acres”	“1,544 acres compared to 357 acres”
136	Sixth	1-2	“5,098 acres, as opposed to 3,857 under Modified Alternative B and 3,309”	“5,025 acres, as opposed to 3,784 under Modified Alternative B and 3,236”
136	Sixth	4	“3,780 acres under Modified Alternatives B and C, and 3,472 acres”	“3,741 acres under Modified Alternatives B and C, and 3,433 acres”
137	Fifth	2	“1,998 acres”	“1,995 acres”
137	Fifth	5	“About 6,772 acres”	“About 6,669 acres”
138	Sixth	4	“over 52 percent”	“over 55 percent”
181	Table B-1, Parcel 12-45	Row 2, Col. 9	“Affected by the December 2009 ash pond spill at KIF.”	“Affected by the December 2009 ash pond spill at KIF, not part of WBRLMP.”
182	Table B-1, Parcel 12-51	Row 1, Col. 9	“Affected by the December 2009 ash pond spill at KIF.”	“Affected by the December 2009 ash pond spill at KIF, not part of WBRLMP.”
207	Table B-1, Parcel 153	Row 1, Col. 9		Add “Affected by the December 2009 ash pond spill at KIF, not part of WBRLMP.”

Page	Paragraph	Line	Delete:	Replace with or Add:
211	Table B-1, Parcel 184	Row 8, Col. 9	"Affected by the December 2009 ash pond spill at KIF."	"Affected by the December 2009 ash pond spill at KIF, not part of WBRLMP."
212	Table B-1, Parcel 185	Row 2, Col. 9		Add "Affected by the December 2009 ash pond spill at KIF, not part of WBRLMP."
212	Table B-1, Parcel 186	Row 3, Col. 9		Add "Affected by the December 2009 ash pond spill at KIF, not part of WBRLMP."
212	Table B-1, Parcel 187	Row 4, Col. 9	"Affected by the December 2009 ash pond spill at KIF."	"Affected by the December 2009 ash pond spill at KIF, not part of WBRLMP."
212	Table B-1, Parcel 188	Row 5, Col. 9	"Affected by the December 2009 ash pond spill at KIF."	"Affected by the December 2009 ash pond spill at KIF, not part of WBRLMP."
213	Table B-1, Parcel 189	Row 2, Col. 9	"Affected by the December 2009 ash pond spill at KIF."	"Affected by the December 2009 ash pond spill at KIF, not part of WBRLMP."
213	Table B-1	After Row 2		Add row for Parcel 189a as in revised Table B-1

Please replace the second paragraph on page 5 with the paragraph below.

Replacement Paragraph 1

All or parts of at least nine parcels (other than KIF) proposed for consideration in the Land Plan action alternatives were impacted directly by the spill. The area of these parcels total about 184.0 acres above mean summer pool elevation. Parcels186 and 188, which total 39.0 acres, were proposed for allocation to Zone 3 (Sensitive Resource Management) because of the presence of wetlands. Parcels 185, 187, and 189a, totaling 83.1 acres, were proposed for Zone 4 (Natural Resource Conservation). The 69.2 acres of Parcels 153 and 184 were proposed for Zone 7 (Shoreline Access). Parcels 12-45 and 12-51 (about 2.8 acres) are currently licensed to the Tennessee Wildlife Resources Agency (TWRA) for boat access ramps and are proposed for Zone 6 (Developed Recreation). In addition, the approximately 84-acre containment pond, which includes 60 acres from which the ash slide occurred, is part of the KIF site (Parcel 190), which is proposed to be allocated to Zone 2 (Project Operations).

Please replace the third paragraph on page 5 with the paragraph below.

Replacement Paragraph 2

In January 2009, TVA began developing a recovery plan that would address remediation of the area affected by the ash spill, including any areas within the above parcels that have been impacted. The appropriate future uses of these nine parcels will be determined during the recovery planning process. Since the vast majority of land parcels on Watts Bar Reservoir are unaffected by the spill, TVA has decided to exclude these parcels from the WBRLMP and to move ahead with the land planning process for this reservoir. Any future TVA actions to reallocate any of these parcels will be subject to environmental reviews under NEPA.

Please replace Table 2-1 on page 35 with the revised table below. Revised information is shown in the dark grey boxes**.**

Table 2.2-1. Comparison of Land Uses by Alternatives (Revised)

Existing (1988) Allocation Categories	Current Land Use Zones	Modified Alternatives					
		A		B		C	
		Acres	%	Acres	%	Acres	%
Retained Developed [1] Previously Unplanned[2]	Zone 2 - Project Operations	3,587	22.4	4,371	27.3	3,611	22.5
Historic Preservation, Habitat Protection, Visual Management and Protection, Small Wild Areas	Zone 3 - Sensitive Resource Management	3,433	21.4	3,741	23.3	3,741	23.3
Wildlife Management Forest Management Agriculture, Open Space, Right-of-Way Protection	Zone 4 - Natural Resource Conservation	3,236	20.2	3,784	23.6	5,025	31.4
Industrial Sites, Barge Terminal Sites, Minor Landings, Fleeting Area, Industrial Access	Zone 5 - Industrial	1,544	9.6	357	2.2	77	0.5
Public Recreation, Commercial Recreation Water Access, Informal Recreation	Zone 6 - Developed Recreation	1,995	12.4	1,549	9.7	1,348	8.4
Previously Unplanned[3]	Zone 7 - Shoreline Access	2,241	14.0	2,234	13.9	2,234	13.9
	Total	**16,036**	**100.0**	**16,036**	**100.0**	**16,036**	**100.0**

[1] Retained development - A TWRA maintenance area (9 acres) and Kingston Pumping Station (16 acres) are the only inclusions from the 1988 Plan.
[2] Primarily consists of TVA project lands from dam and electric power plant reservations.
[3] Consists of TVA lands described as marginal strip in the 1988 Plan.

Please replace Table 2.2-2 on page 36 with the revised table below. Revised information is shown in the dark grey boxes**.**

Table 2.2-2. Comparison of Acres Allocated to Sensitive and Natural Resource Uses (Revised)

Modified Alternative	Allocation	Acres	Percent of Total Area
Alternative A	Historic Preservation, Habitat Protection, Visual Management and Protection, Small Wild Areas, Wildlife Management, Forest Management, Agriculture, Open Space, Right-of-Way Protection	6,669	41.6
Modified Alternative B	Zone 3 – Sensitive Resource Management Zone 4 – Natural Resource Conservation	7,525	46.9
Modified Alternative C	Zone 3 – Sensitive Resource Management Zone 4 – Natural Resource Conservation	8,766	54.7

Please replace Table 4.8-3 on page 122 with the revised table below. Revised information is shown in the dark grey boxes**.**

Table 4.8-3. Prime Farmland Acreage Potentially Affected Under Each Alternative (Revised)

Zone	Modified Alternative A			Modified Alternative B			Modified Alternative C		
	Prime Farmland (Acres)	Total Zone Allocation (Acres)	Percent of Zone	Prime Farmland (Acres)	Total Zone Allocation (Acres)	Percent of Zone	Prime Farmland (Acres)	Total Zone Allocation (Acres)	Percent of Zone
2	234	3587	6.5	262	4371	6.0	244	3611	6.8
3	878	3433	25.6	889	3741	23.8	889	3741	23.8
4	590	3236	18.2	670	3784	17.7	744	5025	14.8
5	139	1544	9.0	66	357	18.5	32	77	41.6
6	278	1995	13.9	233	1549	15.0	211	1348	15.7
7	677	2241	30.2	676	2234	30.3	676	2234	30.3
Total	2796	16036	17.4	2796	16036	17.4	2796	16036	17.4

Please replace Table 4.11-1 on page 131 with the revised table below. Revised information is shown in the dark grey boxes**.**

Table 4.11-1. Acres of Developed and Dispersed Recreation on Watts Bar Reservoir (Revised)

Existing (1988) Allocation Categories	Current Land Use Zones	Modified Alternatives					
		A		B		C	
		Acres	%*	Acres	%	Acres	%
Wildlife Management Forest Management Agriculture, Informal Recreation, Open Space, Right-of-Way Protection	Zone 4 - Natural Resource Conservation	3,236	20.2	3,784	23.6	5,025	31.4
Public Recreation, Commercial Recreation, Water Access	Zone 6 - Recreation	1,995	12.4	1,549	9.7	1,348	8.4
Total		5,231	32.6	5,333	33.3	6,373	39.8

* Percent of total TVA Land on Watts Bar Reservoir

Please replace information after row 2 in Table B-1 on page 213 with the revised table below. Revised information is shown in the dark grey boxes**.**

Table B-1 (Revised)

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
189	182	U	22.2	4	9.0	4	4	Includes all Zone 4 islands in the Emory River embayment upstream from Kingston Fossil Plant and contains bottomland hardwoods and shoreline fringe wetlands of significant importance to various wading/water bird species; duck and goose hunting from blinds occurs on some of these areas.
189a	182	U	22.2	4	11.9	4	4	Includes a peninsula and islands in the Emory River near Kingston Fossil Plant and contains bottomland hardwoods and shoreline fringe wetlands of significant importance to various wading/water bird species; duck and goose hunting from blinds occurs on some of these areas. Affected by the December 2009 ash pond spill at KIF, not part of WBRLMP.

Document Type: Environmental Impact Statement-Administrative Record
Index Field: Final Environmental Document
Project Name: Watts Bar Land Plan
Project Number: 2004-1

FINAL ENVIRONMENTAL IMPACT STATEMENT

WATTS BAR RESERVOIR LAND MANAGEMENT PLAN

Loudon, Meigs, Rhea, and Roane Counties, Tennessee

PREPARED BY:
TENNESSEE VALLEY AUTHORITY

FEBRUARY 2009

Direct Comments to:

Richard L. Toennisson
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, Tennessee 37902
Phone: (865) 632-8517
Fax: (865) 632-3451
E-mail: rltoennisson@tva.gov

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Final Environmental Impact Statement **February 2009**

Proposed project: Watts Bar Reservoir Land Management Plan
Loudon, Meigs, Rhea, and Roane Counties, Tennessee

Lead agency: Tennessee Valley Authority

Cooperating agencies: None

For further information, contact: Richard L. Toennisson
Senior NEPA Specialist
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, Tennessee 37902
Phone: (865) 632-8517
Fax: (865) 632-3451
E-mail: rltoennisson@tva.gov

Comments must be submitted by: March 23,2009

Abstract: Tennessee Valley Authority (TVA) proposes to update the 1988 *Watts Bar Reservoir Land Management Plan* (1988 Plan) for approximately 16,220 acres of TVA public land on Watts Bar Reservoir in Loudon, Meigs, Rhea, and Roane counties, Tennessee. The proposed updated *Watts Bar Reservoir Land Management Plan and Final Environmental Impact Statement* (Land Plan) would guide land use approvals, private water use facility permitting, and resource management decisions on Watts Bar Reservoir. The proposed Land Plan allocates land into broad categories or "Zones," including Project Operations, Sensitive Resource Management, Natural Resource Conservation, Industrial, Developed Recreation, and Shoreline Access.

This Land Plan considers three alternatives and incorporates TVA's November 2006 Land Policy and other administrative changes. The alternatives are a No Action Alternative to continue to use the 1988 Plan with accrued updates; a Modified Development and Recreation Alternative, providing suitable industrial use and developed recreation; and a Modified Conservation and Recreation Alternative, providing an emphasis on natural resource conservation and dispersed recreation activities. TVA's preferred alternative is the Modified Development and Recreation Alternative.

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SUMMARY

PURPOSE OF AND NEED FOR ACTION

The Tennessee Valley Authority (TVA) manages its public lands to protect the integrated operation of the TVA reservoir and power systems, to provide for appropriate public use and enjoyment of the reservoir system, and to provide for continuing economic growth in the Tennessee Valley. TVA is proposing to update the 1988 *Watts Bar Reservoir Land Management Plan* (1988 Plan) to reflect changing community needs and current TVA policies. This includes allocating additional public lands on the reservoir that were not previously allocated in the 1988 Plan. These additional lands include narrow shoreline strips, TVA operation areas, and lands committed under legal agreements.

The purpose of the *Watts Bar Reservoir Land Management Plan and Final Environmental Impact Statement* (Land Plan) is to update the 1988 Plan by incorporating the changes derived from implementation of the TVA Land Policy (November 2006) and other subsequent updates for approximately 16,220 acres of TVA managed public land on Watts Bar Reservoir in Loudon, Meigs, Rhea, and Roane counties, Tennessee. The Land Plan would allow an additional opportunity to assess environmental impacts of a reasonable range of alternatives for allocating TVA public land on Watts Bar Reservoir and provide a means for additional public involvement in the decision-making process. The proposed updated Land Plan would guide land use approvals, private water use facility permitting, and resource management decisions on Watts Bar Reservoir. The proposed Land Plan alternatives allocates land into broad categories or "Zones," including Project Operations, Sensitive Resource Management, Natural Resource Conservation, Industrial, Developed Recreation, and Shoreline Access.

In January 2009, TVA began developing a recovery plan for the December 2008 coal ash spill at Kingston Fossil Plant. At least six parcels on Watts Bar Reservoir were affected by the spill. The continued appropriateness of the allocation of these affected parcels would be reevaluated through the recovery planning process. Future TVA actions to reallocate any of the six parcels would be subject to environmental reviews under the *National Environmental Policy Act* (NEPA).

The Watts Bar Reservoir, which is part of the Watts Bar project, is a multipurpose reservoir operated by TVA for navigation, flood control, power production, recreation, and economic development. The Land Plan is intended to be consistent with the purposes of the Watts Bar project. The Land Plan also seeks to address issues and concerns raised by the general public. Each reservoir land management plan is submitted for approval to the TVA Board of Directors and adopted as policy to provide for long-term stewardship and accomplishment of TVA responsibilities under the TVA Act of 1933.

ALTERNATIVES

TVA is considering three alternatives for managing public land under its control around Watts Bar Reservoir. In order to fulfill the purpose, need and goals of land planning, these alternatives have been modified during the review process based on evaluations, new and existing data, TVA policy and program needs, public and agency comments, and the information previously described in Section 1.3.

- Under the No Action Alternative (Modified Alternative A) , TVA would continue to use the existing 1988 Plan, with minor revisions to reflect allocation changes made over the past 19 years and current TVA policy.

- Alternative B (Modified Development and Recreation) would provide suitable economic and recreation opportunities as prescribed by the TVA Land Policy.

- Alternative C (Modified Conservation and Recreation) proposes a small amount of land allocated for industrial use and large portions to enhance conservation and dispersed recreation.

Under all alternatives:

- TVA would continue to conduct environmental reviews prior to the approval of any proposed development or activity on public land to address site-specific issues.
- Future activities and land uses will be guided by TVA Land Policy.
- TVA land use allocations are not intended to supersede deeded land rights or land ownership (See Section 2.2.1 for more information)

TVA's selected alternative would guide TVA resource management and property administration decisions on the TVA public land surrounding Watts Bar Reservoir until the Land Plan is revised in the future, which is expected to be about 10 years.

***No Action (Modified Alternative A)*:** TVA would continue to use the existing 1988 Plan, with minor revisions to reflect allocation changes made over the past 19 years and current TVA policy. The 19 allocation categories defined by the 1988 Plan would continue to be used, although activities and land uses not provided for by the Land Policy would not occur. Five thousand nine hundred acres of the TVA land on Watts Bar Reservoir (project operations and marginal strip) would continue to be administered by TVA but remain unplanned.

***Modified Development and Recreation (Modified Alternative B)*:** The proposed Modified Alternative B would continue to provide suitable economic and recreation opportunities as prescribed by the TVA Land Policy. This alternative would allocate public land and deeded rights into seven "Zones," including Non TVA Land, Project Operations, Sensitive Resource Management, Natural Resource Conservation, Industrial, Developed Recreation, and Shoreline Access. Each of the Watts Bar Reservoir land parcels being planned would be allocated to one of the land use Zones.

Under this alternative, TVA would help promote some industrial development and commercial recreation by allocating 357 acres of land for industrial use and 1,552 acres to developed recreation totaling about 12 percent of TVA-owned land on Watts Bar Reservoir. In addition, 760 acres of the former Clinch River Breeder Reactor (CRBR) site would be allocated to Zone 2 (Project Operations). Approximately 7,600 acres (47 percent) of land would be allocated for sensitive and natural resource use. Although natural resource conservation and dispersed recreation would predominate on the reservoir, industrial development and developed recreation would occur on TVA land where those activities are most suitable and have the greatest opportunity for success. This alternative includes minor administrative changes and alterations to the boundaries of land parcels or changes

to their allocation zones that reflect new information about deeded rights or natural resources.

***Modified Conservation and Recreation (Modified Alternative C)*:** The Modified Alternative C proposes a small amount of land allocated for economic development or industrial use and large portions to sensitive resource management and natural resource conservation. This alternative would allocate public land similar to Modified Alternative B. Under Modified Alternative C, TVA would help promote conservation of natural resources and dispersed and commercial recreation by allocating about 8,900 acres of land for sensitive resource protection or natural resource conservation and 1,350 acres to developed recreation totaling about 63 percent of TVA-owned land on Watts Bar Reservoir. TVA would apply one of the appropriate land allocation zones to all Watts Bar Reservoir lands. Only those lands with existing industrial facilities, about 80 acres (less than 1 percent), would be allocated for industrial use. This alternative would also include the minor administrative changes and alterations like Modified Alternative B. Under this alternative, natural resource conservation and dispersed recreation would predominate on TVA Watts Bar Reservoir land. Developed recreation would occur on TVA land where those activities are most suitable and have the greatest opportunity for success.

AFFECTED ENVIRONMENT

TVA manages about 16,220 acres of federally owned public land on Watts Bar Reservoir. The principal towns on the reservoir are Spring City, Kingston, Loudon, Rockwood, Lenoir City, Oak Ridge, and Harriman. Rural populations are concentrated in the numerous long valleys between the forested ridges. Watts Bar Reservoir flows from the northeast to southwest through Loudon, Meigs, Rhea, and Roane Counties in east Tennessee. At normal summer pool, the reservoir extends 72.4 miles up the Tennessee River to Fort Loudoun Dam, and 62.5 miles to Melton Hill Dam on the Clinch River. Including parts of the Emory and Little Emory rivers, the shoreline length totals 721 miles. TVA public land surrounding the reservoir includes natural areas, habitat protection areas, land fronting residential development, wildlife management areas, forested areas, licensed recreation areas, power transmission line corridors, riparian/wetland areas along streams and the reservoir shoreline, and Kingston Fossil Plant, Watts Bar Nuclear Plant, and the Watts Bar Dam Reservation.

There are 15 TVA areas managed for Species/Habitat Protection; Recreation; Resource Production; or Scientific, Cultural or Visual Resources. Other local, state, or federal agencies currently manage 19 similar areas located on or in the vicinity of public lands on Watts Bar Reservoir. Segments of the Emory and Little Tennessee rivers, and Piney Creek, which are tributaries to the reservoir, are listed on the National Rivers Inventory. Privately owned land surrounding the reservoir is a mosaic of residential and industrial/commercial development, upland and bottomland forests, and farmland comprised of hay, pasture, row crops, and small woodlots. The reservoir is similar to other reservoirs in the Tennessee River system in landscape character. Substantial visual features throughout the reservoir include secluded coves and vegetated large islands, visual buffering shoreline areas, and attractive isolated areas.

The numerous plant communities on Watts Bar Reservoir provide suitable habitat for a variety of wildlife species. These diverse plant communities include pine/hardwood forests, upland and riparian hardwood forests, and old field and agricultural field habitats. Many features, such as forested and emergent wetlands, streams, limestone bluffs, and caves on

reservoir parcels provide unique habitats for wildlife. In addition, the reservoir has one of the largest populations of nesting osprey in the Tennessee River Valley and a significant establishment of heron colonies suggesting that the reservoir may provide suitable nesting habitat for other wading birds uncommon in Tennessee.

The various aquatic and terrestrial habitats in the vicinity of Watts Bar Reservoir provide suitable habitat for several federally and state-listed wildlife species. Although 13 plant species listed by the state of Tennessee occur on TVA land, there are no known federally listed plant species. Several protected terrestrial animal species occur on TVA land and approximately 24 caves and 37 heron colonies were identified from the project area. One of these species (gray bats) is federally listed, one species (bald eagles) has federal protection status, and 14 species are listed by the state of Tennessee. There are 10 mollusks and six fish in the vicinity of the reservoir that are state or federally listed species. However, five of the mollusk species are believed to be extirpated from the reservoir. Currently, there are four federally listed mussels and one state-listed mussel and two federally listed and four state-listed fish known from the reservoir and its tributaries.

The overall reservoir ecological health rating for Watts Bar Reservoir was fair in 2004, with some ratings declining from good to poor between 1994 and 2002. The overall water quality characteristics of the reservoir are strongly affected by waters outside of the local watershed. Sediment quality ratings have varied from good to fair (1991-2003) with a greater frequency of occurrence of organic chemicals such as chlordane and polychlorinated biphenyls. Institutional controls (warning signs, fish consumption advisories, and monitoring) are in place to reduce health and environmental risks.

Throughout the reservoir, aquatic bottom-dwelling (benthic) animal communities rated generally ‘poor,’ although there may be an improving trend since 2002, except for the midreservoir area, which rated ‘excellent’ in 2004. With only two exceptions since 1994, vital stations’ fish community monitoring results have rated fish communities as ‘good’ in the reservoir, which indicates a consistently well-balanced fish assemblage.

Soils occurring in the Watts Bar Reservoir project area with properties to be classified as prime farmland (about 2,900 acres total) are generally located on the floodplains of the river and smaller streams. Especially significant areas of wetlands occur in the embayments associated with Hines Creek, Whites Creek, Muddy Creek, Greasy Run Creek, and Wolf Creek. Other important wetland areas are located in parcels located along the Little Emory River, in the Swan Pond and former CRBR area and on various forested islands in the reservoir.

The 100-year flood elevations for the Tennessee River part of Watts Bar Reservoir vary from 746.5 to 760.0 feet mean sea level (msl), while on the Clinch River arm of the reservoir, they vary from 747.1 to 755.3 feet msl. The flood risk profile elevations for the Tennessee River vary from elevation 747.0 to 769.3 feet msl and on the Clinch River they vary from 748.4 to 759.2 feet msl.

Watts Bar Reservoir is bounded by three dams (Watts Bar, Fort Loudoun, and Melton Hill) with navigation locks that connect it to the National Inland Waterway System. There are several barge terminals near the principal towns of Spring City, Kingston, Loudon, Rockwood, Lenoir City, Oak Ridge, and Harriman, as well as some concentrations of residential shoreline developments and marinas. In 2005, over 1.2 million tons of

commercial cargo was transported on the reservoir with an annual savings to shippers averaging $9 million.

TVA land comprises about 11 percent of the land within 0.25 mile of Watts Bar Reservoir. There are over 17,000 acres of platted residential property adjacent to public land on the reservoir; approximately half of the platted area has already been converted to residential housing. Since the completion of Watts Bar Reservoir, TVA has sold or transferred over 9,000 acres (35 percent of the original TVA land base) to private, state, or federal ownership. Of the 721 miles of shoreline, 340 miles (47 percent) is available for Shoreline Access, which includes current development. TVA has several long-term land use agreements with other federal, state, and local government agencies for wildlife management areas, refuges, and parks.

Over 700 archaeological resources have been identified on TVA public land surrounding Watts Bar Reservoir from existing data and recent survey results. Prehistoric components and sites dating from the Paleo-Indian through Mississippian periods have been recorded along with historic archaeological sites associated with the 19th to 20th century habitation of the area. Historic structures eligible for listing on the National Register of Historic Places on TVA lands include the Watts Bar Fossil Plant, the Watts Bar Dam, Locks, and Power House, and a number of remaining dwellings from the original construction village (now Watts Bar Resort).

The reservoir receives an estimated 1.9 million recreation user days per year; approximately 313,000 gained access to the reservoir through public use areas, 702,000 through private residential areas, and 874,000 through commercial use areas. There are 67 developed recreation areas on Watts Bar Reservoir. Twenty-six are commercial recreation areas (e.g., marinas and campgrounds), and 37 are public recreation areas (e.g., boat ramps, picnic areas, beaches, and trails). In addition, there are four quasi-public recreation areas such as summer camps. Dispersed recreation is actively managed on 41 parcels allocated for natural resource conservation management but occurs on most undeveloped TVA-managed land. Most of Watts Bar Reservoir water recreation is designated as suburban and the Clinch River arm of the reservoir is designated as rural developed. There are over 50 paved boat ramps on the reservoir, 3,600 permitted docks, and marina facilities with about 1,500 boat docking slips (with an additional 200 plus out-of-water storage slips).

The 2000 census population of the four counties in the Watts Bar Reservoir area is estimated to have increased by 17.7 percent over the 1990 population and estimates for 2006 indicate an additional 7.2 percent growth since 2000. This was a faster growth rate than in either the state or the nation, in contrast to the previous decade in which the area grew much more slowly than the state and the nation. Minorities account for 5.7 percent of the population, which is well below the Tennessee state average of 22.1 percent. In 2006, the civilian labor force of the area was 67,220 with an unemployment rate of 5.3 percent, which is higher than both the state and the national rates. The area is more dependent on manufacturing, farming, and government employment than either the state or the nation. In 2005, farm employment accounted for 4.8 percent, manufacturing 16.8 percent, government 15.4 percent, and, except for Roane County manufacturing and Meigs County government, all were 1 to 4 percent higher than both the state and national averages. Per capita personal income is lower than the state and national averages, averaging 78.4 percent of the national average in 2005. The estimated poverty rate in the area in 2004 was

14.1 percent, slightly lower than the state rate of 15.0 percent, but higher than the national average of 12.7 percent.

Except for ozone and particulate matter, all counties that surround Watts Bar Reservoir and their surrounding counties are currently in attainment with the National Ambient Air Quality Standards that establish safe concentration limits for pollutants in the ambient atmosphere. The closest Prevention of Significant Deterioration Class I area is the Great Smoky Mountains National Park to the east and southeast from the reservoir, which is about 20 miles distant.

ENVIRONMENTAL CONSEQUENCES

Under any alternative, impacts to sensitive resources such as endangered and threatened species, cultural resources, and wetlands would be mitigated through regulatory requirements and commitments prior to any undertaking. Future residential, industrial, and recreational developments on adjacent private property or TVA property have the potential to impact water quality by increased soil erosion, chemical usage, and sewage loading. These impacts can be avoided or minimized by vegetated buffer zones and development restrictions similar to the Shoreline Management Policy.

Under any alternative, impacts to floodplain values would be insignificant and any development proposed in the 100-year floodplain would be subject to the requirements of Executive Order (EO) 11988 (Floodplain Management). Likewise, adverse effects to wetlands from land clearing and ground disturbance would be mitigated under Section 404 of the Clean Water Act and EO 11990 and would be insignificant. The potential for activities to affect archaeological and historic properties would be mitigated through phased compliance with the implementation of the programmatic agreement with the Tennessee State Historic Preservation Officer and the Advisory Council on Historic Preservation.

All of the alternatives result in insignificant impacts on air quality. Proposed industry or project operations development actions would be carefully reviewed for potential impacts and compliance with air quality requirements. There may be some incremental clearing of wetland vegetation by landowners which results in some minor cumulative losses of wetland function, primarily shoreline stabilization, wildlife habitat provision, and plant community diversity. In cases where wetland impacts occur, mitigation requirements would offset any long-term loss of wetland functions.

Under the No Action Alternative, there would be an insignificant loss of public lands. However, there would be potential for habitat alteration of up to 1,300 acres from future industrial use and the eventual loss of 3,300 acres of high-quality habitat from future industrial and developed recreation use. Loss and fragmentation of terrestrial habitat by clearing and alteration of vegetation could impact the composition and abundance of species. There would be no federally listed as threatened and endangered plants impacted, and use of the 1988 Plan would not likely adversely affect federally listed animal species. There would be some insignificant impacts to state-listed species from clearing and alteration of vegetation and pollution and siltation from erosion and ground disturbance activities. There would be temporary insignificant adverse impacts to managed areas and sensitive ecological sites from incompatible land use on adjacent areas. There would be no change to aquatic ecology and commercial navigation from the existing conditions that would have insignificant impacts and the gradual minor degradation of visual resources would continue.

Under the No Action Alternative, Developed Recreation (Zone 6) would have the largest amount of land available for current and future opportunities than under the other two alternatives. The eventual use of land allocated for industrial or recreation development would cause loss of existing dispersed recreation at some sites resulting in a reduction of diversity in recreation opportunities. There would be no impacts to environmental justice and no change in impacts to socioeconomic issues with opportunities for future beneficial development. Insignificant air quality adverse impacts from emissions of construction and development activities would occur depending on the industries recruited. Some insignificant noise impacts from future industrial or recreation development are expected. Insignificant adverse impacts would occur to water quality from the release of toxic substances, erosion, or nutrient loading from future industrial and recreation development, and the potential loss of prime farmland would have an insignificant impact to region.

Under Modified Alternative B, the loss of public lands and other impacts described below would be less than the No Action Alternative. There would be potential for the habitat alteration of up to 1,100 acres from future industrial use and the eventual loss of 2,700 acres of high-quality habitat from future industrial and developed recreation use; loss and fragmentation of terrestrial habitat by clearing and alteration of vegetation could impact the composition and abundance of species. No federally listed threatened or endangered plants would be affected and the effects on federally listed animal species would not be adverse. There would be slightly less insignificant impacts to state-listed species from clearing and alteration of vegetation and pollution and siltation from erosion and ground disturbance activities. There would be temporary insignificant impacts to managed areas and sensitive ecological sites from incompatible land use of adjacent areas. There would be beneficial impacts from the adjustment of boundaries or designation of new management areas. There would be insignificant adverse impacts to aquatic ecology and the gradual minor degradation of visual resources would continue. There would be no impacts to environmental justice and insignificant impacts to socioeconomic issues with opportunities for future beneficial development. Insignificant air quality impacts from emissions of construction and development activities would occur depending on the industries recruited. Some insignificant noise impacts from future industrial or recreation development are expected. Insignificant impacts would occur to water quality from the release of toxic substances, erosion, or nutrient loading from future industrial and recreation development, and the potential loss of prime farmland would have an insignificant impact to the region.

Under Modified Alternative B, the minor reduced amount of land available for Developed Recreation (Zone 6) when compared to the No Action Alternative would be offset by an increase in land allocated for Natural Resource Conservation (Zone 4) which would support more dispersed recreation. There would be insignificant impacts to commercial navigation from loss of the potential barge terminals; however, the designation of safety harbor land would be beneficial.

Under Modified Alternative C, TVA would maintain public ownership of almost all Watts Bar Reservoir land and the greatest amount of land would be allocated for Natural Resource Conservation, offsetting the reduced amount of land available for Developed Recreation. Only 77 acres of public land would likely eventually be converted to industrial uses; however, there would be beneficial impacts to environmental justice because of the greater availability of public and dispersed recreation opportunities. Because there would be minimal clearing and alteration of vegetation and consequently minimal pollution and siltation from erosion or ground disturbance activities, there would be some beneficial

impacts to federally listed as threatened and endangered species. This alternative would also have the least impact to state-listed species. The retention of high-quality terrestrial habitat would be a benefit to terrestrial ecology on the Watts Bar Reservoir area. This alternative would have the least potential alteration of aquatic habitat and most beneficial improvement to aquatic ecology and water quality, because there would be less industrial and recreation development of land that typically leads to the release of toxic substances, erosion, or nutrient loading. There would be similar impacts to managed areas and sensitive ecological sites as Modified Alternative B. Among the alternatives, the least noise, prime farmland, air quality, and visual impacts of all the alternatives would occur under Modified Alternative C. Although still insignificant, this alternative has the greatest impacts on commercial navigation from loss of potential future barge terminals; however, the designation of safety harbor land would be beneficial.

IMPACTS SUMMARY

The No Action Alternative has greater acreages of land allocated to developed uses, including Industrial and Developed Recreation, than the other alternatives. Adoption of Modified Alternative B would allow greater recreational and industrial development than Modified Alternative C, but slightly less than the No Action Alternative. Therefore, Modified Alternative B would have greater potential for impacts to natural resources than Alternative C, but less than Modified Alternative A. Implementation of Modified Alternative C would result in the largest amount of acres allocated to Zone 4, Natural Resource Conservation.

PREFERRED ALTERNATIVES

The preferred alternative is Modified Alternative B, which provides suitable opportunities for economic development and the conservation of natural resources. The environmentally preferred alternative is Alternative C, which has the least adverse impact on the environment of all the alternatives.

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Acronyms and Abbreviations

1988 Plan	1988 *Watts Bar Reservoir Land Management Plan*
APE	Area of Potential Effects
ARPA	Archaeological Resources Protection Act
BMPs	Best Management Practices
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CRBR	Clinch River Breeder Reactor
CRM	Clinch River Mile
cfs	Cubic Feet Per Second
DEIS	Draft Environmental Impact Statement
DO	Dissolved Oxygen
EA	Environmental Assessment
EIS	Environmental Impact Statement
ECSA	Ecological Study Area
ERM	Emory River Mile
EO	Executive Order
ESA	Endangered Species Act
FEIS	Final Environmental Impact Statement
FRP	Flood Risk Profile
GIS	Geographic Information System
HPA	Habitat Protection Area
HUC	Hydrologic Unit Code
ibid	Abbreviation for the Latin term, *ibidem*, meaning “in the same place”; refers to the immediately preceding work cited
IRM	Integrated Resources Management
KIF	Kingston Fossil Plant
Land Plan	*Watts Bar Reservoir Land Management Plan and Final Environmental Impact Statement*
LWBU	Lower Watts Bar Management Unit
mg/m^3	Milligrams per cubic meter
msl	Mean Sea Level
n.d.	Indicates “no date,” or date which Web site was accessed is unknown
NRI	Nationwide Rivers Inventory

NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NNL	National Natural Landmark
NOI	Notice of Intent
NPS	Nonpoint Source
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
PA	Programmatic Agreement
PCB	Polychlorinated Biphenyls
$PM_{2.5}$	Particulate Matter With a Diameter Less Than or Equal to 2.5 Micrometers
PPNL	Potential National Natural Landmark
PPS	Protection Planning Site
PSD	Prevention of Significant Deterioration
ROD	Record of Decision
ROS	Reservoir Operations Study
ROS FEIS	*Reservoir Operations Study Final Environmental Impact Statement*
SAHI	Shoreline Aquatic Habitat Index
SEG	Scientific Ecology Group Inc.
SEIS	Supplemental Environmental Impact Statement
SHPO	State Historic Preservation Officer
SMI	Shoreline Management Initiative, TVA
SMI EIS	*Shoreline Management Initiative: An Assessment of Residential Shoreline Development Impacts in the Tennessee Valley Final Environmental Impact Statement*
SMIN	Shoreline Management Inventory
SMP	Shoreline Management Policy, TVA
SWA	Small Wild Area
TDEC	Tennessee Department of Environment and Conservation
TRM	Tennessee River Mile
TVA	Tennessee Valley Authority
TWRA	Tennessee Wildlife Resources Agency
U.S.	United States
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
USDOE	U.S. Department of Energy

USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
WBN	Watts Bar Nuclear Plant
WBWG	Watts Bar Working Group
WMA	Wildlife Management Area
WOA	Wildlife Observation Area
WROS	Water Reservoir Opportunity Spectrum

CHAPTER 1

1. PURPOSE OF AND NEED FOR ACTION

1.1. Background

Tennessee Valley Authority (TVA) proposes to update the 1988 *Watts Bar Reservoir Land Management Plan* (1988 Plan) for TVA public land around Watts Bar Reservoir. TVA has been charged by Congress with improving navigation, controlling floods, providing for the proper use of marginal lands, providing for industrial development, and providing power at rates as low as feasible, all for the general purpose of fostering the physical, economic, and social development of the Tennessee Valley region. The lands that TVA holds as steward in the name of the United States are some of the most important resources of the region. They have provided the foundation for the great dams and reservoirs that protect the region from flooding and secure for its residents the benefits of a navigable waterway and low-cost hydroelectricity. TVA's lands are the sites for its power generating system and the arteries for delivering power to those that need it. Many of the region's parks, recreation areas, and wildlife refuges that are so important for the region's quality of life are on lands that TVA made available for these uses. TVA's lands often have been the catalyst for public and private economic development activities.

TVA originally acquired approximately 1.3 million acres of land in the Tennessee Valley. The construction and operation of the reservoir system inundated approximately 470,000 acres with water. TVA has already transferred or sold approximately 508,000 acres, the majority of which was transferred to other federal and state agencies for public uses. TVA currently owns approximately 293,000 acres, which continue to be managed pursuant to the TVA Act.

As stewards of this important resource, it is TVA's policy to manage its lands to protect the integrated operation of the TVA reservoir and power systems, to provide for appropriate public use and enjoyment of the reservoir system and to provide for continuing economic growth in the Valley. TVA recognizes that historical land transfers have contributed substantially to meeting these multipurpose objectives and it is TVA's policy to preserve reservoir lands remaining under its control in public ownership except where different ownership would result in significant benefits to the public.

Watts Bar Reservoir is a 67-year-old multipurpose impoundment of the Tennessee River formed by Watts Bar Dam and Lock, which is located at Tennessee River Mile (TRM) 530 in Meigs and Rhea counties, Tennessee. Currently, TVA owns and manages about 16,220 acres of land on the reservoir. TVA proposes to use an updated *Watts Bar Reservoir Land Management Plan and Final Draft Environmental Impact Statement* (Land Plan) to guide future decision-making and manage these reservoir properties.

The reservoir flows from the northeast to southwest through Loudon, Meigs, Rhea, and Roane counties in east Tennessee. The reservoir extends 72.4 miles up the Tennessee River to Fort Loudoun Dam, and 62.5 miles to Melton Hill Dam on the Clinch River. It also includes parts of the Emory and Little Emory Rivers (see Figure 1.1-1). At full pool, the reservoir shoreline length is 721 miles and the surface area is about 39,000 acres. Of the

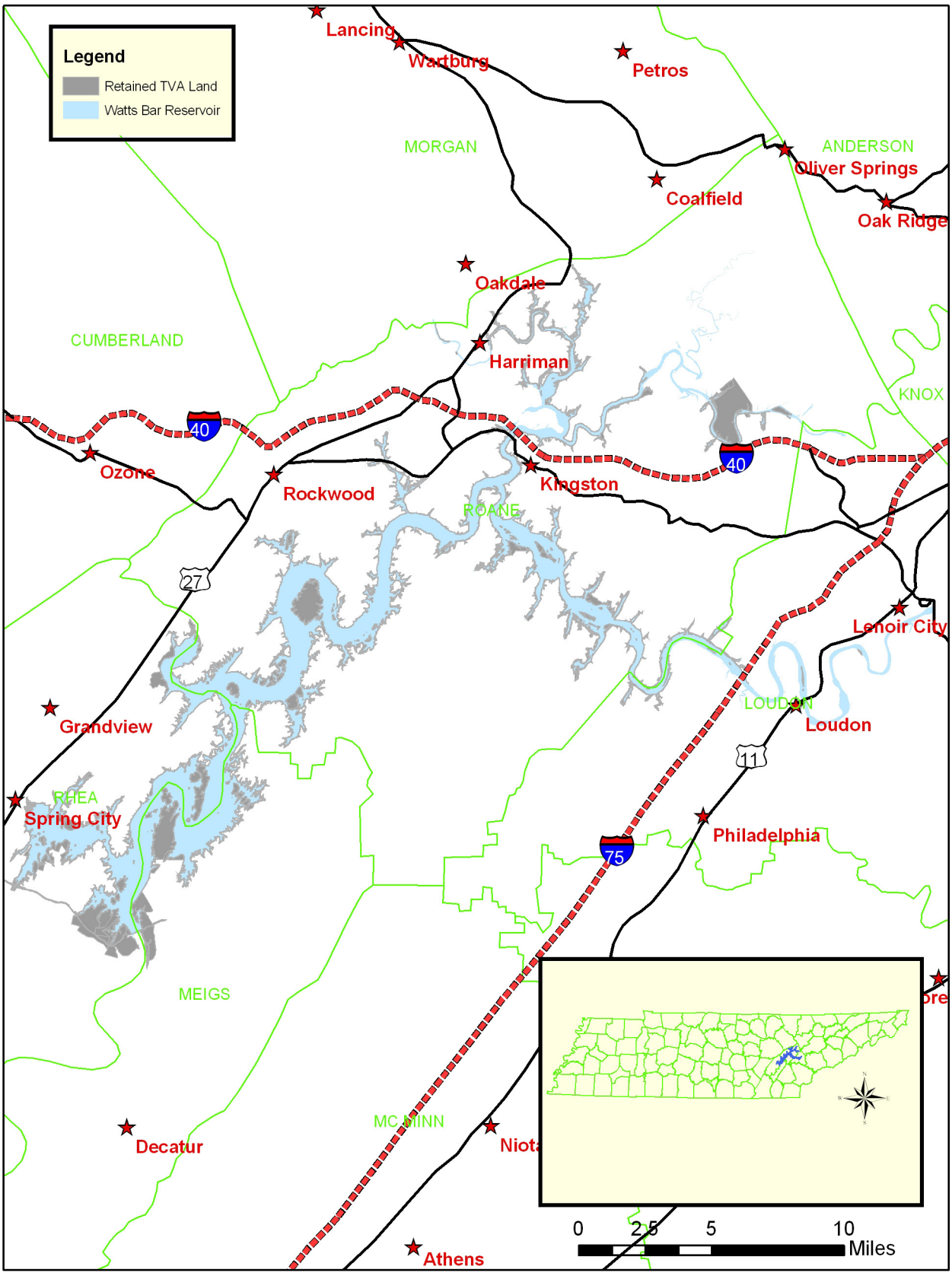

Figure 1.1-1. Map of Watts Bar Reservation and Vicinity

721 miles of shoreline, 340 miles (47 percent) are available for Shoreline Access uses (where TVA sold tracts with deeded or implied rights for access and/or water use facilities across TVA land), which include current development. The available area also includes previously planned lands determined by TVA policy to be available for consideration of water use facilities.

TVA originally acquired approximately 55,000 acres of land for the Watts Bar project including flowage and easements (TVA 1949). Subsequent purchases for fossil and nuclear plants, transfers and/or sales of land to U.S. Department of Energy (USDOE), and for various commercial, industrial, residential, and recreational uses have resulted in a current balance of about 16,220 acres of TVA public land being available for lands planning.

TVA manages public land on Watts Bar Reservoir to protect and enhance natural resources, generate prosperity, and improve the quality of life in the Tennessee Valley. This TVA public land, together with adjoining private land, is used for public and commercial recreation, economic development, natural resource management, and a variety of other community needs. The purpose of the land planning effort is to apply a systematic method of evaluating and identifying the most suitable use of public land under TVA stewardship. Public input and resource data are used to help allocate land to the following land management categories or allocation zones: Zone 1 - Non-TVA Shoreland, Zone 2 - Project Operations, Zone 3 - Sensitive Resource Management, Zone 4 - Natural Resource Conservation, Zone 5 - Industrial, Zone 6 - Developed Recreation, and Zone 7 - Shoreline Access (see Section 2.1.2). These allocations are then used to guide the types of activities that would be considered on each parcel of land. Each reservoir land management plan is submitted for approval to the TVA Board of Directors and adopted as policy to provide for long-term stewardship and accomplishment of TVA responsibilities under the TVA Act of 1933.

1.2. Purpose and Need

TVA proposes to update the 1988 *Watts Bar Reservoir Land Management Plan* (1988 Plan) for approximately 16,220 acres of TVA public land on Watts Bar Reservoir in Loudon, Meigs, Rhea, and Roane counties, Tennessee. The proposed updated *Watts Bar Reservoir Land Management Plan and Final Environmental Impact Statement* (Land Plan) would guide land use approvals, private water use facility permitting, and resource management decisions on Watts Bar Reservoir. The proposed Land Plan allocates land into broad categories or “Zones,” of uses.

TVA intends to provide a clear statement of how its land would be managed in the future based on scientific, cultural, economic principles and on public needs. TVA considers a wide range of possible land uses in the development of the proposed alternatives for the Land Plan. The Land Plan alternatives were developed using information obtained from the public, various state and federal agencies, elected officials, resource conservation groups, and other interested groups; existing and newly collected field data, both on land conditions and resources; and technical knowledge of TVA staff. Based on this information, TVA proposes to allocate each land parcel into one of the seven land use zones.

The goals of the Land Plan include the following:

Goal 1: Apply a systematic method of evaluating and identifying the most suitable uses of TVA public lands using resource data, stakeholder input, suitability and capability analyses, and TVA staff input.

Goal 2: Identify land use zone allocations to optimize public benefit and balance competing demands for the use of public lands.

Goal 3: Identify land use zone allocations to support TVA's broad regional resource development mission. TVA reservoir properties are managed to provide multiple public benefits including recreation, conservation, and economic development.

Goal 4: Provide a clear process by which TVA will respond to requests for use of TVA public land.

Goal 5: Comply with federal regulations and executive orders (EOs).

Goal 6: Ensure the protection of significant resources, including threatened and endangered species, cultural resources, wetlands, unique habitats, natural areas, water quality, and the visual character of the reservoir.

Goal 7: Provide a mechanism that allows local, state, and federal infrastructure projects when the use is compatible with the zone allocation.

The purpose of this final environmental impact statement (FEIS) is to identify and assess the environmental impacts of a reasonable range of alternatives for allocating the uses of TVA managed public land around Watts Bar Reservoir. TVA has prepared this FEIS in accordance with the Council on Environmental Quality regulations and TVA procedures for implementing the National Environmental Policy Act (NEPA).

1.3. Development and Modification of the Land Plan

Following the May 2005, release of the *Watts Bar Reservoir Land Management Plan and Draft Environmental Impact Statement* (TVA 2005a), the TVA Board instituted a TVA Land Policy (see Appendix A) governing TVA's retention, disposal, and planning of the public lands it managed. To implement this November 2006 directive from the TVA Board, some proposed allocation zones of the action alternatives were updated to reflect the land policy (see Section 1.3.2). These modifications along with other minor changes were provided in the *Watts Bar Reservoir Land Management Plan and Amended Draft Environmental Impact Statement* (TVA 2007c) issued in August 2007.

During the development of the alternatives for the final land plan, modifications were proposed to the 1988 Plan as a result of additional data and information, TVA policy and program needs, public and agency comments, and minor administrative changes. The alternatives for this Land Plan incorporate the substantive modifications and changes proposed by the previous draft plans. All of these versions including the final Land Plan are an outcome of the planning process described in Section 1.2.

Coal Ash Spill at Kingston Fossil Plant (KIF)
On December 22, 2008, a dike failed at KIF, releasing about 5.4 million cubic yards of coal ash that was estimated in January 2009 to cover about 275 acres of TVA and private land, including two coves on Watts Bar Reservoir. Local roads past the Kingston plant and about 3,000 feet of rail were damaged when the ash release occurred. Navigation on the Emory River from Emory River Mile (ERM) 0 through ERM 4 was temporarily suspended. Emergency response operations were immediately initiated, and impacts to environmental resources and private and public property were being assessed at the time this FEIS was published.

All or parts of at least six parcels (other than KIF) proposed for consideration in the Land Plan action alternatives were impacted directly by the spill. The area of these parcels total about 133.5 acres above mean summer pool elevation. Parcel 188 with 25.2 acres was proposed for allocation to Zone 3 (Sensitive Resource Protection) because of the presence of wetlands. Parcels 187 and 189, totaling 76.7 acres, were proposed for Zone 4 (Natural Resource Conservation). The 28.8 acres of Parcel 184 were proposed for Zone 7 (Shoreline Access). Parcels 12-45 and 12-51 (about 2.8 acres) are currently licensed to the Tennessee Wildlife Resources Agency (TWRA) for boat access ramps and proposed for Zone 6 (Developed Recreation). In addition, the approximately 84-acre containment pond, which includes 60 acres from which the ash slide occurred, is part of the KIF site (Parcel 190) proposed to be allocated to Zone 2 (Project Operations).

In January 2009, TVA began developing a recovery plan that would address remediation of the area affected by the ash spill, including any areas within the above parcels that have been impacted. The appropriate future uses of these six parcels will be determined during this recovery planning process. Since the vast majority of land parcels on Watts Bar Reservoir are unaffected by the spill, TVA has decided to move ahead with the land planning process for this reservoir, recognizing that the continued appropriateness of the allocation of these six affected parcels will be reevaluated through the recovery planning process. Future TVA actions to reallocate any of the six parcels will be subject to environmental reviews under NEPA.

1.3.1. Natural Resource Management

The May 2005 Plan and draft environmental impact statement (DEIS) included an Integrated Resources Management (IRM) approach to resource management evaluation that would have established management prescriptions or activities for visual, recreational, cultural, and natural resources on parcels with manageable resources. However, TVA is currently developing a new Natural Resource Management Strategy to replace IRM that would promote better integration of TVA's management of visual, recreational, cultural and natural resources, and public use on parcels allocated for recreation, resource protection and conservation. Following approval of the Natural Resource Management Strategy, specific integrated implementation plans will be developed to guide future management on tracts allocated for the above uses.

TVA Environmental Policy
On May 19, 2008, the TVA Board of Directors approved the TVA Environmental Policy. The policy is intended to provide guidance for TVA’s business decisions as the agency provides electric energy, sustainable economic development, and environmental stewardship for the Tennessee Valley. As a regional development agency and the nation’s

largest public power provider, TVA is committed to protecting and sustaining the environmental resources of the Tennessee Valley for future generations through leadership in clean energy innovation and environmental management.

Natural Resource Management Goals

In managing its public lands and resources, TVA seeks to provide efficient resource stewardship that is responsive to stakeholder interests. TVA intends to manage its public land for an optimum level of multiple uses and benefits that protect and enhance natural, cultural, recreational, and visual resources in a cost-effective manner. Through this approach, TVA ensures that resource stewardship issues and stakeholder interests are considered while optimizing benefits and minimizing conflicts. Resource management is based on cooperation, communication, coordination, and consideration of stakeholders potentially affected by resource management. TVA recognizes that the management or use of one resource affects the management or use of others; therefore, an integrated approach is more effective than considering resources individually.

In managing public lands and resources under its authority, TVA seeks to:

- Provide effective and efficient management of natural, cultural, visual, and recreation resources to meet all regulatory requirements and applicable guidelines.

- Apply an integrated, proactive, approach to natural resource management that balances the competing interests of stakeholders, while conserving and enhancing natural, cultural, visual, and recreation resources.

- Ensure the availability of a diversity of quality, affordable, public outdoor recreation opportunities.

- Manage resources in a cost-effective manner.

1.3.2. TVA Land Policy

In November 2006, the TVA Board instituted a TVA Land Policy (see Appendix A) governing TVA's retention, disposal, and planning of its lands. This policy describes residential, economic development, recreation, and other uses for TVA's reservoir lands; provides specific definitions of these uses; and requires a suitability assessment of all TVA land allocated for recreation and economic development use. This directive from the TVA Board has been incorporated into the Land Plan.

In particular, Economic Development (Zone 5) was renamed 'Industrial' to be consistent with other TVA land plans, and modified by the elimination of residential and retail use of TVA lands. Also, preference will be given to future industrial proposals requiring water access. The definition of Developed Recreation (Zone 6) was modified to clarify that residential development is not an accepted use of TVA lands. It also included modifications to the description of water-based recreation and more specific descriptions of Public and Commercial Recreation uses and expectations (see Table 2.1-2).

1.3.3. Former Clinch River Breeder Reactor (CRBR) Site

Under the action alternatives there would be additional buffers along the Clinch River by expanding parcels allocated for the protection of sensitive resources. With this change

almost all of the perimeter of the former CRBR site adjacent to the reservoir would be incorporated in a buffer to protect cultural resources, sensitive plants, or wetlands.

Under the Modified Alternative B, the allocation of the parcels collectively referred to as the former CRBR site (Parcels 142, 142, 145, and 148) would be changed from industrial to project operations for possible use for a power generation facility. Growth in the Tennessee Valley continues to increase about 1.9 percent per year and as growth continues the demand for electricity increases. TVA intends to reserve the site to meet possible future electric power demands.

By allocating the former CRBR site to power generation, it could be available for power generating facilities when the need arises. TVA plans a future site characterization study to determine its usefulness as a power operation facility. The study will look at the attributes of the site including transmission line access, transportation access and characterize the site soil and land suitability for a large construction project.

1.3.4. Other Modifications

This Land Plan incorporates minor changes that reflect new information about deeded rights, natural resources, or improve understanding.

Administrative

Minor corrections occurred in acreage or boundaries for about 30 parcels as a result of more accurate mapping techniques and oversight. In addition, a reevaluation of deeded access rights revealed a need to designate about 20 parcels or parts of parcels to a different land use zone. About 13 acres were added to Watts Bar Reservoir land due to the completion of land exchanges or agreements. All of these administrative changes are minor, resulting in corrections to the zones of less than 50 acres and a net decrease of about 26 acres when compared to previous draft plans (see Table B-1 in Appendix B).

Parcel Boundary

The action alternatives in this Land Plan include the redrawing of some parcel boundaries to change their size or create new parcels for the protection of sensitive resources, augment commercial navigation safety landings, or allow for improved project operations. Modifications to parcel boundaries and land use allocation that could better provide for the suitability and proposed use of specific TVA land are described in Chapter 2 descriptions for the action alternatives.

Land Use Designation

The action alternatives include the redrawing of some parcel boundaries to change their size or create new parcels for the protection of sensitive resources, augment commercial navigation safety landings, or existing industrial operations. Modifications to parcel boundaries and land use allocation that could better provide for the suitability and proposed use of specific TVA land are described in Chapter 2 descriptions for the action alternatives.

Zone Definitions

In addition to the modifications described to comply with the Land Policy, minor changes were made to the definitions of the land allocation zones of the action alternatives for clarification and ease of understanding.

1.4. The Decision

The TVA Board of Directors will decide which of the Land Plan action alternatives to adopt or whether to continue the use of the existing 1988 Plan.

1.5. Other Pertinent Environmental Reviews or Documents

Watts Bar Reservoir Land Management Plan (TVA 1988)

In August 1988, the TVA Board of Directors approved a land management plan to guide TVA resource management and property administration decisions on 10,405 acres of TVA land on Watts Bar Reservoir. A multidisciplinary TVA team undertook a detailed planning process that resulted in the land use designation in the plan. Both public input and information from TVA specialists were analyzed in making land use decisions. The 207 tracts of land on Watts Bar Reservoir were allocated for one or more of these 19 different land use allocations (see Section 2.1).

Record of Decision for the Lower Watts Bar Reservoir (USDOE 1995)

The record of decision (ROD) for lower Watts Bar Reservoir was prepared by USDOE in accordance with the requirements under the Comprehensive Environmental Response, Compensation, and Liability Act to present the remedy that addresses the contamination of the Watts Bar Reservoir area by past USDOE operations. Remediation includes the continuance of institutional controls and long-term monitoring of water, sediment, and fish. Institutional controls are implemented primarily by the Watts Bar Working Group (WBWG), created in 1991, of which TVA is a signatory member along with the U.S. Environmental Protection Agency (USEPA), Tennessee Department of Environment and Conservation (TDEC), U.S. Army Corps of Engineers (USACE), and the USDOE. The WBWG implements a notification and screening methodology for member agency actions that may be impacted by the contaminants, whereby USDOE can then identify contaminants and provide appropriate remediation.

Proposed Sale of TVA Tract No. XWBR-688IE (Parcels 1 and 2) on Watts Bar Reservoir to Scientific Ecology Group Inc. and Approval of Operations of Additional Facilities and Modifications to Existing Facilities Environmental Assessment (TVA 1995)

TVA assessed the environmental impacts associated with alternatives derived from a request by Scientific Ecology Group Inc. (SEG) to purchase TVA Tract XWBR-688IE, on which it had been operating under a lease agreement. In addition, SEG requested approval to build and operate additional waste management facilities and to modify the operation of existing facilities. The alternative selected by TVA allowed the sale and operation changes with commitments by SEG to reduce impacts to water quality and the expansion of the TVA Grassy Creek Habitat Protection Area (HPA) onto adjacent portions of Parcels 1 and 2.

Shoreline Management Initiative (SMI): An Assessment of Residential Shoreline Development Impacts in the Tennessee Valley Final Environmental Impact Statement (TVA 1998)

TVA completed an environmental impact statement (EIS) on possible alternatives for managing residential shoreline development throughout the Tennessee River Valley. Under the alternative selected, sensitive natural and cultural resource values of reservoir shorelines would be conserved and retained by preparing a shoreline categorization for individual reservoirs; by voluntary donations of conservation easements over flowage easement or other shoreland to protect scenic landscapes; and by adopting a “maintain and

gain" public shoreline policy when considering requests for additional shoreline access rights. This Land Plan will tier from the final SMI EIS.

The residential shoreline on Watts Bar Reservoir comprises 340 miles or 47 percent of the total 721 miles of shoreline. In accordance with the TVA Shoreline Management Policy (SMP), TVA categorized the residential shoreline for previous land plans based on resource data collected from field surveys. A resource inventory was conducted for sensitive species and their potential habitats, archaeological resources, and wetlands along the residential shoreline.

The shoreline categorization system established by SMP is composed of three categories:

- **Shoreline Protection** for shoreline segments that support sensitive ecological resources, such as federally listed as 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 will be protected. Docks and other residential shoreline development would not be permitted on land within the Shoreline Protection category because of the sensitive nature of the resources contained in this area or because of navigation restrictions.

- **Residential Mitigation** for shoreline segments where resource conditions or certain navigation restrictions would require analyses of individual development proposals, additional data, or specific mitigation measures. Section 26a (of the TVA Act) applications for docks and other residential shoreline development in the Residential Mitigation area would be reviewed by TVA for compliance with the SMP and Section 26a regulations. Development restrictions or mitigation measures may be necessary in this shoreline category.

- **Managed Residential** for shoreline segments where no sensitive resources are known to exist. Standard environmental review would be completed for any proposed action. Section 26a applications for docks and other shoreline development in the Managed Residential area would be reviewed for compliance with the SMP and Section 26a regulations.

As new data are collected on the spatial location and significance of endangered species, wetlands, cultural resources, or navigation restrictions, adjustments to category boundaries have been found to be necessary. Through experience with the shoreline categorization process set up in 1999 by the SMI EIS (TVA 1998), TVA believes that the value of advance categorization is less than when SMP was implemented. Today's technology provides the ability to identify sensitive resources during permitting evaluations. Today's resource databases are interactive and continually updated to allow ease of use of latest information in permitting decisions. In addition, TVA's experience in permitting suggests that the Shoreline Protection category is not a prohibition on permitting because mitigation techniques are often available. Because resource data are continually updated, shoreline categorized as Managed Residential (no sensitive resources exist) may change as updated resource surveys are conducted. Based on these considerations, TVA is not providing a complete categorization of residential shoreline with this Land Plan.

With the current proposed Land Plan, TVA has categorized shoreline in areas undergoing high development pressure as indicated by the volume of permit requests in the last few

years. In the future, the shoreline will be gradually categorized in response to permit requests. Because the permit reviews provide current real-time information, over time this will result in more accurate shoreline resource inventories, thus meeting the intent of the SMP shoreline categorization system.

Sale of Boeing Land Environmental Assessment (USDOE 2000)
USDOE prepared this environmental assessment (EA) to review the impacts of selling a narrow strip of former TVA land on the Clinch River to a private developer. Sale of this property reduced the amount of non-TVA-owned public shoreline and changed it to private shoreline available for shoreline access.

Final Supplemental Environmental Impact Statement (SEIS): Kingston Fossil Plant Alternative Coal Receiving Systems (TVA 1999a)
This SEIS analyzes a new alternative for a coal delivery system at Kingston Fossil Plant (KIF). In a ROD dated March 10, 1997, TVA decided to implement an alternative from the 1997 *Final Environmental Impact Statement: Kingston Fossil Plant Alternative Coal Receiving Systems,* which would have resulted in the reduction of coal transportation costs by the construction of a new railroad spur from Harriman, Tennessee, to KIF. The 1997 alternative included the railroad crossing Emory River and several streams and impacted the Swan Pond area of Roane County, including both private and TVA lands. Prior to construction, TVA received a proposal from one of the railroads providing service to KIF, which allows the two railroads involved direct access to the KIF yard via existing facilities and reduces coal transportation costs by eliminating associated switching fees. With the decision to use this new alternative, the environmental and physical impacts from the construction of the railroad spur did not occur.

Agricultural Lands Licensing for 1999 Through 2003 Crop Years for Fontana, Fort Loudoun, Melton Hill, Tellico, and Watts Bar Reservoirs Environmental Assessment (TVA 1999b)
TVA reviewed the environmental impacts associated with licensing 74 tracts of TVA land totaling over 1,200 acres to individuals for agricultural use on lands around five TVA reservoirs in east Tennessee and North Carolina. Thirty-four of these tracts totaling 335 acres are on Watts Bar Reservoir and are part of the TVA lands currently being planned. TVA is currently reassessing the continued licensing of these tracts.

Lower Watts Bar Management Unit Watts Bar Reservoir, Resource Management Plan and Final Environmental Assessment (TVA 2000)
TVA completed an Environmental Assessment (EA) on possible alternatives for determining the scope and intensity of TVA's resource management activities for the Lower Watts Bar Management Unit (LWBU) and implementing a management plan for the LWBU. The 3,481-acre LWBU is a major component of the TVA land that is the subject of the current planning process.

Proposed Land Use Allocation Change and Request for a Commercial Recreation License and Section 26a Approval for Whitestone Country Inn Environmental Assessment (TVA 2001a)
TVA reviewed the environmental impacts associated with the approval of a request by Whitestone Country Inn to change the land use allocation from Wildlife and Forest Management and Historic Preservation to Commercial Recreation; approve under Section 26a; and issue a commercial recreation license for a six-boat slip marina for 0.76 acre of TVA land. Included in the approval conditions was the transfer of 11.47 acres of lakefront and shoreline property to TVA to replace resources degraded by the operation.

Modernization of Turbines at Watts Bar Hydro Plant, Rhea County, Tennessee Environmental Assessment (TVA 2001b)
The environmental impacts attributed to the modernization of the electric generating turbines at the Watts Bar Dam and Hydro Plant were reviewed. Commitments of the action alternative include the stabilization of shoreline on TVA land considered by the current planning process.

Proposed Issuance of Regulations Under Section 26a of the TVA Act for Nonnavigable Houseboats, Storage Tanks, Marina Sewage Pump-Out Stations, Wastewater Outfalls and Septic Systems, and Development Within Flood Control Storage Zones Environmental Assessment (TVA 2001c)
In 2001, TVA completed an EA for its issuance of regulations for nonnavigable houseboats, storage tanks, marina sewage pump-out stations, wastewater outfalls, septic systems, and development within flood control storage zones of TVA reservoirs. The complete update of the 1971 Section 26a regulations, incorporating the standards for residential development in the SMI EIS and the miscellaneous updates above, became final on September 8, 2003. Taken together, these regulations comprehensively updated the TVA requirements for development along the shoreline of TVA reservoirs, including Watts Bar. The regulations for marina sewage pump-out stations and holding tanks, fuel storage tanks and handling facilities, and development within the flood control storage zones were new. Actions requiring Section 26a approval by TVA frequently are requested and occur on TVA reservoir lands and consequently are governed by TVA Section 26a regulations.

Complete details on the new Section 26a regulations may be obtained from TVA watershed teams or by viewing the regulations at *www.tva.gov/river/26apermits/index.htm.*

Commercial Recreation License and Marina Expansion for Blue Springs Marina, Roane County Tennessee, Environmental Assessment (TVA 2002)
TVA reviewed the environmental impacts associated with approving and issuing a license for a request by Blue Springs Marina to expand and operate its marina on Watts Bar Reservoir. The proposal includes the addition of 104 boat slips and improvements to private property, TVA land, and the adjacent TWRA boat ramp facility.

Completion of Watts Bar Nuclear Plant Unit 2, Rhea County, Tennessee, Supplemental Environmental Impact Statement and Record of Decision (TVA 2007a)
On August 2, 2007, TVA issued a Record of Decision (ROD) for the proposed completion and operation of Watts Bar Nuclear (WBN) Plant Unit 2. TVA has decided to implement the preferred alternative identified in its final supplemental environmental impact statement (SEIS) for the Completion and Operation of Watts Bar Nuclear Plant Unit 2, Rhea County, Tennessee. The final SEIS, issued June 23, 2007, supplemented the substantial environmental record previously prepared for actions related to the construction and operation of WBN, including an update of the need-for-power analysis.

Under the selected alternative, TVA will meet the need for additional base-load electrical generating capacity in the TVA system and for maximizing the use of its existing assets. The unit will be completed as originally designed; incorporating additional modifications made to its sister unit, WBN Unit 1, which has been operating since 1996. No expansion of the existing site footprint will be required. TVA currently holds a valid construction permit for completing WBN Unit 2.

1.6. The Scoping Process

TVA determined that the development of an EIS would allow a better understanding of the impacts of any proposed land use changes. Accordingly, TVA published a notice of intent (NOI) to prepare an EIS in the *Federal Register* on February 25, 2004.

From February 16, 2004, to October 8, 2004, TVA sought comments from citizens, various state and federal agencies, elected officials, resource conservation groups, and other organizations. TVA advertised public participation opportunities through news releases and paid advertisements in newspapers and letters and questionnaires were sent to individuals on the Watts Bar Reservoir mailing list. Stakeholder organizations and local, state, and federal agencies were contacted for scoping meetings. To announce the public comment period and public meeting dates, TVA placed paid advertisements in eight local newspapers and notices were also displayed at various public places around Watts Bar Reservoir. To provide for better identification of issues and alternatives to be considered in the Land Plan, a revised NOI was published in the *Federal Register* on April 18, 2004, extending the scoping comment period to June 30, 2004. On August 16, 2004 an announcement of the September 28, 2004, public meeting and extension of the public comment period to October 8, 2004, was published in the *Federal Register.*

In addition to the notices in the *Federal Register*, public notices appeared in regional and local newspapers in August 2004. There were also several newspaper articles published during the comment period. From March 2004 through October 2004, public participation was sought to assist TVA in identifying specific future uses for TVA managed lands around Watts Bar Reservoir and issues to be addressed in the EIS. To provide additional opportunities for public input, TVA hosted a public meeting. During the public meeting, information forms, writing material, and a stenographer were available on site for people to make comments. A total of 142 participants attended the public meeting in Harriman, Tennessee. Over 1,000 information forms were mailed to interested people and information forms were distributed at over 20 briefing sessions with stakeholder groups. In addition, information about the proposed Land Plan and an interactive information form were available on the TVA Web site. TVA received 95 individual letters or e-mails from 88 individuals, 126 information forms either mailed or entered on the Web site, and a petition with 183 signatures. All together TVA received a total of 397 specific comments from 214 individuals. See scoping document in Appendix C.

1.6.1. Scoping Response

The majority of the public scoping response to the NOI focused on the use of public lands for private residential and commercial development and the associated environmental impacts that could occur. Many comments expressed concerns about the importance of water quality and terrestrial and aquatic ecology and questioned the economic need for development given the success of similar projects on private land. There were also many comments about TVA's management of public lands, the planning for the management and use of public lands, and the potential results of TVA's management and planning.

The public responses in support of the increasing economic and community development described the potential to have a positive impact to the area economy. Commenters cited boosts to the local economy and an increase in land values, jobs, and taxes available for local government as positive results. They cited the opportunity to create jobs, commerce, increase tax bases, and infrastructure as important to their communities and expressed the need for a new 'mixed use' TVA land zone utilizing a variety of uses, such as residential,

commercial/light industrial, and recreation (live, work, play) developments. However, several respondents on this issue commented on the need to limit or stop industrial, commercial, and residential development on Watts Bar Reservoir, expressing a concern for the destruction of natural surroundings due to continued development and that the loss of undeveloped natural land would decrease the socioeconomic value of the area.

Commenters opposing development stated that TVA should keep all land public and not develop reservoir lands. They were concerned that other public lands similarly designated would also be made available for development. Commenters stated that selling the land is contrary to public opinion and contrary to past TVA decisions not to develop this public land and would, therefore, increase public distrust of TVA.

Much of the public response focused on philosophical opposition to use of public lands for private residential and commercial development and the associated impacts that would occur. From all the comments provided, six predominant themes or general issues were identified: Natural Resources, Loss of Public Lands, Residential/Commercial Developments and Socioeconomics, Land Use Policy and Planning, Recreation Resources, and Proposals (i.e., development of Lowe Branch and the former CRBR site). Of these, most comments concerned Natural Resources, Loss of Public Lands, Residential/Commercial Developments, and Proposals.

1.6.2. Allocation Proposals

TVA received comments that either confirmed or requested changes for use allocations regarding specific parcels of land around Watts Bar Reservoir. Requests to keep or change allocation to Zone 4 were most frequently made by individuals, stakeholder groups, and in a petition. Local city and county governments requested large nearby tracts of TVA land to support commercial, residential, or recreation development. The majority of the comments were concerned with the parcels consisting of the former CRBR site (1,223 acres) and the Lowe Branch site (1,182 acres) near Watts Bar Dam. Many respondents expressed either support or opposition to the development of the Lowe Branch area and the former breeder reactor site. Opponents expressed concern that development would reduce wildlife and outdoor recreation opportunities in the area. Proponents of development expressed the view that it would increase commerce and jobs for the area.

1.6.3. Issue and Resource Identification

TVA internal reviews of current and historical information, reservoir data collected, and public input were used to identify the following resources/issues for evaluation in this Land Plan. The effect of each alternative on these issues is evaluated:

Aesthetics and Visual Resources are those areas and parcels of TVA land that allows for distinct visual qualities.

Cultural Resources are archaeological and historic resources on or near Watts Bar Reservoir lands including sites listed on the National Register of Historic Places (NRHP). TVA will comply with the National Historic Preservation Act (NHPA).

Endangered and Threatened Species are populations of state-listed or federally listed or rare plants and animals known to exist in the vicinity of Watts Bar Reservoir including their

occurrence and habitats on TVA lands and waters. TVA will comply with the Endangered Species Act (ESA).

Terrestrial Ecology is the natural systems of plants and animals supporting the indigenous ecosystems and broad natural community types found adjacent to and on TVA Watts Bar Reservoir lands. Issues include the identification and protection of significant natural features, rare species habitat, important wildlife habitat, or locally uncommon natural community types. TVA will comply with EOs 13186 and 13112 on migratory birds and invasive species.

Wetlands are an important ecosystem for many types of plants and animals found on TVA land and along the Watts Bar Reservoir shoreline. TVA will comply with EO 11990 on wetlands and the Clean Water Act.

Floodplains are important to flood control and water quality issues and are productive natural areas. TVA will comply with EO 11988 on floodplains.

Recreation has a broad range of activities on the Watts Bar Reservoir. Recreation opportunities are an important resource for public use of Watts Bar Reservoir lands and waters.

Water Quality and Shoreline conditions are issues that affect the overall aquatic ecological conditions of Watts Bar Reservoir. Water quality includes activities causing shoreline erosion as well as pollution, litter, and debris control, and other activities.

Aquatic Ecology is the natural systems of plants and animals supporting the indigenous ecosystems and broad natural community types found in the waters of TVA Watts Bar Reservoir and its tributaries. Issues include the identification and protection of rare species' habitat, important aquatic habitat, or locally uncommon aquatic community types.

Socioeconomic issues include the impacts of the Land Plan on current population, labor force, employment statistics, income, and property values of the Watts Bar region. Also important are existing and potential industrial sites and commercial and residential development near the reservoir or on TVA lands. A subset of these issues is environmental justice, the potential for disproportionate impacts to minority and low-income communities.

Navigation of commercial and recreational watercraft is an important resource on Watts Bar Reservoir. Issues include recreational boat traffic as well as commercial navigation.

Prime Farmland is land with the best combination of characteristics to produce agricultural and silvicultural products. An important issue is the conversion of prime farmland to urban or industrial developments. TVA will comply with the Farmlands Protection Policy Act.

Land Use designation is the purpose of TVA land use planning on Watts Bar Reservoir. Issues include the importance of contiguous undeveloped shoreline, enforcement of TVA policies, loss of public lands, balance of land uses, providing adequate funds and personnel to enforce TVA policies and control of shoreline, and the use of land adjacent to TVA property.

Managed Areas are special and unique natural areas on or in the vicinity of Watts Bar Reservoir set aside for a particular management objective or lands that are known to

contain sensitive biological, cultural, or scenic resources. Typically, they are parks, preserves, refuges, recreation areas, or other protected areas.

Air Quality is an important resource for public health and welfare. An important issue is compliance with National Ambient Air Quality Standards, which establish safe concentration limits of air pollution.

1.7. Public Review Process

Both the May 2005 and August 2007 draft plans and DEISs were sent to interested federally recognized Indian tribes, government agencies, interested organizations, and members of the public. The notice of availability of the 2005 Plan and DEIS was published in the *Federal Register* on May 20, 2005, with a comment period closing on July 6, 2005. The notice of availability for the 2007 Plan and DEIS was published on August 10, 2007, with a comment period closing on September 23, 2007.

Comments on both draft plans and DEISs were provided by members of the public, local organizations, and interested government agencies. Approximately 85 people attended a public meeting on June 14, 2005, in Harriman, Tennessee for the 2005 Plan; and on August 21, 2007, at the same location 102 people attended a public meeting for the 2007 Plan. During the meetings, comments could be made in writing using comment cards or given to a court reporter. TVA also posted copies of the DEISs on its Internet Web site, where comments could be made electronically, and posted notices in 10 area newspapers similar to the scoping announcements. In addition, TVA accepted comments through surface mail or e-mail, by phone, and by facsimile. TVA also held briefings with community leaders and representatives of interest groups to share information and to receive their input.

Including form letters and petitions, TVA received a total of 186 sets of comments from individuals; federal, state, and local government agencies; and interested organizations on the 2005 Plan. TVA reviewed and prepared responses to all of these comments, in some cases the EIS was changed because of the information or issues presented. These comments and responses are part of the official record and available on request.

There were written and oral comments received for the 2007 Plan from 91 individuals, including 5 interested organizations, two local governments, and 12 federal, state, and local government agencies. TVA has reviewed and responded to these comments, in some cases the EIS was changed because of the information or issues presented (see Appendix F).

1.7.1. Public Comments

The majority of the public comments on the 2005 Plan focused on opposition to using public lands for private residential and commercial development and the associated environmental impacts such as the loss of recreation opportunities and terrestrial habitat that could occur. Many comments on the 2005 Plan raised questions and provided input on the identified environmental issues. These comments were primarily concerned with impacts to the environment such as socioeconomic concerns, recreation on Watts Bar Reservoir, impacts to wildlife, and water quality. Commenters also questioned the economic need of further use of public lands for development on Watts Bar given the success and future potential of current private developments. There were also many comments about TVA's management

of public lands, the planning for the management and use of public lands, and the potential results of TVA's management and planning. Commenters stated that selling public land is contrary to the expressed public opinion and contrary to past TVA decisions not to develop public land. They stated that TVA should continue to maintain and manage TVA public land on Watts Bar Reservoir for future public use.

More than half of the comments received had non-environmental themes such as alternative selection, land use plans and policy, the National Environmental Policy Act (NEPA) process, and trust in TVA. The character of these comments was very similar to those previously provided during scoping.

There was an apparent change in public attitude and opinion following the release of the 2006 TVA Land Policy. There continued to be comments opposing using public lands for private residential or commercial development, but not to the same degree as in responses to those alternatives provided on the 2005 Plan. There were general comments complementing TVA on the implementation of the 2006 Land Policy and TVA's management of public lands.

The largest grouping of public responses to the amended DEIS focused on the types of use allocation for specific parcels of TVA managed land, in particular the former CRBR site and Lowe Branch area. There were also many comments about the NEPA process and alternative selection, and stewardship of public lands. And there was interest in how TVA's land policy is applied and the management of various types of recreation on public lands.

The remainder of comments on the amended DEIS raised questions and provided comments on the identified environmental issues. Of these, the issue of greatest concern was water quality, especially about waste water discharges. Other issues mentioned with concerns about impacts to the environment were socioeconomic and environmental justice, terrestrial ecology, threatened and endangered species, forestry, aquatic ecology, and cultural resources.

1.7.2. Alternatives and Agency Response

Similar to the 2005 Plan stakeholder and special interest groups indicating an alternative preference favored the modified conservation and recreation alternative, primarily, because of the lesser impact on the environment. The public responses in support of some modified economic and recreation development (Modified Alternative B) of Watts Bar public lands described it as having a potentially positive impact to the area economy, land values, jobs, and taxes available for local government.

The Tennessee Historical Commission reminded TVA of its commitment to follow the 2004 programmatic agreement which stipulates a strategy of phased compliance with Section 106.

The Chickasaw Nation was unaware of any specific historic properties or traditional cultural, religious and/or sacred sites, but expected to be notified of further site specific activities that may have an impact of historic properties. They also expected any construction activities to cease in the event of inadvertent discoveries of human remains or funerary objects, according to all applicable state and federal laws.

Tennessee Department of Economic Development, Oak Ridge Chamber of Commerce and Oak Ridge Economic Partnership, support Modified Alternative B, which has a more balanced plan and provides for continued industrial development in the areas currently designated for industrial development. The City of Rockwood informed TVA of an interest in pursuing commercial recreation development opportunities on Parcel 218.

TDEC encouraged TVA to work with local parks and recreation agencies throughout the area to implement the plan. TDEC had a concern that the number of recreation user days per year reported in the amended DEIS may have skewed the quantitative results and consequently future planning for recreation, such as number of boat ramps, marinas, picnic areas, etc. See Appendix F, comment number 102, page 403.

TWRA and USEPA preferred the Modified Alternative C which provides the most overall protection for the environment. TWRA commented that the Modified Alternative C would expand dispersed recreational pursuits, such as wildlife and nature observation and hunting, and that if Modified Alternative B were chosen additional impacts to dispersed recreation at Lowe Branch could occur, as well as eliminate from consideration a request from TWRA for the transfer of land from TVA for a WMA. Additionally, this alternative would eventually eliminate the WMA agreement for the former CRBR Site. TWRA noted that if either Modified Alternative A or Modified Alternative B were chosen habitat for the state endangered Bachman's sparrow could be impacted.

Recognizing TVA's mandate to balance the environment with industrial and economic development, USEPA noted that TVA continues to prefer Modified Alternative B even though the "environmentally preferred" alternative is Modified Alternative C. USEPA further suggested a hybrid or blended alternative between Modified Alternatives B and C rather than using Modified Alternative B, and that development be limited to light industry that depends on water access. USEPA noted that TVA public lands along Watts Bar Reservoir serve to buffer the reservoir from ongoing private development and it is unclear why TVA public lands should be offered for private sale (other than revenue) since considerable private shorelands are already in private ownership.

USEPA commented that the amended DEIS would have been improved if the proposed Natural Resource Management Strategy that is to replace the IRM had been ready and commented that environmental justice need not be an issue for this proposed project since minorities account for only small part of the population. USEPA rated the amended DEIS as "EC-1" (Environmental Concerns, some additional information requested) and recommended lower impact mitigation methods for wetlands, timber harvesting, water quality, and siting marinas and barge terminals.

USFWS clarified its position on programmatic land plans and stated that it would not be able to concur with TVA’s "not likely to adversely affect" determination under the Endangered Species Act, Section 7 without consultation. TVA initiated consultation and a Biological Assessment was submitted February 29, 2008, for review by the USFWS. TVA determined that the Land Plan preferred alternative would have “no effect” on all but one federally listed species or their habitats in the Watts Bar area. TVA also determined the proposed Land Plan preferred alternative was “not likely to adversely affect” the pink mucket, based on implementation of specific measures if the former CRBR site or other sites were developed. USFWS provided a Biological Opinion on May 2, 2008, which stated it does not typically concur with a “not likely to adversely affect determination” at the programmatic consultation level when such determination is based on a commitment to

consult on specific projects in the future when details become known. Rather a “likely to adversely affect” is the appropriate determination at the programmatic consultation level if there is a potential for future adverse impacts. However, after a review of this project and associated conservation measures, USFWS concurred that the proposed Land Plan preferred alternative is “not likely to adversely affect” the pink mucket. USFWS relayed that the requirements of Section 7 of the Endangered Species Act, as they apply to this programmatic review, have been fulfilled.

The Department of the Interior, East Tennessee Development District and USACE had no comments regarding environmental resources or issues, or no conflicts with plans or programs. USACE asked to be contacted should there be future development-related impacts subject to Section 404 and/or Section 10 of the Rivers and Harbors Act of 1899. USDOE commented that the current size of the USDOE Oak Ridge Reservation is more accurately described as having approximately 33,718 acres.

1.8. Necessary Federal Permits or Licenses

No federal permits are required to develop this Land Plan. Site-specific information on reservoir resources has been characterized in this Land Plan and potential impacts on these resources were considered in making land use allocation recommendations. Appropriate agencies regulating wetlands, endangered species, and historic resources have been consulted during this planning process. When specific actions, such as a construction of docks, buildings, roads or walking trails are proposed, additional environmental reviews for these actions would be undertaken.

CHAPTER 2

2. ALTERNATIVES

2.1. Alternatives

TVA is considering three alternatives for managing public land under its control around Watts Bar Reservoir. In order to fulfill the purpose, needs and goals of land planning, these alternatives have been modified during the review process based on evaluations, new and existing data, TVA policy and program needs, public and agency comments, and the information previously described in Section 1.3.

- Under the No Action Alternative (Modified Alternative A), TVA would continue to use the existing 1988 Plan, with minor revisions to reflect allocation changes made over the past 19 years and current TVA policy.

- Alternative B (Modified Development and Recreation) would provide suitable economic and recreation opportunities as prescribed by the TVA Land Policy.

- Alternative C (Modified Conservation and Recreation) proposes a small amount of land allocated for industrial use and large portions to enhance conservation and dispersed recreation.

Under all alternatives:

- TVA would continue to conduct environmental reviews prior to the approval of any proposed development or activity on public land to address site-specific issues.
- Future activities and land uses will be guided by TVA Land Policy.
- TVA land use allocations are not intended to supersede deeded land rights or land ownership (See Section 2.1.2, Property Administration, for more information)

TVA's selected alternative would guide TVA resource management and property administration decisions on the TVA public land surrounding Watts Bar Reservoir until the Land Plan is revised in the future, which is expected to be about 10 years.

2.1.1. Alternative A – The No Action Alternative

Under the No Action Alternative, TVA would continue to use the 1988 Plan that currently guides land use decisions affecting TVA lands surrounding Watts Bar Reservoir, although activities and uses not provided for by the Land Policy would not occur. The 1988 Plan documents actual and prospective uses indicated for TVA managed land based on 1988 information. Land use requests received from applicants are evaluated for consistency with the 1988 Plan. Land use proposals compatible with the 1988 Plan and TVA Land Policy are approved or denied based on environmental reviews and other administrative considerations.

The 1988 Plan used 19 allocation categories to manage 10,387 acres (see Table 2.1-1). Under Alternative A, these categories would continue to be used by TVA as the basis for future land use decisions. The 1988 Plan did not allocate residential shoreline or other marginal shoreline strips along the reservoir nor did it include TVA project lands at KIF,

WBN, Watts Bar Fossil Plant (retired), and Watts Bar Dam Reservation. In addition, the 1988 Plan did not include land transferred to other agencies under easement or other agreements, which TVA still owns. Therefore, under Alternative A, although some management would continue to be provided by TVA's SMP, the Watts Bar residential shoreline and marginal shoreline strips would continue to have no formal land use allocation. Activities on TVA project lands would continue to be planned independently by the business unit managing these lands.

Except for the already approved LWBU, resource management activities of land allocated for that purpose would be limited to regulatory compliance and maintaining public health and safety.

Table 2.1-1. Allocation Category Definitions (1988)

Allocation	Description
1. Public Recreation	Tracts allocated for public recreation will be made available for development by a municipal, county, state, regional, or federal agency. As funds are available, TVA will consider developing selected needed public recreation facilities where no other agency can help develop them. Public recreation tracts are intended to support a wide range of recreation activities and may have facilities such as beaches, toilets, roads, campgrounds, parking lots, game and court areas, launching ramps, and trails. Large public recreation areas may have on-site managers.
2. Commercial Recreation	Tracts allocated for commercial recreation are reserved for developments requiring waterfronts, such as marinas, docks, launching ramps, rental cabins, rails, motels, pools, campgrounds, golf courses, restaurants, and other outdoor recreation facilities. On tracts allocated for new commercial recreation developments, TVA will seek private investors with the financial and managerial capability to develop large-scale facilities that can become destination points for tourists and local reservoir users. To encourage high-quality private development, TVA may provide incentives such as assisting with conceptual site planning; conducting market studies; and assisting with road building, grading, or installation of utilities. TVA may provide technical assistance to existing commercial operators on or near small tracts allocated for commercial recreation.
3. Water Access	Tracts allocated for water access will be available for development of boat ramps, courtesy piers, and car and trailer parking lots to provide public boating access to the reservoir. TVA will take the lead in developing water access tracts, but development and maintenance could be shared with other federal, state, county, or local agencies.
4. Informal Recreation	Informal *(Dispersed)* recreation tracts will be maintained for passive, dispersed activities such as hunting, hiking, bird watching, photography, primitive camping, bank fishing, and picnicking. Buildings, paved access, or development that would tend to concentrate public use will be discouraged. Forestry, agriculture, and wildlife management practices will be permitted as long as they do not limit public use of the land or drastically alter the physical land base.

Allocation	Description
5. Barge Terminal Sites	Tracts allocated for barge terminals will be available to public or private entities for construction of transfer facilities for loading and unloading of commodities between barges and trucks, trains, storage areas, or industrial plants. These sites would be conveyed to a developer at fair market value either at public auction sale in fee or by easement. Each terminal site is identified in the tract descriptions as either special purpose or multipurpose. Special purpose barge terminals would be associated with specific industrial plants and owned or operated by one or more industries. Such terminals are not usually available to other shippers.
6. Fleeting Area	Tracts allocated for barge fleeting areas will be used to anchor offshore mooring facilities (cables, buoys, or cells) used by the towing industry to switch barges between tows of barge terminals. Land-based development will be limited to anchoring devices for the offshore facilities. Fleeting areas are generally needed at the junction of two waterways, close to a large number of barge terminals, or near a navigation lock.
7. Minor Commercial Landings	Tracts allocated for minor commercial landings will be available for public or private development of small-scale barge facilities. These sites can be used for transferring pulpwood, sand, gravel, and other natural resource commodities between barges and trucks. Because this use is intermittent and usually not a major activity, there would generally be no significant impact of adjacent landowners.
8. Industrial Sites	Tracts allocated for industrial sites will be available for development of waterfront industries. These sites would be conveyed to a developer at fair market value either at public auction sale in fee or by easement. TVA technical assistance may include feasibility studies, promotional brochures, industrial site planning, and technical training.
9. Industrial Access	On tracts allocated for industrial access, developers of private back-lying lands could be permitted access across TVA property for water intake, wastewater discharge, or conveyance of commodities (i.e., natural gas pipelines). Industrial access is usually compatible with other uses, such as forest management and wildlife management, and these tracts may serve as a buffer between the shoreline and back-lying industrial development.
10. Retained Development	On tracts designated as retained development, investments have been made in permanent facilities, such as buildings or maintenance facilities. Activities that do not conflict with existing development can be permitted on the tracts.
11. Right-of-Way Protection	On tracts allocated for right-of-way protection, TVA has established vegetation to protect and stabilize the integrity of road cuts or fills. These tracts will be managed to maintain the vegetative cover.
12. Forest Management	Tracts allocated for forest management will be managed to maximize production of forest products and economic returns while enhancing or complementing other uses, such as wildlife management and recreation. All technically acceptable silvicultural and harvesting treatments may be applied in appropriate circumstances. Such treatments could include thinning, improvement cuts, selection, group selection, shelter wood, and clear-cut silvicultural and harvest methods. Additional resource management activities such as timber stand improvement, planting, controlled burning, cattle exclusion, road construction, kudzu control, and other measures would be applied as appropriate. A multidisciplinary TVA

Allocation	Description
	team will decide which management treatments to apply on each tract to benefit the forest resources and complementary uses.
13. Wildlife Management	Tracts allocated for wildlife management will be managed to protect and enhance wildlife habitats and restore depleted or regionally rare populations of certain species. To accomplish these management objectives, TVA will work closely with federal and state fish and wildlife agencies. In cases where TWRA can most effectively manage wildlife habitat, TVA will make tracts available for state management, with tenure based on demonstrated need and submission of acceptable wildlife management plans. Each tract allocated for wildlife management will be managed for a featured group or groups of wildlife species (upland wildlife, wetland wildlife, or waterfowl) or, in some cases, a particular wildlife species. Existing habitat conditions on each tract were analyzed during the data-gathering phase of this planning process to determine the major wildlife group or species to be featured on each tract. Tract-specific, detailed management plans will be developed to enhance or preserve habitat conditions required by the featured group or species. Habitat improvement will be achieved through wildlife provisions in agricultural license agreements, forest management prescriptions, and activities funded by TVA's Wildlife and Natural Heritage program. Selected tracts may be used to demonstrate or develop innovative wildlife management activities such as creation of nesting habitat for resident Canada geese, management of existing wading bird colonies, and expansion of raptor restoration work. Tracts containing unique concentrations of easily observed wildlife may be developed as public wildlife observation areas. In some cases, especially on small or disjunct tracts, protection or maintenance of existing habitat conditions will be the best management alternative.
14. Agriculture	Tracts allocated for agriculture will be managed to protect their potential for agricultural use, promote increased agricultural productivity for row crops or pasture, and demonstrate multiple-use developments compatible with preservation of agricultural lands. They contain a significant amount of prime farmland or farmland of statewide importance. These tracts will be available for agricultural licensing to local farmers, with restrictions to protect topsoil, prevent erosion, and benefit wildlife. In addition to those tracts specifically allocated for agriculture, many tracts allocated for other long-term uses are suitable for interim agricultural licensing. In these cases, the tract description will indicate that portions of the tract will be considered for agricultural licensing.
15. Small Wild Areas	Tracts allocated for small wild areas have exceptional natural, scenic, or aesthetic qualities and will be available for informal, low-impact types of outdoor recreation such as hiking, primitive camping, nature photography, and bird watching. Motorized vehicles will be prohibited. Development may include foot trails, signs, parking areas, and primitive camping sites. Efforts will be made to encourage public use and to interpret the natural features of these areas for visitors.

Allocation	Description
16. Habitat Protection	Tracts allocated for habitat protection areas will be managed to protect populations of species that have been identified as threatened or endangered by the USFWS or that are considered rare in Tennessee. Unusual or exemplary biological communities or unique geological features are also placed in this category for protection. Tracts allocated for this use cannot accommodate any management activities that are not specifically designated to perpetuate the featured species or that would jeopardize the ecological quality of the site. Heavy public use will be discouraged. Motorized vehicles will be prohibited.
17. Visual Management and Visual Protection	Proposals for management or development of tracts for visual management must include provisions for maintaining or enhancing the quality of the visual resources of the tract, in accordance with Visual Resource Management Recommendations (Appendix C of the 1988 Plan). This designation does not preclude any otherwise acceptable management or development activity. However, on tracts allocated for visual protection, TVA intends to restrict activities that would alter the unique or important visual resources. This is generally a single-use allocation, considered incompatible with other developmental uses.
18. Historic Preservation	On all tracts allocated for historic preservation, TVA will protect or interpret significant remnants of the prehistoric and historic past. These may be archaeological sites, buffers to preserve the settings of structures of historic or architectural significance, and historically significant boat landings of trails. This designation precludes any uses that would damage or destroy the cultural resources or diminish the public's appreciation of the cultural values of the tract.
19. Open Space	Tracts allocated for open space are generally narrow strips of public land adjacent to the shoreline that, in their natural state, contribute to the overall aesthetics of the reservoir.

2.1.2. The Planning Process for the Action Alternatives

The modified action alternatives were developed in accordance with TVA policy using information obtained from the public meetings and scoping meetings with stakeholders, community leaders, and peer groups as described in Sections 1.5 and 1.6 and Appendix C. In addition, TVA considered collected field data on land conditions, and natural and cultural resources. Each parcel of land was reviewed to determine its physical capability for supporting certain uses, other potential suitable uses of such land, and the needs of the public expressed during the scoping process. Based on this information, the planning team allocated land parcels to one of seven allocation zones for each of the modified action alternatives (see Tables 2.1-2 and B-1).

TVA Shoreline or Marginal Strip Land. In the 1988 Plan, TVA did not "plan" its marginal strip property. Over the years, when TVA sold land on Watts Bar Reservoir, a strip of land (marginal strip) was retained lying between either the 750- or 745-foot contour and the water's edge. The majority of this public land is encumbered by outstanding shoreline access rights that give back-lying property owners the right to construct private water use facilities subject to TVA's approval under Section 26 of the TVA Act. To be consistent with the other planned lands on Watts Bar Reservoir and with other TVA reservoir land plans, TVA intends to manage or "plan" its marginal strip property. Under the Modified Action

Alternatives (B and C), TVA would manage these lands as Shoreline Access, as defined under SMI.

Committed Land. In the 1988 Plan, TVA did not allocate lands designated for project operations or lands committed through legal tenure, including easements, leases, license agreements, outstanding landrights, and designated natural areas. Under the Modified Action Alternatives (B and C), lands committed in the 1988 Plan to a specific use would be allocated to a zone designated for that use unless there is a need to make a change. Possible reasons not to follow the 1988 land use would be ongoing adverse impacts or a request by a license or easement holder in compliance with the TVA Land Policy. Land with projects such as the TVA dam reservation and public works projects would be allocated to Zone 2, Project Operations. Approximately 12,000 acres of the TVA land surrounding Watts Bar Reservoir are committed due to existing TVA projects and existing land use agreements (see Appendix B). Agricultural licenses are not considered to be committed uses because they are an interim use of TVA public land.

Table 2.1-2. Land Use Zone Definitions

Zone		Definition
1	**Non-TVA Shoreland**	Shoreland that TVA does not own in fee or land never purchased by TVA. Non-TVA Shoreland allocations are based on deeded rights and, therefore, will not change as a result of the land planning process. 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 and/or limit structures. Flowage easement rights are generally purchased to a contour elevation. Since construction on flowage easement land is subject to TVA's 26a permitting requirements, the SMP guidelines discussed in the definition of Zone 7 would apply to the construction of residential water use facilities fronting flowage easement land. SMP guidelines addressing land-based structures and vegetation management do not apply. • ***Privately owned reservoir land***—This was 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	**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 acquired and managed for the primary purpose of supporting the operation and maintenance of TVA dams and associated infrastructure; secondary uses may also include developed and disbursed recreation, maintenance facilities, watershed team offices, research areas, and visitor centers.

Zone		Definition
		• ***Navigation safety harbors/landings—***Areas used for tying off commercial barge tows and recreational boats during adverse weather conditions or equipment malfunctions. • ***Navigation dayboards and beacons—***Areas with structures placed on the shoreline to facilitate navigation. • ***Public works projects***—Includes public utility infrastructure, such as substations and major rights-of-way for sewer lines, water lines, transmission lines, and major highway rights-of-way. • ***Land planned for any of the above uses in the future.***
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 viewscape or natural environment. Recreational natural resource 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 archaeological resources***. • TVA public land 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 public land under easement, lease, or license to other agencies/individuals*** for resource protection purposes. • ***TVA public 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 USFWS, state-listed species, and any unusual or exemplary biological communities/geological features. • ***Ecological Study Areas***—These TVA Natural Areas are designated as 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 segment of river and the adjacent land along the banks. River Corridors often consist of linear green spaces of TVA land serving as a buffer to tributary rivers entering the reservoir. These areas will be included in Zone 3 when identified sensitive resources are present.

Zone		Definition
		• ***Significant scenic areas***—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 public 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.***
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, timber management to promote forest health, wildlife observation, and camping on undeveloped sites. Areas included are: • ***TVA public land under easement, lease, or license*** to other agencies for wildlife or forest management purposes. • ***TVA public land fronting land owned by other agencies*** for wildlife or forest management purposes. • ***TVA public land*** managed for wildlife or forest management projects. • ***Dispersed 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 back-lying property that are managed for wildlife, water quality, or visual qualities. • ***Wildlife Observation Areas***—TVA Natural Areas with unique concentrations of easily observed wildlife that are managed as 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**	Land managed for economic development including businesses in distribution/processing/assembly and light manufacturing. Preference will be given for businesses requiring water access. There are two primary types of uses for TVA land allocated for industrial: **(1) Access for water supply or structures associated with navigation such as barge terminal, mooring cell, etc., or (2) Land-based development potential.** Industrial areas included are:

Zone		Definition
		• ***TVA public land under easement, lease, or license to other agencies/individuals*** for purposes described above. • ***TVA public land fronting land owned by other agencies/individuals*** for industrial purposes described above. • ***In some cases, TVA land allocated to industrial use would be declared surplus and sold at public auction.*** Types of development that can occur on this land are: • **Light Industrial**—TVA waterfront land which would support businesses and light manufacturing activities. Industrial parks should not include retail, service-based businesses like assisted living, retirement centers, or walk-in-type businesses (excluding retail use). • ***Industrial access***—Access to the waterfront by back-lying property owners across TVA property for water intakes, wastewater discharge, or conveyance of commodities (i.e., pipelines, rail, or road). Barge terminals are often 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 may have both offshore and onshore facilities. • ***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	**Developed Recreation**	The designations below are based on levels of development and the facilities available to the public. Parcel descriptions should describe the primary type of use and identify access potential for infrastructure and potential for development. **Water Access** – small parcels of land, generally less than 10 acres, and typically shoreline areas conveyed to public agencies for public access. **Public** – more recreational opportunities, some facilities more than just launching a boat and typically greater than 10 acres. This includes areas conveyed for public recreation. **Commercial** – property suitable and capable to support commercial water-based operations. This includes areas conveyed for commercial recreation. All reservoir land managed for concentrated, active recreational activities that require capital improvement and maintenance, including: • **TVA public land under easement, lease, or license to other agencies/individuals for recreational purposes.** • **TVA public land fronting land owned by other agencies/individuals for recreational purposes.**

Zone		Definition
		• **TVA public 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: • ***Water access,*** e.g., Areas that tend to have limited development and can include a launching ramp, courtesy piers, canoe access, parking areas, picnic areas, trails, etc. • ***Public recreation*** – recreation on publicly owned land. These areas typically have facilities or uses developed by a public agency and provide amenities open to the general public. Facilities at "public recreation" areas could include: playgrounds/play structures, picnic facilities, tennis courts, horseshoe areas, play courts, recreation center, athletic fields, trails, natural areas, amphitheaters, food concessions (vending, snack bar), access to water for fishing and boating, swimming areas and swimming pools, marina facilities owned by the public entity, parking, and campgrounds. Public recreation, time-forward, will not include residential use, cabins, or other overnight accommodations (other than campgrounds) except if a recreation area is owned by a State or State agency and operated as a component of a State Park system in which case cabins and other overnight accommodations will be permitted. Public recreation uses typically include areas and facilities owned and operated by the federal, state, county, or local government (municipalities/communities). However, private entities may operate recreation facilities on public property as concessionaires under agreement with the public entity controlling the property. The use of the facilities may be offered free or for a fee. This does not allow for public private partnership where facilities are owned by private investors. All structures and facilities should be owned by the agreement holder. • ***Commercial Recreation*** – is defined as recreation amenities that are provided for a fee to the public intending to produce a profit for the owner/operator. These primarily water-based facilities typically include: marinas and affiliated support facilities like restaurants and lodges; campgrounds; cabins; military vessel attractions; and excursion tour vessels (restaurant on the water). These uses and activities can be accommodated through changes in existing conveyance agreements. These areas do not include residential use, long-term accommodations or individually owned units. Where applicable, TVA will request appropriate compensation for use of the property. • ***Greenways*** – e.g., linear parks or developed trails 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.

Zone		Definition
7	**Shoreline Access**	TVA-owned land where Section 26a applications and other land use approvals for private shoreline alterations are considered. Requests for private 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. Types of development/management that may be permitted on this land are: • ***Private water use facilities***, e.g., docks, piers, launching ramps/driveways, marine railways, boathouses, enclosed storage space, and nonpotable water intakes. • ***Shoreline access corridors***, e.g., pathways, wooden steps, walkways, or mulched paths that can include portable picnic tables and utility lines. • ***Shoreline stabilization***, e.g., bioengineering, riprap and gabions, and retaining walls. • ***Shoreline vegetation management.***

If sensitive resources were identified on a parcel with an existing land use agreement (leases, licenses, etc.), that parcel would remain zoned for the committed use, unless an ongoing adverse impact is found. However, TVA review and approval would be needed prior to future activities that could impact the identified sensitive resources on that parcel to ensure the proposed activity would not significantly impact the identified sensitive resources.

Uncommitted Land. Uncommitted public land on Watts Bar Reservoir was considered for reevaluation. Field data were collected on many uncommitted parcels by technical specialists, such as archaeologists, historic architects, wetland specialists, and biologists to identify areas containing sensitive resources. Using maps that identified the location of sensitive resources (e.g., cultural resources, wetlands, threatened and endangered species, and visual resources) and the data collected during the scoping process, the capability and suitability for potential uses of each parcel were discussed.

Representatives from different TVA organizations including power generation, navigation, resource stewardship, recreation, and economic development (the planning team) met to allocate the parcels into the new planning zones. The proposed allocations for each alternative were made by consensus of the planning team members and approved by TVA management (see Table B-1 in Appendix B). Maps showing the location of land parcels and allocation proposals are included in the back of this document.

Property Administration. The existing and proposed reservoir land plans take into consideration TVA policy, guidelines, and environmental laws and regulations in developing a strategy to manage resources by identifying suitable uses for each tract of land. As administrators of TVA public land, the watershed team uses the plan along with TVA policies and guidelines to manage resources and to respond to requests for the use of TVA public land. All inquiries about, or requests for the use of TVA public land on Watts Bar Reservoir should be made to TVA's Watts Bar/Clinch Watershed Team, 260 Interchange Park Drive, Lenoir City, Tennessee, 37772-5664, phone 865-632-1320.

TVA will consider changing a land use designation outside of the normal planning process only for water-access purposes for industrial or commercial recreation operations on privately owned back-lying land or to implement TVA's SMP.

TVA may change an allocation to Zone 7, without any further TVA Board approval, in considering requests for approval of private residential water use facilities on parcels previously zoned as Zones 5 and 6 when the change is consistent with the deeded land rights.

Public works/utility projects such as easements for pipelines, power or communication wires, roads or other public infrastructure proposed on any TVA public land that do not affect the zoned land use or sensitive resources would not require an allocation change so long as such projects would be compatible with the use of the allocated zone. To the extent possible, the projects should be designed to minimize the removal of trees or other vegetation and the potential for erosion. If appropriate, the project site should be stabilized and revegetated with native species. Any other requests involving a departure from the planned uses would require the approval of the TVA Board of Directors.

Proposals consistent with TVA's policy, the allocated use, and otherwise acceptable to TVA will be reviewed in accordance with NEPA and conform to the requirements of other applicable environmental regulations, and other legal authorities.

2.1.3. Modified Action Alternative Allocation Proposals

Under the Modified Action Alternatives B and C, TVA would allocate reservoir land parcels into one of the land zones (Table 2.1-2) based on resource data, land and deed records, stakeholder input, and TVA staff input (see Table 2.1-3). Private land that adjoins the reservoir, over which TVA has flowage easement or other rights is designated as Zone 1, but otherwise not included in land planning.

Alternatives B and C include about 6,000 acres not planned in 1988. This previously unplanned land includes sites with license agreements, Watts Bar Dam, Watts Bar Fossil Plant, WBN, KIF, and other Project Operations land, and the marginal strips of retained land fronting TVA sale tracts. These retained strips of TVA land encumbered with water access rights would be allocated to Shoreline Access (Zone 7), based on predetermined access rights as documented in TVA's 1998 SMI. Minor alterations were made to parcel boundaries and acreages to incorporate mapping corrections and updated information about deed rights. Included are minor land additions and disposals. These alterations total less than 50 acres out of the total land on Watts Bar Reservoir.

During the scoping period, TVA received 12 proposals to allocate 32 parcels (about 3,650 acres) of TVA public land for private or public projects. The proposals ranged from economic development with mixed-use (commercial, recreation, and residential) development to natural resource conservation. After review of these proposals following the issue of the 2005 Plan and the implementation of the TVA Land Policy, TVA has determined that most of them are no longer feasible and are therefore no longer being considered. In addition, the allocations of several of these parcels could not be reasonably changed to the requested land use zones, because they are committed land for TVA project operations, protect significant resources, or have deeded access rights, and would be incompatible with the allocations.

2.1.4. Action Alternative B – Modified Development and Recreation

Under Action Alternative B, Modified Development and Recreation, TVA proposes land use allocations for each land parcel (see Appendix B). Under this alternative, TVA would help promote some industrial development and commercial recreation by allocating 357 acres of land Industrial (Zone 5) and 1,552 acres to Developed Recreation (Zone 6) totaling about 12 percent of TVA owned land on Watts Bar Reservoir (see Table 2.2-1) The smaller area available for industrial development would be offset by the addition of 760 acres of the former CRBR site (Parcels 142, 142, 145, and 148) as new Project Operations (Zone 2) which could have TVA energy production facilities similar to industrial activities.

About 7,637 acres (47 percent) of land would be allocated for sensitive and natural resource use (see Table 2.2-2). The Modified Alternative B would include the minor changes and alterations as described in Section 2.1.3. TVA would seek to engage partners to help implement natural resource management activities and facilitate opportunities on lands allocated for Zone 2, Project Operations, Zone 3, Sensitive Resource Management, Zone 4, Natural Resource Conservation, and Zone 6, Developed Recreation.

This alternative complies with the TVA Land Policy and provides compromise between conservation of natural resources and economic development. Although natural resource conservation and dispersed recreation would predominate on the reservoir, industrial development and developed recreation would occur on TVA land where those activities are most suitable and have the greatest opportunity for success.

Table 2.1-3. Comparison of Proposed Zone Allocations, by Alternatives

Parcel	Alt. A (Acres)	Alt. A Zone	Alt. B and C| (Acres)	Alt. B Zone	Alt. C Zone	Reason for Change
1	10.5	6	10.5	2	2	Allocation Change
9	122.5	6	122.5	6	4	Allocation Change
10	78.4	6	78.4	6	4	Allocation Change
15	58.6	7	54.5	7	7	Decrease Acreage to Create new Parcel 15a
15a	n/a	n/a	4.1	3	3	New Parcel
16	28.2	7	20.8	7	7	Decrease Acreage to Create new Parcel 16a
16a	n/a	n/a	3.0	3	3	New Parcel
17	1.4	3	2.6	3	3	Increase in Acreage from other Parcels, Create New Parcel 17a
17a	n/a	n/a	3.2	4	4	New Parcel
63	45.7	7	46.8	7	7	Increase in Acreage from other Parcels
64	1.1	4	n/a	n/a	n/a	Merge with Parcel 63
70	4.9	4	3.6	4	4	Decrease Acreage to Create new Parcel 70a
70a	n/a	n/a	1.3	2	2	New Parcel
89	36.4	4	35.0	4	4	Increase in Acreage from other Parcels
90	n/a	n/a	1.4	2	2	Allocation Change and Decrease in Acreage
91	16.7	3	11.9	3	3	Decrease in Acreage
92	33.9	4	34.9	4	4	Increase in Acreage from other Parcels
94	9.2	3	11.2	3	3	Increase in Acreage from other Parcels
96	9.6	4	11.4	4	4	Increase in Acreage from other Parcels
98	9.4	6	9.4	4	4	Allocation Change
121	24.7	6	17.1	6	6	Decrease in Acreage
122	9.0	2	16.6	2	2	Increase in Acreage from other Parcels
127	13.3	7	11.4	7	7	Decrease Acreage to Create new Parcel 127a
127a	n/a	n/a	1.9	2	2	New Parcel
137	79.3	4	80.7	4	4	Increase in Acreage from other Parcels
137a	n/a	n/a	2.6	2	2	New Parcel

Parcel	Alt. A (Acres)	Alt. A Zone	Alt. B and C| (Acres)	Alt. B Zone	Alt. C Zone	Reason for Change
140	7.8	5	6.4	3	3	Allocation Change and Decrease in Acreage
142	319.5	5	302.5	2	4	Allocation Change, Decrease in Acreage to other parcels and to Create new Parcel 137a
143	391.3	5	181.6	2	4	Allocation Change and Decrease in Acreage
144	48.0	3	172.3	3	3	Increase in Acreage from other Parcels
145	332.9	5	265.8	2	4	Allocation Change and Decrease in Acreage
146	98.6	3	265.5	3	3	Increase in Acreage from other Parcels
147	43.4	5	54.4	5	5	Increase in Acreage from other Parcels
148	21.5	5	10.5	2	4	Allocation Change and Decrease in Acreage
152	6.4	3	4.2	3	3	Decrease Acreage to Create new Parcel 152a
152a	n/a	n/a	2.2	4	4	New Parcel
159	3.4	3	5.7	3	3	Increase in Acreage from other Parcels
170	11.6	5	6.0	5	5	Decrease in Acreage
172	21.2	4	26.8	4	4	Increase in Acreage from other Parcels
174	21.5	5	3.2	5	5	Decrease in Acreage
175	3.4	6	23.2	6	6	Increase in Acreage from other Parcels
176	3.3	3	1.8	3	3	Decrease in Acreage
179	56.0	4	53.8	4	4	Decrease in Acreage
181	8.4	5	7.0	5	5	Decrease Acreage to Create new Parcel 181a
181a	n/a	n/a	3.6	3	3	New Parcel
189	22.2	4	19.9	4	4	Decrease in Acreage
204	23.9	4	21.4	4	4	Merge Parcel 205 and Decrease Acreage to Create new Parcel 205
205	5.0	3	7.5	4	4	Merge Parcel with Parcel 204, Create new Parcel 205
207	19.1	2	12.0	2	2	Decrease Acreage to Create new Parcel 207a
207a	n/a	n/a	7.1	3	3	New Parcel
218	61.4	5	56.8	4	4	Allocation Change and Decrease in Acreage to Create new Parcel 218a
218a	n/a	n/a	4.6	5	5	New Parcel
224	128.6	4	123.7	4	4	Decrease Acreage to Create new Parcel 224a
224a	n/a	n/a	4.9	2	2	New Parcel
229	44.7	7	44.4	7	7	Decrease in Acreage
229a	n/a	n/a	0.3	2	2	New Parcel
230	19.1	6	17.2	6	6	Decrease Acreage to Create new Parcel 230a
230a	n/a	n/a	1.9	6	6	New Parcel
240	6.5	6	6.5	4	4	Allocation Change
243	2.9	6	2.9	7	7	Allocation Change
251	24.0	7	20.7	7	7	Decrease Acreage to Create new Parcel 251a
251a	n/a	n/a	3.3	6	6	New Parcel
255	8.7	6	8.7	4	4	Allocation Change
270	52.9	6	53.3	6	6	Increase in Acreage from other Parcels
272	0.4	2	n/a	n/a	n\a	Merge with Parcel 270
273	8.4	7	10.5	7	7	Increase in Acreage from other Parcels
274	5.2	7	1.1	2	2	Decrease Acreage to Create new Parcel 224a
274a	n/a	n/a	2.0	5	5	New Parcel
297	245.0	5	245.0	5	4	Allocation Change
298	34.4	5	34.4	5	4	Allocation Change
299	370.3	6	423.4	4	4	Allocation Change and Increase in Acreage
300	237.4	6	184.3	6	6	Decrease in Acreage

Alt. = Alternative(s)
n/a = Not Applicable

2.1.5. Action Alternative C – Modified Conservation and Recreation

Under Action Alternative C, Modified Conservation and Recreation, TVA proposes land use allocations for each land parcel (see Appendix B). Under Modified Alternative C, TVA would help promote conservation of natural resources and dispersed and developed recreation by allocating about 8,900 acres of land for Sensitive and Natural Resource use and 1,350 acres to Developed Recreation totaling about 63 percent of TVA-owned land on Watts Bar Reservoir. Only those lands with existing industrial facilities, about 77 acres (less than 1 percent), would be allocated for industrial use (see Tables 2.2-1 and 2.2-2).

The Modified Alternative C would also include the minor changes and alterations described in Section 2.1.3. TVA would seek to engage partners to help implement natural resource management activities and facilitate opportunities on lands allocated for Zone 2, Project Operations, Zone 3, Sensitive Resource Management, Zone 4, Natural Resource Conservation, and Zone 6, Developed Recreation.

Under this alternative, natural resource conservation and dispersed recreation would predominate on TVA land suitable for those activities. Some developed recreation would occur on TVA land where those activities are most suitable and have the greatest opportunity for success.

2.2. Comparison of Alternatives

This section compares the environmental impacts of the three alternatives based on the information and analyses provided in Chapter 3, the Affected Environment and Chapter 4, Environmental Consequences.

Section 101 of the NEPA declares that it is the policy of the federal government to use all practicable means and measures, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations. TVA believes that all alternatives would be consistent with this policy, and TVA has interpreted the regulations and laws governing it to be consistent with this policy, as required by Section 102(1). Because of the environmental safeguards in each alternative, a wide range of beneficial uses of the environment could be obtained without degradation or unintended consequences under each alternative.

Direct comparison of parcel land uses between Modified Alternative A (No Action Alternative) and the Modified Alternatives B and C is difficult because the land allocation definitions in the 1988 Plan and the plans proposed under Modified Alternatives B and C are not the same. The 1988 Plan used 19 land use allocations to manage 10,238 acres of land. Many of the parcels were designated for multiple uses. The 1988 Plan did not allocate about 3,600 acres of TVA lands at Watts Bar Dam and electric power plant reservations or the nearly 2,400 acres of residential shoreline or other marginal shoreline strips along the reservoir. The proposed action alternatives allocate all marginal shoreline strips with existing shoreline access rights to Zone 7 (Shoreline Access) and all project lands to Zone 2 (Project Operations). For comparison purposes, an approximate relationship between the 1988 allocation categories and the current planning zones is shown in Table 2.2-1. This allows the allocated land uses in the 1988 Plan (Alternative A) and the proposed Modified Action Alternatives (B and C) for each TVA parcel to be compared (see Appendix B).

In implementing Modified Alternative A, actual uses for land with multiple allocations would be decided on a case-by-case basis, making the assessment of impacts speculative. Therefore, for comparison purposes, a single allocation zone has been assigned that best represents the intended use (see Table 2.2-1). Under Modified Alternative A, 3,472 acres of land would be allocated to sensitive resource management-type uses; 3,309 acres could be allocated to natural resource conservation-type uses; 1,544 acres would be allocated to industrial uses; and 1,998 acres would be allocated to developed recreational use. The actual allocation would be determined on a case-by-case basis as requests are received.

Under Modified Alternative B, less land would be allocated for industrial use at both the former CRBR and Lowe Branch sites than under Modified Alternative A. However, much of the land at the former CRBR site would be allocated for project operations which could have similar impacts. Potential impacts to threatened or endangered species are expected to be slightly less than Modified Alternative A, but still minor and insignificant, and could be further reduced for aquatic species by the use of best management practices (BMPs) for soil disturbances. There would be lesser but still insignificant potential for impacts to water quality. Under Modified Alternative B, 3,780 acres of land would be allocated to sensitive resource management-type uses; 3,857 acres would be allocated to natural resource conservation-type uses; 357 acres would be allocated to industrial development uses; The smaller area available for industrial development would be offset by the addition of 760 acres as new project operations which could have facilities similar to industrial activities and 1,552 acres could be allocated to developed recreational use.

Under Modified Alternative C, more acreage is allocated for sensitive and natural resource uses than is designated under Modified Alternatives A and B (see Table 2.2-2). Under Modified Alternative C, approximately 1,200 to 2,100 acres of land would be allocated to more protective uses (Zones 3 and 4) than under Modified Alternatives A and B. Approximately 80 acres are proposed to be allocated to Industrial Development under Modified Alternative C. A large number of sites previously allocated for access for future industrial development would be allocated to more protective categories.

In addition, approximately 2,300 acres of marginal shoreline strip, not included in the 1988 Plan, would be allocated for Shoreline Access due to existing deeded rights for water access. Under Modified Alternative C, approximately 1,400 to 1,500 acres allocated to Industrial, Project Operations, and Recreation Development under the Modified Alternatives A and B would be allocated to Natural Resource Conservation or Sensitive Resources.

Table 2.2-1. Comparison of Land Uses by Alternatives

Existing (1988) Allocation Categories	Current Land Use Zones	Modified Alternatives					
		A		B		C	
		Acres	%	Acres	%	Acres	%
Retained Developed[1] Previously Unplanned[2]	Zone 2 - Project Operations	3,587	22.1	4,371	26.9	3,611	22.3
Historic Preservation, Habitat Protection, Visual Management and Protection, Small Wild Areas	Zone 3 - Sensitive Resource Management	3,472	21.4	3,780	23.3	3,780	23.3
Wildlife Management Forest Management Agriculture, Open Space, Right-of-Way Protection	Zone 4 - Natural Resource Conservation	3,309	20.4	3,857	23.8	5,098	31.4
Industrial Sites, Barge Terminal Sites, Minor Landings, Fleeting Area, Industrial Access	Zone 5 - Industrial	1,544	9.5	357	2.2	77	0.5
Public Recreation, Commercial Recreation, Water Access, Informal Recreation	Zone 6 - Developed Recreation	1,998	12.3	1,552	9.6	1,351	8.3
Previously Unplanned[3]	Zone 7 - Shoreline Access	2,310	14.2	2,303	14.2	2,303	14.2
Total		**16,220**	**100.0**	**16,220**	**100.0**	**16,220**	**100.0**

[1] Retained development - A TWRA maintenance area (9 acres) and Kingston Pumping Station (16 acres) are the only inclusions from the 1988 Plan.
[2] Primarily consists of TVA project lands from dam and electric power plant reservations.
[3] Consists of TVA lands described as marginal strip in the 1988 Plan.

Table 2.2-2. Comparison of Acres Allocated to Sensitive and Natural Resource Uses

Modified Alternative	Allocation	Acres	Percent of Total Area
Alternative A	Historic Preservation, Habitat Protection, Visual Management and Protection, Small Wild Areas, Wildlife Management, Forest Management, Agriculture, Open Space, Right-of-Way Protection	6,781	41.9
Modified Alternative B	Zone 3 – Sensitive Resource Management Zone 4 – Natural Resource Conservation	7,637	47.1
Modified Alternative C	Zone 3 – Sensitive Resource Management Zone 4 – Natural Resource Conservation	8,878	54.7

2.3. Impacts Summary

Modified Alternative A has greater acreages of land allocated to developed uses, including Industrial and Developed Recreation, than the other alternatives. Adoption of Modified Alternative B would allow greater recreational, industrial, and project operations development than Modified Alternative C but slightly less than Modified Alternative A. Therefore, Modified Alternative B would have greater potential for impacts to natural resource than Alternative C, but less than Modified Alternative A. Implementation of Modified Alternative C would result in the largest amount of acres allocated to Zone 4, Natural Resource Conservation. A qualitative rating of the potential impacts of the alternatives with respect to different potentially affected resources is provided in Table 2.3-1. Mitigation measures to further reduce impacts are included in Section 4.20.

Table 2.3-1. Summary of the Environmental Impacts of the Alternatives

Environmental Impacts Summary				
Resource	**Potential Impacts**	**Modified Alternative A**	**Modified Alternative B**	**Modified Alternative C**
Terrestrial Ecology	Loss and fragmentation of terrestrial habitat by clearing and alteration of vegetation could impact the composition and abundance of species.	Potential for up to 1,300 acres of habitat alteration from industrial use. Eventual loss of 3,300 acres of high-quality habitat.	Potential for about 1,100 acres of habitat alteration from industrial or new project operations use. Eventual loss of 2,700 acres of high-quality habitat.	Minimal industrial use. Retention of high-quality habitat, beneficial impacts.
Threatened and Endangered Plants	Clearing and alteration of vegetation could impact the composition and abundance of sensitive, rare, and listed species.	No federally listed threatened and endangered plants impacted. Potential impact for state-listed plant species insignificant.	No federally listed as threatened and endangered plants impacted. Slightly lesser impacts than Alternative A to state-listed plants.	No federally listed as threatened and endangered plants impacted. Least impacts to state listed species.

Environmental Impacts Summary				
Resource	**Potential Impacts**	**Modified Alternative A**	**Modified Alternative B**	**Modified Alternative C**
Threatened and Endangered Animals	Clearing and alteration of vegetation could impact the composition and abundance of species.	No federally listed threatened and endangered terrestrial animals impacted; some impacts to state-listed species.	No federally listed threatened and endangered terrestrial animals impacted; lesser impacts than Alternative A.	Beneficial impacts to federally listed and state-listed species.
Threatened and Endangered Aquatic Animals	Pollution and siltation from erosion and ground disturbance activities.	Not likely to adversely affect federally listed aquatic animals.		Greatest protection to sensitive aquatic species.
Managed Areas and Sensitive Ecological Sites	Incompatible land use on adjacent areas. Impacts on sensitive resources.	Insignificant and temporary Impacts.	Beneficial Impacts.	Beneficial Impacts.
Water Quality	Toxic substances, erosion, and nutrient loading.	Insignificant adverse impacts from commercial, industrial and recreation development.	Lesser adverse impacts.	Beneficial Impacts.
Aquatic Ecology	Alteration of aquatic habitat, primarily from shoreline modification.	Generally no change from existing conditions.	Improvement of conditions over Alternative A.	Least impacts and most beneficial improvement.
Wetlands	Adverse effects to or destruction of wetlands from land clearing and ground disturbance.	Adverse impacts mitigated under Section 404 and EO 11990; insignificant impacts.		
Floodplains	Adverse impacts to floodplain values in floodplain.	Minor and insignificant impacts.		
Land Use	Impacts to and loss of TVA's public lands.	Insignificant adverse impacts to public lands.	Lesser impacts to public lands.	Maintains public ownership of land.
Prime Farmland	Conversion of prime farmland. A farmland rating required before development.	Some potential loss of prime farmland. Insignificant impact to region.	Less potential loss of prime farmland. Insignificant impact to region.	Least potential loss of prime farmland. Insignificant impact to region.
Cultural Resources	Potential for activities to affect archaeological and historic properties.	Insignificant impacts with implementation of the programmatic agreement with the Tennessee State Historic Preservation Officer and the Advisory Council on Historic Preservation.		
Air Quality	Emissions from construction and development activities.	Insignificant adverse impacts depending on the industries recruited.	Fewer but still insignificant impacts.	Least impacts to air quality.
Navigation	Interference with commercial navigation.	No change from existing conditions.	Minor impacts from loss of some barge terminals. Beneficial designation of safety harbor land.	Same impacts as Alternative B and loss of future potential barge terminal on Parcel 298.

Environmental Impacts Summary				
Resource	**Potential Impacts**	**Modified Alternative A**	**Modified Alternative B**	**Modified Alternative C**
Recreation	Availability of recreational opportunities.	Largest amount of Zone 6 land. Loss of existing dispersed recreation at some sites, reduction of diverse recreation opportunities.	Minor loss of Zone 6 land offset by increase in Zone 4 land.	Greatest loss of Zone 6 land and beneficial increase in Zone 4 land.
Visual Resources	Minor effects on Scenic Quality. Gradual degradation of visual resources.	No change in present conditions of insignificant impacts.	Lesser impacts than Alternative A.	Least impacts and greatest protection.
Socioeconomic Impacts and Environmental Justice	Effects to the local economy and communities. Dependent on the nature of future proposals.	No change in opportunities for future beneficial development. No impacts to environmental justice.	Impacts similar but slightly less than Alternative A. Loss of Zone 5 land offset by increase in Zone 2. No impacts to environmental justice.	Almost no opportunities for future industrial development. Beneficial impacts to environmental justice.
Other Issues	Impacts from noise.	Some insignificant noise impacts from future industrial or recreation development.	Lesser insignificant impacts from noise.	Least impacts from noise.

2.4. Preferred Alternatives

The preferred alternative is Modified Alternative B, which provides suitable opportunities for economic development and the conservation of natural resources. The environmentally preferred alternative is Alternative C, which has the least adverse impact on the environment of all the alternatives.

CHAPTER 3

3. AFFECTED ENVIRONMENT

3.1. Regional Setting

The Watts Bar Dam drainage basin encompasses 17,310 square miles in Tennessee, North Carolina, and Virginia. It lies predominantly within two physiographic provinces: Ridge and Valley and Blue Ridge Mountains, often described as the Great Valley, with a small portion in the Cumberland Plateau. The geology of the Great Valley of East Tennessee consists of a system of sedimentary sandstones, shale, and limestone formations. This upper part of the Tennessee River Valley is underlain by folded and faulted Paleozoic rock formations. Most of the folds are compressed and many of them have been overturned, and thrust or reverse faults have developed along them often repeating and overlapping along each fault in a shingle-like structure (TVA 1949).

Watts Bar Reservoir is centrally located in the Appalachian Ridge and Valley physiographic province of Mideast Tennessee (Fenneman 1938; Miller et al. 1966) and is within the Appalachian oak forest as described by Küchler (1966). The Ridge and Valley province, with elevations of up to 2,000 to 3,000 feet, consists of northeast-southwest trending valleys and streams. About 1,834 square miles of drainage lies within the watershed draining directly into Watts Bar Reservoir downstream of Fort Loudoun and Melton Hill dams.

Watts Bar Reservoir was impounded in 1942 by Watts Bar Dam, located at TRM 529.9. Watts Bar is a fairly large reservoir with 39,000 acres of surface area. The total length of the reservoir, including the Clinch River arm is about 96 miles; the shoreline length is 721 miles. The reservoir extends 72 miles up the Tennessee River to Fort Loudoun Dam and 63 miles up the Tennessee and Clinch rivers to Melton Hill Dam. It flows from the northeast through portions of four counties in Tennessee: Loudon, Roane, Meigs, and Rhea. The principal towns on Watts Bar Reservoir, Spring City, Kingston, Loudon, Rockwood, Lenoir City, Oak Ridge, and Harriman, all have water intakes or outfalls on the reservoir and access to commercial navigation. Rural populations are concentrated in the numerous long valleys between the forested ridges. Two major interstate highways meet just in the northeast of Watts Bar, and the reservoir is surrounded with several first-class railroads. State and federal highways connect the major communities with a large part of the eastern United States.

Besides Watts Bar Dam, TVA has major electric power-producing facilities on or near the reservoir at KIF on the Clinch River near Kingston, Tennessee, and at WBN near Watts Bar Dam. The USDOE has its Oak Ridge facilities on the upper reaches of Watts Bar Reservoir on the Clinch River. There are several barge terminals and industrial park areas near the larger communities and some concentrations of residential shoreline developments and marinas, but most of the Watts Bar Reservoir shoreline can be typified as appearing forested and rural.

3.2. Terrestrial Ecology (Plant and Animal Communities)

Watts Bar Reservoir lies almost completely within the Central Ridge and Valley section of the ecological subregion referred to as the Eastern Broadleaf Forest (Oceanic) province (Bailey et al. 1994). A small portion of the upper Watts Bar Reservoir is part of the Cumberland Plateau. Küchler (1964) classifies the main vegetation type of the Central Ridge and Valley as Appalachian oak forest. The natural vegetation may consist of cold-deciduous broad-leaved

forest with evergreen needle-leaved trees (Bailey 1995). The main forest type is oak-pine, with blackjack oak, chestnut oak, post oak, scarlet oak, and southern red oak dominating drier sites and the moister sites dominated by white oak, southern red oak, and black oak. Shortleaf pine can form a major portion of the canopy. Other common trees that constitute a minor portion of the vegetation composition are black gum, several hickory species (bitternut, mockernut, pignut, and shagbark), loblolly pine, and sweetgum (ibid).

The Ridge and Valley province, with elevations of up to 2,000 to 3,000 feet, consists of northeast-southwest trending valleys on limestone bedrock and intervening ridges of more resistant sandstones (Martin et al. 1993). Analysis conducted by TVA for the SMI EIS (TVA 1998) found that tree cover comprised 64 percent of the vegetation within 25 feet of the shoreline and 59 percent of the vegetation between 25 feet and 100 feet from the shoreline. The next most common vegetation type along the Watts Bar shoreline was tree cover with grass understory comprising around 30 percent. This study also found that for two counties, Loudon and Meigs, which border portions of Watts Bar Reservoir, at least 20 percent of their forest area occurs within 0.25 mile of the reservoir shoreline.

The approximately 16,200 acres of TVA public land surrounding Watts Bar Reservoir can be broken into five broad community types: (1) forestland; (2) open/agricultural land; (3) shrub/brush land; (4) wetland/riparian/shallow overbank areas (flooded portion of reservoir outside the original riverbed area); and (5) residential/suburban habitats. Approximately 6,800 acres of this property was inventoried in 1994, see Table 3.2-1

Table 3.2-1. Vegetation Type of the 1994 Inventory

Vegetation Type	Acres	Percent of Total
Hardwoods	2,810	41.5
Softwoods (Pines)	2,208	32.5
Mixed-pines, Cedar, and Hardwood	1,593	23.5
Eastern Red Cedar	33	0.5
Open/Idle/Agriculture	127	2.0

1994 TVA Forest Inventory

Past land use has played a major role in creating the present mosaic of forest conditions. When TVA acquired properties around Watts Bar Reservoir, the land uses were typical of most other lands in the Tennessee Valley. There was primarily small subsistence farming on marginal land with row crop and pasture areas interspersed with woodlands. Many of these woodlands were grazed by livestock or burned regularly to promote the growth of annuals and other forage plants. Woodlots were also selectively harvested periodically to provide construction lumber, firewood, and other wood products with many of these areas being subject to severe soil erosion. Following purchase by TVA, much open land was either planted to loblolly or shortleaf pine by TVA or reverted naturally to Virginia pine, red cedar, hickory, and other hardwoods.

While a variety of hardwood types are present on TVA Watts Bar Reservoir lands, upland hardwood comprises the most significant portion of the stands. Typical species that occur in these stands include white oak, black oak, chestnut oak, southern red and scarlet oak, hickories, yellow poplar, red maple, and beech. Mixed pine/hardwood stands include several of these upland species in addition to sweetgum, sugar maple, white ash, chinkapin oak, and Virginia, white, shortleaf, and/or loblolly pines. Bottomland hardwoods comprise a relatively

small portion of the stands and are typically comprised of sweetgum, slippery and American elms, and various oaks including some large willow oaks in some areas. Pine stands are second to hardwoods in area coverage and are comprised of natural Virginia, shortleaf, and white pines and several hundreds of acres of planted loblolly pine. There are a variety of stand ages across the reservoir with the upland hardwood component comprising the majority of the older-age forest stands. Most mixed forest stands range in size from poles to large sawtimber and are a variety of age classes. There are some infrequent stands that could be small, isolated old-growth timber.

The once substantial pine stands on Watts Bar Reservoir land have undergone significant changes in recent years due to a major outbreak of southern pine bark beetles in the late 1990s. These insects decimated most all of the planted loblolly pine stands and infested the majority of mixed pine stands throughout the reservoir area. Aerial surveys conducted by TVA estimate that approximately 90 percent of the pine stands scattered around the reservoir have been impacted by the beetles with high mortality in some areas. As a result, there has been a substantial increase in reverting or shrub/brush habitat. Most of the beetle-impacted areas are slowly reverting back to mixtures of Virginia, loblolly, or shortleaf pine with various hardwoods, depending on the site, including yellow poplar, sweetgum, sassafras, winged elm, various oaks, and other common hardwood species. However, before the new tree cover becomes established, many of these areas will go through an herbaceous/shrubby reversion stage, which includes plants such as annual ragweed, lamb's quarters, spiny amaranth, panic grass, plume grass, sericea lespedeza, yellow crownbeard, tall ironweed, Canadian goldenrod, common blackberry, Japanese honeysuckle, and winged sumac.

Deciduous hardwood forests typically support the greatest diversity of wildlife (see Appendix D, Table D-1). Common mammals in this type include eastern gray squirrel, white-tailed deer, red bat, short-tailed shrew, and white-footed mouse. The bird community includes species present throughout the year, species that nest in the region and migrate to winter in the Caribbean and in Central and South America (often referred to as neotropical songbirds), and species that winter in the region. Common birds present throughout the year include eastern wild turkey, red-shouldered hawk, woodpeckers, blue jay, Carolina chickadee, tufted titmouse, and Carolina wren. Common neotropical songbirds include the yellow-billed cuckoo, wood thrush, red-eyed vireo, hooded and Kentucky warblers, and summer tanager. Wintering birds include the golden-crowned kinglet, winter wren, and yellow-rumped warbler. Among the common reptiles and amphibians found in deciduous forests are eastern box turtle, five-lined skink, black rat snake, dusky and slimy salamanders, American toad, and Cope's gray treefrog.

In recent years neotropical songbirds associated with interior forest habitats have been used as ecological indicators, and their population numbers have been used to detect environmental changes, monitor organic pollutants and radionuclide contamination, indicate changes in water quality, and indicate changes in prey stock (food webs) (Furness and Greenwood 1993). Many neotropical species have undergone significant population declines in recent years due to changes associated with their habitats (Robbins et al. 1989; DeGraaf and Rappole 1995). In order to determine a habitat's viability as interior forest, Temple and Cary (1988) developed a model that used 200 meters as the threshold distance to forest edge. In this methodology, interior-forest habitat requires at least a 200-meter buffer from any feature that breaks the tree cover, such as roads, rivers (reservoirs), or buildings. Using this criterion, Watts Bar Reservoir properties that support the greatest amount of interior forest habitat and/or potential for future interior habitat development include Parcels 7 and 8 (Fooshee Peninsula), Parcel 46 (Thief Neck Island), Parcels 142, 143, 145, 146 (former CRBR site), and Parcels 297 and 298 (Lowe Branch area). There are no current population data on the neotropical, area-sensitive bird

species that are utilizing the habitats on portions of these parcels nor the exact acreage figure of qualifying interior forest. However, there has been some preliminary discussion with members of the Tennessee Ornithological Society and TWRA regarding the nomination and placement of some of these areas into the State of Tennessee's Important Bird Area designation program.

Coniferous or pine forests typically support fewer wildlife species than deciduous forests and the number of species present increases with the proportion of deciduous trees present and the density of the understory shrub layer. Amphibians and reptiles commonly found in pine and mixed pine/cedar forests include eastern narrow mouth toad, eastern spadefoot toad, southern five-lined skink, and black racer. Birds commonly found in this type habitat include eastern wild turkey, blue jay, northern cardinal, American crow, sharp-shinned hawk, and a variety of woodpeckers. Edges along pine and cedar woodlands often provide habitat for mammals such as eastern cottontail rabbit, white-footed mouse, hispid cotton rat, and their associated predators. In many cases, the edges of these pine/cedar stands are dominated by more herbaceous/shrubby vegetation including several species of goldenrod, asters, bush clover, milkweed, broom-sage, wild oat grass, tick-trefoil, foxtail grass and winged sumac.

Shrub/brush and early successional habitats are widespread and common on Watts Bar Reservoir lands, especially since the southern pine bark beetle outbreak of the late 1990s. Beetle-devastated pine stands are reverting to these habitats throughout the reservoir to the benefit of wildlife that utilize these areas. Common amphibians and reptiles found in this habitat type include American toad, spring peeper, upland chorus frog, and common garter snake. Birds that nest in these habitats include eastern wild turkey, eastern towhee, brown thrasher, northern mockingbird, white-eyed vireo, field sparrow, song sparrow, eastern bluebird, common yellowthroat, and prairie warbler. Mammals seeking food and cover in these habitats include white-tailed deer, eastern mole, eastern cottontail rabbit, woodchuck, gray fox, and coyote.

Agricultural and grassland habitats are relatively uncommon on Watts Bar Reservoir properties comprising only a few hundred acres. Lands licensed to individual farmers by TVA are being farmed exclusively to grow hay forage crops for livestock. Most of these fields are planted to cool season grasses, predominantly Kentucky fescue with some orchard grass and clover and are mowed two to three times during the growing season for hay crops. Older fields that are more infrequently mowed support several coarse herbs and shrubs including annual ragweed, lamb's quarters, pigweed, panic grass, sericea lespedeza, tall ironweed, Canada goldenrod, common blackberry, northern dewberry, Japanese honeysuckle, and winged sumac. The frequently mowed open hayfield areas provide somewhat limited wildlife habitat. Bird species that use these areas include resident Canada geese, eastern bluebird, eastern meadowlark, American crow, American kestrel, and red-tailed hawk. Amphibians and reptiles utilizing these habitats, at least on a seasonal basis, include spring peeper, upland chorus frog, and eastern garter snake. Utilizing Breeding Bird Survey data from 1966 to 1992, Peterjohn et al. (1995) reported that birds of grasslands experienced the most significant and consistent declines throughout the Southeast. In an effort to offset this trend on a local landscape level, TVA partnered with the TWRA and agricultural licensees to plant and establish stands of native warm season grasses on portions of the Watts Dam Reservation (Parcel 3) over the last several years. To date, approximately 55 acres of mixed native grass stands have been successfully established. Grassland bird species, in particular northern bobwhite quail and grasshopper sparrows, have responded positively to this management effort.

Several birds on the USFWS list of "Birds of Conservation Concern" (USFWS 2002) occur on Watts Bar Reservoir lands. These species and their preferred habitats (Nicholson 1997) are the chuck-will's widow, whip-poor-will, wood thrush, and worm-eating warbler in upland forest; Acadian flycatcher, Kentucky warbler, and Louisiana waterthrush along forested streams; prairie

warbler in early successional scrub-shrub and sapling habitats; and the prothonotary warbler in forested wetlands. Watts Bar Reservoir lands provide regionally important habitats for most of these species.

Invasive terrestrial plant species typify disturbed, early successional vegetation throughout the Watts Bar Reservoir area. Several previously mentioned species such as Japanese honeysuckle and sericea lespedeza along with Chinese privet, multi-flora rose, kudzu, autumn olive, tree-of-heaven, nepalgrass, bush honeysuckle, and mimosa are widespread and common. Bottomlands, or periodically flooded narrow floodplain areas, are often dominated by Chinese privet and/or nepalgrass in the understory to the total exclusion of native flora. Many of these exotic invasive plant species are negatively affecting some of the uncommon natural plant communities scattered around Watts Bar Reservoir. TVA has taken action in previous years to chemically control some kudzu growth at specific sites and plans to expand this work on several areas in the future.

Riparian/shallow water/overbank habitats are widespread and common on Watts Bar Reservoir with its 771 shoreline miles and almost 29,000 acres of overbank. These shallow water/riparian habitats, coupled with a consistent fish forage base, provide excellent habitat for several fish-eating bird species. Great blue heron and black-crowned night-herons, along with a growing number of cattle egrets and double-crested cormorants, are common throughout the reservoir area with numerous nesting colonies being located on TVA-owned properties. Osprey, formerly listed as endangered in Tennessee, have consistently increased in numbers since the first successful nesting attempt in 1977. TWRA annually conducts a census of the active osprey nests and tallied around 120 nests during the 2004 nesting season.

Other wildlife utilizes the riparian and wetland habitats along the reservoir. Numerous other birds, including some neotropical migrant species such as prothonotary warbler, blue-gray gnatcatcher, and northern parula warbler, utilize these habitats. Some of the more common waterfowl species seen include mallards, American black ducks, hooded mergansers, resident Canada geese, and wood ducks. There are also other water/wading birds such as green herons, great egrets, pied-billed and horned grebes, and various tern and gull species. Common amphibians include green frog, narrow-mouth toad, and Fowler's toad while reptiles are represented by northern water snake, common snapping turtle, painted turtles, and red-eared sliders. Mammals that use these habitats include mink, muskrat, raccoon, and beaver.

3.3. Sensitive (Endangered and Threatened) Species

Sensitive species include any plant or animals listed under the ESA or similar state laws or regulations, as well as any species or community of species considered to be rare, uncommon, in need of management, or of special concern. The sensitive species in this section are those that are found in the area of Watts Bar Reservoir. The discussion of sensitive species is presented in three sections, namely, plants, terrestrial animals, and aquatic animals.

3.3.1. Plants

The rare plants known from the area surrounding Watts Bar Reservoir are found in many different types of terrestrial plant communities (Pyne and Shea 1994a). The major plant communities surrounding Watts Bar Reservoir include the following: forested bluffs and rocky slopes; mesic deciduous forests; moist woodlands; forested streamsides, seeps, and bogs; forest edges, roadsides, and fencerows; prairies, barrens, and open woodlands; marshes, wet meadows, and open streamsides; and gravel bars and boulders in rivers and large streams. Each of these communities is described briefly below.

The Forested Bluff and Rocky Slope community is dominated by white pine and northern white cedar. Plants commonly found in the canopy layer are northern red oak and white oak. Plants commonly found in the understory are sassafras, serviceberry, leatherwood, and maple-leaf viburnum. This community contains the most rare plant species including the federally listed American hart's-tongue fern.

The Mesic Deciduous Forest typically has basswood, yellow buckeye, beech, tulip poplar, and sugar maple in the canopy layer and flowering dogwood, sourwood, umbrella magnolia, witch hazel, and striped maple in the understory.

The Moist Woodlands community includes cove slopes, ravines, valley floors, and floodplain forests. This community commonly contains river birch, green ash, sycamore, willow oak, and swamp chestnut oak.

The Forested Streamsides, Seeps, and Bogs community type is dominated by sycamore, box elder, basswood, sugar maple, and eastern hemlock.

Forest Edges, Roadsides, and Fencerows are typified by fast-growing, opportunistic vegetation and are often dominated by exotic woody vegetation such as Chinese privet, tree-of-heaven, mimosa, princess tree, and Japanese honeysuckle. Typical native vegetation includes eastern red cedar, blackgum, osage orange, and New Jersey tea.

Prairies, Barrens, and Open Woodlands typically have an abundance of grasses such as big blue steam and side oat gamma grass in addition to scattered trees such as eastern red cedar, post oak, and blackjack oak.

Marshes, Wet Meadows, and Open Streamsides are dominated by different species of grasses, sedges, and rushes. Small trees such as black willow, tag alder, button bush, and silky dogwood, as well as numerous fern species, are typical of this community type.

Gravel Bars and Boulders in Rivers and Large Streams are typically dominated by black willow, tag alder, button bush, and silky dogwood. Occasionally, two federally listed species, Virginia spirea and Cumberland rosemary, may occur in this community type.

Various sources were used to compile a list of sensitive plant species known to occur or to have suitable habitat on lands within or adjacent to Watts Bar Reservoir. These sources included the TVA Natural Heritage database, the 1988 Plan, the data for Watts Bar Reservoir from the SMI EIS (TVA 1998), the 2000 *Lower Watts Bar Management Unit Resource Management Plan and Final Environmental Assessment* (TVA 2000), as well as the University of Tennessee Herbarium database. Field inventories were done on Watts Bar in 1984 by Dr. Gene Wofford, of the University of Tennessee Herbarium, and in 1996 by Dr. Larry Pounds, a TVA contract botanist.

At present, no known populations of plants listed under the ESA as threatened or endangered occur on Watts Bar Reservoir lands. However four populations of Virginia spirea (*Spirea virginiana*) and one population of Cumberland rosemary (*Conradina verticillata*), both federally listed as threatened species, occur within 1 mile of the reservoir on the Emory River. In addition, there is a historical record of American hart's tongue fern (*Asplenium scolopendrium* var. *americanum*), a federally listed as threatened species, last observed in 1849 in a cave approximately 2 miles west of Caney Creek. There are 37 state-listed as threatened and endangered species that occur in the vicinity of Watts Bar Reservoir and 13 of these occur on TVA land. A listing of rare plant species and the community types in which they are found is provided in Table 3.3-1.

Spreading false-foxglove (*Aureolaria patula*). Thirty-four populations of false-foxglove (state-listed as threatened) have been reported on and around the Watts Bar Reservoir property. There is one population on the lower Watts Bar Reservoir property (TRMs 530-547) on Parcel 248. Five populations occur in the middle portion of the reservoir property between TRMs 544 and 573 on Parcels 61, 70, 81, 83, and 196. Six populations occur from the confluence of the Clinch River at TRM 568 to TRM 599 on Parcels 91 and 94. Four other populations occur in the area within Zone 1 (Non-TVA Shoreland), but are not associated with any parcel. Eleven populations occur in the upper part of the reservoir property (along the Clinch and Emory rivers) on Parcels 126, 148, 152, and 194. The remaining seven populations occur in Zone 1, and are not associated with any parcel. According to Kral (1983), this plant is a member of the figwort family, is a perennial herb, and is parasitic on the roots of oaks. It grows on steep, dry, partially shaded calcareous slopes above large streams and rivers. It is often found near water. False-foxglove is sensitive to the loss of overstory shading and does not tolerate competition from weedy vegetation. This species is sparsely distributed in a narrow range, with limited habitat (NatureServe 2007).

Appalachian bug-bane (*Cimicifuga rubrifolia*). This species is listed as threatened by the state of Tennessee. Four populations of this member of the buttercup family have been found on Watts Bar Reservoir on Parcels 126, 128, 132, and 196. It is a perennial herb and is rare throughout its range. It typically occurs in cool, moist mixed hardwood forests between 890 to 1,575 feet elevation. However, plants have been found at elevations as high as 2,950 feet elevation. Approximately 50 occurrences are known for the species (NatureServe 2007).

Northern bush-honeysuckle (*Diervilla lonicera*). Two populations of this woody shrub were found growing on limestone cliffs of Watts Bar Reservoir on Parcels 126 and 196. A member of the honeysuckle family, this plant is listed as threatened at the state level. It grows in rocky woodlands often associated with limestone or sandstone bluffs (Kral 1983).

American barberry (*Berberis canadensis*). One population of this plant was found around TRM 593 within a Zone 1 area. This occurrence was determined to be a county record. Barberry is listed by the state as a species of special concern. The plant is a woody shrub about 1-7 feet tall (Radford et al. 1968). Collections at the University of Tennessee-Knoxville Herbarium suggest that the habitat consists of relatively open woodlands, because specimens have been made from wooded slopes, shale slopes, bluffs, terraces along river bluffs, and riverbanks. In the past, American barberry was distributed in open savannas and woodlands where habitat was maintained by fire. Fire suppression has significantly restricted its habitat to sites with shallow soil (e.g., glades and cliffs) or areas that experience periodic mowing or other canopy-clearing activities, such as transmission line or railroad/road rights-of-way, and riverbanks (NatureServe 2007).

Mountain bush-honeysuckle (*Diervilla rivularis*). One population of this state-listed as threatened species was found along Watts Bar Reservoir on Parcel 121. Mountain bush-honeysuckle occurs in damp woods and rocky banks and bluffs in full sun in disturbed areas (Wofford and Chester 2002). It is somewhat threatened by land use conversion, habitat fragmentation, and forest management practices (NatureServe 2007).

Table 3.3-1. Listed Plant Species by Community Type Known From or Potentially Occurring Adjacent (within 5 miles) of Watts Bar Reservoir

Plant		Status		Community[3]							
Common Name	Scientific Name	Federal[1]	State[2]	FBRS	MDF	MW	FSSB	FERF	PBOW	MWOS	GB
American barberry	*Berberis canadensis*		SPCO					X			
American ginseng	*Panax quiquefolius*		S-CE		X						
American hart's-tongue fern	*Asplenium scolopendrium* var. *americanum*	LT	END	X							
Appalachian bugbane	*Cimicifuga rubrifolia*		THR	X							
Barren's silky aster	*Aster pratensis*		THR						X		
Bay starvine	*Schisandra glabra*		THR				X				
Butternut	*Juglans cinerea*		THR			X					
Canada lily	*Lilium canadense*		THR					X		X	
Catfoot	*Gnaphalium helleri*		SPCO						X		
Cumberland rosemary	*Conradina verticillata*	LT	THR								X
Dwarf milkwort	*Polygala nana*		END	X							
Ear-leaf foxglove	*Agalinis auriculata*		END						X		
Fetter-bush	*Leucothoe racemosa*		THR							X	
Goldenseal	*Hydrastis canadensis*		S-CE		X						
Hairy sharp-scaled sedge	*Carex oxlepis* var. *pubescens*		SPCO	X		X					
Heavy-fruited sedge	*Carex gravida*		SPCO	X							
Large-flowered Barbara's-buttons	*Marshallia grandiflora*		END								X
Loesel's twayblade	*Liparis loeselii*		PT			X					
Mcdowell's sunflower	*Helianthus occidentalis*		SPCO						X		
Mountain bush-honeysuckle	*Diervilla rivularis*		THR	X							
Mountain honeysuckle	*Lonicera dioica*		SPCO	X							X
Northern bush-honeysuckle	*Diervilla lonicera*		THR	X							
Northern white cedar	*Thujja occidentalis*		SPCO	X							
Pale green orchid	*Platanthera flava* var. *herbiola*		THR			X					
Pink lady-slipper	*Cypripedium acaule*		E-CE			X					
Prairie goldenrod	*Solidago ptarmicoides*		END						X		
Pursh's wild-petunia	*Ruellia purshiana*		SPCO			X					
River bull rush	*Scirpus fluviatilis*		SPCO							X	
Shining ladies'-tresses	*Spiranthes lucida*		THR							X	
Short-head rush	*Juncus brachycephalus*		SPCO				X				
Slender blazing-star	*Liatris cylindracea*		THR						X		
Spreading false-foxglove	*Aureolaria patula*		THR	X							
Swamp lousewort	*Pedicularis lanceolata*		SPCO				X				
Tall larkspur	*Delphinium exaltatum*		END						X		
Three parted violet	*Viola tripartata*		SPCO			X					
Virginia spiraea	*Spiraea virginiana*	LT	END								X
Waterweed	*Elodea nuttallii*		SPCO							X	

[1] **LT**: Federally listed as threatened

[2] Status Codes:
- **END -** Endangered
- **THR -** Threatened
- **SPCO -** Special Concern
- **E-CE -** Endangered, Commercially exploited
- **S-CE -** Special Concern, Commercially exploited
- **PT -** Proposed Threatened

[3] Community Type Codes:
- **FBRS**: Forested bluff and rocky slope community
- **MDF -** Mesic deciduous forest
- **MW -** Moist woodlands
- **FSSB -** Forested streamsides, seeps, and bogs
- **FERF -** Forest edges, roadsides, and fencerows
- **PBOW -** Prairies, barrens, and open woodlands
- **MWOS -** Marshes, wet meadows, and open streamsides
- **GB -** Gravel bars and boulders in rives and large streams

Fetter-bush (*Leucothoe racemosa*). Fetter-bush is a state-listed as threatened species and is member of the heath family. One population was found in 1984 growing on the shoreline of the upper Watts Bar Reservoir at TVA's KIF. According to Wofford and Chester (2002), this is a deciduous shrub that grows in wet woods, gravel bars, and on stream banks.

Canada lily (*Lilium canadense*). One population of Canada lily was found on the upper Watts Bar Reservoir growing across the river from Parcel 141. Three additional populations are known to occur within 5 miles of the reservoir. This state-listed threatened species grows in sunny areas having acidic soil, such as bogs, meadows, low thickets, and balds. They have also been found growing in roadside ditches and along the edges of woods (Pyne and Shea 1994b).

Mountain honeysuckle (*Lonicera dioica*). A population of this state-listed species of special concern is located in the Sugar Grove HPA (Parcel 152) on the Clinch River. Mountain honeysuckle is infrequently found in open woods and riverbanks (Wofford and Chester 2002).

Large-flowered Barbara's buttons (*Marshallia grandiflora*). There is a historic record for this state-listed as endangered species from the Emory River of the upper Watts Bar Reservoir near ERM 12. This plant is member of the Aster family. It is native to the Appalachians and is known from only 11 watersheds throughout its range. It occurs along flood-scoured banks of large, high-gradient rivers in the central Appalachians. This species is also reported from rocky lakeshores, creek banks, bluffs, and floodplains. It tends to occur in moist to wet sandy soil, in sandy/cobbly alluvium, or in bedrock crevices along rivers (NatureServe 2007). According to Pyne and Shea (1994b), in Tennessee, Cumberland Rosemary, a federally listed as threatened species, is often associated with and found near large-flowered Barbara's buttons.

Pursh's wild petunia (*Ruellia purshiana*). This perennial herb is state-listed as special concern. One population was found growing in Zone 1 within 500 feet of the Clinch River at Clinch River Mile (CRM) 22.5. Weakley (2004) lists the habitat as dry woodlands, forest, and glades especially over magnesium, iron, and calcium-rich rocks.

Northern white cedar (*Thuja occidentalis*). A member of the cedar family, this tree is state-listed as special concern. It is a conifer with a narrow, almost columnar crown. On upland sites, northern white cedar grows primarily in calcium-rich soils and clays and shallow loam overlying broken limestone (NatureServe 2007). On Watts Bar Reservoir, there is one historical population occurring in an area of limestone cliffs with seepage areas above the Emory River between ERMs 11 and 12. Recently, two populations of northern white cedar were found on Parcel 181A on the Emory River at ERMs 6.2 and 8.8

Shinning ladies tresses (*Spiranthes lucida*). Shinning ladies tresses, a state-listed as threatened orchid is primarily found in disturbed areas where the water supply is plentiful, such as open areas along creek banks, wet meadows, marshes, lakeshores, and sandbars of streams. According to Pyne and Shea (1994a) the plant is small and easily overlooked. One population was found on upper Watts Bar Reservoir near Parcel 148.

Bay starvine (*Schisandra glabra*). This state-listed threatened woody vine has a widespread range but with only a small number of known secure populations. It is highly threatened by competition from exotic invasive plants (particularly Japanese honeysuckle), land use conversion and habitat fragmentation (NatureServe 2007). Prior to its discovery in

the Whites Creek Parcel 233, it was known only from three counties along the Mississippi River in southwestern Tennessee.

3.3.2. Terrestrial Animals

The various plant communities on Watts Bar Reservoir provide suitable habitat for a variety of federally and state-listed terrestrial animals. These diverse communities include pine forests, mixed hardwood/conifer forests, upland and riparian hardwood forests, wetlands, and early successional and agricultural lands. Forest stands consist of a mixture of hardwoods and pine; however, recent infestations of southern pine bark beetle have greatly reduced numbers of pine stands in the vicinity. In addition to distinctive vegetated communities, many features such as streams, caves, rock outcrops, and sinkholes found on Watts Bar Reservoir lands provide unique habitats for rare species of wildlife. Although large stands of contiguous forest exist on Watts Bar Reservoir lands, large portions of reservoir lands have been developed, primarily for housing developments. This has resulted in fragmentation of many of these plant communities.

The TVA Natural Heritage database was queried to identify federally and state-listed terrestrial animals as well as sensitive ecological areas (e.g., caves and heron colonies) from the four counties surrounding Watts Bar Reservoir. Fourteen sensitive terrestrial animal species, 24 caves, and 37 heron colonies were identified (see Table 3.3-2). One terrestrial animal (gray bat) is federally listed, one species (bald eagles) has federal protection status and all 14 species are listed by the state of Tennessee.

Table 3.3-2. Listed Terrestrial Animals Known to Occur in Loudon, Meigs, Rhea, and Roane Counties, Tennessee

Common Name	Scientific Name	Federal Status	State Status
Amphibians			
Eastern hellbender	*Cryptobranchus alleganiensis alleganiensis*	-	In Need of Management
Four-toed salamander	*Hemidactylium scutatum*	-	In Need of Management
Tennessee cave salamander	*Gyrinophilus palleucus*	-	Threatened
Birds			
Bachman's sparrow	*Aimophila aestivalis*	-	Endangered
Bald eagle	*Haliaeetus leucocephalus*	Protected	In Need of Management
Barn owl	*Tyto alba*	-	In Need of Management
Least bittern	*Ixobrychus exilis*	-	In Need of Management
Sharp-shinned hawk	*Accipiter striatus*	-	In Need of Management
Mammals			
Eastern small-footed bat	*Myotis leibii*	-	In Need of Management
Gray bat	*Myotis grisescens*	Endangered	Endangered
Southeastern shrew	*Sorex longirostris*	-	In Need of Management
Southern bog lemming	*Synaptomys cooperi*	-	In Need of Management
Reptiles			
Eastern slender glass lizard	*Ophisaurus attenuatus longicaudus*	-	In Need of Management
Northern pine snake	*Pituophis melanoleucus melanoleucus*	-	Threatened

The eastern hellbender (*Cryptobranchus alleganiensis alleganiensis)* is found in large and midsize, fast-flowing, rocky rivers at elevations below 2,500 feet (Petranka 1998). Eastern hellbenders have been documented within the Clinch River and Little Tennessee River watersheds. Suitable habitat for this species exists on many parcels within the Watts Bar Reservoir vicinity.

The four-toed salamander (*Hemidactylium scutatum)* occurs in forested swamps, bogs, vernal pools, and other fish-free habitats, especially those with mossy banks. This salamander has been reported from Roane County. Suitable habitat for four-toed salamanders exists within wetlands in Parcels 36 and 111. Additional habitat exists on Parcel 193.

The Tennessee cave salamander (*Gyrinophilus palleucus)* is found in several cave systems in the region. This species has been documented from a cave approximately 800 feet from TVA land on Watts Bar Reservoir. Caves containing aquatic systems near Marble Bluff provide suitable habitat for this species.

The Bachman's sparrow (*Aimophila aestivalis*) is found in grassy openings in mature pine forests, but this bird species has also been recorded in old-field habitats. Populations are documented for Rhea and Roane counties although none have been recorded on TVA land. Suitable habitat for Bachman's sparrows is limited and scattered throughout Watts Bar Reservoir lands and may be found in Parcels 3, 295, 297, 298, and 299 near Watts Bar Dam.

Bald eagles (*Haliaeetus leucocephalus*) recently removed (2007) from the federal endangered and threatened species list; however, the species is tracked by TVA and is protected under the Bald and Golden Eagle Protection Act. Bald Eagles prefer to nest and roost in large, middle-aged and mature tracts of deciduous forest on Watts Bar Reservoir lands. Although their populations continue to increase in the Tennessee River Valley, nesting bald eagles remain uncommon in east Tennessee. Five bald eagle nests are currently known to occur on Watts Bar Reservoir. Suitable bald eagle nesting habitat is found throughout the project area. Bald eagles regularly roost at various sites along the reservoir during winter months. The largest of these roosts are found in the Paint Rock Wildlife Refuge, Whites Creek embayment, and Thiefneck Island.

Barn owls (*Tyto alba*) roost and nest in caves, hollow trees, barns, and silos. They forage over open landscape such as abandoned farmland, but also in urban habitat such as vacant lots, cemeteries, and parks (Nicholson 1997). The species has been reported from Rhea County and TVA KIF. Suitable habitat for this species is limited and scattered throughout the Watts Bar Reservoir.

Least bitterns (*Ixobrychus exilis*) inhabit marshes with tall, emergent vegetation bordering open water up to a meter or more deep (Weller 1961). The species has been reported from Meigs County. Suitable habitat for least bitterns can be found within some embayments of the Watts Bar Reservoir. Many of these sites are shallow enough to allow the growth of emergent herbaceous and woody vegetation preferred by this species.

Osprey (*Pandion haliaetus*) is currently not listed at the state or federal levels; however, the species is tracked by TVA. Ospreys nest in trees, on power line structures, artificial nest platforms, channel markers, and other structures in or near open water. In recent years, osprey populations have increased in Tennessee. Watts Bar Reservoir has one of the

largest populations of nesting osprey in the Tennessee River Valley. Numerous osprey nests can be found throughout Paint Rock Wildlife Refuge.

Sharp-shinned hawks (*Accipiter striatus*) nest within coniferous and mixed woodlands. The species has been reported from Roane County. Suitable habitat for sharp-shinned hawks occurs within mixed forests found scattered throughout the Watts Bar Reservoir. Although no active nests have been reported, the species has been observed in the area.

Eastern small-footed bats (*Myotis leibii*) roost in crevices in caves, mine tunnels, expansion joints beneath highway bridges, and in buildings (Linzey 1998). There is one documented record for this species from Rhea County. Forested bluffs in the vicinity of Watts Bar Reservoir provide suitable habitat for this species.

Gray bats (*Myotis grisescens*) roost in caves and forage over open water habitats. They have been reported from six caves within the vicinity of Watts Bar Reservoir. Only one of these caves is located on Watts Bar Reservoir land. Results of recent surveys at this cave indicate that gray bats roost at this site on a transitional basis during spring and fall migration.

Indiana bats (*Myotis sodalis*) have not been reported from the vicinity of Watts Bar Reservoir. This species roosts in caves during the winter, and form summer roosts under the bark of living and dead trees. Indiana bats favor mature deciduous forests having open midstories with an abundance of trees with exfoliating bark. Suitable habitat for the species exists in the Watts Bar Reservoir lands.

Southeastern shrews (*Sorex longirostris*) are found in a variety of habitats across Tennessee including moist forests and wetlands. Numerous southeastern shrew records are documented in the vicinity of the Clinch River within the Watts Bar Reservoir area. Suitable habitat for this species exists on most parcels.

Southern bog lemmings (*Synaptomys cooperi*) are found in wet pastures, grassy openings in woods, clear-cuts, power line rights-of-way, and similar habitat. One population of southern bog lemming is known from Rhea County. Suitable habitat for this species exists on several parcels.

Eastern slender glass lizards (*Ophisaurus attenuatus longicaudus*) are found in dry grassland and open woodland habitats. Suitable habitat for glass lizards is found scattered throughout the Watts Bar Reservoir. The upper end of Whites Creek (Parcel 233) contains areas of extensive sandy soils, which are ideal for this species.

Northern pine snakes (*Pituophis melanoleucus melanoleucus*) inhabit sandy pine forests, dry ridges, and hillsides. They have also been found in thickets dominated by Virginia pine, mountain laurel, and rhododendron. There is one historical record for this species from Rhea County. Suitable habitat is found scattered throughout the Watts Bar Reservoir.

Caves represent very specialized habitats and a significant number of federally and state-listed species exist within caves. Cave habitats are utilized year-around, as roosting and maternity sites by several state- and federally listed species of bats. The state-listed Allegheny wood rat (*Neotoma magister*), Tennessee cave salamander, and barn owl are also found in caves. According to a review of the TVA Natural Heritage database, six caves are recorded along the reservoir and 24 caves are reported from the four-county area. Two caves are located on TVA Watts Bar Reservoir land.

Heron colonies are colonial nesting sites used by migratory wading birds. Several species of birds, often in large numbers, nest in these colonies. Birds occupying these sites are sensitive to disturbance, especially during the nesting season.

According to a review of the TVA Natural Heritage database, 22 heron colonies are recorded along the reservoir. A majority of these colonies are within Zone 3 (Sensitive Resource Management) and Zone 4 (Natural Resource Conservation). Most of these colonies contain only great blue herons (*Ardea herodius*), but some are known to contain small colonies of black-crowned night-herons (*Nycticorax nycticorax*) and double-crested cormorants (*Phalacrocorax auritus*). Cattle egrets (*Bubulcus ibis*) are nesting on a small island south of Half Moon Island and on a small island in the Clinch River near the KIF peninsula.

The establishment of heron colonies on Watts Bar Reservoir is significant. Great blue heron populations in Tennessee underwent declines in the late 1960s and early 1970s (Nicholson 1997). Recently, heron colonies have increased dramatically throughout the Tennessee River watershed. The establishment of these new colonies suggests that Watts Bar Reservoir may provide suitable nesting habitat for other species of wading birds that are considered uncommon in Tennessee.

3.3.3. Aquatic Animals

A review of data from the TVA Natural Heritage database indicated that there are several rare and sensitive aquatic animal species found in Watts Bar Reservoir or in its tributaries in Loudon, Meigs, Rhea, and Roane counties. The official status of those species listed at the state and federal levels is provided in Table 3.3-3.

Table 3.3-3. State- and Federally Listed Aquatic Animal Species Reported From Watts Bar Reservoir and its Tributaries, and Recent Status of Those Species in and Around Watts Bar Reservoir

Common Name	Scientific Name	Federal Status	State Status[1]	Recently Found in Study Area?
Fish				
Tangerine darter	*Percina aurantiaca*	-	NMGT	Yes
Blue sucker	*Cycleptus elongates*	-	THR	Yes
Flame chub	*Hemitremia flammea*	-	NMGT	Yes
Snail darter	*Percina tanasi*	THR	THR	Yes
Spotfin chub	*Cyprinella monacha*	THR	THR	Yes
Tennessee dace	*Phoxinus tennesseensis*	-	NMGT	Yes
Mussels				
Pink mucket	*Lampsilis abrupta*	END	END	Yes
Alabama lampmussel	*Lampsilis virescens*	END	END	No
Rough pigtoe	*Pleurobema plenum*	END	END	Yes
Dromedary pearlymussel	*Dromus dromas*	END	END	No
Fanshell	*Cyprogenia stegaria*	END	END	Yes

Common Name	Scientific Name	Federal Status	State Status[1]	Recently Found in Study Area?
Pyramid pigtoe	*Pleurobema rubrum*	-	NMGT	Yes
Fine-rayed pigtoe	*Fusconaia cuneolus*	END	END	No
Purple bean	*Villosa perpurpurea*	END	END	No
Orange-foot pimpleback	*Plethobasus cooperianus*	END	END	Yes
Snails				
Anthony's river snail	*Athearnia anthonyi*	END	END	No

[1] Status Codes: END = Endangered; THR = Threatened; NMGT = Deemed In Need of Management by the TWRA

Fish - The state- and federally listed spotfin chub (*Cyprinella monacha*) and state-listed Tennessee dace (*Phoxinus tennesseensis*) do not occur in Watts Bar Reservoir, but are found in tributary streams on non-TVA lands allocated as Zone 1 (Non-TVA Shoreland).

Likewise, the remaining four fish species are primarily found in the tributary streams allocated as flowage areas. However, they are wide-ranging and are known to use the margins and embayment areas of the reservoir, although this is not their preferred habitat. Snail darter (*Percina tanasi*) larvae drift downstream from tributary streams into reservoirs, and as the young develop they migrate back upstream into tributary streams. Snail darters are also found below Watts Bar Dam in the tailwater.

Mollusks - Five protected mollusk species have been reported from Watts Bar Reservoir and its tributaries, but have not been found in the study area within the last 30 years. These include the Alabama lampmussel (*Lampsilis virescens*), dromedary pearlymussel (*Dromus dromas*), fine-rayed pigtoe (*Fusconaia cuneolus*), purple bean (*Villosa perpurpurea*), and Anthony's river snail (*Athearnia anthonyi*). These species were prevalent before the impoundment of the reservoir (in 1942) and have likely been extirpated because of the loss of suitable habitat.

Four endangered mussel species have been observed relatively recently in Watts Bar Reservoir in the tailwaters of the upstream dams (Fort Loudoun and Melton Hill). These include the pink mucket (*Lampsilis abrupta*), rough pigtoe (*Pleurobema plenum*), fanshell (*Cyprogenia stegaria)*, and the orange-foot pimpleback (*Plethobasus cooperianus*). These mussels are found within the waters of Watts Bar Reservoir, but not in tributary steams including TVA lands associated with the proposed land plan.

Six mussel species occur just downstream of Watts Bar Dam in the tailwater. These include the four mussel species mentioned to occur in the reservoir, as well as the state- and federally listed as endangered dromedary pearlymussel (*Dromus dromas*), and the state-listed in need of management pyramid pigtoe (*Pleurobema rubrum*).

3.4. Managed Areas and Sensitive Ecological Sites

Managed areas and ecologically sensitive sites are lands set aside for a particular management objective or lands that are known to contain sensitive biological, cultural, or scenic resources. Such areas and sites within the seven-state TVA region are identified and recorded in the TVA Natural Heritage database. Managed areas and ecologically

sensitive sites are typically established and managed to achieve one or more of the following objectives.

Species/Habitat Protection for places with endangered or threatened plants or animals, unique natural habitats, or habitats for valued fish or wildlife populations. Examples include national and state wildlife refuges, mussel sanctuaries, TVA's HPAs, refuges operated by nongovernmental agencies, and identified but unprotected ecologically significant sites.

Recreation areas, such as parks, picnic areas, camping areas, trails, greenways, and other sites managed for outdoor recreation or open space, such as national parks, national recreation trails, scout camps, and county and municipal parks.

Resource Production/Harvest on lands managed for production of forest products or for hunting or fishing, such as national forests, state game lands, and fish hatcheries.

Scientific/Educational Resources on lands protected for scientific research and education, including biosphere reserves, TVA's ecological study areas (ECSAs), environmental education areas, and research parks.

Cultural Resources Protection, such as lands with human-made resources of interest, including military reservations, state historic areas, and state archaeological areas.

Visual/Aesthetic Resources Protection of areas with exceptional scenic qualities or views; such as TVA's small wild areas (SWAs), national and state scenic trails, wildlife observation areas (WOAs), and wild and scenic rivers.

Most managed areas and ecologically significant sites have multiple management objectives. If management objectives cannot be met, the integrity of the area may be lost or compromised.

The managed areas and ecologically significant sites addressed in this section have been established by various agencies for numerous and often overlapping objectives. Federal agencies manage areas according to agency policy. TVA, for example, manages SWAs, HPAs, and ECSAs. Federal lands, such as national wildlife refuges and several national forests, are managed with public funds by various agencies within the U.S. Department of the Interior and the U.S. Department of Agriculture, in accordance with applicable laws and regulations.

State laws and regulations permit state agencies, commissions, departments, and divisions to establish and manage a variety of public sanctuaries, parks and forests, and wildlife management areas (WMAs), such as the Watts Bar and Oak Ridge WMAs. City and county governments, through their parks and recreation divisions or their equivalent, serve to provide passive recreational opportunities for the public through management of municipal parks, watersheds, and picnic areas. Various nongovernmental organizations often use private donations to purchase and maintain lands for protection of sensitive resources and passive recreational activities. Some lands, such as Browder Woods, are privately owned.

For this study, managed areas and ecologically significant sites within and in the vicinity of Watts Bar Reservation were identified using the TVA Natural Heritage database and the Land Plan allocation maps. Fifteen TVA managed areas and 17 areas managed by other local, state, or federal agencies are currently located on Watts Bar Reservation. A change

in the number of TVA-managed areas is proposed with this Land Plan and includes the removal of five HPAs and one ECSA and the addition of a new HPA.

These areas are described below.

3.4.1. TVA Small Wild Areas (SWAs)

Two SWAs are located on the Watts Bar Reservation. SWAs are designated areas that have exceptional natural, scenic, or aesthetic qualities and are suitable for low-impact public use.

Fooshee TVA SWA (Parcel 8) is located at TRMs 538.4 to 537.7 on the left-descending shoreline. This 141-acre area on the east side of a large peninsula boasts a dry ridge forest of large white oaks and shagbark hickories. Brown Hollow, on the western edge of the area, is a moist forest of beeches and maples with a ground cover of ferns and wildflowers. The peninsula provides habitat for wintering bald eagles and numerous other migratory birds, offering visitors a unique wildlife viewing opportunity. An unmarked path and several logging roads create a network of trails that extend onto adjacent TVA lands. TVA, in cooperation with the National Wild Turkey Federation, manages these adjacent lands to enhance habitat for wild turkeys and other wildlife. The majority of the SWA and adjacent lands are open for hunting during statewide seasons. The area is accessible by both car and boat. The trail starts in a developed campground where 55 sites are available for overnight visits. A day use area features a beach, playground, picnic pavilions, and a boat ramp.

Whites Creek TVA SWA (Parcel 238) is located on Whites Creek at Miles 2.5 to 2.0 on the right-descending shoreline. This 171-acre area is composed of dry sawback ridgetops with stands of pine and chestnut oak. Moist coves of beech and maples can be found at lower elevations. This area is noted for spring wildflower displays including trout lily, doll's eyes, and wild ginger. An adjacent TWRA boat ramp provides access to the area. This ramp also marks the beginning of a 3-mile loop trail. The proposed 87.5-acre addition to Whites Creek TVA SWA (Parcel 237) is located on Whites Creek at approximately Miles 3.75 to 2.75 on the right-descending shoreline. The TWRA boat ramp area (Parcel 12-26) and proposed new trail would connect these two areas.

3.4.2. TVA Ecological Study Areas (ECSAs)

ECSAs are areas designated for use for ecological research or environmental education. One ECSA is currently located on the reservation. The upper reaches of Thiefneck Island, approximately 254 acres, was designated a TVA ECSA in the 1988 Land Plan. Until recently, the island was used for several years by Roane State Community College for environmental education and research. Because the college is no longer interested in studying the ecology of the island, it is proposed that the ECSA designation be removed from this area under the action alternatives. The island is proposed to remain a Zone 3 designation.

3.4.3. TVA Habitat Protection Areas (HPAs)

Twelve HPAs are located on Watts Bar Reservation. HPAs are established to protect populations of species that have been identified as either endangered or threatened in the state in which they occur or by the USFWS. Unusual or exemplary biological communities or geological features also can receive protection. Activities that could damage the ecological quality of these areas are deterred.

Under the action alternatives, the HPA designations for five of these 12 areas were removed because the animals being protected (e.g., ospreys and great blue herons) on these lands are no longer present and/or their populations have rebounded such that this extra form of management and protection is no longer warranted. These areas include Blue Springs Peninsula TVA HPA, Fooshee Bend Islands TVA HPA, Johnson Bend Islands TVA HPA, Long Island TVA HPA, and Riley Creek Islands TVA HPA.

Along with the remaining seven TVA HPAs, one new TVA HPA is proposed under the action alternatives; these areas are described below.

Marney Bluff TVA HPA (Parcel 65) is located at TRMs 565.0 to 564.5 on the left-descending shoreline. This site consists of bluff terrain and is one of three site locations in Tennessee that provides habitat for the state-threatened northern bush honeysuckle (*Diervilla lonicera*). The brittle stems of this plant make it susceptible to trampling and breakage.

Marble Bluff TVA HPA (Parcel 91*)* is located at TRMs 578.5 to 577.7 on the left-descending shoreline. This 12-acre narrow tract has a high limestone bluff that provides habitat for spreading false-foxglove (*Aureolaria patula*), which is a state-listed as threatened plant species. This site also contains Marble Bluff Cave that supports a summer colony of federally listed gray bats *(Myotis grisescens)* and possibly state-listed Tennessee cave salamanders *(Gyrinophilus palluecus).*

Polecat Creek Slopes TVA HPA (Parcel 94) is located at TRMs 579.5 to 579.0 on the left-descending shoreline. This 11-acre site provides habitat for spreading false-foxglove, a state-listed as threatened plant species.

Grassy Creek TVA HPA (Parcel 146) is located on Grassy Creek at CRM 14.5 on the right-descending shoreline. This 99-acre tract, with a proposed 166 additional acres, provides habitat for spreading false-foxglove, Appalachian bugbane (*Cimicifuga rubifolia*), and shining ladies'-tresses (*Spiranthes lucida*), all state-listed as threatened species. This area also could contain habitat for the state-listed eastern small-footed bat (*Myotis leibii*).

Sugar Grove TVA HPA (Parcel 152) is located on Emory River at ERMs 1.4 to 0.0 on the left-descending shoreline. This 4-acre area provides habitat for spreading false-foxglove and mountain honeysuckle (*Lonicera dioica*).

Rayburn Bridge TVA HPA (Parcel 194), located on the Clinch River at CRMs 2.5 to 2.2 on the right-descending bank, is an 8-acre site under the bridges of Interstate-40 and U.S. Highway 70. It provides habitat for spreading false-foxglove.

Stowe Bluff TVA HPA (Parcel 196) is located on the Clinch River at CRMs 1.7 to 1.0 on the right-descending shoreline. This 11-acre site provides habitat for Appalachian bugbane, northern bush honeysuckle, and spreading false-foxglove.

Whites Creek Alluvial Deposit Forest TVA Proposed HPA (Parcel 233) is located on 27.2 acres of the most upper end of Parcel 233 (total 80.5 acres) on Whites Creek at Whites Creek Miles 4.0 to 5.5 on the left-descending shoreline. This newly proposed HPA is a result of the recent discovery of a significant rare plant species, the bay starvine *(Schisandra glabra)*, which is listed as threatened by the state of Tennessee. The survey also found that the overall vegetation of the site is rare in the Ridge and Valley area and

more characteristic of Cumberland Plateau ravines and gorges. A more detailed description of the HPA can be found in Table B-1 of Appendix B.

3.4.4. Wildlife Management Areas (WMAs), Wildlife Refuges, and Wildlife Observation Areas (WOAs)

Two WMAs, two wildlife refuges, and one WOA are on the reservoir. The TWRA manages WMAs for hunting and trapping and manages refuges primarily to support migratory and resident waterfowl and other birds, although some hunting is allowed. WOAs provide areas specifically designated for public viewing and photographing of wildlife.

Watts Bar State WMA consists of two units, the Thiefneck Island Unit (Parcel 46) and the Long Island Unit (Parcel 78), and several unnamed tracts scattered throughout the reservoir (parcels or portions of Parcels 7, 35, 50, 72, 75, 227, 254, 276, and 286). The Watts Bar State WMA totals almost 3,900 acres. The Thiefneck Island Unit is located on Thiefneck Island at TRMs 556 to 551 in midchannel. It is one of two WMA units on Watts Bar Reservoir. TWRA Region III manages approximately 80 acres on the northern tip of Thiefneck Island. To enhance wildlife, TWRA annually plants small grain crops on approximately 20 acres. Hunting is allowed on the entire island, with special restrictions on the manner and means of harvest. The Long Island Unit is located on Long Island between TRMs 571 and 572.2 in midchannel. TWRA Region III administers hunting in this area according to statewide and some special hunting seasons. Small and big game and waterfowl hunting opportunities include squirrel, raccoon, opossum, northern bobwhite quail, eastern cottontail rabbit, American woodcock, Wilson's snipe, mourning dove, and white-tailed deer. Trapping also is allowed on this unit except during duck season.

Paint Rock State Wildlife Refuge (Parcel 88) is located at TRMs 575.8 to 573.8 on the left- and right-descending shorelines, in midchannel, and includes embayments on several creeks. The refuge is managed by TWRA Region III to attract and support migratory and resident waterfowl, osprey, bald eagles, sandhill cranes, and numerous other wading birds. Beaver, raccoon, white-tailed deer, and other mammals also inhabit the area. During a winter closure period, public access is limited. TWRA opens this 1,600-acre area (which includes both the land acreage of Parcel 88 and water acreage) to early Canada goose and wood duck/teal hunts.

Kingston Fossil Plant WOA (Parcel 190) is situated near the confluence of the Clinch and Emory rivers from ERMs 3.0 to 1.9 on the right-descending shoreline. KIF's ash settling ponds provide habitat for a wide variety of shorebirds, wading birds, and waterfowl. It is managed by TVA in cooperation with TWRA.

Kingston Refuge is located on the Clinch River at CRMs 4.4 to 2.5 and on the Emory River at ERMs 2.0 to 0.0 on the right-descending shoreline. Although the refuge encompasses the entire 1,260-acre KIF site, TWRA only actively manages a 300-acre area on the peninsula between the rivers. TWRA regulations create a refuge for migrating waterfowl; however, limited hunting opportunities exist. The refuge also is a popular area for bird watchers where the brown-headed nuthatch is a species of particular interest.

Oak Ridge State WMA, located at CRMs 18.8 to 14.5 on the right-descending shoreline, is a 37,000-acre area primarily on the Oak Ridge Reservation and adjacent USDOE lands. TWRA administers special shotgun, muzzleloader, and archery deer hunts. Boat access is limited in the section of the WMA adjacent to the Clinch River. The WMA includes some of the adjacent TVA lands at the former CRBR site.

3.4.5. Parks

Seven municipal or county parks are on Watts Bar Reservoir.

Meigs County Park (Parcel 5), located at TRMs 531.5 to 530.5 on the left-descending shoreline, is a 249-acre park managed by Meigs County under a recreation easement from TVA. The park features tennis courts, playgrounds, ball fields, an informal camping area, and a natural boat ramp for lake access.

Steekee Creek Park (Parcel 99) is located between TRMs 592 and 591 on the left-descending shoreline. TVA granted an easement to the city of Loudon for this municipal park.

Southwest Point Park (portion of Parcel 121) is located at TRMs 568.4 to 568.2 on the right-descending shoreline at the junction of the Clinch and Tennessee Rivers. Atop a hill overlooking Watts Bar Reservoir, Fort Southwest Point is the only fort in the state of Tennessee reconstructed on its original foundation. Completed sections of the fort, dating from 1792, include barracks, a blockhouse, and 250 feet of palisade wall. A separate building houses a welcome center and museum, which are open from late March to mid-December. In addition to the fort, the 30-acre park includes several ball fields, a track, picnic tables, and a pavilion. A walking trail around the base of the fort connects other waterfront areas in the city of Kingston to the park. Visitors can access the area from the water via a boat ramp located on this trail. This site was transferred to the City of Kingston by TVA after archaeological studies were completed in cooperation with TDEC. The site is listed on the NRHP.

Kingston City Park (portion of Parcel 121) is located at CRM 2.5 on the left-descending shoreline. This municipal park has been a popular gathering place for the community of Kingston since its transfer from TVA in 1958. Fishing tournaments and boat races are two of the many recreational activities at the park, which features floating boat docks, boat ramps, a pier, a roped-off swimming area, sand volleyball court, and playground equipment. Picnicking along the riverbank is an especially popular activity here. Visitors also can enjoy observing bird life, including osprey, gulls, wading birds, and waterfowl, from one of the many benches provided along a waterfront walking trail. This trail, used extensively by the public, begins at the adjacent Byrd Field, passes through Kingston City Park and extends for nearly 2.75 miles to Southwest Point Park.

Roane County Park (fronted by Parcel 201) is located at TRM 562.3 at Caney Creek. In 1961, TVA transferred this 183-acre area, spanning two peninsulas, to Roane County for public recreation use. The large peninsula offers many recreational opportunities including a marina, campground, tennis courts, swimming beach, picnic pavilion, ball fields, other amenities, and an extensive trail system. The smaller peninsula, with a more rugged terrain, is undeveloped. However, a primitive walking trail offers hikers the opportunity to enjoy the abundant wildflower display in the spring.

City of Rockwood Park (Parcel 219) is located at TRM 553 on King Creek. This area, roughly 69 acres of open fields with some wooded areas, was transferred by TVA to the City of Rockwood in 1951. The city park provides a boat ramp, sheltered picnic tables, and restroom facilities. Also known as Tom Fuller Memorial Park, it was named for Rockwood prominent citizen and doctor, Tom Fuller. The park has become a popular area for lake access.

Spring City Park (Parcel 270 and fronted by Parcel 277) is located on the Piney River at approximately Piney River Mile 5.5 on two sites. TVA granted an easement to the town of Spring City for public recreation on Parcel 270 and transferred property to Spring City, which is fronted by Parcel 277, also for public recreation. This site includes the Spring City Boat Dock.

3.4.6. Other Managed Areas

Two protection planning sites (PPSs), two potential national natural landmarks (PNNLs), one state natural area, and one biosphere reserve are on or adjacent to the reservation. PPSs are compiled by the Tennessee Protection Planning Committee, a cooperative effort of government land managers and private individuals knowledgeable about the biota of the state. The National Natural Landmark (NNL) Program was established in the 1970s by the U.S. National Park Service to identify nationally significant examples of ecologically pristine or near pristine landscapes. PNNL tracts, while meeting the criteria for listing, have not to date been registered as NNLs. Biosphere reserves are areas of terrestrial and coastal ecosystems that are internationally recognized within the framework of the United Nations Education, Scientific, and Cultural Organization Man and the Biosphere Program.

Berry Cave PPS is adjacent to Marble Bluff HPA (Parcel 91) and approximately 0.25 mile west of the reservoir at TRM 578.5 on the left-descending shoreline. The cave at this site is home to the Tennessee cave salamander (*Gyrinophilus palleucus*).

Browder Woods PPS and PNNL is located approximately 0.45 mile north of the reservoir at TRM 597.0 on the right-descending shoreline. This privately owned site contains approximately 300 rolling acres of second growth white oak forest, a rare remnant of the white oak forest that was once widespread in the Great Valley.

Campbell Bend Barrens Designated State Natural Area is approximately 0.1 mile west of Clinch River at CRM 12.5 on the left-descending shoreline in the Rarity Ridge area. This 35-acre area, managed by the TDEC, consists of a small barren that is a rare community type in a region where much of the land base has been developed or converted to agriculture. Eastern red cedar, white pine, post oak, dwarf chinquapin oak, and other hardwoods are scattered throughout the open grassland community. The dominant grasses include little and big bluestem and side-oats gramma. The barrens community within the nature area is approximately four to six acres.

Crowder Cemetery Cedar Barrens Designated State Natural Area is approximately 0.7 mile southwest of Clinch River at CRM 12.9 on the left-descending shoreline in the Rarity Ridge area. This 15-acre area, managed by TDEC, has grasslands in a matrix of mixed oak-pine with eastern red cedar and other hardwoods that are scattered throughout the barrens. Grasses include little bluestem and side-oats gramma and rare plants include slender blazing star and prairie dock. The dwarf chinquapin oak that is uncommon in Tennessee also is found here.

Oak Ridge Reservation is adjacent to the reservoir and is located on the Clinch River at CRM 23.2 to CRM 18.9. It excludes the former CRBR site. USDOE manages this 33,718-acre area, which is used variously for manufacture, laboratory research, managed forest, and ecosystem process research.

Oak Ridge National Environmental Research Park Biosphere Reserve is an area adjacent to the reservoir and contains many natural areas, sensitive sites, and research plots. This area contains approximately 20,000 acres and is within the boundaries of the Oak Ridge

Reservation. The park is used as an outdoor laboratory for studying present and future environmental consequences from energy-related issues. It provides protected land for the use of education and research in environmental sciences. Managed by the Oak Ridge National Laboratory for the USDOE, it is located on the Clinch River at CRMs 21.0 to 18.9 and on Melton Hill Reservoir at CRMs 33.2 to 23.0 on the right-descending shoreline.

3.4.7. Nationwide Rivers Inventory-Listed Streams

The Nationwide Rivers Inventory (NRI) listing by the National Park Service was used to identify NRI-listed streams in the vicinity of the reservation; three such river segments were identified and are described below. Approximately 3,400 free-flowing river segments in the United States are listed on the NRI, which were so designated for their nationally significant natural or cultural values.

Emory River, from the upper reaches of Watts Bar Reservoir near ERM 14 at the Roane County line to ERM 25 a mile below the Nemo Bridge, is listed on the NRI. The National Park Service recognizes this 11-mile segment for its scenic, recreational, geologic, and fish and wildlife values. It is noted as a scenic pastoral stream that flows through an impressive gorge area. It also supports game fishery. The segment ERMs 25 to 27 is a designated component of the National Wild and Scenic Rivers System. The Emory River meets the Obed River, Tennessee's only designated National Wild and Scenic River, at ERM 27.

Little Tennessee River, from Little Tennessee River Mile 1.0 above Tellico Dam to Little Tennessee River Mile 33.0 at Chilhowee Dam, is listed on the NRI. The National Park Service recognizes this 32-mile segment for its scenic, recreational, geologic, fish and wildlife, historic, and cultural values. It is noted as critical habitat for the federally listed snail darter (*Percina tanasi*). It offers excellent fishing and floating opportunities, and has 180 recorded archaeological sites.

Piney Creek, from Piney Creek River Mile 9.0 at the confluence with Little Piney Creek 3 miles north of Watts Bar Reservoir at Spring City to Piney Creek River Mile 32.0 at the headwaters near the Bledsoe County line, is listed on the NRI. The National Park Service recognizes this 23-mile segment for its scenic, recreational, and geologic values. It is noted as one of the most wild, scenic, and clear streams in Tennessee. It features adjacent waterfalls and affords sections of exciting creek run.

3.5. Water Quality and Shoreline

Watts Bar is a main stem Tennessee River reservoir with an average annual discharge of about 27,000 cubic feet per second (cfs), average water residence time of 18 days, and a winter drawdown of about 6 feet from the summer pool level. Only 1,834 square miles of total 17,310 miles of the watershed drains directly into Watts Bar Reservoir. Most of the water entering Watts Bar Reservoir (86 percent) comes from outside the immediate drainage area. The Tennessee and Little Tennessee rivers (i.e., discharge from Fort Loudoun Dam, 18,200 cfs) account for approximately 67 percent of the flow into the reservoir. The Clinch River (i.e., discharge from Melton Hill Dam, 5,000 cfs) accounts for about 19 percent of the flow into the reservoir. The remaining 14 percent is contributed by local inflows.

There are five major tributaries, greater than 100-square-mile drainage area, that make up the majority of the local inflow to Watts Bar Reservoir: Poplar Creek (136-square-mile drainage area) joins the Clinch River at CRM 12; the Emory River (865-square-mile

drainage area) joins the Clinch River at CRM 4, near the city of Kingston; Whites Creek (138-square-mile drainage area) joins the Tennessee River at TRM 545; and the Piney River (137-square-mile drainage area) enters the Tennessee River at TRM 532, near Spring City. The Little Tennessee River (2,630-square-mile drainage area) joins the Tennessee River at TRM 601 below Tellico Dam, but very little water is discharged through Tellico Dam. Instead, it is routed through a navigation canal to Fort Loudoun Reservoir and is controlled primarily by Fort Loudoun Dam and Navigation Lock.

Hydrologic unit codes (HUCs) are cataloging units assigned to each watershed by the U.S. Geological Survey for the purpose of assessment and management activities. HUCs are standard units used by most state and federal agencies to reference for scientific study, sampling, and impact analysis. They are important to water quality efforts as they define land areas that drain to a specific stream. HUCs are based on watershed size ranging from 2-digit regional watershed codes (major rivers) to 12-digit cataloging units (creeks and streams) that represent the smaller subwatersheds. The 1,834-square-mile local Watts Bar Reservoir watershed is comprised of three regional cataloging units: 06010201 for the Watts Bar Reservoir; 06010208 for the Emory and Obed river system; and portions of 06010207 for the Clinch River tributaries that are part of Watts Bar Reservoir. This immediate drainage area contains a total of 31 smaller, 11-digit subwatersheds. Land uses can contribute positively or negatively to the water quality of the stream in that drainage basin. These smaller units of study can be used to determine causes and sources of water pollution and develop plans and projects to improve conditions.

3.5.1. General Water Quality Characteristics

The water quality in Watts Bar Reservoir is affected by many factors such as from TVA public land along the reservoir and from land use practices throughout the reservoir's drainage area. Most of the water entering Watts Bar Reservoir originates outside the immediate watershed, so the overall water quality characteristics of the reservoir are strongly affected by waters outside of local watershed. The water quality characteristics of the embayments are, however, more apt to exhibit a response to pollutant loadings and changes in land use within the local area than the main river region.

Watts Bar is considered a productive (eutrophic) reservoir with an average chlorophyll concentration for the growing season (April through September, 1998-2004) of about 15 milligrams per cubic meter (mg/m^3) in the main channel, with embayments ranging from 10 to 35 mg/m^3 (TVA 2004a). Summertime thermal stratification does occur but is generally limited to the downstream reach of the reservoir (TRMs 530 to 545) or embayments where velocity is sufficiently reduced to limit mixing of the water column, diminishing reaeration and causing lower dissolved oxygen (DO) concentrations in the bottom waters. TVA has installed aeration equipment to add oxygen to the deep water above Watts Bar Dam and to improve conditions immediately downstream. The upstream reach above TRM 565 is essentially riverine and typically does not experience thermal stratification. Algal productivity is suppressed due to greater concentration of suspended sediment and limited time in the photic zone (the area of the water column where light is sufficient for photosynthesis) for growth. The middle reach of the reservoir (TRMs 545 to 565) is termed the transition zone. This segment of the river has a greater volume and a longer residence time than the upper reach, and water quality is more influenced by internal processes. Velocity is reduced in this reach, suspended sediment begins to settle from the water column, and algae remain in the photic zone for longer periods. This allows increased photosynthesis and results in higher algal productivity (i.e., higher chlorophyll

concentrations). This reach of the reservoir typically experiences only weak thermal stratification except during low-flow conditions.

3.5.2. TVA Water Quality Monitoring and Results

As part of the Reservoir Vital Signs Monitoring Program initiated by TVA in 1990, Watts Bar Reservoir has been monitored for physical and chemical characteristics of waters, sediment contaminants, benthic macroinvertebrates (bottom-dwelling animals such as worms, mollusks insects, and snails living in or on the sediments) and fish community assemblage. Five key indicators (DO, chlorophyll, fish, bottom life, and sediment contaminants) are monitored and contribute to a final rating that describes the "health" and integrity of an aquatic ecosystem. TVA monitors two locations on Watts Bar Reservoir for physical and chemical characteristics, and sediment contaminants. The forebay region (the deep, still waters near the dam) is sampled at TRM 532.5. The midreservoir region (or transition zone) is sampled at TRM 560.8, downstream of the confluence of the Clinch and Tennessee rivers. Other components of the monitoring program include monitoring of toxic contaminants in fish flesh to determine their suitability for consumption and sampling of bacteriological concentrations at recreational areas to evaluate their suitability for water contact recreation (TVA 2004b).

The overall Reservoir Ecological Health rating for Watts Bar Reservoir was fair in 2004. Ratings declined from good to poor between 1994 and 2002. This was driven mostly by declining scores for chlorophyll and DO (see Table 3.5-1). In reservoirs such as Watts Bar, which have short water residence time (the amount of time required to replace the reservoirs' volume of water with "new" water), DO and chlorophyll can be strongly influenced by reservoir flow. The drought-like condition across the Valley from mid-1998 to mid-2002 led to lower flows, thereby allowing for more stagnant conditions and lower DO concentration in bottom waters. The improved rainfall and runoff in 2003 and 2004 greatly improved DO. However, chlorophyll concentrations have continued to show a trend of increasing concentrations (Figure 3.5-1 and 3.5-2) between 1994 and 2002, with substantial increases at TRM 560.8. These high chlorophyll concentrations have caused the water quality ratings to decrease. Analysis of the total phosphorus data also indicates a trend of increasing concentrations at TRM 560.8. Nitrogen concentrations have been more variable and exhibit no strong trend over time.

Table 3.5-1. Watts Bar Reservoir Water Quality Ratings, Reservoir Vital Signs Monitoring Data

	Monitoring Years					
	1994	**1996**	**1998**	**2000**	**2002**	**2004**
Watts Bar Forebay						
Dissolved Oxygen	Fair	Good	Good	Poor	Poor	Good
Chlorophyll	Fair	Poor	Poor	Poor	Poor	Poor
Sediment	Fair	Fair	Fair	Fair	Fair	Good
Watts Bar Midreservoir						
Dissolved Oxygen	Good	Good	Good	Good	Good	Good
Chlorophyll	Good	Poor	Poor	Poor	Poor	Poor
Sediment	Fair	Fair	Fair	Fair	Fair	Fair

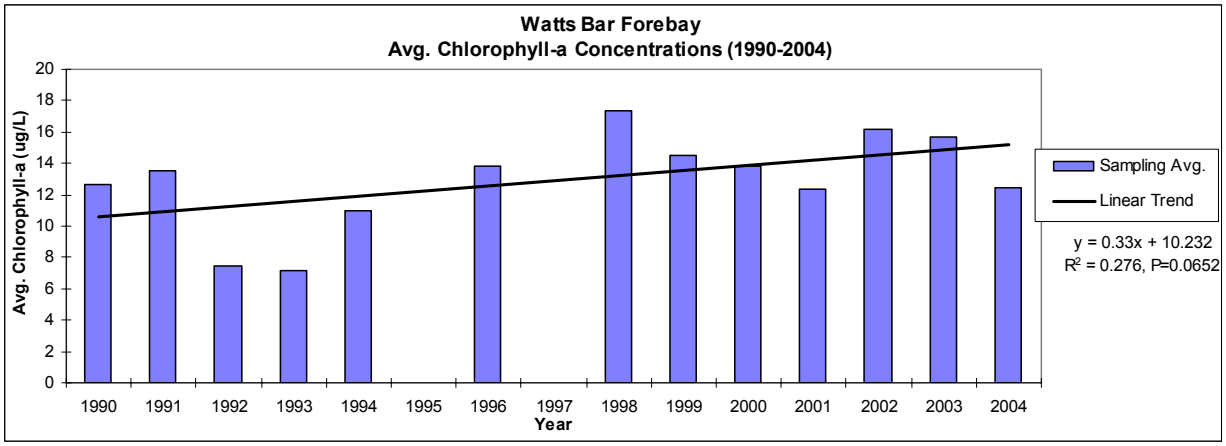

Figure 3.5-1. Trend in Chlorophyll-a Concentrations in Watts Bar Reservoir Forebay (TRM 532.5)

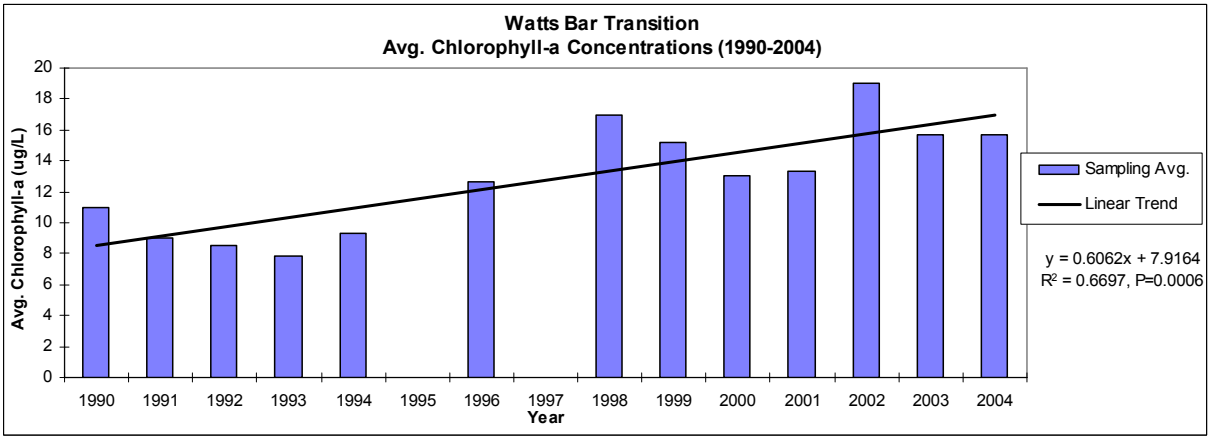

Figure 3.5-2. Trend in Chlorophyll-a Concentrations in Watts Bar Reservoir Transition Zone (TRM 560.8)

Sediment quality rated good at the forebay and fair at the transition due to elevated arsenic levels. The sediment quality ratings have varied from good to fair (1991-2003) with a greater frequency of occurrence of organic chemicals (mainly polychlorinated biphenyls [PCBs] and chlordane) in recent years. PCBs and chlordane were not detected in 2004. The presence or absence of these chemicals is probably more due to sampling variability rather than an actual increase because of their historical, rather than current use. These chemicals are no longer manufactured because they have been linked to a variety of health concerns. Chlordane was mainly used to control termites. PCBs were commonly used in a variety of commercial products, including adhesives, hydraulic systems, transformers, electric motors, and other electrical equipment, as well as during past operations of the USDOE's Oak Ridge Reservation.

Institutional controls (warning signs, fish consumption advisories, and monitoring) are in place to reduce health and environmental risk. USDOE is required to take appropriate actions if a sediment-disturbing activity would threaten human health or the environment. The land planning process will not affect the established procedure for reviewing projects

and proposals that may result in sediment disturbance. TVA participates in the WBWG along with the USACE, the USDOE, TDEC, and the USEPA. The primary purpose of this working group is to review projects that have the potential to disturb contaminated or potentially contaminated sediments resulting from past operations at the Oak Ridge Reservation.

The state of Tennessee has issued several fish consumption advisories for Watts Bar Reservoir because of PCB contamination. Striped bass, catfish, and striped bass-white bass hybrids caught in the Tennessee River portion of the reservoir should not be eaten. Additionally, no fish caught in the Poplar Creek Embayment should be eaten due to PCB and mercury contamination.

There is a precautionary advisory for largemouth bass, white bass, sauger, carp, and smallmouth buffalo caught in the Tennessee River portion of the reservoir and catfish and sauger caught in the Clinch River arm. A precautionary advisory means pregnant women, nursing mothers, and children should not consume the fish species named, and all other individuals should limit their consumption to no more than one meal per month.

PCB concentrations have declined in fish tissue samples from Watts Bar and neighboring Fort Loudoun and Tellico reservoirs in recent years. To better understand the issue of PCB contamination, TVA coordinates with state agencies to sample these reservoirs annually.

There are no state advisories against swimming in Watts Bar Reservoir. Escherichia coli (E. coli) bacteria levels were tested in samples collected on and around the reservoir in 2006. The following sites were within the state of Tennessee's guidelines for water contact: Watts Bar Dam recreation area beach, Rhea Harbor beach, Wolf Creek informal camping area swim site on Peninsula, Fooshee Pass day use area beach, Hornsby Hollow Campground beach, Red Cloud Campground beach, Eden on Lake beach, Brigadoon Resort beach, Whites Creek public access area canoe access site, Lakeside Resort beach, Arrowhead Resort beach, Whites Creek boat ramp, Bayside Marina beach, Roane County Park beach, Caney Creek informal swim site, Boy Scouts of America Camp Buck Toms swim site, Crab Orchard Creek canoe access site and KIF boat ramp.

Several sites exceeded the single-sample maximum at least one time. Some of the elevated E. coli concentrations found at these sites may be related to documented waterfowl presence or collection following a rainfall event. These sites were Whites Creek public access area, Arrowhead Resort beach, Roane County Park beach, Caney Creek informal swim site, Crab Orchard Creek canoe access site, and KIF boat ramp.

In addition, Riley Creek day use area beach and Riley Creek Campground beach exceeded the geometric mean (geometric mean of all 10 samples) and the single-sample maximum 5 of 10 sampling events.

The State of Tennessee 303(d) List is a compilation of the streams and lakes in Tennessee that are "water quality limited" or are expected to exceed water quality standards in the next two years and need additional pollution controls. The assessment of Tennessee's waters was based on a water quality evaluation that took place during 2005 and early 2006 (TDEC 2006).

Water quality limited streams are those that have one or more properties that violate water quality standards. They are considered impaired by pollution and not fully meeting designated uses (TDEC 2006). Of the 31 smaller, 11-digit watersheds, or HUCs, that make

up the local Watts Bar Reservoir watershed, there are 19 that have impaired stream segments. The impaired segment, corresponding hydrologic unit and cause and source of impairment are listed in Appendix D, Table D-3.

3.6. Aquatic Ecology

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

As part of the data collection effort for the SMI EIS, a survey was conducted on four representative TVA reservoirs by TVA to arrive at a shoreline aquatic habitat index (SAHI) score that would indicate the quality of aquatic habitat conditions adjacent to various land uses. Although Watts Bar was not chosen as one of the four reservoirs, nearby Fort Loudoun was included in the surveys. Scoring parameters (metrics) included seven physical habitat parameters (i.e., riparian zone condition, amount of canopy cover, bank stability, substrate composition, amount of cover, habitat diversity, and degree of slope) important to Tennessee Valley reservoir resident sport fish populations, which rely heavily on shoreline areas for reproductive success, juvenile development, and/or adult feeding. Field methods and the SAHI rationale are described in Appendix G of the SMI EIS (TVA 1998). The overall average SAHI score extrapolated for all TVA reservoirs was 24.3 (of a possible 35), which indicates generally “fair” shoreline aquatic habitat within the reservoirs. Average SAHI scores are higher adjacent to lands currently allocated for natural and wildlife uses and cultural/public use/open area uses, compared to shorelines adjacent to all other allocated uses.

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. In areas characterized by residential development, habitat includes man-made features such as shoreline stabilization structures (e.g., seawalls or riprap) and docks. Some aquatic habitats, such as fallen trees, are less numerous in residential areas.

TVA began a program to systematically monitor the ecological conditions of its reservoirs in 1990. Previously, reservoir studies had been confined to assessments to meet specific needs as they arose. Reservoir (and stream) monitoring programs were combined with TVA’s fish tissue and bacteriological studies to form an integrated Vital Signs Monitoring Program. The following descriptions of Watts Bar Reservoir’s existing condition are based primarily on results from this program. Due to sampling methodology and rating criteria changes, only data collected since 1994 are presented.

3.6.1. Benthic Community

Benthic macroinvertebrate (e.g., lake bottom dwelling, readily visible, aquatic worms, snails, crayfish, and mussels) samples were taken in four areas of Watts Bar Reservoir during even numbered years beginning in 1994, as part of TVA’s Reservoir Vital Signs Monitoring Program. Areas sampled included the forebay (area of the reservoir nearest the dam) at

TRM 531.0, a midreservoir transition station at TRM 560.8, and inflows in both the Tennessee River at TRM 600 and the Clinch River at CRM 19. Forebay sampling was moved to TRM 532.5 in 2000. 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. Sampling and data analysis were based on seven parameters (eight parameters prior to 1995) that indicate species diversity, abundance of selected species that are indicative of good (and poor) water quality, total abundance of all species except those indicative of poor water quality, and proportion of samples with no organisms present. Collection methods and rating criteria were different prior to 1994, so those results are not compared directly to samples taken using current methods and therefore are not presented in this document.

As shown in Table 3.6-1, the benthic community in Watts Bar Reservoir rated from poor to excellent in comparison to other run-of-the-river reservoirs. The midreservoir station had the best overall benthic community, rating fair or better each year. In 2004, the benthic community rated excellent at this station. Otherwise throughout Watts Bar Reservoir, benthic communities rated generally poor, although there may be an improving trend since 2002.

Table 3.6-1. Benthic Community Ratings, Vital Signs Monitoring Data

Station	Monitoring Years					
	1994	1996	1998	2000	2002	2004
Forebay	Poor	Very Poor	Poor	Poor	Poor	Fair
Midreservoir	Good	Fair	Fair	Fair	Fair	Excellent
Inflow (Tennessee River)	Poor	Poor	Poor	Poor	Poor	Fair
Inflow (Clinch River)	Poor	Poor	Poor	Poor	Fair	Fair

3.6.2. Fish Community

The Reservoir Vital Signs Monitoring Program included fish sampling at Watts Bar Reservoir in even numbered years from 1994 through 2004. The electrofishing and gill netting sampling stations correspond to those described for benthic 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 that 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 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 1997).

The vital stations fish community monitoring results are shown in Table 3.6-2. These data compare Watts Bar to other run-of-the-river reservoirs. With only two exceptions since 1994, fish communities have rated ‘good’ in Watts Bar Reservoir. This indicates a consistently well-balanced fish assemblage over time. In 2004 sampling, overall species diversity was good, as were the diversity of top carnivores, and the low incidence of anomalies. Lower ratings were seen in percent tolerant individuals and percent of omnivores.

Table 3.6-2. Fish Community Ratings, Vital Signs Monitoring Data

Station	Monitoring Years					
	1994	1996	1998	2000	2002	2004
Forebay	good	good	good	good	fair	good
Midreservoir	good	good	good	good	fair	good
Inflow (Tennessee River)	good	good	good	good	good	good
Inflow (Clinch River)	good	good	fair	good	good	fair

A total of 43 fish species was collected in TVA's most recent fish collections at Watts Bar Reservoir in the fall of 2004. More abundant species in the overall sample were gizzard shad, bluegill, redear sunfish, largemouth bass, and freshwater drum.

TWRA creel data indicate that bluegill is the species caught in highest numbers, with largemouth bass trailing closely behind (TWRA 2002). Black bass are, however, the most sought after group of fish by Watts Bar anglers, as nearly 330,000 hours were spent in pursuit of them in 2000. This was nearly one-half of all the estimated fishing pressure for Watts Bar that year. Other species caught in considerable numbers include black crappie, white bass, white crappie, smallmouth bass, and sauger.

In 1995, TDEC recommended that the public not consume catfish and striped bass, as well as limiting consumption of largemouth bass from the lower Watts Bar Reservoir. Similar advisories associated with PCBs are in effect for other east Tennessee reservoirs, including Fort Loudoun, Tellico, and Melton Hill—all of which are upstream from Watts Bar (USDOE 1995). Currently, TDEC advises the public to not consume catfish, striped bass, and hybrid striped bass from the Tennessee River portion of Watts Bar Reservoir, with precautionary advisories on eating white bass, sauger, carp, smallmouth buffalo, and largemouth bass; and not to consume striped bass from the Clinch River arm of Watts Bar Reservoir with precautionary advisories on eating catfish and sauger. Further, because of PCBs and Mercury contamination TDEC advices that all fish should not be eaten from the East Fork of Popular Creek in Anderson and Roane Counties (TDEC 2008).

3.7. Wetlands and Floodplains

Floodplains and most wetlands by their nature can occur on the same TVA property, that is, lowland areas next to water courses, and are included together in a single section of the EIS as a convenience to readers. Both wetlands and floodplains are important to the function of TVA's management of the Tennessee River including Watts Bar Reservoir lands. The occurrence of wetlands and floodplains can influence the management of TVA property and the activities that can take place there.

3.7.1. Wetlands

Wetlands are defined by TVA Environmental Review Procedures (TVA 1983) as: "Those areas inundated by surface or groundwater with a frequency sufficient to support, and under normal circumstance, do or would support a prevalence of vegetation or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, mud flats, and natural ponds."

Wetlands are typically transitional ecosystems between terrestrial and aquatic communities. Watts Bar Reservoir is located in the Ridge and Valley physiographic province. Wetlands in this region are typically associated with low-lying, poorly drained areas, or linear in feature and associated with the floodplain areas of streams, rivers, and in the case of the Watts Bar project, the reservoir. In the Watts Bar land plan project area, wetlands represent a small percentage of the landscape relative to uplands, mainly due to the geology of the region (Hefner et al. 1994).

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

Wetlands occurring in Watts Bar Reservoir and its tributaries are in the Palustrine system (P), and the forested (FO), scrub-shrub (SS), emergent (EM), and aquatic bed (AB) subsystems. In the forested and scrub-shrub wetlands, the vegetation class is "broad-leaved deciduous," which is designated by the number 1. In the emergent wetlands, the vegetation class is "persistent," designated by the number 1, and "nonpersistent," designated by the number 2. The term "persistent" refers to herbaceous vegetation with aboveground parts that persist through the nongrowing season, such as, for example, the dry remains of cattail and sedges. "Nonpersistent" vegetation dies back completely to ground level during the nongrowing season. The hydrologic regimes in these wetlands were judged to include temporarily flooded (A), and seasonally flooded (C), although it is possible that other hydrologic regimes, such as saturated (B) and semipermanently flooded (F) occur.

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

Shoreline stabilization: The roots of trees, shrubs, and herbaceous vegetation, and the organic litter layer on the ground help to stabilize the shoreline soil against erosion that could result from boat wakes and storm runoff. This function is important throughout the reservoir, but it is particularly important to preserve in those areas along the main shoreline that are subject to wave action from boat wakes and increased runoff from developed areas.

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

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

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

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

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

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

General trends in wetland loss in the Southeast and in Tennessee indicate that palustrine forested wetlands have suffered a net loss in acreage over the last 10 years, primarily due to transportation impacts, the continued growth of urban/suburban development associated with continued population growth, and to a lesser degree, agriculture (Heffner et al. 1994). Prior to impoundment, the Tennessee River system had extensive areas of forested wetlands that were lost as dams were constructed and these floodplain areas were covered by water. Depending upon topography, forested wetlands have developed over time in the riparian and floodplain zones now affected by reservoir operations. Emergent and scrub-shrub wetlands have also developed in the embayments and mouths of tributary streams as they enter the reservoir. These wetlands, located on TVA parcels along Watts Bar Reservoir and its tributaries, are part of the overall resource assessment for this plan.

Wetland types and extent

Some fieldwork was conducted for the purposes of this plan. However, existing data sets were used to estimate the extent and types of wetlands located in the study area. These various data sets are described below.

Reservoir Operations Study (ROS): Data analysis conducted for TVA's 2004 ROS provided acreage figures for wetland types at the reservoir level. This analysis was conducted using USFWS NWI data. A geographic information system (GIS) analysis was performed on these data, and then wetland loss or gain trends, as described in Dahl (2000), were applied to the figures to estimate current acreage.

Shoreline Management Inventory (SMIN): The SMIN wetlands data are comprised of field surveyed wetlands mapped and entered into a GIS. These data provide wetland acreage, as well as mapped locations of extremely small linear wetland areas. SMI coverage does

not include aquatic bed wetlands or flats. These data include mixed habitat types, e.g., forested/scrub-shrub and scrub-shrub/emergent wetlands.

Field Surveys: Field surveys were conducted on a limited number of wetlands determined by TVA biologists to be especially unique or of high ecological value. These wetlands are located on Zone 3 (Sensitive Resource Management), Zone 4 (Natural Resource Conservation), Zone 6 (Recreation) and Zone 7 (Shoreline Access) parcels.

Analysis of these data sets indicates forested wetlands are the most common wetland type on Watts Bar Reservoir. Emergent and scrub-shrub wetlands are less common; however, Watts Bar is unique in that it supports areas with a mix of habitat types. Emergent and scrub-shrub wetlands are often found associated with larger areas of forested wetlands, along the shoreline gradient, and in embayments across the reservoir.

Aquatic bed habitats, those areas with rooted vascular plants, are very limited on Watts Bar. There are a few shallow areas that support spiny-leaf naiad (an exotic species); aquatic bed areas were more extensive in the 1980s and very early 1990s (primarily comprised of Eurasian water milfoil). High water flows and other factors (David Webb, TVA, personal communication) in the mid-1990s eliminated most of the aquatic bed (milfoil) habitats.

While small areas of wetlands are located along the shoreline throughout the reservoir, especially significant areas of wetlands occur in the embayments associated with Hines Creek, Whites Creek, Muddy Creek, Greasy Run Creek, and Wolf Creek. Other particularly important wetland areas are located in parcels located along the Little Emory River, in the Swan Pond and former CRBR site area, and on various forested islands in the main stem of the river.

Palustrine emergent and scrub-shrub wetlands are less common and are commonly found at the head of embayments of the smaller tributary streams as they enter the reservoir. There are significant areas of emergent and scrub-shrub wetlands found in the embayments of Greasy Run Creek, Hines Creek, and Grassy Creek.

Typical plant species that comprise wetlands in the study area include red maple, sycamore, green ash, willow oak, sweetgum, box-elder, alder, river birch, rose mallow, buttonbush, silky dogwood, soft rush, smartweed, cattail, *Scirpus* spp., and rice cutgrass. Reed canary grass, an exotic species, is becoming increasingly more common, especially in the Tennessee arm of the river upstream from Kingston.

Based on field surveys designed to assess especially unique wetland areas on Watts Bar, there are 12 areas of wetlands located on portions of Zone 7 (Shoreline Access) parcels that were determined to be of very high quality. This assessment was made using a version (TVARAM) of the *Ohio Rapid Assessment Method* (version 5.0) specific to the TVA region. The assessment was developed to assess wetland condition/ecological significance. Using the TVARAM, 10 of these wetlands scored as Category 3 wetlands, which includes wetlands of very high quality and wetlands that are of concern regionally and/or statewide, such as wetlands that provide habitat for threatened or endangered species. Two wetlands on these Zone 7 parcels scored as Category 2 wetlands, which are described as moderate-quality wetlands. These areas are listed below in Table 3.7-1.

Table 3.7-1. Wetland Types on Zone 7 Parcels

Parcel Number[1]	Wetland Type[2]	TVA RAM Score/Category[3]	Allocation
160	PFO/PEM/PSS/flats	90/Category 3	Zone 7
36	PEM/PFO/PSS/flats	84/Category 3	Zone 7
265	Flats/PSS/PEM/PFO	78.5/Category 3	Zone 7
267	PFO/PSS/PEM/flats	74.5/Category 3	Zone 7
269	PFO/PSS/PEM/flats	76/Category 3	Zone 7
102	PFO/PSS/PEM/flats	62/Category 2	Zone 7
109	Flats/PSS/PFO/PEM	55.5/Category 2	Zone 7
112	PEM/PSS/flats	55/Category 2	Zone 7
128	PFO/PEM/PSS	71.5/Category 3	Zone 7
157	PFO/PEM/PSS/flats	64/Category 2	Zone 7
111	PFO/PEM/PSS/flats	82.5/Category 3	Zone 7
234	PEM/PSS/PFO/flats	73/Category 3	Zone 7

[1]Wetlands occupy portions of these parcels; acreages are listed in Table B-1.
[2]P – palustrine; EM – emergent; SS - scrub-shrub; FO – forested; Cowardin 1979; order of wetland class is based on the dominant class in descending order of prevalence.
[3]TVARAM scoring methodology provides a maximum score of 100 points. Wetlands scoring between 67-100 are classified as Category 3 wetlands; wetlands scoring between 35-67 are Category 2 wetlands, and wetlands scoring below 35 are Category 1 wetlands.

Other significant wetlands were surveyed prior to the development of TVARAM; while these areas were not scored using TVARAM, they were assessed using a habitat assessment method that indicated they were of especially high quality. These wetlands are listed in Table 3.7-2.

Table 3.7-2. Watts Bar Parcels With Significant Wetlands

Parcel/Location[1]	Wetland Type[2]	Ecological Significance/Sensitivity[3]	Allocation
103/Hines Creek	PFO	High	Zone 3
268/Muddy Creek	PFO	High	Zone 3
160/Little Emory River	PFO/PSS/PEM	High	Zone 7
183/Swan Pond	PFO	High	Zone 6
185	PFO	High	Zone 4
188	PFO	High	Zone 3
281/Wolf Creek	PFO	Average	Zone 3
169	PFO	Average	Zone 4
166	PFO	Average	Zone 3
233/Whites Creek	PFO	Average	Zone 3

[1] Wetlands occupy portions of these parcels.
[2] P – palustrine; EM – emergent; SS - scrub-shrub; FO – forested; Cowardin 1979; order of wetland class is based on the dominant class in descending order of prevalence.
[3] The rapid assessment methodology used rated the ecological significance/sensitivity of the wetlands as High/Average/Low.

As stated in Section 2, this Land Plan includes two action alternatives that differ in the land use zone category assigned to certain parcels (Tables 2.1-2 and 2.2-1). A description of each of these parcels is presented below.

Parcels 5, 9, 44, 47, 80, 120-123, 12-55, 218, 257, 294-299: Based on NWI maps, SMIN data, and information from the previous 1988 Plan, these parcels contain no significant areas of wetlands. These parcels, however, may contain some small, scattered scrub-shrub and emergent areas on shoreline portions of some of these parcels.

Parcel 10: NWI maps indicate a small forested wetland occurs in an embayment associated with this parcel.

Parcels 142-148: NWI data, as well as SMIN data, indicate there are extensive areas of wetlands associated with these parcels. A mix of habitat types occurs in this area, and there are areas of forested wetlands along the shoreline of Parcel 144 and 145, as well as emergent and scrub-shrub wetlands in the Grassy Creek embayment. There are also forested wetlands within Parcel 146, the Grassy Creek HPA.

Parcel 153: SMIN data indicate nine small wetlands occur on this parcel. A linear strip of forested wetlands occurs along the shoreline at the northern end of the parcel. The remaining wetlands are a mix of emergent and scrub-shrub wetlands located along the shoreline at the southern end of the parcel.

Parcel 230: SMIN data indicate four areas of emergent wetlands occur along the shoreline in coves on this parcel.

3.7.2. Floodplains

As a federal agency, TVA is subject to the requirements of EO 11988 (Floodplain Management). The objective of EO 11988 is "…to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative"

The EO is not intended to prohibit floodplain development in all cases, but rather to create a consistent government policy against such development under most circumstances. It applies to all federal agencies that: acquire, manage, or dispose of federal lands and facilities; undertake, finance, or assist construction and improvements; and conduct activities and programs affecting land use, including planning, regulating, and licensing. The EO requires that agencies avoid the 100-year floodplain unless it is the only practicable alternative.

The 100-year floodplain on Watts Bar Reservoir is the area that would be inundated by the 100-year flood. There are two main water courses in Watts Bar Reservoir, the Tennessee River and the Clinch River. The 100-year flood elevations for the Tennessee River vary from elevation 746.5 feet mean sea level (msl) at Watts Bar Dam (TRM 529.9) to elevation 760.0 feet msl at the upper end of Watts Bar Reservoir at TRM 602.3 (downstream of Fort Loudoun Dam). A tabulation of the 100-year flood elevations is included in Appendix D, Table D-5. For the Clinch River, the 100-year flood elevations vary from elevation 747.1 feet msl at the mouth (CRM 0.0) to elevation 755.3 feet msl at the upper end of Watts Bar Reservoir at CRM 23.1 (downstream of Melton Hill Dam). A tabulation of the 100-year flood elevations is included in Appendix D, Table D-4.

The flood risk profile (FRP) elevations for the Tennessee River vary from elevation 747.0 feet msl at Watts Bar Dam to elevation 769.3 feet msl at the upper end of Watts Bar Reservoir at TRM 602.3. A tabulation of the FRP elevations is included in Appendix D, Table D-5. For the Clinch River, the FRP elevations vary from elevation 748.4 feet msl at the mouth to elevation 759.2 feet msl at the upper end of Watts Bar Reservoir at CRM 23.1. The FRP elevations are based on the 500-year flood and are used to control flood damageable development for TVA projects and on TVA Lands. A tabulation of the FRP elevations is included in Appendix D, Table D-4.

3.8. Land Use and Prime Farmland

3.8.1. Land Use

Of the original 1.27 million acres of land purchased for TVA reservoir construction, 37 percent (470,000 acres) is retained land under water, 23 percent (293,000 acres) is retained reservoir land, and 40 percent (506,000 acres) has been sold or transferred. Most of the transferred land (342,000 acres) was acquired by state and federal agencies for recreation and resource management. The sold land (160,000 acres) was acquired by various private individuals and corporations for development, and 4,000 acres were sold with restrictions for commercial recreation, group camps, or private clubs.

When TVA acquired properties around Watts Bar Reservoir, the land uses were primarily small subsistence farming on marginal land with row crop and pasture areas interspersed with woodlands. Following purchase by TVA, much open land was either planted in pine or reverted naturally to pine and/or hardwoods. Now the TVA public land surrounding Watts Bar Reservoir can be broken into five broad community types: forestland, open/agricultural land, shrub/brush land, wetland/riparian/shallow overbank areas, and residential/suburban habitats. Agricultural and grassland habitats are relatively uncommon on Watts Bar Reservoir properties comprising only a few hundred acres.

Since the completion of Watts Bar Reservoir, TVA has sold or transferred over 35 percent of the original land base (9,000 acres) to private, state, or federal ownership for economic development and recreation, and to private ownership. TVA land comprises only about 11 percent of the land within 0.25 mile of Watts Bar Reservoir (see Table 3.8-1), 54 percent of the land around Watts Bar has been or currently is being developed, and 35 percent of the land is available for development.

Table 3.8-1. Comparison TVA Planned Land and Private Land Within 0.25 Mile of Watts Bar Reservoir

Land Within 0.25 Mile of Watts Bar Reservoir	Acres	Percent of Watts Bar Reservoir Land
TVA Reservoir Lands (1988 Plan)	7,411	11
Existing Development (Urban Growth Initiative)*	35,251	54
Planned Growth (Urban Growth Initiative)*	22,468	35
Total Land	65,130	100

*Tennessee State Urban Growth Initiative Data

Currently, TVA owns and manages 16,220 acres of land and 721 miles of shoreline on Watts Bar Reservoir. The Watts Bar Reservoir flows from the northeast to southwest through Loudon, Meigs, Rhea, and Roane Counties in east Tennessee. These counties

are distinctly rural in description. The principal towns on the reservoir are Spring City, Kingston, Loudon, Rockwood, Lenoir City, Oak Ridge, and Harriman. Rural populations are concentrated in the numerous long valleys between the forested ridges. There are several barge terminals and industrial park areas near the larger communities, and some concentrations of residential shoreline developments and marinas. However, most of the Watts Bar Reservoir shoreline can be typified as appearing forested and rural. Of the 721 miles of shoreline on Watts Bar, 340 miles (47 percent) are available for Shoreline Access, which includes current development.

Currently, there are over 17,000 acres of platted residential property adjacent to Watts Bar Reservoir public lands, which is 1,000 acres greater than the total amount of TVA public land being planned on the reservoir. It is estimated that a little more than half of the platted area has already been converted to residential housing with complete conversion of most of these areas anticipated.

Other large tracts of land in the immediate vicinity include the USDOE Oak Ridge facilities on the upper reaches of Watts Bar Reservoir on the Clinch River. The Oak Ridge State WMA, totaling approximately 37,000 acres is primarily on the Oak Ridge Reservation and adjacent USDOE lands. USDOE manages the Oak Ridge Reservation, which is 33,718 acres (excluding the former CRBR site). Of those approximately 34,000 acres, 20,000 acres are defined as the Oak Ridge National Environmental Research Park Biosphere Reserve. These USDOE lands total 71,000 acres adjacent to TVA public lands on Watts Bar Reservoir. Large tracts of privately owned lands in the immediate area include Browder Woods, approximately 300 rolling acres of second-growth white oak forest and Crowder Cemetery Cedar Barrens, a 15-acre tract containing rare plants (see Managed Areas, Section 3.4).

There are over 26.3 million acres of land in the state of Tennessee. Only 976,014 acres or 3.7 percent of the land base is in public ownership (State of Tennessee 2003). TVA owns approximately 165,440 acres (0.6 percent) of the land in Tennessee, which is 17 percent of the public lands in the state. From 1992 to 1997, the state of Tennessee ranked 14th in the percentage of agricultural land converted to developed uses with 212,500 acres or 2 percent of agricultural land being converted to developed land, for an average annual rate of 42,500 acres. Additionally, 405,100 acres of rural land was converted to developed uses, with an average annual rate of 81,020 acres (Farmland Information Center 2004).

TVA had a pilot study prepared on Land Evaluation (CH2M Hill 2005) that was based on the draft 2005 Plan and DEIS, to evaluate the usefulness of using land value methods for TVA land plans and to provide information to support the ongoing Land Plan. The study provided ‘Highest and Best Land Use Analysis’ for the May 2005 Plan, considering the proposed allocation changes and also ‘Ecological Services and Human Use Valuation’ for the most important TVA ecological and recreation property on the reservoir. The report confirmed the relative impact of the former alternatives on ecological, recreational, and real estate values, and recommended a blended or hybrid alterative to optimize the land values under current marketing conditions. Results of an accompanying market analysis indicated limited opportunities for commercial and industrial development opportunities for the Meigs, Rhea, and Roane counties area, and that much of the residential development market was saturated by several ongoing large-scale and long-term projects.

TVA Land Policy: The TVA Board of Directors approved a final Land Policy, in November 2006 (see Appendix A), which protects and preserves undeveloped public lands managed by TVA. The new Land Policy reflects both TVA business operations and public

stakeholder expectations. TVA recognizes the public value in the remaining reservoir lands and that TVA should continue to provide for the public use and enjoyment of the reservoir system. Uses of TVA reservoir lands should be in the overall greatest public interest. The significant directives of the Land Policy pertaining to reservoir lands are:

- TVA will continue to develop reservoir land management plans with substantial public input and approval from the TVA Board.

- Public lands managed by TVA will not be sold for residential or retail.

- TVA will consider disposing of reservoir lands for industrial purposes or other businesses, if the property is located in an existing industrial park or the land is designated for such purposes in a reservoir land management plan. Preference will be given to businesses that require water access.

- TVA will consider leasing and granting easements over public lands for commercial recreation or public recreation purposes, if the property is allocated for that use in a reservoir land management plan.

- TVA will consider deed modifications pertaining to flowage rights no longer needed for river operation purposes. TVA would consider modifications that would open the land affected to public recreational access or, in the case of land already open to the public, continue such access. TVA will not remove or modify other deed restrictions for the purpose of facilitating residential development.

Interim Use: Although TVA reservoir land is designated for specific uses by allocation to one of the land use zones, often these plans are designed to take time to implement. During this time (sometimes years) the land is available for dispersed public recreation use (hiking, hunting, camping, etc.), wildlife and other natural resource management, and agriculture where no permanent changes or obligations occur that detract from its planned purpose but a temporary usefulness can be sustained. Likewise, by their design, some land allocation zones encourage temporary or resource use in the management of natural resources, such as dam reservation maintenance, wildlife plots, or WMAs.

TVA considers use of TVA public land for agriculture to be a short-term use but provides agriculture licenses under certain circumstances where they are compatible with TVA land management goals or are the best use of the land. There are currently about 20 agricultural licenses for land on about 30 parcels totaling about 450 to 500 acres of TVA public land on Watts Bar Reservoir, which all expire on December 31, 2008. Agricultural licenses can be compatible with Zones 2, 3, 4, 5, 6, and 7. An example is utilizing hay crops as an effective way to manage open fields for certain wildlife species, archaeological sites, and reduce maintenance costs for mowing areas of land on recreation and industrial sites. Lands licensed to individual farmers by TVA are largely being farmed to grow hay forage crops for livestock.

Land Use Agreements: Land use agreements such as licenses, leases, and easements are implemented by TVA to authorize activities or landrights on TVA land to support TVA's various programmatic plans and goals. These include road and utility easements, industrial sites, water treatment facilities, marinas, public recreation areas, and WMAs.

TVA project operations on Watts Bar Reservoir include the Watts Bar Dam Reservation, KIF, TVA maintenance facilities, and navigation safety harbors and landings. Although

technically downstream of the Watts Bar Dam, WBN, which is immediately adjacent to the dam reservation, is included in this Land Plan. TVA provides the use of public land to public agencies and utilities when in the public interest. Most often these are land use agreements for utility or road rights-of-way, sites for industrial use, public works projects (water intakes), dewatering/pump stations, and community maintenance facilities. The existing land use agreements for Watts Bar Reservoir are summarized in Table 3.8-2, along with the number of currently approved land use agreements as well as the number that were approved in 1988. Between 1988 and 2004, there was an increase of 88 new agreements for 603 acres of TVA public land. Since 2004, there has been a net increase of over 15 land agreements.

Table 3.8-2. Number of Land Use Agreements by Category Existing in 1988 and 2004

Land Use Agreement Categories	1988		2004	
	No. of Agreements	Acres	No. of Agreements	Acres
Highways/Roads	49	409	50	430
Railroad Easements	7	9	17	9
Industrial				
Barge Terminals	N/A	N/A	3	11
Industrial Sites	8	1,259	10	1,274
Project Operations				
Maintenance Facility	1	<1	1	<1
Pump Station/Dewatering	5	1	6	1
Recreation	161	3,150	191	3,518
Sufferance Agreements	1	<1	6	<1
Wastewater Treatment	1	1	2	186
Wildlife Management Areas	2	1,900	3	1,900
Utilities				
Electric	8	7	13	8
Gas	2	1	8	3
Sewer	23	8	25	8
Telephone	15	7	20	7
Water	10	22	13	22
Total	**272**	**6,774**	**360**	**7,377**

Currently, TVA has several long-term land use agreements with other federal, state, and local government agencies for WMAs and refuges and city and county parks. TWRA has long-term land use agreements in Roane County for approximately 1,900 acres of TVA public land for two state refuges and one WMA totaling almost 3,900 acres. Kingston Fossil Plant WOA (Parcel 190), approximately 300 acres, is managed by TVA in cooperation with TWRA. Two SWAs are located on Watts Bar Reservoir, totaling about 350 acres; these are managed for low-impact public use because of their exceptional natural, scenic, or aesthetic qualities. Seven HPAs, approximately 155 acres, have been established to protect populations of endangered or threatened species, unusual or exemplary biological communities, or unique geological features. Seven municipal or county parks totaling approximately 600 acres are located on TVA reservoir lands. In total, about 7,100 acres are managed for natural resource conservation or sensitive resource protection on TVA public land on Watts Bar Reservoir.

There are about 20 commercial marinas on Watts Bar Reservoir. Most of these marinas adjoin TVA property and are under a license agreement that conveys the landrights for commercial recreation. Some marinas are located on former TVA property transferred to a city or county for recreation purposes. The remaining marinas reside on former TVA property sold specifically for recreation development. See Recreation, Section 3.11, for more detailed information.

3.8.2. Prime Farmland

Prime farmland has the best combination of soil physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, and labor, and without intolerable soil erosion. This land can be cropland, pastureland, rangeland, forestland, or other land not urban nor water. The conversion of farmland and prime farmland soils to industrial and other nonagricultural uses essentially precludes farming the land in the foreseeable future. Creation of the 1981 Farmland Protection Policy Act addressed this issue and set guidelines that require all federal agencies to evaluate impacts to farmland prior to permanently converting to a nonagriculture land use. The act requires that Form AD 1006, "Farmland Conversion Impact Rating," be completed by federal agencies with assistance from the Natural Resource Conservation Service before an action is taken.

The geographic extent of the Watts Bar Reservoir reaches Loudon, Meigs, Rhea, and Roane counties. Agriculture census data show that during a recent 15 year period, except for Meigs County, acreage in county farms has increased by an average of about 8 percent while the value of agricultural products sold has increased in all counties, ranging from 8.6 percent in Meigs County to 105 percent for Rhea County (Table 3.8-3). This trend is expected to continue. These four counties have a total of 125,964 acres of land with soil properties to be classified as prime farmland ranging from 14.1 percent of Roane County to 21.2 percent of Meigs County (Table 3.8-4).

Table 3.8-3. Change in Farm Size and Value of Agricultural Products from 1987 to 2002 in Counties Adjacent to the Watts Bar Reservoir

County	1987	1992	1997	2002	Percent Change in 15 Years
Acres in farms					
Loudon	77,665	73,654	73,976	82,656	6.4
Meigs	54,949	56,253	48,977	48,918	-11.0
Rhea	55,956	52,462	56,049	60,762	8.6
Roane	58,739	52,433	53,110	63,378	7.9
Market value of agricultural products sold ($1,000)					
Loudon	31,486	38,546	45,067	50,628	60.8
Meigs	5,195	5,039	4,783	5,642	8.6
Rhea	8,687	7,908	7,575	17,809	105.0
Roane	4,377	4,825	5,771	5,660	29.3

Source: U.S. Department of Agriculture, Agriculture Census, http://agcensus.mannlib.cornell.edu/

Table 3.8-4. Acreage of Farmland in the Counties Adjacent to the Watts Bar Reservoir

County	Total Land in County*	Farm Size in 2002**	Farmland in County**	Total Prime Farmland*	Prime Farmland in County*
	Acres	Acres	Percent	Acres	Percent
Loudon	151,323	82,656	54.6	23,459	15.5
Meigs	122,240	48,918	40.0	25,905	21.2
Rhea	214,400	60,762	28.3	42,304	19.7
Roane	243,200	63,378	26.1	34,296	14.1
Total	731,163	255,714	35.0	125,964	17.2

Source: *TVA 2004
**U.S. Department of Agriculture, Agriculture Census, http://agcensus.mannlib.cornell.edu/

About 2,871 acres of prime farmland soils occur in 217 parcels of the over 300 land parcels of the Land Plan, about 14 percent are currently used for agriculture (Natural Resources Conservation Service 2008). These soils have formed in local alluvium located on the floodplains of the river and smaller streams in the area. A list of prime farmland soils and their combined acreage within each county are found in Table D-10, Appendix D.

Historically, TVA understands the value of farmland and has continued to license about 450 to 500 acres of its public lands on Watts Bar Reservoir for use as agriculture. Currently, there are about 30 parcels with existing agriculture licenses ranging in size from 159 acres to less than an acre.

3.9. Cultural Resources

For at least 12,000 years, the Tennessee River and the Little Tennessee River Valley have been an area for human occupation, which became more intense through succeeding cultural periods. In the upper east Tennessee area, archaeological investigations have demonstrated that Tennessee and the eastern Ridge and Valley Region were the setting for each one of these cultural/temporal traditions, from the Paleo-Indian (12,000-8000 B.C.), the Archaic (8000-1200 B.C.), the Woodland (1200 B.C.-1000 A.D.), the Mississippian (1000-1500 A.D.), to the Protohistoric-Contact Period (1500-1750 A.D.). Prehistoric archaeological stages are based on changing settlement patterns. Smaller time periods, known as “phases” are represented by distinctive sets of artifact remains. In addition, historic era cultural traditions have included the Cherokee (1700 A.D.-present), European and African-American (1750 A.D.-present) occupations.

The Paleo-Indian Period (12,000-8000 B.C.) represents the documented first human occupation of the area. The settlement and land use pattern of this period were dominated by highly mobile bands of hunters and gatherers. The subsequent Archaic Period (8000-1200 B.C.) represents a continuation of the hunter-gatherer lifestyle. Through time, there is increasing social complexity and the appearance of horticulture late in the period. The settlement pattern during this period is characterized by spring and summer campsites. Increased social complexity, reliance on horticulture and agriculture, and the introduction of ceramic technology characterize the Woodland Period (1200 B.C.-1000 A.D.). The increased importance of horticulture is associated with a less mobile lifestyle as suggested by semipermanent structures. The Mississippian Period (1000 -1500 A.D.), the last prehistoric period in east Tennessee, is associated with the pinnacle of social complexity in

the southeastern United States. This period is characterized by permanent settlements, maize agriculture, and chiefdom-level societies.

The Archaic through Mississippian periods have been intensively investigated in east Tennessee (Chapman 1973, 1975, 1977, 1978, 1979a, 1979b, 1981; Cridlebaugh 1981; Kimball 1985; Polhemus 1979 Davis 1990; Guthe and Bistline 1981). In addition, it is widely known historically that many settlements along the Little Tennessee River were Overhill Cherokee villages (Timberlake 1927; Bartram 1995). Many archaeological investigations in the 1960s and 1970s focused on the Cherokee occupation of the area (Schroedl 1985; Baden 1983; Russ and Chapman 1984). All of these investigations have provided additional details about the changing environments, shifting subsistence strategies and settlement patterns, and variations in the cultural material associated with each major stage.

As previously mentioned, Watts Bar Reservoir is located in four Tennessee counties (Roane, Rhea, Meigs and Loudon). In 1792, John Sevier established Fort Southwest Point at the convergence of the Tennessee and Clinch rivers to protect white settlers traveling west. Roane County was established in 1801 at the juncture of the Tennessee, Clinch, and Emory rivers. The town of Kingston was chosen as the county seat in 1807 (Hall 1998). Rhea County was established in 1807, from a portion of Roane County. The new county was situated in a valley between the Tennessee River and Cumberland Plateau. Though enlarged in 1817, parts of the county were lost in the formation of Hamilton County in 1817 and Meigs County in 1836 (Broyles 1998). Meigs County was established in 1836 from Rhea County. The county is bounded on the west by the Tennessee River, and the lower Hiwassee River crosses through the southern portion of the county. The county contains fertile bottomland and ample timber, as well a vein of iron core (Toplovich 1998). When Tennessee voted on secession in June 1861, the majority of these counties sided with the Confederacy. No major Civil War battles were fought in these counties, but there were massive troop movements through the area. Industrialization developed slowly after the Civil War. Loudon County was established on June 2, 1870, from portions of Roane, Monroe, and Blount counties. Loudon County lies on both sides of the Tennessee River and extends north to the Clinch River. The Little Tennessee River also passes through the county. Settlements were made on the north banks of the Tennessee and the Little Tennessee before 1800 (Spence 1998). TVA brought changes to the area with the construction of a reservoir network along the Tennessee and Little Tennessee River Valley (Chickamauga in 1940, Watts Bar in 1942, Fort Loudoun in 1943, and Tellico in 1979). TVA's construction of Sequoyah and Watts Bar nuclear plants one south and the other north of the county, in the 1970s, added residential growth.

The NHPA of 1966 and the Archaeological Resources Protection Act (ARPA) of 1979 address the protection of significant archaeological resources and the preservation of historic properties located on TVA lands or affected by TVA undertakings. A historic property is defined under 36 CFR Part 800.16 (1) as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places."

In response to this federal legislation, TVA conducts inventories of its lands to identify historic properties. The area of potential effect (APE) as defined in 36 CFR Part 800.16 (d) is "the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if such properties exist." For the action proposed, APE is approximately 16,220 acres of land that TVA retained or

previously committed to specific land uses and other non-TVA lands that may be affected by a TVA undertaking.

In September 2004, TVA consulted with the Tennessee State Historic Preservation Officer (SHPO) and appropriate affiliated Native American Indian tribes for this project. The comments are attached in Appendix G. Based on these comments, a programmatic agreement (PA) was executed between TVA, the Tennessee SHPO, and the Advisory Council on Historic Preservation to address a phased compliance survey strategy and potential adverse effects to historic properties.

3.9.1. Archaeological Resources

The Watts Bar Reservoir area has been the focus of archaeological research since the early 19th century. The earliest description of prehistoric Native American culture within the Watts Bar study area comes from John Haywood (1823, 1959) who described the mounds of the Bell and DeArmond sites as they were seen in the early 1800s. It was not until the 1930s and 1940s during the extensive Works Progress Authority projects in preparation of the Chickamauga and Watts Bar reservoirs that extensive survey and excavations were undertaken (Ahlman 2000). Three major archaeological surveys and numerous small-scale surveys have been completed on TVA land along Watts Bar Reservoir. In the early 1940s, prior to TVA's inundation of Watts Bar Reservoir, archaeological investigations (including site recording and in some cases excavation) were conducted in the flood zone. To address land management concerns for the 1988 Plan, TVA contracted with the University of Tennessee to conduct an archaeological survey in 1986. Later in the 1990s, the University of Tennessee surveyed an additional 6,861 acres of TVA fee-owned lands (only 2,211 acres are within the 16,220 acres considered in the Land Plan) and 6 miles of shoreline on the Watts Bar Reservoir. The last large-scale survey (Ahlman 2000) was conducted by means of a pedestrian survey and systematic shovel testing from existing humus to culturally sterile subsoil. The soil matrix was screened through a 0.25-inch wire mesh screen. Crew members walked the areas in 20-meter transects and excavated shovel test pits on 20-meter centers along each transect in zones of low slope and/or high site probability.

Existing data were reviewed during this assessment and over 700 archaeological resources have been identified within and along the Watts Bar Reservoir. Prehistoric components and sites dating from the Paleo-Indian through Mississippian periods were recorded, and historic archaeological sites were associated with the 19th to 20th century habitation of the area.

3.9.2. Historic Structures

Initially, European settlement in the early 19th century developed into an agricultural economy with farmsteads and small towns. Transportation networks revolved along the Tennessee River. Towns grew and prospered, and a plantation economy developed. Towns became river ports, and many ferry crossings were established. The later development of the railroad resulted in rail lines following the river valley. The Civil War brought destruction and economic devastation to the area. Following this war, development was slow. Agriculture, commerce, industry, and the river and rail systems gradually expanded.

The coming of TVA and the development of Watts Bar Reservoir (1939-1942) resulted in further significant changes of the region. The acquisition of land for the Watts Bar Reservoir by TVA resulted in the removal of most structures and other man-made features

on these TVA lands. Very few structures remained, though many historic structures do remain on adjacent non-TVA lands. Historic structures (and other man-made features) remain from all these historical periods. The earliest settlements tended to be on the waterways, and many of these were lost to TVA's reservoir development. Also, the richest farmlands and the most prosperous farms and plantations were located on the river bottoms. Many of these were also lost.

A major historic structures' survey was done for the 1988 Plan. This was conducted by TVA Cultural Resources staff and included sites on TVA lands and on adjacent non-TVA lands. This survey identified 17 structures listed on the NRHP and 25 eligible for listing, 150 historic structures and/or historic districts of which many are probably eligible for listing, and 171 that are no longer eligible for listing.

Only a small portion of these identified historic structures have the potential to be affected by the proposed allocations of the alternatives. The only eligible historic structures on TVA lands are the Watts Bar Fossil Plant; the Watts Bar Dam, Locks, and Power House; and a number of remaining dwellings from the original construction village (now Watts Bar Resort).

3.10. Navigation

Watts Bar Reservoir is one of the impoundments that make the commercially navigable Tennessee River System possible. This approximately 650-mile system connects Knoxville, Tennessee, at the upper end with Paducah, Kentucky, at the confluence of the Tennessee and the Ohio rivers and provides for year-round navigation the length of the Tennessee River, with an additional 150 miles of navigable tributaries. The Tennessee River system is in turn part of the interconnected National Inland Waterway System that links much of the eastern half of the United States by water transportation with coastal and Great Lakes links to the rest of the world.

Watts Bar Reservoir is bounded by three dams with navigation locks. Watts Bar Lock and Dam, at TRM 529.9, marks the southern (downstream) boundary of the reservoir and Fort Loudoun Lock and Dam defines the upstream limits of the reservoir at TRM 602.3. In addition, Watts Bar Reservoir extends into two navigable tributaries of the Tennessee River: the Emory River, navigable for 12 miles to the town of Harriman and the Clinch River. While the Clinch is navigable for 62 miles to the town of Clinton, Melton Hill Lock and Dam complex at CRM 23.1 marks the furthest extent of Watts Bar Reservoir on the Clinch River.

In 2005, the most recent year for which there is comprehensive commodity data, over 1.2 million tons of commercial barge cargo moved on Watts Bar Reservoir (USACE 2006a). Over 800 thousand tons of this traffic either originated or terminated at the four active commercial barge terminals located on Watts Bar Reservoir. The average barge tow size on Watts Bar Reservoir in 2005 was 4.5 barges with a total of 233 barge tows (USACE 2006a). Commodities transported include grains and grain products, iron and steel, minerals, asphalt, sand, salt, and fertilizers.

The economic impact of commercial waterway transportation is typically measured in terms of the transportation savings (or shipper savings) that accrue to the area's economy as a result of using barge transportation over other modes. Shipper savings from commercial waterway traffic originating or terminating on Watts Bar Reservoir in 2005 was $7.7 million.

The average shipper savings benefit to the area for the period 2001 to 2005 was just under $9 million annually.

To support commercial waterway traffic, TVA and the U.S. Coast Guard (USCG) maintain a number of navigation aids either on the water or along the shoreline. These include main channel and secondary channel buoys; mooring cells, dolphins, and buoys; dayboards (navigation signs) and lighted beacons; and shoreline signs for safety harbors, landings, and secondary channels. A safety harbor is a cove or embayment off the main channel into which a tow may pull in high flow, inclement weather conditions, or an emergency; a safety landing marks a place on the shoreline of the main channel where a tow may tie off in a weather or operations emergency.

Navigation aids also support recreational boat traffic, as do the locks at Watts Bar and Fort Loudoun dams (Melton Hill Lock was closed to all but essential traffic in August 2003 due to an electrical system failure in the mechanism that fills and empties the lock chamber). While it is impossible to know the actual number of recreational vessels on Watts Bar Reservoir at any one time, several indicators may provide useful information. For example, in 2006, 1,849 recreational vessels locked through at Watts Bar Lock, and 1,928 recreational vessels locked through at Fort Loudoun Lock (USACE 2006b).

TVA's comprehensive ROS FEIS recreation field study (TVA 2004b) indicated that in 2002, there were about 1.9 million visitor days to Watts Bar Reservoir. Eight hundred seventy-four thousand visitor days (46 percent) were attributed to use of commercial facilities for access to Watts Bar Reservoir, 702 thousand (37 percent) accessed from private residences, and 313 thousand (17 percent) from public facilities. A subsequent internal TVA inventory of recreation facilities showed that, in 2004, there were 50 paved boat ramps on Watts Bar Reservoir and about 1,500 boat docking slips at area marinas, with an additional 238 out-of-water storage slips. The inventory also found that there were 16 facilities on Watts Bar Reservoir where one could rent boats or personal watercraft in 2002 (TVA 2005b).

3.11. Recreation

Developed recreation and dispersed recreation are the major components of recreation on TVA lands. Developed recreation on TVA lands is described as Zone 6 in the Land Plan (see Table 2.1-2). It consists of public property suitable and capable to support the following: for-profit commercial water-based facilities available to the public for a fee (Commercial Recreation), recreation facilities provided by a nonprofit public agency (Public Recreation), and narrow strips on the reservoir (Water Access). Dispersed recreation is usually a component of Zone 4, Natural Resource Conservation, where land is maintained for hunting, fishing, hiking, picnicking, and viewing wildlife. Therefore, land allocated for Zone 6 is actively managed primarily for developed recreation, while dispersed recreation is a more passive opportunistic component of Zone 4. Recreation impacts are assessed for both Zones 4 and 6. Also, additional recreation facilities (such as picnic areas, beaches, and boat ramps) are sometimes located on TVA Project Operation lands (Zone 2).

Watts Bar Reservoir encompasses 37,385 surface acres at full summer pool. The reservoir receives an estimated 1.9 million recreation user days per year, according to the TVA ROS FEIS (TVA 2004b). Of the total 1.9 million visitor days, approximately 313,000 gained access to the reservoir through public use areas, 702,000 through private residential areas, and 874 thousand through commercial use areas.

The types of recreation opportunities that can be provided on the public lands and waters of Watts Bar Reservoir, i.e., day hiking, wildlife viewing, developed camping, picnicking, swimming, biking, hunting, fishing, and boating, continue to be high-growth recreation activities and/or those activities with high participation rates (Cordell et al. 2004). In 1988, TVA directly operated recreation facilities such as campgrounds, day use areas, and boat ramps on Parcels 4, 10, 22, 74, and 266. However, TVA has currently leased three of the five parcels to private operators, closed one, and is in the process of leasing the fifth. The Watts Bar Dam Reservation is available for use and TVA provides access to undeveloped lands for dispersed recreation use.

The 2004 ROS FEIS (TVA 2004b) focused on water-based recreation and did not account for people using land-based recreation such as trails, visitor overlooks, driving for pleasure, hunting, etc. The undeveloped lands around Watts Bar Reservoir support many of these types of activities. Although these types of uses are not quantified, these uses are extensive based on the visual impacts of foot paths, bare soils, litter, and other indicators. Some of the important Zone 4 Parcels on Watts Bar Reservoir that support dispersed, informal wild land recreation include Parcels 7, 24, 46, 237, 227, 254, 285, 286, and 283. Considerable logging has occurred on Parcels 297, 298, and 299 as a result of damage from the southern pine bark beetles. However, the size of these three parcels (245, 34, 423 acres, respectively in Alternative B) makes them important wild land dispersed recreation parcels.

Through the November 2006 Land Policy, the TVA Board of Directors directed a survey be completed of TVA land designated for Developed Recreation use (Zone 6) in reservoir land management plans. TVA determined whether the properties previously designated in the 1988 Plan remained suitable for recreational use and whether a continued need exists to use the property for recreational purposes. This assessment examined the anticipated demand for reservoir recreation activities, percentage of total shoreline open for residential development, and Water Reservoir Opportunity Spectrum (WROS) boating capacity coefficients.

Anticipated Demand for Reservoir Recreation Activities: The estimated demand for activities specifically dealing with recreation opportunities provided by lands and waters managed by TVA are described in Table 3.11-1. Demand for public boat access, campgrounds, other developed opportunities, and dispersed recreation opportunities are in high demand, while demand for marinas and lodging are in medium demand.

Table 3.11-1. Demand for Recreation Opportunities on Watts Bar Reservoir

Opportunity	Demand High/Medium/Low
Public boat access	High
Commercial marinas	Medium
Campgrounds	High
Lodging in support of reservoir recreation tourism	Medium
Developed land-based opportunities	High
Dispersed, informal land-based opportunities	High

Percentage of Total Shoreline Open for Residential Development: Of the 721 miles of shoreline on Watts Bar Reservoir, 47 percent (340 miles) is open for private residential dock access according to TVA's SMP. A little less than about half (22 percent of the total) of the open shoreline has been developed or planned for residential development, leaving about half (25 percent of the total) of the open land currently undeveloped (see Table 3.11-2).

Table 3.11-2. Current Shoreline Use

Watts Bar Reservoir Shoreline	Miles of Shoreline	Percent of Total Shoreline
Total Shoreline	721	100
Total open SMP shoreline	340	47
Current shoreline developed/permitted	159	22
Open shoreline remaining (not developed or permitted)	181	25

WROS Boating Capacity Coefficients: WROS (Hass et al. 2004) defines the setting available to achieve a particular recreation experience. The WROS is broken down into six opportunity classes from the greatest impact to the least (Urban, Suburban, Rural Developed, Rural Natural, Semi Primitive, and Primitive) based on the way people experience their natural surroundings, in particular a body of water (see Table 3.11-3). Research shows that people not only seek to participate in recreation activities, but they also seek specific settings in order to enjoy a given experience and its benefits. In WROS, settings, experience, and benefits are listed as components of a recreation opportunity. Several attributes are used to categorize the reservoir. Physical attributes include degree of development, degree of resource modification, and distance to development on the water. Managerial attributes include the degree of public or commercial access facilities and degree of management presence. Social attributes include the degree of visitor concentration or presence, degree of nonrecreational use, and the degree of diverse recreation activities.

Table 3.11-3. WROS Opportunity Classes as a Function of Density

Opportunity Class	Density (Acres per Boat)
Urban	1-10
Suburban	10-20
Rural Developed	20-50
Rural Natural	50-110
Semi Primitive	110-480
Primitive	480-3,200

Two management zones were identified and defined by the recreation assessment for Watts Bar Reservoir and a WROS opportunity class calculated and assigned for each. Most of Watts Bar Reservoir was designated as Suburban and the Clinch River arm of the reservoir, upstream of CRM 9 was designated as Rural Developed.

Boating units were identified by unit access analysis. That is, all access points on the reservoir were tallied and an assumption of the percentages of boats that would use the reservoir at different times of the season/week (for each type of access point) was compiled in a matrix to determine the WROS opportunity class.

Based on boating units ranging from 75 acres per boating unit (one marina boat slip or one private dock or one parking place at a public boat ramp) for summer weekday to 44 acres per boating unit on peak summer holidays with an average summer weekend day of 36 acres per boating unit (Table 3.11-4), the upper Clinch River section of Watts Bar Reservoir was assigned a WROS opportunity class of Rural Developed or 20 to 50 acres per Boat (Table 3.11-3).

Table 3.11-4. WROS Opportunity Class Calculation for Clinch River

Zone Rural Developed	Average Summer Weekday	Average Summer Weekend day	Peak Summer Holiday
Estimated boating units in use	16	33	44
Surface acres per boating unit	75	36	27

Likewise, the majority of Watts Bar Reservoir was assigned a Suburban Opportunity class (10 to 20 acres per boat) based on the calculated boating units (Table 3.11-5) with an average summer weekend day of 11 acres per boating unit.

Table 3.11-5. WROS Opportunity Class Calculation for Main Watts Bar

Zone Suburban	Average Summer Weekday	Average Summer Weekend day	Peak Summer Holiday
Estimated boating units in use	1,727	3,296	4,473
Surface acres per boating unit	21	11	8

Between 1999 and 2005, over 90,000 Americans (3,300 in the Tennessee Valley) age 16 and over were interviewed (U.S. Forest Service 2006) for the National Survey on Recreation and the Environment. Respondents were asked about their participation in approximately 80 specific outdoor recreation activities. This report provides an up-to-date review and analysis for the outdoor recreation demand, participation rates, and trend data for the target study region of the counties surrounding the Watts Bar Reservoir area and for the United States (Table 3.11-6). A subset of activities was chosen based on compatible uses of TVA managed lands.

Table 3.11-6. National Survey on Recreation and Environment for the Watts Bar Reservoir Area

Recreation Category	Percent of People Participating in Watts Bar Clinch Watershed Area	Percent of People Participating in United States
Public Boat Access		
Boating (any type)	39	36.9
Motor Boating	33.7	24.8
Freshwater Fishing	43.3	30
Personal Watercraft Use	11.3	9.6
Canoeing	7.4	9.9
Kayaking	2.2	3.9
Sailing	0.8	5.2
Commercial Marinas		
Motor Boating	33.7	24.8
Campgrounds		
Developed Camping	27.3	26.6
Developed Land-Base Opportunities		
Walking for Pleasure	75.4	82.6
Family Gathering	75.2	74.3
Picnicking	60.2	54.2
Swimming in Lakes and Streams	42	41.9
Visiting a Beach	24.8	43
Freshwater Fishing	43.3	30
Dispersed, Informal Land-Based Opportunities		
Visiting a Wilderness or Primitive Area	39.8	33.1
Day Hiking	28.5	32.8
Primitive Camping	14.5	16.2
Mountain Biking	18.7	20.7
Backpacking	10.7	10.3
Hunting (any type)	18.5	11.6
Orienteering	5.6	1.8
Visit Other Waterside (besides beach)	31.5	25.6
View/Photograph Natural Scenery	64	60.8
View/Photograph Wildlife	48.8	45.3
View/Photograph Birds	28.7	32.7
Gather Mushrooms, Berries, etc.	35.6	28.6

The above comparison indicates that recreation in the Watts Bar area is similar to the rest of the U. S., except that participation in freshwater fishing from a public boat launching ramp and from a land-base structure are greater in the Watts Bar Reservoir compared to the national average. In addition, motor boating from a public boat launching ramp and a commercial marina occur to a greater extent in the Watts Bar watershed area as compared to the national average.

3.11.1. Developed Recreation

Watts Bar Reservoir has a number of commercial, public, and quasi-public recreation facilities that provide developed recreation opportunities (see Table 3.11-7). An existing recreation inventory database was created in 2003 and updated in 2006 that details the types of developed recreation facilities available to meet recreation needs for users of Watts Bar Reservoir (see Table D-6). The database is a current inventory of recreation facilities and services available on each reservoir and includes the following categories of water-based areas:

Public - TVA, other federal, state, and county/municipal facilities operated for nonprofit,

Private - private commercial areas operated for-profit, noncommercial areas for members/residents only

Quasi-public - areas serving members of nonprofit organizations

The focus of the inventory was on areas directly bordering the reservoir shoreline. Information collected included basic attribute data, such as area type, contact list, location information, and facilities encompassing a wide range of accommodations typically offered at water-oriented outdoor recreation operations.

Only those recreation areas with some level of facility development and evidence of maintenance were included. By these criteria, undeveloped lands managed by TVA or other public agencies were excluded. Dispersed recreation facilities on TVA lands are considered separately.

Table 3.11-7. Recreation Facilities on Watts Bar Reservoir

Facility Type	Commercial	Public
Wet Slips	1,447	0
Dry Slips	238	0
Campsites with electrical hookups	744	0
Campsites without electricity	78	0
Paved boat ramps	21	30
Parking spaces	1,574	693
Picnic tables	87	298
Picnic pavilions	5	20

There are 67 developed recreation areas on Watts Bar Reservoir (see Table D-6). Twenty-six of them are commercial recreation areas operated by private entities, most of which are resorts or marinas that offer such facilities as boat slips, boat rentals, swimming beaches, picnic areas, supply store, restaurant, camping, rooms and cabins, and other recreation facilities. Likewise, there are 37 public recreation areas that may have facilities such as launching ramps, picnic tables, swimming beaches, trails, playgrounds, or other facilities. And, there are four quasi-public recreation areas such as summer camps for churches and scouts.

3.11.2. Dispersed Recreation

Dispersed or informal recreation has historically been an important recreation opportunity on Watts Bar Reservoir. Lands where dispersed recreation occur are managed to

accommodate activities such as hunting, hiking, biking, bird watching, photography, primitive camping, bank fishing, and picnicking, etc. Dispersed recreation is actively managed on 41 parcels allocated for Zone 4 or equivalent categories but can occur on most TVA-managed lands where development has not taken place. Data collected by the National Survey on Recreation and the Environment for informal, dispersed land-based opportunities in the Tennessee Valley watershed indicate above average participation in many of these activities.

In 2005, TVA introduced the Informal Recreation Analysis Tool (Guerry 2005) to measure the amount and extent of ecological impact associated with recreation activities. This is an ongoing effort to identify and measure said impacts on all TVA lands. In addition to assessing ecological damage, this tool gives managers a spatial component in which to quantify the number and location of active dispersed recreation areas that are on a given reservoir. To date, approximately 20 percent of the TVA lands on Watts Bar Reservoir have been assessed (*TVA Informal Recreation Technical Report*, TVA 2006; *TVA Informal Recreation Technical Report*, TVA 2007b). Although this data set is incomplete, initial findings suggest that Watts Bar Reservoir receives a large amount of dispersed or informal recreation use. Table 3.11-8 is a summation of the informal areas (with the number of sites for each area) that have been identified to date.

Table 3.11-8. Dispersed Recreation Areas Identified on Watts Bar Reservoir

Recreation Area	Parcel Number	Number of Sites
Bayside	41	1
Kembro, Pine, and Woodland Islands	291	2
Unnamed - Mound Island	286	1
Toestring Branch	262	1
Doc Smith 1	286	1
Doc Smith 2	286	2
Unnamed	276	1
Wolf Creek Parcel	285	4
Goat Island	7	5
Hornsby Hollow	24	2
Red Cloud 1	306	1
Red Cloud 2	306	1
Pearl Harbor	30	1
Eagle Furnace	233	1
Fingers	224	4
Half Moon	227	4
Snoopy Head	35	2
Thiefneck	46	6
Whites Creek	237	1
Total Sites		**41**

3.12. Visual Resources

Watts Bar Reservoir extends from Watts Bar Dam at the head of the Chickamauga pool to Fort Loudoun Dam near Lenoir City, Tennessee, and lies in a region of the Tennessee River Valley noted for a wide variety of scenic resources. Watts Bar provides 721 miles of shoreline and over 39,000 acres of water surface. The reservoir and floodplain areas include attractive islands, rock bluffs, secluded coves, wetlands, and agricultural land, which are framed by high wooded ridges. Since the scenic features of the ridge and valley landscape are not limited by property boundaries, the attractive landscape character extends across TVA public and private land alike. The natural elements together with the communities and other cultural development provide a scenic, relatively harmonious, rural countryside.

Land uses adjacent to the Watts Bar Reservoir are similar to other mainstream reservoirs. They include industrial areas and TVA power generating facilities (WBN, KIF, and Watts Bar Hydro Plant) as well as state and local parks, WMAs, commercial recreation facilities, and an ever-growing assortment of residential development. The reservoir offers abundant water-recreation opportunities along with a variety of scenery. Most creek embayments are broadly open at the mouth, and some wind several miles to their headwaters.

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

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.

Viewing distance indicates scenic importance based on how far an area can be seen by observers and the degree of visible detail.

- The foreground distance is within 0.5 mile of the observer where details of objects are easily distinguished. Details are most significant in the immediate foreground from 0 to 300 feet.

- Middleground is normally between 0.5-4.0 miles from the observer where objects may be distinguishable, but their details are weak and tend to merge into larger patterns.

- Background is the landscape seen beyond 4.0 miles where object details and colors are not normally discernible unless they are especially large, standing alone, or provide strong contrast. Figure 3.12-1 illustrates the viewing distance parameters.

Human sensitivity is the expressed concern of people for the scenic value of the land under study. Concerns are derived or confirmed by public meetings and surveys. Sensitivity also includes considerations such as the number of viewers, frequency, and duration of views.

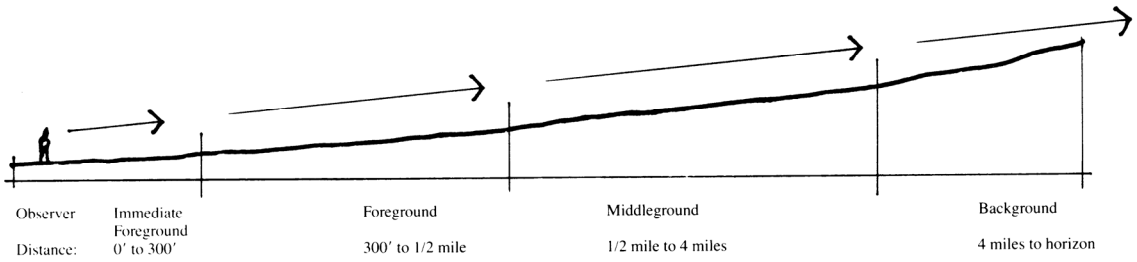

Figure 3.12-1. Viewing Distance

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

3.12.1. Environmental Setting of Watts Bar Reservoir

Among the scenic resources of Watts Bar Reservoir, the water body itself is the most distinct and outstanding aesthetic feature. The horizontal surface provides visual balance and contrast to the islands, bluffs, and wooded hillsides. The 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. Views across the water provide a tranquil sense of place that is satisfying and peaceful to most observers.

Islands are another significant visual feature. Numerous notable islands and a number of minor islands have been identified. The islands provide scenic accents and visual reference points throughout the reservoir and serve as visual buffers for less desirable views. They also provide a pleasing foreground frame for the distant shoreline or background. Limestone bluffs are distinct scenic elements that occur along a few sections of the main river channel. The sheer rock faces rise from the water with steep, wooded, bluff-like ridges rising several hundred feet more above them. The bluffs provide attractive vertical accents and a natural contrast of colors that can be seen from the distant middleground.

Other important scenic features include the tranquil, secluded coves and steep, wooded ridges that occur around the reservoir. The isolated coves with wooded shoreline provide peaceful and relatively private locations for overnight boat anchorage although shallow waters limit the use of some. Steep slopes along the shoreline rise mostly undisturbed to wooded skylines. Some ridge tops reach more than 300 feet above the water. The significant elevation changes provide a dramatic contrast to the surrounding reservoir and gently sloping countryside, particularly when they are viewed from background distances.

Watts Bar Dam (TRM 530) is 112 feet high and stretches 2,960 feet across the Tennessee River. The dam skirts the base of a steep, rocky bluff that forms the right abutment of the dam. A flat floodplain stretches for a distance of approximately 750 feet from the left

riverbank to the base of a low bluff that rises about 50 feet in the 300 foot length and then slopes gently toward the top of the east abutment (TVA 1949).

The shoreline upstream from the dam is naturally appearing and includes several attractive coves. Vegetative patterns are interrupted by transmission lines on each bank above the dam. Meigs County Park can be seen intermittently from the cove at Peak-Hornsby Cemetery. Numerous homes along adjacent bluffs and ridges can be seen in the foreground and middleground from the water for approximately 5 miles, beginning at Watts Bar Dam.

The embayment along Piney River at Wolf Creek and Muddy Creek (TRM 533) ranges from approximately 0.5 mile wide to over 1.5 miles wide at the confluence of the three streams. This embayment includes public use areas at Rhea Springs Recreation Area and Spring City Park, a sewage disposal plant, and numerous residential and commercial areas. Visual clutter in the embayment is interspersed with unaltered landscapes, particularly along the east side of Wolf Creek. Duck Island, the largest island within the embayment, has a vegetative buffer along the shoreline with an interior that is used mainly for agriculture to benefit wildlife. Scenic attractiveness in the area is common. Scenic integrity is low to moderate.

The main channel of Watts Bar Reservoir continues east between Goat Island, north of Fooshee Peninsula and Iron Hill Island. Fooshee Peninsula features Fooshee SWA and Fooshee Public Use Area and offers outstanding views of the reservoir. Goat Island is dominated by pine forest along the shoreline and mature hardwoods on the interior, while Iron Hill Island is characterized by the number of occurring wetlands along the shoreline. Scenic attractiveness is common. Scenic integrity is moderate.

Continuing north, from TRM 540 near Rowden Branch and Hornsby Hollow Recreation Area, several islands can be seen in the foreground from the reservoir. These islands provide visual contrast and buffers of shoreline development at Rowden Branch as seen from the main river channel. Near TRM 551 is Thiefneck Island, the site of the Fooshee Pass Public Use Area. Visible features along the shoreline include a number of wetland areas. The island is heavily vegetated with some peaks rising over 240 feet above the water surface. Residential development on adjacent shorelines is sparse compared to other areas on Watts Bar Reservoir.

At TRM 558, several islands and a peninsula can be seen in the foreground and middleground distances. These islands are used mainly for wildlife management. Wetland areas are prevalent along the shorelines, and the remainder of the islands is heavily vegetated, providing visual contrast to shoreline development along this section of the reservoir. Near TRM 562, Caney Creek enters Watts Bar Reservoir. From the confluence of Caney Creek and Watts Bar Reservoir, New Hope Road Bridge can be seen in the foreground. Farther upstream, human alterations include water use facilities and Roane County Park.

The next 6 miles upstream (TRMs 562 to 568) to the confluence of Tennessee and Clinch Rivers, views of the shoreline include subdivisions and homes with their associated docks and water use facilities. Views include occasional passing highway traffic in the foreground and middleground. Several ridgelines rise approximately 300 feet in the background with development visible on some slopes. The visual congestion along this area is generally viewed in the foreground; therefore, scenic attractiveness is minimal and scenic integrity is

low. When viewed from greater distance across the reservoir, details become weaker and scenic value improves.

The main channel bends to the southeast and a wide range of landforms in the middleground and background provide visual relief from human alteration along the shoreline and back-lying land. These landforms include ridges ranging from 100 to 200 feet in height and valleys accentuated by natural vegetative patterns. Islands along the channel, particularly those larger than 5 acres, provide visual buffers of shoreline development. Riley Creek Recreation area is located on the right bank near TRM 570, approximately 1 mile west of Long Island.

Upstream of Long Island near Smith Creek embayment, the main reservoir narrows to a riverine character. Shoreline development is sparse, and heavy vegetation covers the naturally appearing slopes. The channel becomes again broadly horizontal near Huffine Island and Paint Rock WMA. Wide shoreline areas are accentuated by sparse vegetation, and gently sloping topography is used mainly for farmland. Embayments enter the main channel on each side of the reservoir and are mainly unaltered by human activity. Scenic attractiveness is common. Scenic integrity is moderate.

At TRM 577, moderate development can be seen on the left bank from the water. Views of development along the right bank are less discernible due to broad bands of vegetation along the shoreline. At TRM 583, residential development becomes increasingly heavy and is a focal point in the landscape. Visual clutter along the shoreline is relieved intermittently for recreation users in the water by Matlock Island (TRM 583.5) and Sweetwater Island (TRM 584.5).

3.12.2. Environmental Setting of the Clinch River Segment of Watts Bar Reservoir

The Clinch River segment of Watts Bar Reservoir enters the Tennessee River part of Watts Bar Reservoir at approximately TRM 568 (CRM 0) just downstream of the city of Kingston. This section of the Clinch River is characterized by dense residential development along the shoreline. At approximately CRM 2.5, the Interstate-40 and U.S. Highway 70 bridges crossing the Clinch River are viewed in the foreground distance, and KIF is viewed in the middleground. Views of KIF are mainly of the smokestacks and broadly horizontal industrial facilities. Scenic attractiveness is minimal. Depending upon viewer location, scenic integrity is low to very low.

At CRM 5, the industrial setting of KIF transitions to sparse residential development on the right and left banks. This riverine setting is less altered with the exception of occasional private water use facilities seen along the shoreline. From CRMs 5 to 11, landscape character ranges from light residential and open space to natural woodlands. Several scenic coves are seen along this section of the Clinch River with high ridges in the background, retaining moderate scenic integrity.

At approximately CRM 11, industrial facilities at the USDOE East Tennessee Technology Park (former K-25 Plant) come into view on the left bank. Numerous transmission lines, industrial facilities, and broadly horizontal buildings combine to create a concentration of mixed shoreline development. The results are extensive visual congestion, adverse contrast, and very low scenic integrity. Upstream, at CRM 14, the former CRBR site is on the left bank. From the reservoir, this site appears mainly undisturbed due to extensively retained shoreline buffers. However, the site has been greatly altered through vegetative removal and earthwork operations. Beyond the former CRBR site, at CRMs 19 to 21, the

landscape on the right bank becomes predominately agriculture, while the left bank appears unaltered and is heavily wooded. Jones Island, one of the largest islands along this portion of the reservoir, is naturally appearing and has excellent scenic value.

3.12.3. Environmental Setting of the Emory River Segment of Watts Bar Reservoir

The Emory River segment of Watts Bar Reservoir begins just beyond CRM 4 east of KIF. The KIF environmental setting was previously discussed in Section 3.12.2. At ERM 2, northeast of KIF, the shoreline character becomes mainly light residential interspersed with tracts of undisturbed woodlands and agriculture lands. At ERM 5 the main body of water turns west toward Harriman, and the Little Emory River tributary enters from the north at this point.

The Little Emory River tributary at the mouth of the Emory River is a riverine setting punctuated by sparse residential development on each bank. To the east, Pine Ridge rises over 300 feet and provides visual contrast to the lower-lying shoreline areas. Residential development becomes more concentrated near Harvey Hannah Highway to the north. Water use facilities and boat ramps become more prevalent in the landscape in this area, and there is a reduction in visual integrity. This portion of the Watts Bar Reservoir terminates near Bitter Creek Highway.

The Emory Creek section of the Watts Bar Reservoir continues from ERM 5 and traverses west through rural countryside. From the water, this section of river is naturally appearing due to the wide vegetative buffers along the shoreline. Brief views of residential areas and altered landscapes can be seen periodically, particularly within small coves along the river. At ERM 7, the natural landscape transitions from open space to heavy residential at TRM 10 east of Harriman. Automobiles, as well as myriad transmission and utility lines, are frequently seen along local roads. Taller buildings to the north become focal points in the landscape. This portion of the Watts Bar Reservoir terminates near William Hampton Browder Bridge on U.S. Highway 27.

3.13. Socioeconomics and Environmental Justice

3.13.1. Socioeconomics

Both social and economic values and activities pertaining to the Watts Bar Reservoir area are derived primarily from the local communities and their livelihoods. Meigs, Loudon, Rhea, and Roane counties are decidedly rural in description with several locally important towns or small cities. The important overall socioeconomic conditions that could be impacted by the Land Plan include population, size of the labor force, types of jobs, unemployment levels, and income levels. Within the general subject of socioeconomic conditions is the specific subject of environmental justice, which relates to the amount and any concentrations of the population that is in poverty or is a racial or ethnic minority.

Population: The four counties in the Watts Bar Reservoir area had a population of 130,482 in 2000, an increase of 17.7 percent since 1990 (see Tables 3.13-1 and 3.13-2). This was a faster growth rate than in either the state or the nation, in contrast to the previous decade in which the area grew much more slowly than the state and the nation. Estimates for 2006 indicate that the population of the area has grown an additional 7.2 percent since 2000. This remains a faster rate than either the state or the nation. Meigs County, the smallest of the four counties in the area, had the fastest growth rate between 1990 and 2000, but Loudon County is estimated to have had the highest growth rate between 2000 and 2006.

Roane County, the largest of the four, had the slowest growth rate after a loss of population between 1980 and 1990 and is estimated to have had the slowest growth rate between 2000 and 2006. All four counties grew much faster from 1990 to 2000 than in the previous decade, but the growth rates since 2000 have been slower than from 1990 to 2000. Projections indicate that the area will continue to have faster population growth than either the state or the nation for the next several years and decades, but that the growth rate will not be as fast as it is now.

Table 3.13-1. Population and Population Projections, 1980-2020

	1980	1990	2000	2006 (Estimate)	2010	2020
Loudon County	28,553	31,255	39,086	44,566	48,208	57,953
Meigs County	7,431	8,033	11,086	11,698	13,579	17,343
Rhea County	24,235	24,344	28,400	30,347	31,607	35,018
Roane County	48,425	47,227	51,910	53,293	54,484	57,677
Area Total	108,644	110,859	130,482	139,904	147,878	167,991
Tennessee	4,591,023	4,877,185	5,689,283	6,038,803	6,425,969	7,195,375
United States (000)	226,542.2	248,709.9	281,421.9	299,398.5	308,936.0	335,805

Source: Historical data from U.S. Census Bureau, Census of Population 1980, 1990, and 2000; state and county projections from Tennessee Advisory Commission on Intergovernmental Relations and the University of Tennessee Center for Business and Economic Research, *Population Projections for the State of Tennessee, 2005 to 2025,* December 2003; U. S. projections from U.S. Census Bureau, "U.S. Interim Projections by Age, Sex, Race, and Hispanic Origin," March 2004.

Table 3.13-2. Percent Change in Population

	1980-1990	1990-2000	2000-2006	2000-2010	2010-2020	1980-2020
Loudon County	9.5	25.1	14.0	23.3	20.2	103.0
Meigs County	8.1	38.0	5.5	22.5	27.7	133.4
Rhea County	0.4	16.7	6.9	11.3	10.8	44.5
Roane County	- 2.5	9.9	2.7	5.0	5.9	19.1
Area Total	2.0	17.7	7.2	13.6	13.6	54.6
Tennessee	6.2	16.7	6.1	12.0	12.0	56.7
United States	9.8	13.2	6.4	9.8	8.7	48.2

These counties are decidedly rural in distribution of population. The largest city in the four counties is Lenoir City (Loudon County) with about 7,700 residents. All counties have from almost 60 percent (Roane) to almost 90 percent (Meigs) of their population outside incorporated cities or towns.

Labor Force and Unemployment: In 2006, the civilian labor force of the area was 67,220, as shown in Table 3.13-3. Of these, 3,570 were unemployed on average during the year, yielding an unemployment rate of 5.3 percent. This rate was higher than both the state and the national rates.

Table 3.13-3. Labor Force Data, Residents of Watts Bar Reservoir Area, 2006

	Civilian Labor Force	Unemployed	Unemployment Rate (Percent)
Loudon County	22,350	990	4.4
Meigs County	4,840	330	6.8
Rhea County	13,400	820	6.1
Roane County	26,630	1,430	5.4
Area Total	67,220	3,570	5.3
Tennessee	2,990,220	154,600	5.2
United States (000)	151,428	7,001	4.6

Source: Tennessee Department of Employment Security

Employment: The area is more dependent on manufacturing, farming, and government employment than either the state or the nation (Table 3.13-5). Farm employment accounted for 4.8 percent of the total in 2005, notably higher than the state average of 2.7 percent and the national average of 1.7 percent. Both Loudon and Meigs counties have relatively high farm employment, while Rhea and Roane counties have farm employment shares more like the state average. Manufacturing employment is especially dominant in Rhea County, at 31.7 percent of the total, compared to 11.7 percent in the state and 8.5 percent nationally. It is also relatively high in Loudon County, 16.8 percent of the total, and slightly higher than the state in Meigs County, at 12.9 percent. Government employment is higher than both the state and national averages in Rhea and Roane counties. All other types of employment, conversely, are lower in the area than in the state or nation, though in Meigs and Roane counties, this category is relatively close to the state and national percentages.

Table 3.13-4. Employment, 2005

	Total	Farm	Manufacturing	Government	Other
Loudon County	18,721	1,324	3,153	2,166	12,078
Meigs County	5,766	406	741	471	4,148
Rhea County	14,851	511	4,711	2,463	7,166
Roane County	21,420	646	1,601	4,248	14,925
Area Total	60,758	2,887	10,206	9,348	38,317
Tennessee	3,630,959	98,051	424,041	438,664	2,670,203
United States (000)	174,249.6	2,914.0	14,860.9	23,837.0	132,637.7

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

Table 3.13-5. Percent Distribution of Employment, 2005

	Total	Farm	Manufacturing	Government	Other
Loudon County	100.0	7.1	16.8	11.6	64.5
Meigs County	100.0	7.0	12.9	8.2	71.9
Rhea County	100.0	3.4	31.7	16.6	48.3
Roane County	100.0	3.0	7.5	19.8	69.7
Area Total	100.0	4.8	16.8	15.4	63.1
Tennessee	100.0	2.7	11.7	12.1	73.5
United States	100.0	1.7	8.5	13.7	76.1

Occupation Patterns: Another way to compare the employment in the area with state and national employment patterns is by type of occupation, which to a certain extent cuts across the broad categories described above. Table 3.13-6 shows that in 2000 the area had fewer of its workers in the management, professional, and related occupations, as well as in sales and office occupations than does either the state or the nation. This pattern holds for all of the four counties in the area. Conversely, all four counties had relatively more workers in the construction, extraction, and maintenance occupations and in production, transportation, and material moving occupations than the state or the nation. The share of workers in service occupations is similar to the state, but smaller than the national average. Farming, fishing, and forestry occupations accounted for only a small share in any of the counties, but the share was higher than the state and national averages except in Roane County.

Table 3.13-6. Occupation of Workers (Percent Distribution), 2000

Occupation Class	Loudon	Meigs	Rhea	Roane	Area Total	State	U.S.
Management, Professional, and Related	25.6	16.6	18.5	26.7	23.8	29.5	33.6
Service	13.3	12.9	13.3	14.4	13.7	13.7	14.9
Sales and Office	25.3	19.4	20.4	22.4	22.7	26.1	26.7
Farming, Fishing, and Forestry	0.9	1.7	1.1	0.5	0.8	0.6	0.7
Construction, extraction, and maintenance	12.2	15.2	11.9	13.3	12.8	10.3	9.4
Production, transportation, and material moving	22.7	34.2	34.8	22.7	26.2	19.9	14.6

Source: U.S. Census Bureau, Census of Population 2000

Income: Per capita personal income in all four of the area counties is lower than the state and national averages (Table 3.13-7). Loudon County had the highest level in 2005 at $30,538, almost 89 percent of the national average. Meigs County had the lowest level at $22,206, a little more than 64 percent of the national average. The area as a whole averaged 78.4 percent of the national average in 2005.

Table 3.13-7. Per Capita Personal Income

	1995	Percent of U.S. in 1995	2005	Percent of U.S. in 2005
Loudon County	20,395	88.4	30,538	88.6
Meigs County	14,679	63.6	22,206	64.4
Rhea County	16,228	70.3	22,757	66.0
Roane County	18,905	81.9	27,584	80.0
Area Total	18,419	79.8	27,015	78.4
Tennessee	21,174	91.8	30,969	89.8
United States (000)	23,076	100.0	34,471	100.0

Source: U.S. Bureau of Economic Analysis, Regional Economic Information System.

3.13.2. Environmental Justice

Environmental justice is concerned with the possibility of disproportionate impacts to minority and low-income populations in the area. The minority population in the Watts Bar Reservoir area is small, 5.7 percent of the total in 2005, which is well below the state

average of 22.1 percent and the national average of 33.1 percent (Table 3.13-8). Within the four counties in the area, the minority population ranges from 3.2 percent of the total in Meigs County to 6.2 percent in Loudon County. The estimated poverty rate in the area in 2004 was 14.1 percent, slightly lower than the state rate of 15.0 percent, but higher than the national average of 12.7 percent. Among the counties in the area, poverty rates range from 11.1 percent in Loudon County to 17.5 percent in Meigs County.

Table 3.13-8. Minority Population, 2005, and Poverty, 2004

	Population	Minority Population			Poverty
	Total	Nonwhite	White Hispanic	Percent Minority	Percent Below Poverty Level
Loudon County	43,387	1,194	1,507	6.2	11.1
Meigs County	11,657	298	74	3.2	17.5
Rhea County	29,918	1,170	635	6.0	16.2
Roane County	52,889	2,517	445	5.6	14.7
Area Total	137,851	5,179	2,661	5.7	14.1
Tennessee	5,962,959	1,153,315	164,831	22.1	15.0
United States	296,410,404	58,555,450	39,488,517	33.1	12.7

Source: U.S. Census Bureau, Estimates of the Population by Race and Hispanic or Latino Origin for the United States of America; July 1, 2005, and CC-ESR2005-6RACE; U.S. Census Bureau, Small Area Income and Poverty Estimates, December 2004

3.14. 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 strictly controlled. Except for ozone and particulate matter, all counties that surround Watts Bar Reservoir and their surrounding counties are currently in attainment. In July 1997, USEPA promulgated new, more restrictive standards for ozone and fine particulate matter ($PM_{2.5}$). The $PM_{2.5}$ nonattainment designations include Loudon County and part of Roane County and the nearby counties of Anderson, Blount, Knox, and Hamilton. Current nonattainment counties for ozone include Loudon and Meigs among the Watts Bar Reservoir lands counties. Other ozone nonattainment counties that are adjacent to the Watts Bar Reservoir lands counties are Knox and Blount adjacent to Loudon, Anderson adjacent to Roane, and Hamilton adjacent to Meigs. However, on March 12, 2008, USEPA promulgated a new, more restrictive standard for ozone. USEPA will designate non-attainment areas based on this new standard in March 2010, at which time more counties may be designated nonattainment for ozone.

Prevention of Significant Deterioration (PSD) regulations are used to limit air pollutant emissions from new or expanding sources. National parks and certain wilderness areas are designated PSD Class I air quality areas and therefore subject to the air quality protection under the PSD regulations. The closest PSD Class I area is the Great Smoky Mountains National Park to the east and southeast from Watts Bar Reservoir. The shortest distance to the nearest border of the park is from the upper end of the reservoir close to Fort Loudoun Dam and is about 20 miles.

CHAPTER 4

4. ENVIRONMENTAL CONSEQUENCES

4.1. Introduction

This chapter describes the environmental consequences of the three alternatives for managing TVA public land around Watts Bar Reservoir. Under all three alternatives, previously unplanned land includes strips of retained land fronting TVA sale tracts (marginal strip). These retained strips of TVA public land that are encumbered with water access rights are proposed for allocation to Zone 7 (Shoreline Access) under Modified Alternatives B and C, in accordance with the SMI decision of 1999. Approximately 14 percent (2,303 acres) of TVA public land, which comprises 340 shoreline miles, on Watts Bar Reservoir is proposed for allocation to Zone 7 under Modified Alternatives B and C. As explained in Section 1.3, land in Zone 7 would be categorized as shoreline protection, residential mitigation, or managed residential under the TVA SMP. Review of private water use facility requests in Zone 7 would include consideration of the site's shoreline categorization status to minimize environmental impacts. Protective measures presently in place under TVA's land use approval process and SMI EIS would reduce or minimize impacts of residential development of private property.

Under the No Action Alternative, the land use allocation categories assigned to each parcel in the 1988 Plan would remain in effect. Under the Action Alternatives B and C, TVA would update the allocations originally designated for each parcel in the 1988 Plan to reflect the land use zones defined in Table 2.1-1 of this Land Plan. Modified Action Alternatives B and C incorporate alternative land use zone allocations listed in Table 2.1-2.

4.2. Terrestrial Ecology (Plant and Animal Communities)

The terrestrial ecology on Watts Bar Reservoir lands could be impacted by management scenarios dictated by land use allocations. Each of the land use zone designations allow for specific uses (see Chapter 2, Table 2.1-2), which would have individual and specific impacts on terrestrial ecology.

In most cases, the least environmental impacts to terrestrial animals and vegetation on a reservoir-wide basis would occur on lands allocated to Zone 3 (Sensitive Resource Management) and Zone 4 (Natural Resource Conservation), where land is managed for the protection of sensitive resources, maintenance of wildlife habitat, and dispersed recreation uses. Conversely, the greatest potential for negative effects on general terrestrial ecology would occur on lands allocated to Zone 5 (Industrial), and on some lands allocated to Zone 2 (Project Operations). While a range of impacts from minimal to extensive could occur on lands allocated to Zone 6 (Developed Recreation), the effects on the terrestrial ecology resources would depend on the type and extent of any recreation development.

The majority of parcels that would be allocated to Zones 5 and 6 and developed under Alternative A and Modified Alternative B are currently forested. Loss of these forests would accompany land clearing for development, resulting in permanent conversion to nonforest conditions with a substantive loss of biodiversity. In situations where some forested areas

were left intact, they would essentially be small islands of “habitat” that would have much less value to area wildlife.

Development entails land cover changes that often foster the establishment of invasive terrestrial animals and other species, such as brown-headed cowbirds, European starlings, house sparrows, and rock pigeons that are symptomatic of disturbance. Large-scale developments can also lead to increased wildlife “nuisance” problems where animals such as white-tailed deer, raccoons, striped skunks, opossums, and beaver may cause garden crop or ornamental shrub damage when their natural habitats are encroached upon.

Additionally, under any development scenario, an increased representation by invasive plant species that typically inhabit edge habitats would be expected. In order to minimize the potential for the introduction of invasive plant species on TVA-owned or transferred properties, any development scenario would include the following conditions and requirements:

- Landscaping activities on developed properties would not include the use of plants listed as Rank 1, “Severe Threat,” Rank 2, “Significant Threat,” and Rank 3, “Lesser Threat,” on the Tennessee Exotic Pest Plant Council’s list of Invasive Exotic Pest Plants in Tennessee (Appendix D, Table D-7).

- Revegetation and erosion control work would utilize seed mixes comprised of native species or noninvasive nonnative species (Appendix D, Table D-8).

Only 3.7 percent of the land base in the state of Tennessee is in public ownership (State of Tennessee 2003). Alternatives that develop TVA land would reduce this percentage and reduce land available for wildlife habitat and dispersed recreation public use. This has been an expressed concern of many stakeholders. Cumulative impacts to terrestrial ecological resources are ongoing and likely to continue in the Watts Bar Reservoir area, regardless of any action taken by TVA or the alternative selected. This is due to the amount of private land that borders TVA-owned properties. These private lands are developing at an increasingly rapid pace, particularly for residential housing purposes throughout the Watts Bar Reservoir area. Currently, there are over 17,000 acres of platted residential property adjacent to Watts Bar Reservoir. This acreage is greater than the total amount of TVA public land being planned on the reservoir. TVA constantly receives inquiries about new potential development areas. It is estimated that approximately 60 percent of the platted area has already been converted to residential housing with complete conversion of most of these areas anticipated. Varieties of terrestrial habitats are being impacted through conversion to residential housing including forests of various ages and open land in multiple successional stages. While some types of wildlife and vegetation can adapt to this alteration of the habitat, many species cannot and will no longer be found in these areas.

Alternative A – No Action: Under the 1988 Plan, several large parcels of land are allocated for developed uses that would fall under land allocation categories equivalent to Zone 5 (Industrial) and Zone 6 (Developed Recreation). The former CRBR site (1,109 acres - Parcels 142, 143, 145, 147, and 148) is allocated for industrial use. Since 1988, several timber harvests have been conducted by TVA on these parcels, and a short-term revocable land use permit was granted to the TWRA allowing the use of these parcels as part of the Oak Ridge Reservation WMA. These parcels provide substantial high-quality habitat for a variety of terrestrial animal and plant species including high-density populations of white-

tailed deer and eastern wild turkey, which are an important part of the TWRA-managed hunts on the Oak Ridge Reservation WMA.

Another area allocated for developed uses is the Lowe Branch site, which includes Parcels 297 and 298 (279 acres). Following the 1988 Plan, these parcels have been managed in the interim for forestry and wildlife habitat development and have received extensive use for a variety of dispersed recreation activities by the general public, especially for white-tailed deer hunting. In the late 1990s, TVA identified significant abuse to portions of this property including trash dumping, disposal of dead livestock, and severe off-road vehicle impacts. In an effort to control these abuses and better manage the area, TVA incorporated this area into its resource management plan and EA for the LWBU (TVA 2000). This process and implementation plan led to the gating and control of land use abuses and the development of stakeholder partnerships (Quail Unlimited) to help better manage the site for wildlife resources.

Adoption of this alternative could potentially impact over 1,300 acres of high-quality terrestrial habitat primarily at the former CRBR site and the Lowe Branch site. The parcels are allocated for Industrial Development in the 1988 Plan and would be developed in the future, resulting in the loss of interim uses for dispersed recreation such as the TWRA land use permit. There is also an additional 2,000 acres of TVA property scattered across the reservoir that, under the 1988 Plan, might be developed for commercial recreation. Therefore, under this alternative, there are about 3,300 acres, or approximately 20 percent, of the TVA land base on Watts Bar Reservoir where terrestrial ecological resources would be adversely impacted.

Action Alternative B – Modified Development and Recreation: Under this alternative, TVA would allocate approximately 357 acres (2.2 percent) of the TVA public land base on Watts Bar Reservoir to Zone 5 (Industrial). An additional 760 acres of the former CRBR site (Parcels 142, 143, 145, 148) would be allocated for Zone 2 (Project Operations). Zone 2 and Zone 5 could have similar impacts to terrestrial ecology, although the retention of TVA ownership with Zone 2 allows a greater degree of control that could be exercised to mitigate adverse impacts on terrestrial ecology. Should these areas be developed in the future, the dispersed recreation opportunities supported by terrestrial habitats in these areas would eventually be lost. Under this alternative, an additional buffer along the Clinch River is proposed by adding 110 acres to Parcel 144 as Zone 3. The establishment of a riverside buffer would reduce the potential impacts to wildlife and vegetation that would result from any type of industrial development at the former CRBR Site.

The total amount of land (1,072 acres) proposed for allocation to Zone 5 and the additional land proposed for allocation to Zone 2 is about a third less than the 1,545 acres allocated for Industrial and Commercial Development in the 1988 Plan (Alternative A). In addition, the allocation of Parcel 240 as Zone 4 would be beneficial to terrestrial ecology.

Therefore, potential impacts to terrestrial ecological resources would be less under this alternative than for Alternative A. Where habitat alteration occurs under this alternative, the impacts would be similar to Alternative A, and they would include the loss of some interior forest bird habitat, more habitat fragmentation and loss of biodiversity, and a concurrent increase in invasive plants and animals. More specifically, this alternative would affect some habitat for several listed Birds of Conservation Concern (USFWS 2002) including chuck-will's widow, whip-poor-will, Acadian flycatcher, wood thrush, prairie warbler, prothonotary warbler, worm-eating warbler and Kentucky warbler. The Louisiana waterthrush also occurs in this

region, but suitable habitat for this species is very limited on TVA lands under consideration; therefore, TVA's actions would have little effect on it.

From a dispersed recreation user perspective, this alternative would lessen opportunities for recreation pursuits such as hiking, camping, hunting, and wildlife observation. Specifically, selection of this alternative would eliminate future stakeholder partnership opportunities and activities on Parcels 297 and 298 at Lowe Branch as well as eliminate from consideration a request from TWRA for the transfer of Parcels 295, 297, 298, and 299 from TVA for inclusion in its WMA program as a contiguous tract of land. Additionally, this alternative would eliminate, over time, the WMA hunting regulation agreement with TWRA for the former CRBR Site area (which includes Parcels 142, 143, 144, 145, and 146).

Under Modified Alternative B, direct, indirect, and cumulative impacts on terrestrial ecological resources would occur on a site-specific basis, particularly on portions of the Lowe Branch area and the former CRBR Site, over time as industrial development progresses. Recreation area development under this alternative would also impact terrestrial resources on site- and action-specific bases. The eventual development of the proposed Zone 2, 5, and 6 parcels could potentially impact up to 1,072 acres of currently undeveloped, mostly forested habitat. While some of these impacts would be significant on a localized basis, loss of terrestrial ecological biodiversity and associated dispersed recreation opportunities under this alternative is expected to be insignificant on a reservoir-wide basis over the 10-year plan horizon.

Action Alternative C – Modified Conservation and Recreation: Under this action alternative, TVA would allocate approximately 31 percent (5,098 acres) of the current public land base on Watts Bar Reservoir to Zone 4 (Natural Resource Conservation). This is about 1,800 acres more than the No Action Alternative and 1,200 acres more than Modified Alternative B. Impacts to terrestrial ecological resources under this alternative would be less than under Alternative A or Modified Alternative B. Selection of this alternative would protect more interior forest bird habitat and terrestrial biodiversity, reduce habitat fragmentation potential, and lessen the occurrence of invasive exotic plant and invasive animal species on a reservoir-wide basis. This alternative would also be considered beneficial to most of the Birds of Conservation Concern species as described under Modified Alternative B.

From a recreation user's perspective, this alternative would expand opportunities for informal pursuits, such as wildlife and nature observation and hunting. Specifically, selection of this alternative would maintain current stakeholder partnership opportunities and activities on Parcels 297 and 299 at Lowe Branch and keep open consideration of TWRA's request for the transfer of Parcels 295, 297, 298, and 299 for inclusion in its WMA program. Additionally, this alternative would change the allocation of the former CRBR site (Parcels 142, 143, 145, and 148) from Zone 2 or 5 to Zone 4. This reallocation would maintain the area's current ecological state and allow TWRA to continue its interim management agreement.

Specifically, this alternative would allow for continued management of natural resources on Parcels 295, 297, 298, and 299 with the possibility of designating a portion of this area as an Important Bird Area in conjunction with TWRA and the incorporation of prescribed burning regimes to better manage groups of wildlife species in conjunction with the Tennessee Division of Forestry. The eventual development of the proposed Zone 5 and 6 parcels could potentially impact up to 54 acres of currently undeveloped, mostly forested habitat.

Selection of Modified Alternative C would have the greatest benefit for terrestrial ecological resources on both a site-specific and reservoir-wide basis for the proposed 10-year plan horizon.

4.3. Sensitive (Endangered and Threatened) Species

Sensitive species include any plant or animals listed under the ESA or similar state laws or regulations, as well as any species or community of species considered to be rare, uncommon, in need of management, or of special concern. The sensitive species in this section are those that are found in the area of Watts Bar Reservoir. The discussion of sensitive species is presented in three sections, plants, terrestrial animals, and aquatic animals.

Overall, TVA has determined that under all of the Alternatives there would be no effect on the two federally listed plants present in the project area; Virginia spirea and Cumberland rosemary, four of the five federally listed mussels; fanshell, rough pigtoe, shiny pigtoe, and orangefoot pimpleback, the two federally listed fish; snail darter and spotfin chub, and one mammal; gray bat. Also, these alternatives would not result in adverse modification of designated critical habitat for the federally listed spotfin chub in the Obed or Emory Rivers, and potential impacts for state-listed species would be insignificant.

Further, TVA has determined that adoption of Alternative A or Modified B is not likely to adversely affect the federally listed mussel, pink mucket, but adoption of the Modified Alternative C would have no effect on the mussel.

TVA consulted with the USFWS (see Appendix H) and received concurrence that the preferred alternative (Modified Alternative B) is not likely to adversely affect federally listed species.

4.3.1. Plants

Most of the potential for adverse effects to rare plant species, including threatened and endangered species, is dependent on how land is used and impacted from changes in the allocated land use. For example, land allocated to Zone 3 (Sensitive Resource Management) or Zone 4 (Natural Resource Conservation), which has little or no activities like soil disturbances, would be beneficial to a protected plant species. However, a change of allocation of a parcel to Zone 5 (Industrial) or Zone 6 (Developed Recreation), which allows soil disturbance, could result in a loss of protected species on that parcel. Such changes would facilitate changes in land use and land cover. Potential direct effects include ground disturbance that could result in the physical destruction and loss of sensitive plant species. Also, changes in land use could indirectly affect some sensitive plants by subtly affecting the habitats of some sensitive plants. Examples of such potential indirect effects include changes in the amount of light, soil moisture, and drainage patterns.

No populations of federally listed plants are known to occur on Watts Bar Reservoir lands. Thirty-seven species of state-listed as threatened and endangered plants are reported from within a 5-mile radius of Watts Bar Reservoir with 13 species occupying areas directly on or adjacent to reservoir lands. The remaining sensitive species are found within 5 miles of Watts Bar Reservoir and would not be impacted by any of the alternatives.

Seven HPAs on Watts Bar Reservoir have been designated for protection of state-listed plant species, and one new HPA is proposed under the modified action alternatives. These are on land parcels allocated to Zone 3 and contain habitat for six of the 13 state-listed as threatened and endangered plant species. Spreading false-foxglove, a state-listed as threatened species, is protected at Grassy Creek, Marble Bluff, Polecat Creek Slopes, Rayburn Bridge, Sugar Grove, and Stowe Bluff; Appalachian bug bane, a state-listed as

threatened species, is protected at Grassy Creek and Stowe Bluff; northern bush-honeysuckle, a state-listed as threatened species, occurs within Marney Bluff and Stowe Bluff; mountain honeysuckle, a species of special concern, is protected at Sugar Grove; Bay starvine, a state-listed as threatened species, occurs on the proposed Whites Creek Alluvial Deposit Forest (see Section 3.4.3); and shining ladies'-tresses, a state-listed as threatened orchid, is protected at Grassy Creek. The remaining seven listed plant species occur in Zone 1 (Non-TVA Shoreline), Zone 4, Zone 6, and Zone 7 (Shoreline Access), see Table 4.3-1.

A majority of the rare plant species occur under all the alternatives within Zone 1, Zone 3 (Parcels 65, 91, 94, 146, 152, 194, and 196), Zone 4 (Parcels 70 and 126), Zone 6 (Parcel 121), and Zone 7 (Parcels 61, 81, 128, and 248), see Section 3.3.1. The rare plant communities occurring in flowage areas of Zone 1 could incur minor impacts by the changing water levels resulting from normal river and reservoir operations. Since the HPA boundaries and the amount of land designated to Zone 3 would remain constant (Alternative A) or increase (Modified Alternatives B or C) impacts to the rare plant communities found on parcels within Zone 3 are not likely. Although the amount of land varies with the alternative, rare plants occurring on Zone 4 would likewise incur the benefits of protection from adverse activities. There could be impacts to any rare plant species occurring on Zones 2, 5, 6, and 7 primarily from the construction of infrastructure to support their purpose; however, these and any other populations of listed species that might be discovered in the future would be subjected to TVA environmental review should individual projects or changes in land use be proposed. Accordingly, appropriate protective or mitigative measures would be implemented as required to protect these sensitive plant resources.

Table 4.3-1. Rare Plant Species Occurring on Watts Bar Reservoir Land for All Alternatives, Listed by Zone

Zone*	Parcel # or River Mile	Rare Plants Present	Habitat Protection Area
1 (2)	CRM 3	Fetter-bush (*Leucothoe racemosa*)	
1	TRM 593	American barberry (*Berberis canadensis*), Mountain honeysuckle (*Lonicera dioica*)	
1	CRM 10.5, 12.5	Spreading false-foxglove (*Aureolaria patula*)	
1	CRM 19.5	Canada lily (*Lilium canadense*), Spreading false-foxglove (*Aureolaria patula*)	
1	CRM 12.5	Large-flowered barbara's-buttons (*Marshallia grandiflora*), Pursh's wild-petunia (*Ruellia purshiana*)	
1	CRM 11.4	Northern white cedar (*Thuja occidentalis*)	
3	Parcel 196	Spreading false-foxglove (*Aureolaria patula*), Appalachian bugbane (*Cimicifuga rubifolia*), Northern bush-honeysuckle (*Diervilla lonicera*)	Stowe Bluff
3	Parcel 65	Northern bush-honeysuckle (*Diervilla lonicera*)	Marney Bluff
3 & 4	Parcel 91	Spreading false-foxglove (*Aureolaria patula*)	Marble Bluff
3 & 4	Parcel 94	Spreading false-foxglove (*Aureolaria patula*)	Polecat Creek Slopes
3	Parcel 194	Spreading false-foxglove (*Aureolaria patula*)	Rayburn Bridge
3	Parcel 152	Spreading false-foxglove (*Aureolaria patula*), Mountain honeysuckle (*Lonicera dioica*)	Sugar Grove

Zone*	Parcel # or River Mile	Rare Plants Present	Habitat Protection Area
3	Parcel 146	Spreading false-foxglove (*Aureolaria patula*), Appalachian bugbane (*Cimicifuga rubifolia*), Shining ladies'-tresses (*Spiranthes lucida*)	Grassy Creek
3	Parcel 233	Bay starvine (*Schisandra glabra*)	Whites Creek Alluvial Deposit Forest
2 & 4	Parcel 70	Spreading false-foxglove (*Aureolaria patula*)	
4	Parcel 126	Spreading false-foxglove (*Aureolaria patula*), Northern bush-honeysuckle (*Diervilla lonicera*)	
4 & 6	Parcel 121	Mountain bush-honeysuckle (*Diervilla rivularis*)	
7	Parcel 248	Spreading false-foxglove (*Aureolaria patula*)	
7	Parcel 61	Spreading false-foxglove (*Aureolaria patula*)	
7	Parcel 81	Spreading false-foxglove (*Aureolaria patula*)	
7	Parcel 128	Appalachian bugbane (*Cimicifuga rubifolia*)	

* Zone 1: Non-TVA Land (Flowage), Zone 2: Project Operations, Zone 3: Sensitive Resource Management, Zone 4: Natural Resource Conservation, Zone 6: Developed Recreation, Zone 7: Shoreline Access. Under Modified Alternatives B and C, some parcel acreages would increase from or would be added to another parcel.

Alternative A – No Action: As described above, there are no known populations of federally listed plants on Watts Bar Reservoir lands; therefore, no impacts to federally listed plants are expected under this alternative. Known populations of other rare plants would continue to be protected by their inclusion in Zones 3 (Sensitive Resource Management) and 4 (Natural Resource Conservation) or through the environmental review of any development proposals. Therefore, insignificant direct or indirect adverse impacts to state-listed or other rare plants are expected under Alternative A.

Under the No Action Alternative about 58 percent (9,400 acres) of the total TVA-owned land area would be allocated to categories equivalent to Zones 2 (Project Operations), 5 (Industrial), or 6 (Developed Recreation), or would remain as unplanned marginal strips where impacts to rare plants would be most likely to occur. However, about 42 percent (6,800 acres) of the total TVA-owned land area would be allocated to categories equivalent to Zones 3 and 4 for resource conservation (see Table 2.2-2) where rare plants would be protected. Adoption of the No Action Alternative would result in insignificant cumulative impacts to the rare, sensitive, and state-listed plants on Watts Bar Reservoir.

Action Alternative B – Modified Development and Recreation: As described above, there are no known populations of federally listed plants on Watts Bar Reservoir lands; therefore, no impacts to federally listed plants are expected under this alternative. Known populations of rare plants would continue to be protected by their inclusion in Zones 3 (Sensitive Resource Management) and 4 (Natural Resource Conservation) or through the environmental review of any development proposals. Therefore, insignificant direct or indirect adverse impacts to state-listed or other rare plants are expected under Modified Alternative B.

Under Modified Alternative B, about 53 percent (8,600 acres) of the total TVA-owned land area would be allocated to Zones 2 (Project Operations), 5 (Industrial), 6 (Developed Recreation), and 7 (Shoreline Access) where impacts to rare plants would be most likely to occur. However, about 47 percent (7,600 acres) of the total TVA-owned land area would be

allocated to Zones 3 and 4 for resource conservation (see Table 2.2-2) where rare plants would be protected. Impacts would be slightly less than the No Action Alternative; therefore, the adoption of Alternative B would result in insignificant cumulative impacts to the rare plants on Watts Bar Reservoir.

Action Alternative C – Modified Conservation and Recreation: As described above, there are no known populations of federally listed plants on Watts Bar Reservoir lands; therefore, no impacts to federally listed plants are expected under this alternative. Known populations of rare plants would continue to be protected by their inclusion in Zones 3 (Sensitive Resource Management) and 4 (Natural Resource Conservation) or through the environmental review of any development proposals. Therefore, insignificant direct or indirect adverse impacts to state-listed or other rare plants are expected under Modified Alternative C.

Under Modified Alternative C, about 45 percent (7,300 acres) of the total land area on Watts Bar Reservoir would be allocated to Zones 2, 5, 6, and 7 where impacts to rare plants would be most likely to occur. However, about 55 percent (8,900 acres) of the total TVA-owned land area would be allocated to Zones 3 and 4 for resource conservation (see Table 2.2-2) where rare plants would be protected. Adoption of Modified Alternative C would result in the least impacts of all the alternatives to the rare plants on Watts Bar Reservoir.

4.3.2. Terrestrial Animals

Land use allocations (see Table 2.1-2) would have varying degrees of potential effects on rare and sensitive terrestrial animals and sensitive ecological areas (e.g., caves and heron colonies) on the Watts Bar Reservoir lands. In general, the potential to adversely affect these sensitive resources depends on the type of action, specifically, the degree of site or ground disturbance and whether measures were taken to protect sensitive resources.

Adverse effects to sensitive terrestrial animals are not likely to occur on parcels allocated to Zones 3 (Sensitive Resource Management) and 4 (Natural Resource Conservation). These allocations, especially Zone 3, are designed to provide protection to sensitive resources. Proposed actions within these zones would typically be initiated by TVA, and actions that could adversely affect threatened or endangered species would not be considered. Proposed management actions within Zones 3 and 4 would typically be designed to have beneficial effects to rare and sensitive terrestrial animals and ecological areas.

Future actions in Zone 6 (Developed Recreation) parcels could have minimal to extensive impacts to sensitive terrestrial animals and their habitats, depending upon the type of recreation activities implemented. In particular, recreational activities involving extensive vegetation clearing or widespread landscape alteration would have a high potential to adversely affect terrestrial animals, including threatened and endangered species. Other associated activity such as increased boat traffic could also impact these resources.

Future activities on Zone 5 (Industrial) and some Zone 2 (Project Operations) parcels would have a generally high potential to affect sensitive terrestrial animals, their habitats, and any nearby sensitive ecological areas because they would likely involve habitat alterations (e.g., vegetation clearing and ground disturbance and other impacts).

Potential impacts from site-disturbing activities would be reduced through the use of BMPs and other avoidance measures. Such measures would be conditions of TVA approval of land

use requests. Likewise, potential effects to populations of rare terrestrial animals and sensitive ecological areas would be considered during TVA environmental reviews associated with specific project proposals and land use requests. Thus, the allocation of land use under any of the alternatives is not likely to adversely affect threatened or endangered terrestrial animals.

Because caves are extremely fragile and biologically significant, TVA has placed and would continue to maintain protective buffer zones around the known caves on TVA public land on Watts Bar Reservoir.

Gray bat colonies have been documented on only one parcel within the Watts Bar property. This parcel has been designated as Zone 3. This allocation would provide adequate protection to the cave and gray bats. Because gray bats forage over water, land management activities would not have any direct impacts to the gray bat foraging activities.

Impacts to eastern hellbenders are not expected under any of the alternatives, provided adequate BMPs are used when activities occur. Appropriate BMPs would be used to control sedimentation and runoff into rivers and streams that may contain hellbenders.

Habitat for four-toed salamanders, Tennessee cave salamanders, least bitterns, and eastern slender glass lizards does not occur within parcels subject to the proposed land allocations. Therefore, no impacts to these species are expected.

Habitat for sharp-shinned hawks, Bachman's sparrows, barn owls, eastern small-footed bats, southern bog lemmings, southeastern shrews, and northern pine snakes exists within the counties encompassing the Watts Bar Reservoir properties. Although no historic records occur for these species on TVA Watts Bar property, they may occur if suitable habitat occurs on TVA lands.

Alternative A – No Action: Under this alternative, TVA would continue to use the 1988 Plan, SMP, and other previous commitments to guide the management of 16,220 acres on the reservoir. Alternative A allocates a greater percentage of land (9.5 percent) for Zone 5 (Industrial) use than Modified Alternatives B (2.2 percent) and C (less than 1 percent). Adoption of this alternative has a greater potential for adverse impacts to rare terrestrial animals than Modified Alternatives B and C.

At the former CRBR site, under Alternative A, Parcels 144 and 146 (totaling 147 acres) would be designated as Zone 3. Another 1,109 acres (i.e., Parcels 142, 143, 145, 147, and 148) would be placed in Zone 5. The two parcels allocated as Zone 3 (Sensitive Resource Management) would be separated, and no protected corridors would connect them. State-listed southeastern shrews and Bachman's sparrows, which have been recorded in the area but not on the parcels, would be locally impacted by development under Alternative A and Modified Alternative B if they occur on these parcels. Southeastern shrews likely occur on the site; however, the species is likely found throughout other TVA Watts Bar properties. Bachman's sparrows have not been recorded from the area since 1987, and the habitat for them at the former CRBR site is marginal. Therefore, potential impacts to populations of these species would be minimal.

Bald eagles and ospreys have been observed roosting and foraging on or near Parcels 142 through 148. Site development under Alternative A would reduce the potential of these parcels as roosting sites. However, other suitable roost sites for these species exist within

the Watts Bar area. Therefore, potential impacts to roosting and foraging sites would be minimal at the former CRBR site.

If Alternative A were chosen, the Grassy Creek HPA (Parcel 146), which protects rare plant habitat and also has habitat for listed animal species, including eastern small-footed bats, could become isolated from other habitats resulting in minimal impacts.

Parcels 295 through 299 (the Lowe Branch area) contain habitat for roosting and nesting bald eagles, although no records are known from here presently. If Alternative A were chosen, 279 acres of land (Parcels 297 and 298) would be allocated to Zone 5. Given the amount of suitable nesting habitat in the vicinity, adoption of Alternative A would not result in adverse impacts to bald eagles.

Adoption of the No Action Alternative would minimally add to the cumulative impacts to protected terrestrial animals of Watts Bar Reservoir. Land activities under Alternative A could result in some additional fragmentation of an already fragmented landscape. Additional shoreline development may begin to limit the roosting and nesting potential of bald eagles, ospreys, and herons. These species may be limited to nesting on isolated islands and on inland sites further isolated from shoreline development.

Action Alternative B – Modified Development and Recreation: This alternative would allocate fewer acres of land to Zone 5 (Industrial) than under Alternative A which is somewhat offset by the allocation of Parcels 142, 143, 145, and 148 to Zone 2 (Projects Operations). In general, adoption of this alternative would have less potential to impact wildlife than Alternative A but more potential than Alternative C (see Table 2.2-1). Development of Watts Bar Reservation shoreline under Modified Alternative B could impact areas with potential for bald eagle, osprey, and heron nesting. Project operation site development at the former CRBR site could degrade the suitability of Parcels 142 through 148 as roosting sites for eagles and ospreys.

Similar to Alternative A, the Grassy Creek HPA (Parcel 146), which protects rare plant habitat and also has habitat for listed animal species, including eastern small-footed bats, could become isolated from other habitats. However a buffer zone would be incorporated around the site to reduce these effects. Under this alternative, impacts to species within the Grassy Creek HPA would be minimal.

Adoption of Alternative B would result in similar impacts to the protected terrestrial animals as those described in Alternative A. However with more tracts allocated for Zones 3 (Sensitive Resource Management) and 4 (Natural Resource Conservation) and lesser land area allocated for Zones 5 (Industrial) and 6 (Developed Recreation), adoption of Modified Alternative B would result in fewer impacts than Alternative A. Overall, impacts to protected terrestrial animals would be insignificant.

Action Alternative C – Modified Conservation and Recreation: Under this alternative, a greater amount of land would be allocated to Zone 4 (Natural Resource Conservation) than under the other alternatives. About 1,700 to 1,200 more acres would be allocated for natural resource conservation under Modified Alternative C than under Alternative A or Modified Alternative B, respectively. These additional acres would provide more wildlife habitat and foraging sites and would afford wildlife greater mobility. Wildlife and their habitats would be less disturbed under Modified Alternative C than under the other alternatives. No impacts are expected to protected terrestrial animals under this alternative. The selection of Modified

Alternative C is not likely to cause any significant cumulative impacts to sensitive terrestrial animals in the area.

Bald eagles and ospreys would benefit most under Modified Alternative C as compared to the other two alternatives. Under this alternative, over 950 contiguous acres at Lowe Branch would be allocated to Zone 4, which would offer protection to bald eagle and osprey habitat.

Under Modified Alternative C, most of the former 1,200-acre CRBR site would be designated as either Zone 3 or 4. Because extensive site disturbance is not likely within these two zones, sensitive resources at the former CRBR site would be protected. These parcels would form a contiguous wildlife habitat, allowing wildlife to move freely in the area. Thus, adoption of Modified Alternative C would not impact southeastern shrews and Bachman's sparrows on the former CRBR site, if they exist there. Adoption of Alternative C may also offer the best protection to eastern hellbenders that reside in the nearby Clinch River, because activities that could result in erosion would be unlikely. Adoption of Modified Alternative C may also improve the wildlife habitat potential of nearby Grubb and Jones islands by providing a natural buffer along the Clinch River.

4.3.3. Aquatic Animals

In general, ground disturbance activities that affect riparian areas (and therefore, water quality) have the greatest potential for impacting rare and sensitive aquatic species. That is, the greater the soil disturbance from an activity the greater the potential for adverse impacts to water quality due to runoff and the resulting sediment pollution impacts to habitat. Therefore, in most land use allocation situations Zone 5 (Industrial) or Zone 2 (Project Operations) would have the most potential for impacts to rare and sensitive aquatic species, while Zone 3 (Sensitive Resource Management) and Zone 4 (Natural Resource Conservation) would have the least adverse impacts and would likely have beneficial effects on water quality and aquatic habitat when compared other land uses. The impact from the allocation of other zones would vary depending on the degree of ground disturbance activities.

Alternative A – No Action: The federally listed as endangered mollusk (pink mucket) occurs in the Clinch River adjacent to the former CRBR parcels (142, 143, 145, and 148) allocated as industrial. Industrial activities could have some minor impacts to listed aquatic species from typical impacts like storm water runoff or sewage outfalls. Existing environmental review procedures for proposed projects on these parcels (including compliance with ESA) would ensure that TVA actions would not likely adversely affect the habitat of protected aquatic species in adjacent areas.

Ground disturbance activities associated with these Zone 5 (Industrial) parcels could have minor impacts to sensitive aquatic animal species (mollusks and fish) found in the reservoir and tailwater. The current land management plan would have no impact on sensitive aquatic animal species (fish) in flowage areas. Overall, allocating land in this alternative is not likely to adversely affect sensitive aquatic species.

Action Alternative B – Modified Development and Recreation: Under this alternative, the former CRBR parcels would be allocated for Zone 2 (Project Operations) with a conservation buffer established along the reservoir. Activities that could occur on this parcel could have minor impacts to protected aquatic species in Watts Bar Reservoir. An environmental review of any proposed development would occur before any future TVA action. Any subsequent

mitigation or conditions of the review would ensure that TVA actions would not likely adversely affect sensitive species or their habitat. Parcel 142 would also retain a riparian buffer with Parcels 138 and 144, thereby offering more protection to aquatic animals and their habitats. Existing environmental review procedures for proposed projects on these parcels (including compliance with ESA) would ensure that TVA actions would not likely adversely affect the habitat of protected aquatic species in adjacent areas.

Parcels 100, 134, and 137, which have protected aquatic species adjacent to them, would be placed under or remain in Zone 4 (Natural Resource Conservation). Parcels 97, 101, 138, 139, 140, 141, and 144 would be placed under or remain in Zone 3 (Sensitive Resource Management). Parcels in both Zones 3 and 4 would provide habitat protection for sensitive aquatic species by minimizing ground disturbance. Parcels 99, 102, 133, 135, and 136 would be placed under either Zone 6 (Developed Recreation) or Zone 7 (Shoreline Access), providing a lesser degree of protection to aquatic species. However, these properties make up a small portion of shoreline in areas where listed species may be present. Future activities on these parcels would undergo environmental review, at which time specific avoidance and mitigation measures needed to protect listed aquatic animal species would be determined. Overall, allocating land in this alternative is not likely to adversely affect sensitive aquatic species.

Action Alternative C – Modified Conservation and Recreation: Under this alternative, Parcels 142, 143 and 145 would be allocated to Zone 4 (Natural Resource Conservation). Otherwise this alternative would involve the same parcel allocation changes and potential impacts to listed aquatic species as discussed above in Modified Alternative B.

The cumulative effects of these actions could result in improved riparian buffer zones and may help improve water quality and aquatic habitats downstream of the project areas, including areas where sensitive aquatic species are known to occur. Because this alternative retains the largest amount of acreage in Zone 3 (Sensitive Resource Management) and Zone 4, it would provide the greatest degree of protection to sensitive aquatic species known from Watts Bar Reservoir and its tributary streams.

Future activities on planned parcels would undergo environmental review, at which time specific avoidance and mitigation measures needed to protect listed aquatic animal species would be determined. Overall, allocating land in this alternative is not likely to adversely affect sensitive aquatic species.

4.4. Managed Areas and Sensitive Ecological Sites

Overall, the development and implementation of TVA reservoir land plans has historically benefited the management and protection of managed areas and ecologically significant sites. TVA land planning allocates designated TVA managed areas that are HPAs, ECSAs, and SWAs into Zone 3 (Sensitive Resource Management). Likewise, WOAs are usually designated into Zone 4 (Natural Resource Conservation). In this environmental review of the alternatives for lands planning on Watts Bar Reservoir only a few specific proposed allocations have the potential to negatively affect this resource area.

Under any of the alternatives, there would be no impact to the NRI-listed streams that are in the vicinity of Watts Bar Reservoir (see Section 3.4). The NRI-listed segments of the Emory River, Little Tennessee River, and Piney River would be upstream to any proposed actions resulting from allocating land on Watts Bar Reservoir and not likely to incur any impacts.

Several TVA natural areas designation changes are proposed under Modified Alternatives B and C:

- Removal of TVA HPA designation from five areas where habitat protection for targeted species is no longer warranted (see Section 3.4.3). These areas would remain in Zone 3 or Zone 4, as appropriate, but with no TVA natural areas status.

- Removal of the "Ecological Study Area" designation from a 254-acre portion of Thiefneck Island, which is no longer used by local research institutions as a study area. This area would remain in Zone 3 but with no TVA natural areas status. This change is not expected to affect the public use or the management of the island.

- Addition of 87.5-acre Parcel 237 to the Whites Creek SWA to expand the opportunities afforded by this natural area.

- Designation of a 27.2-acre portion of Parcel 233 as a TVA HPA to protect its unique vegetation community and the state threatened plant, bay starvine.

- Increased acreage for Grassy Creek TVA HPA from 99 to 265 acres to expand the area of sensitive species and habitat protection.

Alternative A – No Action: Under Alternative A, TVA would continue to use the 1988 Plan as the basis for making land use decisions. Under this scenario, land uses would be reviewed on a case-by-case basis, and impacts to management areas would be evaluated as they are proposed. Some management areas no longer meeting the HPA criteria would continue to be protected as HPAs, while other areas meeting the HPA or SWA criteria for needed management and protection would not be designated. Therefore, the No Action Alternative directly impacts management areas by delaying needed changes in the designation of management areas and consequently the temporary loss of TVA resources and management for the benefit of any rare species or habitat. Selection of Alternative A is expected to result in insignificant temporary direct, indirect or cumulative adverse effects to TVA managed areas and ecologically significant sites.

Action Alternative B – Modified Development and Recreation: Under this alternative, in compliance with the TVA Land Policy, TVA would provide a compromise between conservation of natural resources and industrial development. Acreage zoned for Sensitive Resource Management and Natural Resource Conservation would increase (see Tables 2.2-1 and 2.2-2) over the No Action Alternative, but would be less than acreage allocated to these two zones in Modified Alternative C.

The proposed increased acreage for Grassy Creek TVA HPA would provide a buffer from surrounding parcels allocated for industrial development in this alternative. Overall, other proposed allocation changes along the reservoir would either not occur adjacent to management areas or would result in no change in the ecological integrity of management areas. While future industrial development of the former CRBR site would impact management objectives and current land uses of the Oak Ridge Reservation WMA, the Oak Ridge National Environmental Research Park Biosphere Reserve, and other USDOE-owned lands because of their proximity to this site, these impacts are considered to be minor and insignificant. Selection of Modified Alternative B is expected to result in beneficial direct, indirect, and cumulative impacts to TVA managed areas and ecologically significant sites.

Action Alternative C – Modified Conservation and Recreation: Under this alternative, TVA would allocate more land parcels to Zone 4 (Natural Resource Conservation) and fewer land parcels to Zone 5 (Industrial) (see Tables 2.2-1 and 2.2-2).

Under this alternative, the Zone 2 and 5 parcels of the former CRBR site, noted above under Alternative B, would be allocated to Zone 4. Under this alternative, the site parcels (Parcels 142 through 146 and 148) would be allocated to either Zone 3 or Zone 4 and would provide a contiguous parcel of land for natural resource conservation or protection. These allocations would complement the management objectives for the expanded Grassy Creek TVA HPA and the surrounding land uses managed by USDOE and TWRA. Overall, other proposed allocation changes along the reservoir would either not occur adjacent to management areas or would result in no change in the integrity of managed areas. Selection of Alternative C is expected to result in beneficial direct, indirect, and cumulative impacts to TVA managed areas and ecologically significant sites.

4.5. Water Quality and Shoreline

Water quality in any particular body of water is influenced by 'point source' pollution from specific sources, such as industrial and sewage treatment plants, and nonpoint source (NPS) pollution, which comes from many diffuse sources. Sources of NPS pollution include rainfall or snowmelt runoff, which moves over and through the ground, picking up natural and human-made pollutants. These pollutants may eventually be carried into lakes, rivers, wetlands, and other waters. Water quality is also influenced by the condition of the water entering the water body from upstream sources. Most of the water entering Watts Bar Reservoir (86 percent) comes from sources outside its own immediate watershed. These include the inflows of the Clinch River through Melton Hill Dam (19 percent) and the Tennessee and Little Tennessee rivers through Fort Loudon Dam (67 percent). The remaining 14 percent of the incoming volume is contributed by local inflows from the local 1,834 square miles of the Watts Bar Reservoir watershed, including direct drainage from TVA reservoir properties.

Increased levels of development and intensive use in a watershed would generally have a negative impact on water quality. Development and intensive land uses typically increase the amount of impervious surfaces (i.e., roofs, roads, paved areas), remove vegetation and expose soil to erosion, and increase the amount of NPS pollution. Results of increased development on a water body can include increased turbidity and sedimentation, increased levels of nutrients and bacteria from managed lawns and septic systems, increased levels of chemicals and substances toxic to aquatic life, and increased storm water pollution and velocity.

Increases of nutrient loading from NPS pollution can contribute to higher algal mass in the reservoir, which can lead to decreased levels of DO in the reservoir during periods of stratification. Increases in sediment discharge contribute to the muddy appearance of the water and interfere with the quality of aquatic habitat. Toxic materials such as metals, hydrocarbons, and pesticides in storm water runoff from residential and commercial land uses, streets, and intensively managed lawns can be toxic to aquatic organisms.

The use of BMPs (such as adequate sediment control and the establishment of buffer zones), and low-impact design and management concepts (such as porous pavement and constructed wetlands) can help to reduce some of the negative impacts to water quality from increased levels of development. However, if careful design, construction, and maintenance

practices are not followed, BMPs and low-impact design concepts would be less effective in protecting water quality. Prior to any proposed on-site development, TVA would conduct additional site-specific environmental reviews and recommend appropriate site design and management practices to minimize negative environmental impacts.

Alternative A – No Action: Under Alternative A, the extent to which a proposed land use might affect water quality depends on the nature and extent of development possible under the 1988 Plan allocations. Proposed land uses under the 1988 Plan are somewhat less restrictive than the proposed new zones. Future industrial and recreational developments on either TVA or private property have the potential to negatively impact water quality.

Under this alternative, any proposed use of TVA public land would be evaluated on a case-by-case basis to ensure it fits the allocated use and that the proposed use serves the needs and interests of the public, as well as meeting the Land Policy adopted in 2006. Six thousand seven hundred eighty-one acres or 42.1 percent of the TVA land on the reservoir would be allocated to Zones 3 and 4; however, of all the alternatives, this would be the least amount of land protected by conservation uses (Zones 3 and 4). Further, this alternative would have the most amount of land allocated to uses with the potential for greater development and adverse impacts to water quality (Zones 5 and 6).

The use of vegetated buffer zones and other BMPs would reduce negative effects of riparian vegetation removal associated with development. In addition, protective measures presently in place under TVA's land use approval process and SMI (TVA 1998) would substantially offset impacts of development of private property. With appropriate environmental reviews and use of any identified impact reductions methods, including existing BMPs, future activities under Alternative A would not significantly impact the reservoir's water quality.

Action Alternative B – Modified Development and Recreation: Under Modified Alternative B**,** approximately 800 acres (i.e., all or a portion of Parcels 15a, 16a, 17, 94, 98, 140, 144, 146, 159, 181a, 207a, 218, 240, 255, and 299) would move from a more developed status to a less developed status (e. g.; either a Zone 5, or 6 to a Zone 3 or 4). In addition, under Alternative B, 7,637 acres, or 47 percent of the public lands would be allocated to Zones 3 and 4, which are more protected.

Also under this alternative, most of Parcel 218 would change from a Zone 5 to a Zone 4 with the existing industrial and barge terminal remaining as Zone 5 as Parcel 218a. The present impacts from the existing site would continue; however, the future industrial use proposed for this site under the No Action Alternative would not occur. Therefore, the Alternative B allocation for Parcel 218 would have fewer impacts to water quality compared to the No Action Alternative.

While Modified Alternative B is not as conservation focused as Modified Alternative C, it would increase the total amount of land in more protected zones in comparison to the No Action Alternative, leading to an overall beneficial effect to water quality conditions.

Action Alternative C – Modified Conservation and Recreation: In general, management of land in less developed status throughout a watershed impacts water quality in a positive manner. Under Alternative C, about 2,100 acres (i.e., all or a portion of Parcels 9, 10, 15a, 16a, 17, 94, 98, 140, 142, 143, 144, 145, 146, 148, 159, 172, 181a, 207a, 218, 240, 255, 297, 298, and 299) would move from a more developed zone status (Zone 4, 5, or 6) to a

more protected zone status (i.e., Zone 3 or 4). In addition, under Alternative C, 8,878 acres, or 55 percent of the public lands would be allocated to Zones 3 and 4.

Allocation of these parcels to a more protected status would have a beneficial impact to local water quality in proximity to these parcels. As more watershed land develops (both on reservoir and off reservoir), it is likely that preserving less developed lands will become increasingly important to maintaining water quality in the reservoir. However, in consideration of all the impacts to water quality from sources outside of reservoir lands and the relatively small amount of TVA public lands throughout the watershed, allocation of these lands under Modified Alternative C would not likely impact the cumulative water quality in the reservoir.

4.6. Aquatic Ecology

Impacts to aquatic resources are directly related to changes of the existing natural shoreline conditions and water quality. Aquatic resources can be impacted by changes to shoreline (riparian) vegetation, vegetation on back-lying lands, and land uses. Shoreline vegetation, particularly trees, provides shade, organic matter (a food source for benthic macroinvertebrates), and shoreline stabilization. Trees also provide aquatic habitat (cover) as they fall into the reservoir. Shoreline vegetation and vegetation on back-lying land provide a riparian zone that functions to filter pollutants from surface runoff while stabilizing erodible soils. Therefore, there would likely be some degradation of aquatic habitats associated with development along the reservoir shoreline.

The littoral (shoreline) zone is the most productive habitat of a reservoir environment. Fish utilize littoral habitats because of their spawning requirements, the availability of submerged cover (i.e., rocks, logs, brush, etc.), and the presence of smaller fish and aquatic invertebrates as a food source for the fingerlings. In the future, the extent of woody shoreline cover on parcels allocated to Zone 3 (Sensitive Resource Management) and Zone 4 (Natural Resource Conservation) is expected to increase as natural succession on these lands continues.

Shoreline development can alter the physical characteristics of adjacent fish and aquatic invertebrate habitats, which can result in dramatic changes in the quality of the fish community. One of the most detrimental effects of shoreline development is the removal of riparian zone vegetation, particularly trees. Removal of this vegetation can result in loss of fish cover and shade, which elevates surface water temperatures. Also, fish spawning habitat, such as gravel and woody cover, can be rendered unsuitable by excessive siltation and erosion, which can occur when riparian vegetation is cleared. Additionally, shoreline development often results in the removal of existing aquatic habitat (i.e., stumps, brush, logs, boulders, etc.) in association with the construction of water use facilities.

Alternative A – No Action: Under Alternative A, the least acres of TVA public land would be allocated to Zone 3 (Sensitive Resource Management) and Zone 4 (Natural Resource Conservation), and the most acres would be allocated to Zone 5 (Industrial) and Zone 6 (Developed Recreation) (Table 2.2-1).

Use of TVA public land below the 745-foot contour has often been controlled by landrights of the adjacent property owners. As a result, various development activities below that contour, as well as private development of back-lying land, have resulted in loss of riparian woody vegetation at some sites. Clearing of trees and brush may have accelerated shoreline erosion, thereby impacting water quality and aquatic ecology. However, in some cases

where shorelines lack woody vegetation and aquatic habitat is poor, placement of shoreline stabilization structures, such as riprap or fixed docks, has improved aquatic habitat.

Industrial activities anticipated on Zone 5 parcels could have some minor impacts to aquatic species from typical impacts like storm water runoff, sewage outfalls, or the construction and operation of barge facilities. Future environmental reviews for any proposed projects on these parcels would ensure that TVA actions would not likely adversely affect the habitat aquatic species in adjacent areas. Ground disturbance activities associated with these Zone 5 parcels could have minor impacts to aquatic animals found in the reservoir and tailwater.

The 1988 Plan would have no change in impacts on aquatic animal species (fish) in the flowage areas as it proposes no change in their management. Under the No Action Alternative, the quality of aquatic habitats associated with various land use allocations would remain similar to the existing conditions. Overall, allocating land in this alternative is not likely to adversely affect the aquatic ecology of the reservoir.

Action Alternative B – Modified Development and Recreation: Under this alternative, more acres of TVA public land would be allocated to Zone 3 (Sensitive Resource Management) and Zone 4 (Natural Resource Conservation) than Alternative A, and fewer acres would be allocated to Zone 5 (Industrial) and Zone 6 (Recreation) than Alternative A (Table 2.2-1).

Approval requirements for proposed developments, such as commercial recreation areas and water access sites, could require protection of important natural features. The quality of shoreline aquatic habitats would improve with the protective zones mentioned above through the enhanced opportunity for natural succession, as well as protective vegetation management now required through TVA's SMP standards for private water use facilities. Narrow shoreline strips of TVA land fronting Zone 5 or Zone 6 lands can also be maintained in a natural condition since industrial and commercial recreation development seldom requires extensive clearing of shoreline vegetation.

However, under certain circumstances (e.g., denuded banks) 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. Fixed docks can actually enhance the shoreline aquatic habitat when combined with habitat improvements such as anchored brush, rock aggregations, log cribs, and/or other forms of cover.

Partial loss of riparian habitat and clearing of land beyond the shoreline management zone could allow runoff of soils, nutrients, fertilizers, and herbicides into streams and wet weather conveyances leading to Watts Bar Reservoir, thereby degrading aquatic habitats.

Aquatic ecology would likely improve under Modified Alternative B because more lands would be placed in Zones 3 and 4 designations than under the 1988 Plan, thereby protecting important aquatic habitats along the shoreline.

Action Alternative C – Modified Conservation and Recreation: Under this alternative, the most number of acres of TVA public land would be allocated to Zone 3 (Sensitive Resource Management) and Zone 4 (Natural Resource Conservation), and the least acres would be allocated to Zone 5 (Industrial) and Zone 6 (Recreation) (Table 2.2-1).

Forest, agricultural, and wildlife management activities in Zone 4 could potentially affect aquatic ecology through runoff of nutrients and soils. These potential impacts would be avoided through careful planning to limit the sizes of activities and through the use of BMPs during implementation.

Development of the private lands on the reservoir shoreline will likely continue under any alternative. However, somewhat more development and shoreline disturbances are likely under Alternative A and Modified Alternative B than under Modified Alternative C; therefore, the least impacts to aquatic ecology would be expected under Modified Alternative C. Aquatic ecology would likely improve under Modified Alternative C because the greatest amount of lands would be placed in Zones 3 and 4 designations, and the fewest acres would be allocated to lands where development may occur.

4.7. Wetlands and Floodplains

4.7.1. Wetlands

All wetlands, regardless of their ecological significance, are subject to various state and federal mandates and regulations. Specifically, regulatory protection is extended to certain wetlands under Section 404 of the Clean Water Act. In many cases, wetlands are also protected under the Aquatic Resources Alteration Permit program administered by the Tennessee Department of Environmental Protection. Also, TVA is subject to EO 11990 (Protection of Wetlands), which mandates that federal agencies 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…" Generally, EO 11990 is relevant to TVA actions involving the disposal of land or the granting of approvals of water use facilities pursuant to Section 26a of the TVA Act. Consistent with the requirements of EO 11990, to the extent practicable, TVA takes measures to either avoid adverse wetland impacts or mitigate unavoidable effects to wetlands as a result of such actions.

However, even with these regulatory measures in place, adverse effects to wetlands could occur. These effects usually occur on small wetland areas, and some activities in wetlands may be permissible under the various protective regulations. Such activities include wetland fill, vegetation removal, and alteration of wetland hydrology. In most instances, compensatory mitigation would be required under the regulations for impacts to jurisdictional wetlands.

The potential for adverse effects to wetlands is generally associated with land use, especially in cases involving land-disturbing activities. In general, wetlands are best protected in lands allocated to Zone 3 (Sensitive Resource Management) and Zone 4 (Natural Resource Conservation). Development activities occurring on lands allocated to Zone 5 (Industrial) and Zone 6 (Developed Recreation) could potentially adversely affect wetlands. The degree of the potential wetland effect would depend on the amount of site disturbance associated with the proposed recreational or industrial facility, as well as the type, location, and condition of wetlands present on the site. However, these potential impacts are subject to both state and federal law, and they must be avoided and minimized where practicable. Despite regulatory mechanisms for wetland protection, there is the potential for both a temporary loss of wetland function as well as a cumulative, incremental loss of wetlands associated with small-scale wetland loss and alteration.

Alternative A – No Action: Under the No Action Alternative, TVA would continue to use the 1988 Plan, SMP, and the TVA Land Policy to guide decision-making regarding land use on TVA public land surrounding Watts Bar Reservoir. Land use requests within those parcels containing wetlands and allocated under the 1988 Plan for wetland wildlife management, waterfowl management, and HPAs would be evaluated to ensure the request would protect the integrity of wetland resources. On unplanned marginal strip parcels, potential impacts to wetlands would be regulated under state and federal law. In the event that site-specific wetland impacts appear likely, mitigation requirements could be required to offset any long-term loss of wetland functions. However, there could be some short-term loss of wetland functions during the time required for the mitigated wetland to mature. On unplanned marginal strip parcels, there may also be some incremental clearing of wetland vegetation by landowners. This could result in some minor, cumulative loss of wetland function. These functions include loss of shoreline stabilization capability, loss of ability to provide wildlife habitat, and loss of plant community diversity. Although some direct effects to wetland resources and functions could occur under Alternative A, these are expected to be minor and insignificant. Similarly, some long-term, cumulative effects are also possible, but these are also likely to be insignificant.

Action Alternative B – Modified Development and Recreation: Under this alternative, a lesser percentage of land would be allocated to potential industrial development (Zone 2 and 5) than under Alternative A. Thus, based on reasons stated above, there would be a slightly lesser potential for adverse effects to wetlands under this alternative as compared to Alternative A.

Any land use requests involving development proposals would be subjected to an environmental review. As a part of that review, a field survey would be performed to further determine the presence and quality of any on-site wetlands, as well as other sensitive biological or cultural resources. Any land use requests for parcels containing wetlands would be evaluated to ensure the proposed request would protect the integrity of wetland resources.

Under this alternative, potential effects to any wetlands on these parcels would be similar to those mentioned under Alternative A. An exception is the proposed extension of the shoreline buffer (Parcel 144) at the former CRBR site which would offer protection to the wetlands in that vicinity. Because there would be very minimal change in acreage designated as Zone 7 (Shoreline Access), potential cumulative effects to wetlands on these Zone 7 properties would be the same as those anticipated under Alternative A. Although there is a potential for some impacts to wetlands, significant wetland impacts are unlikely due to regulatory protection and required mitigation. Thus, potential direct, indirect, and cumulative effects to wetlands under Modified Alternative B are expected to be minor and insignificant.

Action Alternative C – Modified Conservation and Recreation: Under this alternative, the greatest amount of land would be allocated to Zone 3 (Sensitive Resource Management) and Zone 4 (Natural Resource Conservation). Importantly when compared to the other alternatives, some parcels would change from a Zone 5 (Industrial), Zone 2 (Project Operations) or Zone 6 (Developed Recreation) allocation to a Zone 4. This change would afford greater protection to wetlands in these parcels as existing wetlands on these parcels would be protected according to existing Zone 3 and 4 criteria. As with the Modified Alternative B, the proposed extension of the shoreline buffer (Parcel 144) at the former CRBR site would offer protection to wetlands in that vicinity.

As is the case under the other alternatives, any land use requests involving a change in use allocation would be subjected to an environmental review. Also, in all cases, wetland surveys would be performed to determine and verify the presence and quality of wetlands on the subject parcels as part of the environmental review for the particular land use request. Wetlands present within any of the allocation zones would be subject to state and federal law, and significant wetland impacts are regulated under these programs. In site-specific cases where some wetland impacts could occur, required mitigation requirements would offset any long-term loss of wetland functions. However, there could be some short-term loss of wetland functions during the time required for the mitigated wetland to mature. Some incremental clearing of wetland vegetation by landowners could occur on parcels designated as Zone 7 (Shoreline Access). Such activities may result in some minor, cumulative loss of wetland function, as described above. However, potential effects to wetlands resulting from the adoption of Modified Alternative C are expected to be minor and insignificant.

4.7.2. Floodplains

Although there are impacts to floodplains of varying degrees under all alternatives, potential impacts to floodplain values would be insignificant.

Alternative A – No Action: Under Alternative A, the development, and/or management of properties would proceed under the 1988 Plan, and evaluations would be done individually to ensure consistency with EO 11988. Potential development would generally consist of water use facilities and other repetitive actions in the floodplain that would result in minor floodplain impacts.

Action Alternative B – Modified Development and Recreation: Under this alternative, the potential adverse impacts to natural and beneficial floodplain values would be slightly less than those expected under Alternative A, because less land would be allocated for industrial and recreation development and more land would be allocated to sensitive and natural resource uses.

Action Alternative C – Modified Conservation and Recreation: The potential adverse impacts to natural and beneficial floodplain values under Alternative C would be less than those under Alternative A or Modified Alternative B because a substantial portion of the available land would be allocated for resource management and conservation activities.

4.8. Land Use and Prime Farmland

4.8.1. Land Use

TVA manages public land on Watts Bar Reservoir to protect and enhance natural resources, generate prosperity, and improve the quality of life in the Tennessee Valley. TVA public land is used for public and commercial recreation, industrial development, natural resource management, and a variety of other community needs, often with adjoining or nearby private lands. Consequently, TVA is aware of at least six relatively large developments on Watts Bar Reservoir (see Table 4.8-1) in various stages of completion that require TVA's approval for Section 26a or land use permits. In addition to these developments, TVA anticipates that two additional private marinas could be proposed at the upper end of Watts Bar. These proposed developments would have an impact on the use of adjoining and nearby TVA lands.

Table 4.8-1. New Private Developments on Watts Bar Reservoir

Name	Location	Planned Development	Size (acres)
The Docks at Caney Creek - Roane County	TRM 561.5 R, adjacent to TVA shoreline access land and TVA Tract 207 (Zone 2)	200 homes total, 42 of which adjoin TVA property, private docks	94
Emerald Pointe - Roane County	TRM 560.6 R, adjacent to TVA shoreline access property	53 lots, 44 of which are interior; community slips for interior lot owners	58
Grande Vista Bay - Roane County	Just upstream of Thief Neck Island, adjacent to TVA shoreline access property, property that was transferred to TWRA, and TVA Parcel 213 (Zone 2)	160 lakefront lots with plans for multiple community docks for interior lots	1,200
Ladd Landing - Roane County	Clinch River, approximately 2 river miles east of the Kingston Fossil Plant, adjacent to TVA shoreline access property; former TVA property transferred to TWRA, and Parcel 162	Mixture of single family, multifamily, and light commercial development, private docks	800
Rarity Ridge - Roane County	West of the former K-25 site in Oak Ridge, on the south side of Watts Bar Reservoir, previously owned by USDOE	Mixture of single family, multifamily, and light commercial development, private docks	2,000
Tennessee National - Loudon County	Tennessee River in Loudon County, including a parcel of TVA Parcel 98 in the new plan (Preallocated for Zone 4.)	Mixture of single family, multifamily, and docks, water intake, and land use agreement	1,400
		Total Acres	**5,552**

TVA would require that all these developments comply with SMP standards. These standards minimize the environmental impacts of residential development (TVA 1998) such as water quality, aquatic ecology, aesthetics, and other impacts.

On Watts Bar Reservoir, several large tracts of land allocated for industrial and commercial development, such as the former CRBR site and Lowe Branch area, have remained undeveloped. Over the course of several decades, these areas have become quality terrestrial habitat for native wildlife. Consequently, they have become important sources of dispersed recreation, such as hunting, wildlife observation, camping, and trails. Loss of this interim use when the original allocated land use is developed may be perceived by dispersed recreation users as a loss of public lands and the quality of life in the area.

Under Modified Alternatives B and C, TVA has proposed changes and allocations that are compatible with the local zoning ordinances of the cities of Harriman, Kingston, Loudon, and Spring City for TVA public land in and adjoining to land within their city limits. Proposed new development would result in changes to the 1988 Plan. The action alternatives would include the planning of an additional 6,000 acres not included in the 1988 Plan. The acreage of land use change resulting under each alternative is listed in Table 2.2-1. Parcels that would result in land use changes under Alternatives B and C are listed in Table 2.1-3. The new TVA Land Policy would be implemented under all alternatives.

Over a recent 15 year period in the Watts Bar area, except for Meigs County, acreage in county farms has increased by an average of about 8 percent (see Section 4.13.1, Socioeconomics). However, in Meigs County, the acreage in county farms has decreased by 11 percent or 6,031 acres. Information in the Socioeconomics Section (Section 3.13) indicates that the counties surrounding the Watts Bar Reservoir have grown faster in the past 10 years than either the state or the nation with projections that this faster growth is likely to continue for the next several years.

Alternative A – No Action: Under the No Action Alternative (Alternative A), TVA would continue to use the 1988 Plan that currently guides land use decisions affecting TVA lands surrounding Watts Bar Reservoir (see Section 2.1.1). All land use requests would be evaluated for consistency with the 1988 Plan and TVA's Land Policy and would undergo appropriate environmental and administrative reviews before being denied or approved. TVA Board approval would continue to be required for all uses that are incompatible with the plan.

The 1988 Plan used 19 allocation categories to manage 10,387 acres (see Table 2.1-1). Under Alternative A, these categories would continue to be used by TVA as the basis for future land use decisions. The 1988 Plan did not allocate residential shoreline or other marginal shoreline strips along the reservoir nor did it include TVA project lands at KIF, WBN, Watts Bar Fossil Plant (retired), and Watts Bar Dam Reservation. Also, the 1988 Plan did not include land transferred to other agencies under easement or other agreements that TVA still owns. Therefore under Alternative A, although some management would continue to be provided by TVA's SMP, the Watts Bar residential shoreline and marginal shoreline strips would continue to have no formal land use allocation. Activities on TVA project lands would continue to be planned independently by their respective TVA operative.

Under Alternative A, there would be minor changes to current land use. Land currently allocated for industrial use (1,544 acres) and developed recreation (1,998 acres) would eventually be developed. Direct and indirect impacts to land use would remain nearly the same without the changes or the new planning of additional reservoir lands proposed under the action alternatives. Therefore, the greatest impact of all the alternatives would occur under Alternative A.

Action Alternative B – Modified Development and Recreation: Under this alternative, developed recreation and industrial development would be promoted by allocating appropriate parcels of TVA public land to Zones 2, 5, and 6. When compared to the No Action Alternative, this would result in about 1,200 fewer acres being allocated for industrial development, which would decrease the total acreage in Zone 5 to 357 acres. Therefore, the number of land use agreements for industrial use such as industrial parks and barge terminals could decrease in the future. The smaller area available for industrial development would be offset in part by the addition of 760 acres of the former CRBR site as new Project Operations (Zone 2) which could have future TVA energy production facilities.

Under this alternative, Natural Resource Conservation (Zone 4) would increase about 500 acres to 3,857 acres, and Developed Recreation (Zone 6) would decrease about 400 acres to 1,552 acres. Land no longer required for commercial landings, protection of natural resources, or commercial recreation would be designated to other uses. Reciprocally, land required for specific uses or best suited to support TVA land planning goals are proposed to be allocated to navigation safety landings and harbors, recreation areas, and to protect sensitive resources. Although natural resource conservation and dispersed recreation would

predominate on the reservoir, economic development and developed recreation would occur on TVA land where those activities would have an opportunity for success.

Under Modified Alternative B, there would be moderate changes to overall current land use when compared to Alternative A, by the allocation of additional land to Natural Resource Conservation (Zone 4) from Developed Recreation and Industrial development land. Direct and indirect adverse impacts to land use would be less than Alternative A and would include the benefit of the proposed changes and planning of additional reservoir lands.

Action Alternative C – Modified Conservation and Recreation: Under this alternative, the conservation of natural resources and dispersed recreation would be promoted by allocating parcels of public land to Zone 4. When compared with the No Action Alternative, these allocation differences from Alternative A would result in an additional 1,700 acres to be included in Zone 4 for natural resource conservation. As a result, the total acreage allocated in Zone 4 would increase to 5,098 acres. Changes under Modified Alternative C would result in a significant decrease in total acreage of industrial development and to a lesser degree, developed recreation. The total acreage currently allocated for Zone 5 would include only the 77 acres of property already committed. As a result, 95 percent of the total acreage previously allocated to economic development in the 1988 Plan would be allocated to Zone 4, Natural Resource Conservation or to Zone 3, Sensitive Resource Protection. The land allocated for Developed Recreation (Zone 6) would also decrease by about 550 acres to 1,351 acres. Impacts to natural resources and recreation are further discussed in Sections 4.2 and 4.11.

Modified Alternative C proposes the greatest change to current overall use when compared to Alternative A and Modified Alternative B by the allocation of additional land to Natural Resource Conservation (Zone 4) from Developed Recreation and Industrial Development land. Direct and indirect adverse impacts to land use would be less than Alternative A and Modified Alternative B and would include the benefit of the proposed changes and planning of additional reservoir lands.

Cumulative Land Use Impacts: TVA has sold or transferred over 500,000 acres of land over the life of the agency (see Section 3.8.1). Currently, the majority of the remaining TVA land (75 percent) is managed for natural resource conservation and sensitive resource management and a total of about 11 percent of TVA reservoir land is managed for developed recreation or economic/industrial development (see Table 4.8-2).

Table 4.8-2. TVA Land Use Valleywide

TVA Land Use	Thousand Acres	Percent of Total
Natural Resource Conservation and Sensitive Resource Management	221	75.4
Developed Recreation	21	7.2
Shoreline Access	17	5.8
Not Currently Planned	17	5.8
Project Operations	13	4.4
Economic/Industrial Development	4	1.4
Total	293	100

Cumulative land use impacts in the Watts Bar region are ongoing and likely to continue in the foreseeable future, regardless of any of the alternatives selected. This is because of the continued population increase of the area and the expected accompanying residential and commercial growth. An important part of this land development is likely to occur on private land that borders TVA reservoir properties, where an estimated 17,000 acres of land is currently platted for residential subdivisions. It is estimated that about one-half of those 17,000 acres (8,500 acres) are all already developed and continue to be developed throughout the Watts Bar Reservoir area. In addition, TVA is aware of approximately 5,500 acres of privately owned land bordering the reservoir that is under development or proposed in the near future (see Table 4.8-1). In consequence, all types of public uses on TVA land are likely to increase.

Thirty-five percent of the 65,000 acres of land within 0.25 mile of Watts Bar Reservoir is private land currently planned for growth. In addition, 54 percent of the land around Watts Bar Reservoir is private land and, along with about 47 percent of the shoreline, is currently available for development at some point in the future. All TVA public lands comprise about 11 percent of the land around Watts Bar Reservoir with only about half designated to a planned use. Therefore, much private land is available for projected growth around the reservoir, far outstripping any potential use of TVA land for development and making the TVA land increasingly important as a public resource as development occurs.

Under all the alternatives, cumulative impacts to the use of land in the area would be minor and insignificant, although the increases in the use of public land for sensitive resource protection and natural resource conservation proposed in Modified Alternatives B and C may be beneficial over the long-term availability of public lands in the Watts Bar region.

4.8.2. Prime Farmland

Effects to prime farmlands can occur when actual or designated land uses are changed to other uses or designations, such as industrial or recreation development, that preclude the

property being used for agricultural purposes. Generally, those properties located in Zone 3 (Sensitive Resource Management) and Zone 4 (Natural Resource Conservation) are not subject to impacts to prime farmland, since they would be retained in a relatively 'natural' state and would not be converted to other land uses preserving any occurring prime farmland. However, parcels allocated to Zones 2, 5, 6, or 7 are subject to potential adverse effects to prime farmland because farmland in these zones could be devoted to other, nonagricultural uses such as industrial development, developed recreation, and water access.

- Major soil disturbance could occur on Zone 2 (Project Operations) when TVA or other public facilities are constructed. However, once these facilities are established they often remain intact for long periods and large tracts of land remain without adverse impacts to prime farmlands.

- Zone 3 (Sensitive Resource Protection) and Zone 4 (Natural Resource Conservation) by their function have little or no soil disturbance and would have no adverse impacts to Prime farmlands.

- The greatest adverse impacts to prime farmland would occur with Zone 5 (Industrial) where major soil disturbances would be likely to occur.

- Major soil disturbances could occur on Zone 6 (Developed Recreation) in specific locations if recreation facilities are constructed. Conversely, large areas could be left unaffected for more dispersed recreation management.

- In most situations allocation to Zone 7 (Shoreline Access) would result in minor soil disturbances to narrow corridors providing access to private water use facilities or by construction of shoreline erosion control structures.

Under any of the alternatives, proposed actions involving the transfer of land for development that contains any acreage of soil with prime farmland properties could require completion of Form AD 1006, *Farmland Conversion Impact Rating*. This impact rating is based on soil characteristics as well as site assessment criteria such as agriculture and urban infrastructure, support services, farm size, compatibility factors, on-farm investments, and potential farm production loss to the local community and county. Site assessment scores tend to be higher for the more rural locations. Sites receiving scores greater than 160 points (out of possible 260) are given greater consideration of protection so that agricultural use can be preserved. Potential direct impacts on acreage of prime farmland are shown in Table 4.8-3.

Table 4.8-3. Prime Farmland Acreage Potentially Affected Under Each Alternative

Zone	Modified Alternative A			Modified Alternative B			Modified Alternative C		
	Prime Farmland (Acres)	Total Zone Allocation (Acres)	Percent of Zone	Prime Farmland (Acres)	Total Zone Allocation (Acres)	Percent of Zone	Prime Farmland (Acres)	Total Zone Allocation (Acres)	Percent of Zone
2	234	3587	6.5	262	4371	6.0	244	3611	6.8
3	889	3472	25.6	900	3780	23.8	900	3780	23.8
4	632	3300	19.2	712	3857	18.5	786	5098	15.4
5	139	1544	9.0	66	357	18.5	32	77	41.6
6	278	1998	13.9	233	1552	15.0	211	1351	15.6
7	699	2319	30.1	698	2303	30.3	698	2303	30.3
Total	2871	16220	17.7	2871	16220	17.7	2871	16220	17.7

Alternative A – No Action: Under the No Action Alternative, prime farmland could be converted to land uses incompatible with agriculture. There are 1,350 acres of prime farmland allocated to Zones 2, 5, 6, and unplanned marginal strip parcels (Zone 7). There would be no impacts to prime farmland in those parcels allocated to Zone 3 (Sensitive resource Protection) and Zone 4 (Natural Resource Conservation) or to those lands intended for undeveloped recreation and shoreline access. However, there could be impacts to the prime farmlands in those parcels where soil disturbance is expected, such as those allocated to Zone 5 (Industrial), to Zone 6 (Developed Recreation), and to a less degree on Zone 7 (Shoreline Access) and Zone 2 (Project Operations). A list of these parcels can be found in Table D-11, Appendix D.

The largest acreage of prime farmland in occur on Parcels 88, and 78 which are part of the Paint Rock Wildlife Refuge (Parcels 88 and 78), and on or near Watts Bar Dam Reservation (Parcels 3 and 285).

Those parcels allocated for recreation (i.e., allocated to Zone 6) that contain the most prime farmland are Parcels 201, 5, and 68 (see Table D-11). Parcel 201, which is partially adjacent to the Roane County Park, contains 25 acres of prime farmland. Parcel 5, Meigs County Park, has 22 acres of prime farmland, and Parcel 68, which is adjacent to the Southwest Point Golf Course, contains 20 acres of prime farmland. Any development on these parcels would require a farmland rating.

The retained strips of TVA land along the waterfront are allocated to Shoreline Access (Zone 7) (see Table D-11). Parcel 212 covers 76 acres and extends along portions of the shoreline from Bullet Branch past Pinoak Pointe and Lock Haven Estates past Johnson Bend to McDaniel Hollow. This stretch of land contains 26 acres of prime farmland soils, and 24 acres are classified as agricultural land use. Parcel 265, which borders Estes Woods Estate, has 43 acres of prime farmland on 51 total acres.

Adoption of Alternative A would have the most potential to negatively affect prime farmland, since the greatest amount of land would be impacted. Under Alternative A, 651 acres of prime farmland are allocated for project operations, industrial or recreation development (see Table 4.8-3). Converting this land would have negative impacts due to land use changes that are incompatible with agriculture. However, only about 0.2 percent of the total prime

farmland in the four counties of Watts Bar Reservoir would be affected, and any future impacts would be expected to be insignificant.

Action Alternative B – Modified Development and Recreation: Under Modified Alternative B, 561 acres of prime farmland are allocated for project operations, industrial or recreation development (see Table 4.8-3). Therefore, about 90 fewer acres of prime farmland would eventually be adversely impacted (see Table 4.8-3) as compared to the no action alternative. Implementation of Alternative B would have slightly fewer potential impacts to prime farmland than would Alternative A. These impacts are expected to be insignificant because this acreage comprises only about 0.2 percent of the total prime farmland in the four counties, i.e., 125,964 acres (see Table 3.8-4).

Action Alternative C – Modified Conservation and Recreation: Under Modified Alternative C, 486 acres of prime farmland are allocated for project operations, industrial or recreation development (see Table 4.8-3). With this alternative the least amount of prime farmland would eventually be adversely impacted (see Table 4.8-3) and about 1,687 acres of prime farmland would be protected by allocation to Zone 3 (Sensitive Resource Protection) and Zone 4 (Natural Resource Conservation).

Implementation of Modified Alternative C would have the least potential to negatively affect prime farmland; and potential effects of the large amounts of land allocated for Natural Resource Conservation or Sensitive Resource Protection would be beneficial. Overall, implementation of this alternative would have beneficial effects on prime farmland in the project area.

Cumulative Impacts: Development of TVA land surrounding Watts Bar Reservoir is not likely to produce any significant indirect or cumulative impacts to farmland. On a countywide basis, the percentage of agricultural land in the four-county area ranges from 26.1 to 54.6 percent (see Table 3.8-4). The current trend indicates that farm size is increasing in all counties except Meigs (see Table 3.8-3). Land in all four counties with properties to be classified as prime farmland totals 125,964 acres (Table 3.8-4). Prime farmland soils within the project area total 2,871 acres, and a maximum of 1,350 acres is subject to potential development (see Table 4.8-3), which is about 1 percent of the combined acreage in the four counties. Thus, cumulative impacts to farmland are not expected to be significant.

4.9. Cultural Resources

The preservation and treatment of historic properties, which includes cultural resources, are addressed by the NHPA. Cultural resources include archaeological and historic resources (historic sites and historic structures). In addition, archaeological resources located on federal lands are afforded protection under the ARPA. Similarly, the Native American Graves Protection and Repatriation Act provides protection to Native American artifacts and human remains.

A Programmatic Agreement (PA) was executed in October 2005 between TVA and the Advisory Council on Historic Resources and the Tennessee SHPO regarding the implementation of TVA Reservoir Land Management Plans for identification, evaluation, and treatment of historic properties that are eligible for inclusion on the NRHP (see Appendix G). This PA applies to all TVA land considered within the three alternatives. NRHP eligibility will be evaluated in consultation with the Tennessee SHPO according to stipulations of the PA.

Furthermore, mitigation of adverse effects to any historic property will be conducted according to the stipulations in the PA.

4.9.1. Archaeological Resources

Archaeological resources are widespread on the Watts Bar Reservoir properties and have been identified in each of the seven allocation zones. Before approval of future activities on a specific parcel, additional archaeological investigations to identify and evaluate historic resources would be required unless the parcel has been previously investigated and no archaeological resources with a potential to provide information important to history or prehistory were identified. Approximately 16 percent of the area involved in this Land Plan has been subjected to intensive survey.

Under any of the alternatives, the land that has not been investigated will require a systematic survey in order to identify and evaluate any archaeological resources that may exist. If a land use proposal has the potential to affect archaeological resources, then TVA will abide by the stipulations set forth in the PA.

Alternative A – No Action: Under this alternative, site-specific activities proposed in the future would be approved or denied according to the significance of the resource. In cases where archaeological resources would be affected, mitigation may be required. Such mitigation typically calls for additional archaeological investigation and may require data recovery of potentially impacted archaeological resources in the form of removal, cataloging, and archiving of these resources as defined in the PA. Thus, under Alternative A, archaeological resources could be affected, but adverse effects would be mitigated. Under Alternative A, preservation or protection of archaeological resources would be achieved through compliance with NHPA and ARPA requirements. Because of the executed PA and because appropriate mitigation would be performed as necessary, potential effects to cultural resources would be insignificant.

Action Alternative B – Modified Development and Recreation: Under Modified Alternative B, TVA would decrease the acreage allocated to Zone 5 (Industrial) by about 1,187 acres. The decrease in land allocated to Zone 5 would be offset by the allocation of 760 acres to Zone 2 (Project Operations) at the former CRBR site. Zone 6 (Developed Recreation) would decrease by about 381 (see Table 2.2-1). Conversely, the acreage dedicated to Zone 4 (Natural Resource Conservation) would increase about 446 acres, as compared to Alternative A. The acreage allocated to Zone 3 (Sensitive Resource Management), and Zone 7 (Shoreline Access) would be similar as under Alternative A.

Because of the likelihood of soil disturbance, the allocation of parcels to Zones 5 and 2 pose the greatest potential for affecting archaeological resources. Land use requests, and resultant activities on Zone 6 (Developed Recreation) parcels could also affect archaeological resources for similar reasons, but to a slightly lesser degree. Under Modified Alternative B, approximately 38 percent (by acreage) of the known archaeological resources on the proposed allocations would be placed in preservation or conservation (i.e., allocated to Zone 3 and Zone 4). The remaining 62 percent of the acreage would be allocated for purposes of development and recreation (i.e., 50 percent Zone 5, and 12 percent Zone 6). Thus, there is a potential for effects to archaeological resources under Modified Alternative B. However, because appropriate mitigation would be implemented under the stipulations of the PA, potential effects would be insignificant.

Action Alternative C – Modified Conservation and Recreation: Under Modified Alternative C, TVA would help promote conservation of natural resources and dispersed recreation by allocating about 55 percent of the TVA land on Watts Bar Reservoir to Zone 3 and Zone 4. Under Alternative C, less than 1 percent of the land would remain as Zone 5 and about 8 percent as Zone 6, resulting in the least potential impacts to archaeological resources of all the alternatives. All of the known archaeological resources within the proposed allocations on Table 2.1-3 would be placed in preservation and conservation (i.e., in Zone 3 and Zone 4). TVA would be selective in entertaining any land use requests within Zone 3 parcels in order to ensure protection of sensitive resources, including archaeological resources. Similarly, land use requests and proposed resource management actions within Zone 4 parcels would be scrutinized to prevent adverse effects to any sensitive resources present. Thus, adverse effects to archaeological resources are not likely to occur within Zone 3 or 4, and the potential for such effects would be less under Modified Alternative C than the other two alternatives. Because any potential adverse effects to archaeological resources would require appropriate mitigation under the PA, any such effects would be insignificant.

Overall, adoption of Modified Alternative B would have a greater potential to affect archaeological resources than Modified Alternative C. By the same token, Modified Alternative B would have a lesser impact on cultural resources than Alternative A. Under Modified Alternative C, more acreage would be allocated to Natural Resource Conservation and Sensitive Resource Management than under Alternative A or Modified Alternative B. Because of the types of activities expected within this zone, the potential for adverse effects to archaeological resources is low.

4.9.2. Historic Structures

The historic structures data used for this study was derived primarily from the survey done for the 1988 Plan. For any proposal on a given parcel (regardless of zone allocation), a field check of the current status of these historic resources would be accomplished to determine the significance of the resource and will abide by the stipulations set forth in the PA. Under each alternative, review under Section 106 of the NHPA would take place for any proposed activity that has the potential to affect historic resources identified on or adjacent to TVA public land. Nearly all these historic resources are located on property adjacent to TVA land, not on TVA tracts. Historic properties, especially historic structures, located off site would be considered because they may be subject to indirect effects such as changes in the visual character or setting from actions on TVA property.

Regardless of the alternative, proposed site-specific activities would be subject to the PA to determine what historic properties exist on TVA public land and on adjacent lands within the APE. Also, the significance of any historic structures present and the degree of potential impact of the action on historic resources would be determined under each of the alternatives.

Alternative A – No Action: Activities on Zone 6 (Developed Recreation) parcels, particularly those developed for commercial recreation, have the potential to impact adjacent historic structures, because they could alter the visual characteristics surrounding the property that may contribute to their historic significance. This situation applies to Parcels 9, 10, 121, 230, and 5. Likewise, development activities on parcels allocated to Zone 5 (e.g., Parcels 142, 143 and 145) also would have the potential to visually impact adjacent historic structures. Actions on Parcels 120 and 122, which are allocated to Zone 2 (Project Operations), also could visually affect adjacent historic structures.

Thus, potential effects, especially indirect, visual effects, are possible under Alternative A. However, because the stipulations in the PA would address these potential effects to historic structures, along with possible mitigation measures, and TVA would reserve the option to refuse land use requests that would have unavoidable adverse effects, potential effects to historic structures would be insignificant.

Action Alternative B – Modified Development and Recreation: Activities within parcels allocated to Zone 6 (Developed Recreation), especially those tracts developed for commercial recreation, have the potential to indirectly impact adjacent historic structures. Thus, recreational developments on Parcels 5, 9, 10, 44, 120, 121, and 230 have the potential to affect nearby historic structures. Likewise, future activities on land allocated to Zone 2 (Project Operations) (Parcels 122, 142 and 145) have the potential to indirectly impact adjacent historic structures. However, since potential effects to historic structures would be identified and mitigated appropriately under the PA, these effects would not be significant.

Action Alternative C – Modified Conservation and Recreation: Developed recreation could indirectly affect historic structures, depending upon the visual characteristics of the proposed development and visibility of the development from the potentially affected structure. In particular, recreational development on Parcels 120, 121, and 230 would have the potential to visually affect historic structures on adjacent, non-TVA properties. As is the case with Modified Alternative B, project operations on Parcel 122 could potentially affect historic structures. However, for the reasons stated above, potential effects to historic structures are expected to be insignificant.

Overall, adoption of Modified Alternative B would have a greater potential to affect historic properties than Modified Alternative C. Under Modified Alternative B, there would be more tracts and more acreage available for development. In general, this development would have the potential to affect historic properties, primarily indirectly. Under Modified Alternative C, more acreage would be allocated for Natural Resource Conservation and Sensitive Resource zones. Because of the types of activities expected within this zone, the potential for adverse effects to historic structures is low under either action alternative.

4.10. Navigation

Potential effects to commercial navigation as a result of a new Land Plan for Watts Bar Reservoir include the disruption or loss of barge terminal activities on TVA lands that are leased or licensed to a private entity and the possible loss of safety harbors and landings. Safety harbors and landings, designed by TVA prior to impoundment of the reservoir and shoreline in these areas, are allocated as Zone 2 (Project Operations). Navigation signs, lights, and dayboards on shoreline tracts are considered permanent features and are protected by the TVA Act (Section 26a regulatory process). Specifically, shoreline construction regulations and language in standard easements and leases stipulate that these aids may not be removed or obstructed. Thus, these navigation aids would remain unaffected by any changes in land management policy.

Commercial navigation is expected to remain at a fairly constant level of 600,000 to 800,000 tons per year on Watts Bar Reservoir under any of the alternatives. This level would likely fluctuate, depending on the overall health of the nation's economy, fluctuations in transportation costs, and the weather (the volume of road salt delivered to upper east Tennessee terminals is dependent on the previous winter's depletion of supply and

predictions of the coming winter's severity). Navigation traffic would likely increase if new waterway-using industries locate on Watts Bar Reservoir or upstream on Melton Hill, Fort Loudoun, or Tellico reservoirs.

A larger replacement lock downstream at Chickamauga Dam is being constructed and is scheduled to be completed in 2012. The existing lock can only handle one barge at a time. However, the replacement lock will allow nine barges to be locked through at one time, which will greatly reduce travel times and transportation costs, making upper Tennessee River industrial locations much more attractive to industries. However, any increase in barge traffic as a result of the new lock at Chickamauga would likely be gradual and may or may not involve new industries and terminals on Watts Bar Reservoir.

Alternative A – No Action: Under the No Action Alternative, there would be no immediate effect to commercial shipping or to any existing barge terminal on Watts Bar Reservoir. Three parcels that are currently designated Zone 5 for possible commercial or industrial development were designated as such because they possess deep water access along the shoreline suitable for a barge terminal. Such sites are Parcel 145 on the Clinch River at the former CRBR site, Parcel 140 across the Clinch River from the former CRBR site, Parcel 218 at King Creek, and Parcel 298 on the Watts Bar Dam Reservation. Part of Parcel 218 is currently under license to a local industry and is used intermittently as a barge loading facility. Should the other sites ultimately be developed by commercial waterway-using industries, growth in commercial shipping that originates or terminates on Watts Bar Reservoir could occur. The degree of actual effect is unknown at this time, but such development would be subjected to an environmental review specific to that development.

From the commercial navigation perspective, adoption of Alternative A would result in the fewest negative impacts to commercial navigation. None of the existing terminals would be affected, and the Watts Bar Reservoir area private and public entities would have the most flexibility in future industrial development options.

Action Alternative B – Modified Development and Recreation: Under Modified Alternative B, 367 acres would be available for industrial development, which is a fraction of the 1,544 acres proposed in Alternative A. This is offset by the addition of 760 acres of the former CRBR site to Project Operations (Zone 2). However, only Parcel 298 would be available for future barge terminal development. Still, the allocation of Parcel 298 as Zone 5 is arguably most significant to future commercial navigation interests which contain 34 acres suitable for barge terminal development near Watts Bar Dam Reservation. Parcel 298 has been identified as an excellent location for a year-round deep water barge terminal site. Along with the neighboring, 245-acre tract Parcel 297, Parcel 298 has potential for future development as a water-based industrial site with either a public or private barge terminal. Light and heavy industries that utilize the waterways typically have a highly skilled workforce, higher than average pay, and a high level of local investment.

Results of the industrial assessment indicate that Parcel 218 may be more suitable for recreation use. The company operating the terminal on Parcel 218 has an agreement with TVA to use a section of the 61-acre tract. Under Modified Alternatives B, Parcel 218 would be split with about 5 acres containing the existing barge terminal and supporting facilities remaining as Zone 5, while the majority of the parcel with 57 acres would be allocated to Zone 4 (Natural Resource Conservation), allowing it to be used for dispersed recreation purposes. Although the impact would be minor relative to the overall economy, maintaining terminal operations on Parcel 218 would not cause the facility to seek other, potentially more

expensive, transportation options, and would continue a positive affect on the local and regional economy.

In addition, under Modified Alternative B, all of the shoreline along the designated safety harbors or landings would be allocated to Zone 2 (Project Operations). Under the previous plan (the current Alternative A), shoreline designations associated with safety harbors and landings were inconsistent. Standardizing these designations helps to protect TVA's mission to provide a safe and efficient commercial waterway.

Under Modified Alternative B, there would be minor direct impacts to commercial navigation as it currently exists. Commercial navigation would benefit by the support of safe areas in the event of emergencies.

Action Alternative C – Modified Conservation and Recreation: Under this alternative, about 1,467 acres of TVA land that is proposed for industrial activities (Zone 5) under the no action alternative would be designated, primarily to Zone 4 (Natural Resource Conservation). Therefore, this acreage would no longer be available for any kind of industrial development without a board action. In particular, the three suitable sites for barge terminals and commercial navigation use would not occur. One would have been on Parcel 145, a section of the former CRBR site on the Clinch River; another on Parcel 140 across the Clinch River from the site; and the third on Parcel 297 at Lowe Branch.

Parcels 140 and 145 could be barge terminal sites, but are not ideal for that use and their allocation to other uses would have minor impacts. The most significant action to future commercial navigation interests would be the allocation of Parcel 298 to Zone 4, which could have provided a year-round deep water barge terminal site near the Watts Bar Dam Reservation. Along with the potential development of the neighboring, 245-acre tract Parcel 297, Parcel 298 has potential for future development as a water-based industrial site as previously described. However, these parcels have been available since at least the implementation of the 1988 Plan and have not been developed to date, being used in the interim for dispersed recreation.

Under Modified Alternative C, Parcel 218 would be split between Zone 4 and 5 as described under Modified Alternative B. The impacts would be similar to those described previously.

Adoption of Modified Alternative C would remove potential year-round deep water terminal sites between Knoxville and Chattanooga owned by TVA from the range of economic development options currently available. In addition, as in Modified Alternative B, the shoreline along the designated safety harbors or safety landings would all be allocated to Zone 2 (Project Operations), which would benefit commercial navigation by defining a clear use of the land at these sites. Overall, under Alternative C, there would be minor impacts to commercial navigation as it currently exists, but future opportunities for greater use of commercial navigation in conjunction with industrial development would be greatly reduced.

Recreational Navigation

Recreational boat traffic on Watts Bar Reservoir is expected to increase under any of the alternatives under consideration. This is due to several factors. There are numerous high-quality boat manufacturers in east Tennessee and the level of interest in boating is high in the area. There is an abundance of recreational areas on Watts Bar Reservoir provided by TWRA and TVA. Watts Bar Reservoir has a number of refueling and boating supply facilities at public marinas. Area reservoirs, including Watts Bar Reservoir, generally provide good

fishing opportunities. Also, the predictable water levels on Watts Bar Reservoir tend to enhance boating conditions. These factors tend to attract boaters from elsewhere in the state, as well as out-of-state visitors, to the Watts Bar Reservoir area.

A Land Plan for Watts Bar Reservoir may affect the growth of recreational boating in several ways. First, the availability of shoreline access for residential development on which the owners may be able to build a dock for their own boat, directly affects recreational boating. Second, boating opportunities are influenced by the acreage made available for developed recreation, including marinas. Additionally, and perhaps contradictorily, maintaining a natural shoreline may also attract boaters as fish and wildlife habitats are maintained and/or improved. Because the land planning process merely allows for certain kinds of land use and there are few, if any, specific development plans for the future, prediction of the actual increase in the number of boats utilizing the reservoir in the future is imprecise, although some general conclusions may be drawn.

Although the acreage of land allocated to Zone 7 (Shoreline Access) would remain roughly constant at 2,300 acres under all three alternatives (see Table 2.2-1), there is some variation in the acres allocated for Developed Recreation (Zone 6). The No Action Alternative actually has the most acres allocated for Developed Recreation (1,998 acres or 12 percent of all TVA land on Watts Bar Reservoir), according to the 1988 Plan. Under Modified Alternative B, 1,552 acres (10 percent of the total TVA land) would be made available for Developed Recreation. However, under Modified Alternative C, 1,351 acres or 8 percent of total acres would be allocated to Developed Recreation. Although these acreages are very similar, the number of acres available for commercial recreation development places some limits on the number of additional public marinas and boat rental businesses that may eventually be available on Watts Bar Reservoir. Conversely, the reduction in developable acres and the increase in Natural Resource Conservation acres under Modified Alternative C may actually increase the number of boaters enjoying the scenery and wildlife.

An increase in recreational boating activity on Watts Bar Reservoir makes boating safety an issue of particular concern to both law enforcement agencies and the commercial navigation industry. In the period 1995 to 2004, 77 boating accidents on Watts Bar Reservoir were reported to the USCG, an average of about nine incidents per year. The National Boating Safety Council reports that there is typically a 10 to 30 percent under-reporting of accidents to the USCG. Thus, the actual number of incidents is likely to be 10 to 12 per year. Of the 77 reported incidents, 50 involved alcohol, careless or reckless operation, inexperienced drivers, operator inattention, or excessive speed. Less than one-third of the incidents reported were due to bad weather, equipment/mechanical failure, or hazardous waters. There were no reported incidents of collision with a commercial vessel or barge on Watts Bar Reservoir in this time period.

Regardless of the alternative selected, the amount of recreational boating is likely to increase on Watts Bar Reservoir as the desirability of lakefront living and the popularity of the region as a retirement destination increases. The reservoir already affords good accessibility for day users and there would likely be a demand for additional boat storage in the form of wet and dry slips. Scenic beauty is also an attraction for boaters; therefore, limiting development of commercial recreation facilities is not necessarily a means to control the numbers or types of boaters.

Future increases in boating on Watts Bar Reservoir could potentially increase the use of Watts Bar and Fort Loudoun locks by recreation boaters. These structures are aging and

expensive to maintain. 'Locking through' is a free service for recreational boats (and commercial vessels) used by thousands every year (see discussion above). The lock facilities are owned by TVA and operated by the USACE.

4.11. Recreation

Land proposed for allocation for Developed Recreation (Zone 6) under Modified Alternatives A, B, and C comprises 1,998 acres, 1,552 acres, and 1,351 acres, respectively. Dispersed recreation is an important part of Natural Resource Conservation (Zone 4), which is proposed for allocation under Modified Alternatives A, B, and C as 3,309 acres, 3,857 acres, 5,098 acres, respectively. With the exception of one abandoned marina and Parcel 9 within the Fooshee Recreation area, which are both allocated to Zone 4 under Alternative C, parcels where existing recreation commitments are in place would be zoned for Developed Recreation.

The Recreation and Industrial Assessment (Appendix E) found that future demand for public boat access, campgrounds, developed land-based opportunities, and dispersed land-based opportunities to be high, while future demand for commercial marinas and lodging is medium.

Supply of current developed facilities supporting these activities is presently meeting the recreation demand. Furthermore, the expansion capabilities of said facilities should be adequate to meet the future demand trends. Supply of dispersed land-based opportunities is currently meeting the demand. However, future demand trends indicate a need for additional acreage to supply the needs of the future.

Two major areas may be affected depending on the alternative chosen. The parcels comprising the former CRBR site (Parcels 142, 143, 145, 147, and 148, which total 814.8 acres under Modified Alternatives B and C) were previously allocated for industrial use in the 1988 Plan, but have since been used as part of the Oak Ridge WMA. This area is under a short-term revocable land use agreement granted to the TWRA that allows for quota deer and wild turkey hunts, thus allowing for an interim, dispersed recreation use. Since 1988, several timber harvests have been conducted by TVA. These parcels provide substantial high-quality habitat for a variety of terrestrial animal and plant species including high-density populations of white-tailed deer and eastern wild turkey.

Another area with a significant amount of recreational use is the Lowe Branch site, which includes Parcels 296, 297, 298, and 299 and total about 901 acres under Modified Alternatives B and C. Parcels 297 and 298 (279 acres, collectively) are both allocated for industrial use in the 1988 Plan. Since 1988, these parcels have been managed for forestry and wildlife habitat development and have received extensive use for a variety of dispersed recreation activities by the general public, especially for white-tailed deer hunting. In the late 1990s, TVA identified significant abuse to portions of this property including trash dumping, disposal of dead livestock, and severe off-road vehicle impacts. In an effort to control these abuses and better manage the area, TVA incorporated this area into its resource management plan for the LWBU (TVA 2000). This process and implementation plan led to the gating and control of land use abuses and the development of stakeholder partnerships (i.e., Quail Unlimited) to help better manage the site for wildlife resources.

As stated earlier, recreation has two components: developed recreation and dispersed recreation. Although there are some sites such as at Watts Bar Dam where recreation facilities were developed as a secondary or interim activity, developed recreation

opportunities are planned and allocated primarily through Zone 6 designation. Likewise while dispersed recreation opportunities are planned primarily into the Zone 4 designation, they also occur in the interim or unofficially on land allocated for other Zones (2, 3, and 5). Below is a comparison of Zone 4 and 6 acreages designated for each type of recreation opportunity by alternative (Table 4.11-1).

Under Modified Alternative B, there would be six fewer parcels for Developed Recreation as compared to Alternative A; four of these would be allocated as Zone 4, providing dispersed recreation opportunities. Under Modified Alternative C, there would be eight fewer parcels for Developed Recreation as compared to Alternative A; six of these would be allocated as Zone 4 providing dispersed recreation opportunities. In addition, Modified Alternative C would allocate seven additional Zone 4 parcels from Zone 5 (Table 4.11-2) as compared to Alternative A.

Table 4.11-1. Acres of Developed and Dispersed Recreation on Watts Bar Reservoir

Existing (1988) Allocation Categories	Current Land Use Zones	Modified Alternatives					
		A		B		C	
		Acres	%*	Acres	%	Acres	%
Wildlife Management Forest Management Agriculture, Informal Recreation, Open Space, Right-of-Way Protection	Zone 4 - Natural Resource Conservation	3,300	20.3	3,857	23.8	5,098	32.4
Public Recreation, Commercial Recreation, Water Access	Zone 6 - Recreation	1,988	12.3	1,552	9.6	1,351	8.3
Total		5,298	32.6	5,409	33.4	6,449	40.7

* Percent of total TVA Land on Watts Bar Reservoir

Table 4.11-2. Comparison of Recreation Allocation Differences by Alternative

Parcel Number	Alternative A Acreage	Alternative A Zone	Alternatives B and C Acreage	Alternative B Zone	Alternative C Zone
1	10.5	6	10.5	2	2
9	122.5	6	122.5	6	4
10	78.4	6	78.4	6	4
98	9.4	6	9.4	4	4
140	7.8	5	6.4	3	3
142	319.5	5	302.5	2	4
143	391.3	5	181.6	2	4
145	332.9	5	265.6	2	4
148	21.5	5	10.5	2	4
218	61.4	5	56.8	4	4
218a	N/A	N/A	4.6	5	5
240	6.5	6	6.5	4	4
243	2.9	6	2.9	7	7
255	8.7	6	8.7	4	4
297	245.0	5	245.0	5	4
298	34.4	5	34.4	5	4
299	370.3	6	423.4	4	4

Alternative A – No Action: Under Alternative A, there are approximately 3,309 acres allocated for dispersed recreation opportunities. Parcels in the former CRBR site and the Lowe Branch area of Watts Bar Reservoir (Parcels 142, 143, 145, 148, 297, and 298) are allocated for economic development (1,345 acres) in Alternative A. Should these parcels be developed in the future, the available recreation opportunities they provide would be eliminated. Prior to development, the former CRBR site could continue to be used as part of the Oak Ridge WMA by TWRA and the Lowe Branch parcels (297 and 298) could continue to be used for dispersed recreation purposes.

Under the 1988 Plan (Alternative A), there are approximately 446 and 647 additional acres allocated for Developed Recreation than under Modified Alternative B and C, respectively. The Zone 6 assessments do not show a need for this additional acreage to be zoned for Developed Recreation.

Continuation of the current plan could adversely affect the amount of future dispersed recreation activities on Watts Bar Reservoir. Analysis of future demand trends indicates a need for a small amount of additional acreage to be available for dispersed recreation opportunities.

Although, impacts to total recreation use would be insignificant, there would be less diverse recreation opportunities. Consequently, Alternative A would continue to provide lands available for developed recreation, but could reduce or limit the number of dispersed recreation opportunities.

Action Alternative B – Modified Development and Recreation: This alternative attempts to incorporate economic development interests, natural resource conservation needs, and recreation demands. This alternative aligns with the analysis of current/future supply and demand for recreation opportunities through the Zone 6 assessments.

Under Modified Alternative B, the total acreage allocated for dispersed recreation opportunities is 557 acres more when compared to Alternative A and is 1,241 acres less when compared to Modified Alternative C (Table 4.11-1). Adoption of this alternative would provide approximately 446 fewer acres allocated for Developed Recreation than in Alternative A. Modified Alternative B would provide approximately 201 additional acres allocated for Developed Recreation than Modified Alternative C. Any presently committed tracts that have facilities considered as developed recreation, with agreements in place, would remain allocated as Developed Recreation. While the demand for developed recreation is expected to increase (per Zone 6 assessments), several public parks and marinas are not operating at full capacity. Thus, current operations supplying developed recreation opportunities can be potentially expanded, and efficiency gains could be sought without allocating additional acreage.

Under Modified Alternative B, parcels in the former CRBR site (Parcels 142, 143, 145, 148) would be allocated for project operations and the Lowe Branch area (Parcels 297, and 298) for industrial use. Both Zone 2 (Project Operations) and Zone 5 (Industrial) have similar impacts to recreation. Should these parcels be developed in the future, the recreation opportunities these parcels provide would eventually be lost (specifically hunting). Prior to development, the former CRBR site could continue to be used as part of the Oak Ridge WMA by TWRA, and the Lowe Branch parcels could continue to be used for dispersed recreation purposes.

Under Modified Alternative B, a riverside buffer is proposed by assigning 110 acres to Parcel 144 (Zone 3) from Parcel 145 (Zone 4 respectively) as compared to Alternative A. The establishment of a riverside buffer would enhance the recreation benefits of this area by providing a screen of natural environment to future development at the former CRBR Site, allowing water recreationists an opportunity to experience a more riverine environment. Further, as a Zone 3, 110 addition acres would be permanently available for dispersed recreation which would be a beneficial impact.

Parcel 240 (6.5 acres) would be changed from Zone 6 under Alternative A to Zone 4 in Alternative B and C. The operators of Arrowhead Marina have not indicated they have the need for expansion of their facilities. The proposed developed recreation use of the parcel for an expansion of an adjoining marina is unlikely. The allocation of Parcel 240 as Zone 4 would be beneficial to dispersed recreation.

Alternative B reduces the amount of land allocated for Developed Recreation but increases the amount of land available for dispersed recreation (Table 4.11-1). The total land available for overall recreation is increased by 111 acres from Alternative A. With the increase of total recreation area from Alternative A and the alignment with anticipated demand analysis (see Table 3.11-1), only minor adverse impacts to recreation are expected.

Action Alternative C – Modified Conservation and Recreation: Under this alternative, there are 5,098 acres allocated to Zone 4, providing a sharp increase in lands for dispersed recreation opportunities as compared to Alternatives A and B. Adoption of this alternative would provide 647 fewer acres allocated toward Developed Recreation than Alternative A and 201 fewer acres than Alternative B.

While the demand for developed recreation is expected to increase, several public parks and marinas are not operating at full capacity. Current operations supplying developed recreation

opportunities can be potentially expanded, and efficiency gains could be sought without allocating additional acreage.

Under Modified Alternative C, Fooshee Pass Campground (Parcel 9) would be allocated as Zone 4. This would remove important future camping opportunities on Watts Bar Reservoir. The recreation assessments found developed camping to be high demand with 27.3 percent of the local population participating.

Under Modified Alternative B, parcels in the former Clinch River Breeder site and the Lowe Branch area (Parcels 142, 143, 145, 148, 297, and 298) of Watts Bar Reservation would be allocated for Natural Resource Conservation (Zone 4). This would allow dispersed recreation and other activities to continue to occur.

Similar to Modified Alternative B, under Modified Alternative C a riverside buffer is proposed by transferring 110 acres to Parcel 144 (Zone 3) from Parcel 145 (Zone 4). No impacts are expected from this as Dispersed recreation activities can occur in both Zone 3 and Zone 4 allocations. However, allocating Parcel 240 (6.5 acres) from Zone 6 under Alternative A to Zone 4 would result beneficial impacts similar to Modified Alternative B.

While Modified Alternative C when compared to Alternative A would have fewer 647 acres of lands available for developed recreation, this would be somewhat offset by 1,798 more acres available for dispersed recreation. Although, Modified Alternative C would not have as many developed camping opportunities, which would put supply in a deficit with demand (Recreation and Industrial Assessment, see Appendix E), the addition of dispersed recreation opportunities would benefit recreation and aligns with the assessments of future dispersed recreation demand.

The total impact to recreation under Alternative C would be insignificant.

4.12. Visual Resources

Potential visual consequences were examined in terms of the likely visual changes between the existing landscape and the landscape as it might be altered by the proposed actions. The assessment of visual change considered the sensitivity of viewing points available to the general public, their viewing distances, and visibility of proposed changes. In this assessment, scenic character is described using a variety of adjectives. Scenic integrity, which relates to degree of intactness or wholeness of the landscape character, is also an important factor. These measures help identify changes in visual character based on commonly held perceptions of landscape beauty and the aesthetic sense of place. Scenic Value Class is determined by combining the levels of scenic attractiveness, scenic integrity, and visibility. Scenic Value Class and the foreground, middleground, and background viewing distances were described previously in Section 3.12.

Comparative scenic values of TVA public land were assessed during the development of Modified Alternatives B and C in order to identify areas for scenic protection and visual resource conservation. Those parcels having distinctive visual characteristics such as the islands, rock bluffs, steep, wooded ridges, wetlands, and flowering shallow water areas were allocated to Sensitive Resource Management (Zone 3). Land that provides valuable protective screening also retained this allocation. Parcels that possess attractive visual resources of less significance were allocated to Natural Resource Conservation (Zone 4). This zone also includes land that provides important scenic buffers. Activities that involve

minor visible change, such as recreational hiking, picnicking, bank fishing, and some selective forest management, could take place under both zone allocations. Some development with more visible modifications could take place under the Zone 4 designation as long as the location and appearance were subordinate to maintaining the desired visual characteristics.

The scenic character of major WMAs and wetlands would be preserved under all the alternatives. Many islands around the reservoir would be protected from alteration under all alternatives. This would preserve the scenic accent, attractive contrast, and visual richness they contribute to reservoir vistas. Several areas of the reservoir would benefit under the action alternatives. Major sections of the riverine, upper reservoir would be protected or screened from further development. This would preserve the variety of wooded, river, ridge landforms; linear channel islands with low trees; broad areas of shallow water; flowering plants; and steep, forest-covered mountainside along the banks. The combined contributions of these attractive features would help sustain the scenic landscape character and aesthetically pleasing sense of place.

Under all the alternatives, the effect of land management on Watts Bar Reservoir would be beneficial for visual resources. Activities occurring during the management of TVA lands typically include road access, illegal dump cleanup and prevention, construction and maintenance of access trails, wildlife and forest management, and parking area provisions within proximity of desired outdoor and recreational activities. These activities could provide greater visual opportunities for viewing natural scenery for pleasure from the water or land. For example, wildlife openings and agriculture leases could create positive visual contrast in the landscape. Controlled burns could enhance the aesthetic value of naturally appearing landscapes. Conducting timber harvests in some areas of the reservoir could encourage successional forest cover that would enhance scenic integrity. The minor visual impacts following timber harvests and other types of vegetation management are temporary and would diminish as the site revegetates. As necessary and as practicable, visual buffers between 50 feet and 100 feet wide would be provided to screen timber harvest areas and commercial development from public thoroughfares and shorelines.

Likewise, future natural areas and wetlands management activities could preserve and enhance the exceptional natural, scenic, or aesthetic qualities of landscapes that are suitable for low-impact public use. TVA attempts to monitor and remedy, to the extent practicable, abuses found in these areas and which can enhance opportunities for viewing naturally appearing landscapes. Historically, such abuses include illegal dumping, unauthorized all-terrain vehicle use, and other activities not permitted in some areas.

Lands having the greatest scenic qualities are often the most desirable for public preservation. Frequently, however, they are also the most sought-after for commercial and residential development. Under all alternatives, TVA would continue to conduct environmental reviews, including evaluation for potential visual impacts, prior to the approval of any proposed development on public land. These reviews may prevent the most serious scenic disruptions or loss of visual resources by requiring mitigation measures to reduce potentially significant visual impacts.

Alternative A – No Action: Under the No Action Alternative, a slow but noticeable decline in scenic resources, aesthetic quality, and visual landscape character is expected, as demands for residential, commercial, and industrial development are likely to continue to increase. This decline in scenic resources would likely reduce scenic class levels for some areas of the

reservoir by one level or more (e.g., from excellent to good, or from fair to poor). Areas with low scenic values are often influenced by small changes in visual character. Thus, reductions in scenic class level could be potentially significant for areas of common or minimal scenic quality or for those areas that have very little scenic importance.

Incremental additions of water use facilities may not be individually significant. However, when viewed together with similar structures over a wide area, they contribute to a cumulative reduction of visual harmony and scenic integrity along the shoreline. Visual shoreline congestion and related adverse contrasts would likely increase. Consequently, a gradual reduction of scenic attractiveness, which would degrade the visual landscape character and the aesthetic sense of place, is most likely under the No Action Alternative. Scenic integrity of the predominantly natural shoreline would likely continue to decrease under the No Action Alternative.

Continued use of Alternative A could result in adding to cumulative negative impacts including gradual losses of visual resources, scenic attractiveness, and undeveloped natural areas as well as adverse changes in the aesthetic sense of place. The overall result would be a minor but continuing decrease in the visual quality of the naturally scenic reservoir landscape.

Action Alternative B – Modified Development and Recreation: Under this alternative, the slow degradation of scenic resources described in Alternative A would continue, although to a lesser degree. Modified Alternative B calls for about 450 fewer acres to be considered for future industrial or additional project operation use (i.e., 1,545 acres compared to 1,072 acres, respectively). Eventually, these lands would likely be devoted to light manufacturing, general industrial purposes, or TVA energy related facilities.

Although insignificant, adoption of Modified Alternative B would have an overall greater adverse impact on the visual landscape character and aesthetic sense of place than Modified Alternative C, but less than Alternative A. Modified Alternative B provides for some protection of scenic resources and preservation of natural areas around the reservoir over time through the use of natural vegetative buffers, particularly on the former CRBR site (Parcels 144 and 146) and the Lowe Branch area (Parcel 294). Scenic integrity would remain moderate or higher. Consequently, implementation of this alternative would provide some protective management for visual resources to help preserve the scenic landscape character of Watts Bar Reservoir for long-term public enjoyment.

Action Alternative C – Modified Conservation and Recreation: Under Modified Alternative C, the most distinctive scenic areas on Watts Bar Reservoir would be preserved. Also, Modified Alternative C calls for balancing future development with sufficient areas of unaltered shoreline to retain a natural visual character.

Under Modified Alternative C, the acreage of Zone 4 lands would increase to 5,098 acres, as opposed to 3,857 under Modified Alternative B and 3,309 under Alternative A. This proposed increase in acreage in Zone 4 would tend to benefit scenic quality. The acreage of Zone 3 lands would remain 3,780 acres under Modified Alternatives B and C, and 3,472 acres under Alternative A (see Table 2.2-1).

Beneficial visual effects could occur for many parcels under Modified Alternative C as a result of the reallocation of some parcels from Zone 5 (Industrial) and Developed Recreation (Zone

6) to either Zone 3 or Zone 4. A summary of all potential visual impacts can be found in Appendix D, Table D-9.

Overall, this alternative has insignificant impacts on visual resources and the least impacts of all the alternatives. Like Modified Alternative B, Modified Alternative C provides for better protection of scenic resources and preservation of natural areas around the reservoir over time through the use of natural vegetative buffers. Consequently, implementation of this alternative would provide enhanced protective management for visual resources and would help preserve the scenic landscape character of Watts Bar Reservoir for long-term public enjoyment.

4.13. Socioeconomics and Environmental Justice

4.13.1. Socioeconomics

Socioeconomic impacts under the proposed alternatives would be due to the direct effects of the number and types of jobs created by development accommodated by the allocation of TVA lands to different zones. In addition, there would be indirect effects of population growth due to new development, as well as the effect on development potential of other lands due to the management of TVA land. Socioeconomic impacts could also occur as a result of changes in recreation opportunities, including dispersed recreation, in the area and changes in the overall attractiveness of the area as a place to live or to visit.

Under the November 2006 TVA Land Policy, the use of TVA land has been clarified specifically for industrial use and in particular water- based industries that would utilize water transportation or large amounts of process water. However, in many cases, future industrial, commercial, and residential development would still occur in the Watts Bar area on private land whether TVA land were available or not, and there would be little net effect on income and jobs.

There could be some cumulative adverse socioeconomic effects from future development under all the alternatives, depending on the intensity of future development of private tracts. In most cases, if industrial, commercial, or residential development occurs, use of these areas for natural resources including recreation would likely be excluded. The result is a potential decrease in the attractiveness of and the quality of life in the region, especially if large amounts of land are affected. Reduced attractiveness of the area could in turn lessen new population growth and economic development opportunities.

Alternative A – No Action: Presently, 1,544 acres of TVA land on the Watts Bar Reservoir are allocated for Zone 5 (Industrial), and another 1,998 acres are allocated for Zone 6 (Developed Recreation) (see Table 2.2-1). The Developed Recreation allocation includes commercial recreation as well as public recreation, greenways, and water access which are socially and economically important. About 6,772 acres are classified for Zones 3 (Sensitive Resource Management) and 4 (Natural Resource Conservation) and would be managed for the enhancement of natural resources for human use and appreciation. Under Alternative A, parcels would retain their current allocations. Current classifications would continue to be used, and future land use requests would be evaluated for consistency with the current classifications. Therefore, adverse potential socioeconomic effects are not anticipated under Alternative A. However, the potential socioeconomic impacts of any specific land use proposals on currently allocated land would still be evaluated as appropriate during the environmental review process, so the types of possible impacts are generally discussed here.

Many of the tracts that are or could be allocated for Zone 5 (Industrial) are small or narrow tracts that might provide reservoir access for terminal operations or water use for industries locating on adjacent back-lying private properties. Others, in particular, the former CRBR site in Roane County and the parcels in Rhea County near the Watts Bar Dam, could accommodate relatively large industrial facilities. In the rural counties of the Watts Bar Reservoir area with limited job opportunities and relatively high poverty level, as discussed in Section 3.13, use of these sites for such purposes could potentially have significant positive effects to the economy of the area if firms attracted to the sites would not have located in the area otherwise. Conversely, the loss of recreation opportunities and natural resources associated with industrial use could make the local area less attractive and possibly lower the quality of life in the surrounding area.

Action Alternative B – Modified Development and Recreation: Under this alternative, the amount of land available for Zone 5 (Industrial) use and the amount available for Zone 6 (Developed Recreation) would be about 45 percent less as compared to Alternative A. The amount of land for Zone 4 (Natural Resource Conservation) would increase about 15 percent. These proposed allocations would lessen the potential for increasing income and jobs in the area. However, the large site near Watts Bar Dam would still be available for development. The large former CRBR site would be allocated as Zone 2 (Project Operations) to make it available for future TVA power-related activities or for industrial uses, so most of the potential for beneficial socioeconomic impacts would remain. Therefore, the impacts would be slightly less than Alternative A.

As discussed in Section 4.10 (Navigation), the decrease in land available for Developed Recreation could negatively affect recreational boating opportunities and related businesses and could possibly have some negative effects on the local economy.

Most of the potential effects of this alternative would be likely to occur in Rhea and Roane counties, as all of the land that would be allocated for industrial use or for power related facilities is located in these two counties. The availability of the two sites discussed above for industrial use or similar purposes could lead to increased jobs and income in the Rhea or Roane County areas if the subject parcels are used for developments that otherwise would not have located in those counties. Conversely, the loss of recreation opportunities and natural resources associated with current land uses could make the local area less attractive and possibly lower the quality of life in the surrounding area.

In addition, except for land under license for an existing barge terminal, Parcel 218 in Roane County would be rezoned from Zone 5 (Industrial) under Alternative A to Zone 4 (Natural Resource Conservation). The 4.6 acres encompassing the barge terminal would remain Zone 5 as Parcel 218A. The potential impacts on the local economy and on transportation are as discussed in Section 4.10. However, the continuation of industrial activities at this site could have a positive influence on the local economy. Also, several other, generally small tracts in Roane County would be classified as Developed Recreation, which could also affect the local economy positively.

Action Alternative C – Modified Conservation and Recreation: Adoption of this alternative would almost completely eliminate the amount of land available for Zone 5 (Industrial) use for future development and reduce by about 32 percent the acreage for Zone 6 (Developed Recreation). It would increase by over 52 percent the amount available for Zone 4 (Natural Resource Conservation) (see Table 2.2-1).

The loss of land for industrial development could preclude much potential economic development in the area if alternate locations are not available in the local area. The result could be loss of potential jobs and income, although future industrial and commercial development could still occur in the Watts Bar area on private land. However, the allocation of this land for natural resource conservation would enhance quality of life and the attractiveness of the area, making it more inviting for other economic opportunities, such as housing on adjoining, private lands. This would result in positive economic effects on the local area and surrounding areas.

The remaining land available for Developed Recreation could produce jobs and income in the local area by attracting visitors and stimulating the development of recreation-related businesses such as motels and restaurants. However, these socioeconomic benefits would probably be lessened as compared to Modified Alternative B due to the smaller amount of land available for such uses.

4.13.2. Environmental Justice

Alternative A – No Action: Under the No Action Alternative, there would be no change in parcel allocations from their current designations. Therefore, no change in the current situation with respect to environmental justice is likely. Poverty levels are high in places, especially in Meigs and Rhea counties as discussed in Section 3.13, but the minority population in the area is small and unlikely to be disproportionately affected adversely by any development proposal under Alternative A (or any of the alternatives). In general, economic development proposals could benefit those in poverty by providing job opportunities. Specific land use proposals could potentially have significant adverse environmental justice impacts by reducing affordable public access to the reservoir and lands for dispersed recreation. These proposals would be evaluated as appropriate during the environmental review process. Significant cumulative impacts could occur if several tracts were developed, even if no single development caused significant impacts. However, the extent and degree of such impacts would depend on the specific proposals.

Action Alternative B – Modified Development and Recreation: Implementation of Modified Alternative B would decrease the amount of land available for Zone 5 (Industrial) and Zone 6 (Developed Recreation) as compared to Alternative A, thus reducing job opportunities that could benefit those in poverty. However, the amount of land for Zone 4 (Natural Resource Conservation) would increase. The net effect of this situation would be potentially increased access to public lands for dispersed recreation. This situation could especially benefit disadvantaged populations more than others because these populations, especially low-income populations, would be less able to afford developed recreation alternatives. This group is also less able to travel to other locations for dispersed recreation.

Action Alternative C – Modified Conservation and Recreation: Under Modified Alternative C, additional acreages would be made available for dispersed public recreation as compared to the other alternatives. Thus, adoption of Modified Alternative C would provide public lands that would be accessible and affordable for more people, including disadvantaged populations.

4.14. Air Quality

With respect to the Land Plan, the greatest potential for air quality effects is from industrial use on proposed Zone 5 (Industrial) properties. Activities, either current or future, associated

with Zone 6 (Developed Recreation) are not likely to cause any significant impacts to local air quality. Likewise, activities occurring on the remaining zones (Zones 3, 4, and 7) are not likely to generate any noticeable amount of air emissions, and thus are not likely to cause any significant effects to air quality. Most activities associated with Zone 2 (Project Operations) are similar to Zone 6 except where there are TVA power production facilities such as KIF. In these cases, the facilities on these parcels would have an impact on air quality and are subject to various federal, state, and local regulations (see www.tva.com/environment/air/ontheair). However, the allocation of land by the Land Plan would have no influence on power production operations and their continuing impacts to air quality, and these existing impacts would continue under any of the alternatives.

For purposes of analysis, the potential for adverse air quality effects was assumed to be correlated to the amount of acreage available for industrial development, i.e., the acreage allocated to Zone 5. At this time, predictions of the nature of air emissions from industries that might locate on Watts Bar land tracts would be speculative. Any industry seeking to operate a facility that involves Watts Bar lands would be subject to various federal, state, and local regulations (see Section 3.14). Thus, from a regulatory standpoint, air quality impacts from industrial or commercial operations on Zone 5 areas would not be significant.

Alternative A – No Action: Under this alternative, the 1988 Plan would remain in place. This plan, along with TVA Land Policy, currently guides land use decisions on TVA public land surrounding Watts Bar Reservoir. The 1988 Plan used 19 allocation categories, which would continue to be used by TVA to make land use decisions. A total of 1,531 acres could be considered for industrial use. An appropriate level of environmental review would be done to document the extent of expected air quality impacts whenever a proposed land use request is received. Each such review that involved a tract in or potentially affecting a nonattainment area for ozone and/or $PM_{2.5}$ would require a conformity applicability determination pursuant to regulations implementing Section 176(c) of the Clean Air Act to assure compatibility with measures in local plans for achieving attainment. Although there could be some minor decrease in air quality under Alternative A, any effects are expected to be insignificant.

Action Alternative B – Modified Development and Recreation: Under Modified Alternative B, TVA would update land allocations using resource data, computer analyses, stakeholder input, and TVA staff input to generate a proposed mix of land allocations. Under Modified Alternative B, 357 acres would be allocated to Zone 5 for industrial use and an additional 760 acres for project operations at the former CRBR site. Overall, this alternative is expected to have a lesser impact on air quality than Alternative A as less acreage is allocated to industrial use, an environmental review would be performed for each expansion or development proposal to document the extent of expected air quality impacts. If a nonattainment area were involved, the same conformity applicability determination as stated for reviews under Alternative A would also be required. There would be less potential for adverse effects to air quality under Modified Alternative B; these effects would be held to insignificant levels by regulatory standards.

Action Alternative C – Modified Conservation and Recreation: Under Modified Alternative C, only 77 acres would be allocated to Zone 5 at previously developed sites. As with Alternative A and Modified Alternative B, the appropriate environmental review would be performed for any expansion or development proposal to document potential impacts on air quality. The small acreage so allocated would be much less than for either Alternative A or Modified Alternative B, and the potential for air pollution would likely be proportionally smaller.

Because of the small amount of acreage involved and because of regulatory controls, industrial development under Modified Alternative C is not expected to result in any significant effects to air quality.

4.15. Noise

The greatest potential for community noise impacts comes from industrial and commercial development, commercial transportation, and, to a lesser extent, from commercial recreational development. In the land use allocations in Modified Alternative C, the potential for community noise impacts are substantially reduced because of the large potential decrease in land available for noise-producing activities as compared to Alternative A and Modified Alternative B. Under Alternative A and Modified Alternative B, the land available for Zone 5 (Industrial) could be the original 1,544 acres (Alternative A) or a decrease to about 357 acres with an additional 760 acres for project operations at the former CRBR site (Modified Alternative B). None of the potential developments would likely be in close proximity to large existing residential areas; therefore, the potential for increased noise effects would be insignificant. Maximum land allocated for Developed Recreation (Zone 6) would decrease by approximately 450 to 650 acres, respectively, if Modified Alternatives B or C were approved.

Under Modified Alternative C, there is a substantial increase in the land allocated to Natural Resource Conservation (Zone 4). This would decrease the potential for noise effects in those allocations.

Overall, based on the amount of TVA public land available for development and the additional environmental evaluations, there would be an insignificant increase in the potential for community noise impacts from implementation of Alternative A or Modified Alternative B. Modified Alternative C would have the least impacts.

4.16. Unavoidable Adverse Effects

Because of the requirement that site-specific environmental reviews would be conducted prior to implementation, there are currently few, if any, adverse environmental effects that cannot be avoided should any alternative be implemented. However, regional development trends, such as residential shoreline development, will continue to result in losses of aquatic and terrestrial habitat regardless of which alternative is selected.

4.17. Relationship of Short-Term Uses and Long-Term Productivity

Commitments of the shoreline to shoreline access, commercial, industrial, and some types of recreational development are essentially long-term decisions that would decrease the productivity of land for agricultural, forest, wildlife, and other natural resource management. Long-term productivity decreases would likely be greatest under Alternative A and to a lesser extent under Modified Alternative B. As described in earlier sections, the types of changes that occur with development would result in a decline in the habitat quality for some terrestrial species and increase the habitat for others. Many of the water-related impacts of shoreline development could be minimized by the use of appropriate controls on erosion, added nutrients, and pesticide input.

Increased residential development could occur under any of the alternatives and result in population increase along the shoreline. New jobs and income would be generated by the spending activities of these new residents, leading to enhanced long-term socioeconomic productivity. This would be the case as long as the desirable features that prompted their move to the shoreline were maintained or enhanced.

4.18. Irreversible and Irretrievable Commitments of Resources

Irretrievable use of nonrenewable resources (i.e., fuel, energy, and some construction materials) could occur under all of the alternatives due to residential shoreline development as well as commercial, industrial, and some types of recreational development. The proposed developments would result in region wide population increase. This means that the same development could occur somewhere else in the region. Therefore, use of most (if not all) of these resources could occur somewhere else in the region to provide the same residential development services regardless of the alternative chosen.

As shoreline is converted to residential, commercial, industrial, and some types of recreational use, the land is essentially permanently changed and not available for agricultural, forestry, wildlife habitat, natural area, and some recreation uses in the foreseeable future. This is an irreversible commitment of land, which would occur under all alternatives; over the long term, it would likely be greatest under Alternative A.

4.19. Energy Resources and Conservation Potential

Energy is used by machines for fuel to maintain grassy areas on the TVA project lands, such as the dam reservation, and by the operation of the TVA power-producing facilities located on Watts Bar Reservoir. There are no short-term energy uses required for TVA project lands, as they are already established.

Energy is also used by machines to maintain areas set aside for Natural Resource Conservation. Although these activities are not likely to have much influence on regional energy use demands either, there would be some short-term energy use for fuel to conduct prescribed natural resource conservation activities, such as mowing, timber management, controlled burning, disking, planting of small grain crops, etc. Alternative C would have a greater requirement for this type of energy use, since it contains the largest amount of acreage allocated for Natural Resource Conservation.

Comparable amounts of TVA public land (21-23 percent) are allocated to Zone 3, Sensitive Resource Management, under all the alternatives. Some areas set aside for protection of archaeological sites could potentially be maintained by mowing, light disking, or controlled burning. There would be some short-term energy use of fuel for machines to conduct these types of activities. The level of these activities is considered minimal.

4.20. Summary of Proposed Mitigation Measures

The following mitigation measures would be considered in preparing the ROD for the final EIS.

- All activities would be conducted in accordance with the stipulations defined in the Program Agreement between TVA, the Tennessee SHPO, and the Advisory Council on Historic Preservation.
- The construction of water use facilities and shoreline alterations within the marked limits of the safety landings and harbors would be prohibited.
- Requests for water use facilities on shoreline immediately upstream and downstream of the safety landings and harbors would continue to be reviewed to ensure that barge tows would have sufficient room to maneuver in and out of the safety landings and harbors without the risk of damaging private property.
- Because caves are extremely fragile and biologically significant, TVA has placed and would continue to maintain protective buffer zones around the known caves on TVA public land on Watts Bar Reservoir.
- As necessary and as practicable, visual buffers, between 50 feet and 100 feet wide, would be provided to screen timber harvest areas and commercial development from public thoroughfares and shorelines.
- Best management practices would be used on all soil-disturbing activities.
- Landscaping activities on developed properties would not include the use of plants listed as Rank 1, “Severe Threat,” Rank 2, “Significant Threat,” and Rank 3, “Lesser Threat,” on the Tennessee Exotic Pest Plant Council’s list of Invasive Exotic Pest Plants in Tennessee (Appendix D, Table D-7).
- Revegetation and erosion control work would utilize seed mixes comprised of native species or noninvasive nonnative species (Appendix D, Table D-8).
- If TVA were to develop facilities at any Zone 5 (Industrial) or Zone 2 (Project Operations) site , the following measures would be employed to minimize the potential for effects on federally listed species:

    1. TVA will consult with USFWS in order to determine if the proposed action could affect listed mussels present in the area.
    2. Pre-construction mussel surveys would be conducted in all areas of the Clinch River (Watts Bar Reservoir) that would be affected by construction and use of any future terminal associated infrastructure (e.g. barge terminal, water intakes or water outfalls)
    3. Any listed mussels found during these surveys would be dealt with according to terms and conditions imposed as a result of the USFWS consultation process. These could consist of minimization or avoidance measures implemented during construction and operation, or relocation of the mussels encountered if effects are unavoidable.

CHAPTER 5

5. LIST OF PREPARERS

Tyler Baker - Surface Water Review
Limnologist, TVA Aquatic Monitoring and Management, Chattanooga, Tennessee

Evelyn Benton (retired) - Maps and Data Management
Watershed Information Technician, TVA Land and Water Stewardship, Lenoir City, Tennessee

Chellie J. Cook - Clerical Assistance
Business Support Representative, TVA Land and Water Stewardship, Lenoir City, Tennessee

Stephanie Chance (former TVA employee) - Sensitive Aquatic Species Review
Aquatic Endangered Species Biologist, TVA Heritage Resources, Knoxville, Tennessee

Gary Chappelle - Land Use and 26a Analysis
Land Use Representative, TVA Land and Water Stewardship, Lenoir City, Tennessee

Patricia Cox - Sensitive Plant Species Review
Botanist, TVA Heritage Resources, Knoxville, Tennessee

Mike Crowson (retired) - Team Management and Project Review
Watts Bar/Clinch Watershed Manager, TVA, Lenoir City, Tennessee

Alisa Crutchfield (retired) - Land Use Review
Watershed Representative, TVA, Lenoir City, Tennessee

Mark Degnan (retired) - Land Use and 26a Analysis
Land Use Representative, TVA Watershed Operations, Lenoir City, Tennessee

Michael Dobrogrosz - Past Project Manager, Watts Bar Reservoir Land Plan
Project Manager, TVA Land and Water Stewardship, Knoxville, Tennessee

James Eblen - Socioeconomics and Environmental Justice Analysis
Economist, TVA Contractor, Knoxville, Tennessee

Joe Feeman (retired) - Project Manager, Integrated Resources Management
Forester, TVA Land and Water Stewardship, Lenoir City, Tennessee

Steven Clay Guerry - Recreation Resources Analysis
Recreation Representative, TVA Land and Water Stewardship, Lenoir City, Tennessee

Ella Christina Guinn - Technical Staff Coordination
Project Control Specialist, TVA Environmental Services and Programs, Knoxville, Tennessee

Nancy Greer - Watershed Team Management and Project Review
Watts Bar/Clinch Watershed Manager, TVA Land and Water Stewardship, Lenoir City, Tennessee

David B. Harrell - Recreation Resources Analysis
Land Use Representative, TVA Land and Water Stewardship, Lenoir City, Tennessee

Hill Henry - Sensitive Animal Species Review
Endangered Species Specialist, TVA Heritage Resources, Knoxville, Tennessee

A. Eric Howard - Cultural Resources Review
Archaeologist, TVA Cultural Resources, Knoxville, Tennessee

George Humphrey (retired) - Recreation Resources Analysis
Land Use Specialist Recreation, TVA, Lenoir City, Tennessee

Wesley James - Terrestrial Ecology Review
Wildlife Biologist, TVA Land and Water Stewardship, Lenoir City, Tennessee

Jimmie Kelsoe (retired) - Prime Farmland Review
Environmental Scientist, TVA, Muscle Shoals, Alabama

Carolyn Koroa - Navigation Review
Senior Geographic Analyst, Navigation, TVA River Operations, Knoxville, Tennessee

Scott Ledford - Land Use and 26a Analysis
Land Use Representative, TVA Land and Water Stewardship Lenoir City, Tennessee

Catherine Mackey - Parcel Descriptions
Project Manager, TVA Office of Environment and Research, Knoxville, Tennessee

Mark McNeely - Document Layout and Publishing Coordinator
Program Administrator, TVA Office of Environment and Research, Knoxville, Tennessee

Alissa MacMahan (former TVA employee) - Maps
Watershed Representative, TVA, Lenoir City, Tennessee

Paul A. Mays - Prime Farmland Review
Environmental Scientist, TVA Research and Technology Applications, Knoxville, Tennessee

Roger Milstead - Floodplains and Flood Risk Review
Manager, Flood Risk and Data Management, TVA River Operations, Knoxville, Tennessee

Jason M. Mitchell - Managed Areas and Sensitive Ecological Sites Review and Technical Editing
Natural Areas Biologist, TVA Heritage Resources, Knoxville, Tennessee

Kate E. Morelock (former TVA employee) - Recreation Resources Analysis
Recreation Representative, TVA, Lenoir City, Tennessee

Norris Neilson (retired) - Air Quality Review
Meteorologist, TVA, Muscle Shoals, Alabama

Donna Norton - Land Use and Planning Analysis
Manager, TVA Land and Water Stewardship, Lenoir City, Tennessee

Chett Peebles - Visual Resources Review
Senior Landscape Architect, TVA Environmental Services and Programs, Knoxville, Tennessee

Kim Pilarski-Brand - Wetlands Review
Senior Wetland Biologist, TVA Heritage Resources, Knoxville, Tennessee

Erin Pritchard - Project Manager, Watts Bar Reservoir Land Plan
Project Manager, TVA Environmental Services and Programs, Knoxville, Tennessee

Helen Rucker - Land Use Analysis
NEPA Manager, TVA NEPA Resources, Knoxville, Tennessee

Peter Scheffler (retired) - Socioeconomics and Environmental Justice Analysis
NEPA Specialist, TVA NEPA Resources, Knoxville, Tennessee

Edwin Scott (retired) - Aquatic Ecology Review
Aquatic Biologist, TVA Heritage Resources, Knoxville, Tennessee

Russell Smith - Technical Staff Coordination
Project Control Specialist, TVA Land and Water Stewardship, Knoxville, Tennessee

Charles Tichy (retired) - Historic Structures Review
Historic Architect, TVA Cultural Resources, Knoxville, Tennessee

Richard L. Toennisson - NEPA Project Management
NEPA Specialist, TVA NEPA Resources, Knoxville, Tennessee

Jan Thomas - Managed Areas and Sensitive Ecological Sites Review
Natural Areas Specialist, TVA Contractor Heritage Resources, Knoxville, Tennessee

Alan Trently (former TVA contractor) - Sensitive Terrestrial Species Review
Terrestrial Zoologist, TVA Contractor Heritage Resources, Knoxville, Tennessee

Elizabeth Upchurch - Water Quality Review
Watershed Resource Representative, TVA Land and Water Stewardship, Lenoir City, Tennessee

James F. Williamson - Analysis and Text Editing
NEPA Specialist, TVA NEPA Resources, Knoxville, Tennessee

Page intentionally blank

CHAPTER 6

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

Federal Agencies

Dr. Lee A. Barclay, Field Supervisor
U.S. Fish and Wildlife Service
446 Neal Street
Cookeville, TN 38501

Lt. Col. Steven J. Roemhildt
U.S. Army Corps of Engineers
Nashville District
Post Office Box 1070
Nashville, TN 37202-1070

Mr. Ron Gatlin, Chief
U.S. Army Corps of Engineers
Regulatory Branch
3701 Bell Road
Nashville, TN 37214

Mr. Phil Campbell, Unit Manager
National Park Service, Obed Wild and Scenic River
Post Office Box 429
Wartburg, TN 37887

Ms. Anne J. Zimmerman
U. S. Forest Service
Cherokee National Forest
Post Office Box 2010
Cleveland, TN 37320

Mr. Gerald G. Boyd, Manager
U. S. Department of Energy
Oak Ridge Office
Post Office Box 2001
Oak Ridge, TN 37830

Mr. Bob Nelson
U.S. Coast Guard
Post Office Box 12406
Knoxville, TN 37912

Mr. George Frank
Knoxville Export Assistance Center
U.S. Department of Commerce
601 West Summit Hill Drive
Knoxville, TN 37902

State Agencies

Douglas J. Delaney, Director
Environmental Planning and Permits Division
Tennessee Department of Transportation
Suite 900, James K. Polk Building
505 Deaderick Street
Nashville, TN 37243-0334

Mr. Terry Oliver
Tennessee Department of Agriculture
Ellington Agricultural Center
Post Office Box 40627
Nashville, TN 37204

Mr. Mathew Kisber, Commissioner
Tennessee Department of Economic and Community Development
312 Eighth Ave
11th Floor Tennessee Tower
Nashville, TN 37243

Mr. Mr. Patrick McIntyre,
State Historic Preservation Officer
Tennessee Historical Commission
2941 Lebanon Road
Nashville, TN 37243-0442

Mr. Robert M. Todd
Tennessee Wildlife Resources Agency
Post Office Box 40747
Nashville, TN 37204-0747

Mr. Terrence Bobrowski
East Tennessee Development District
P. O. Box 19806
Knoxville, TN 37939-2806

Mr. Hale Booth
Southeast Tennessee Development District
P. O. Box 4757
Chattanooga, TN 37405

Mr. David Owensby
Tennessee Department of Environment and Conservation
Environmental Policy Office
L & C Tower, 21st Floor
401 Church Street
Nashville, TN 37243-1530

Mr. Reggie Reeves
Tennessee Department of Environment and Conservation
Division of Natural Heritage
8th Floor, L&C Tower
401 Church Street
Nashville, TN 37243

Mr. Mark Tummons
Tennessee Department of Environment and Conservation
Div. of Recreation and Education Services
10th Floor, L&C Tower
401 Church Street
Nashville, TN 37243

Mr. Paul Davis
Tennessee Department of Environment and Conservation
Division of Water Pollution Control
7th Floor, L&C Tower
401 Church Street
Nashville, TN 37243

Mr. Barry Stephens
Tennessee Department of Environment and Conservation
Division of Air Pollution Control
9th Floor, L&C Tower
401 Church Street
Nashville, TN 37243

Mr. Ron Hammontree
Tellico Reservoir Development Agency
59 Excellent Way
Vonore, TN 37885

Mr. Allen Neel
East Tennessee Economic Development Agency
Suite 202, 10215 Technology Drive
Knoxville, TN 37932

Ms. Beth Phillips
Tennessee Department of Economic and Community Development
Suite 202, 10215 Technology Drive
Knoxville, TN 37932

Mr. James Fyke, Commissioner
Tennessee Department of Environment and Conservation
L & C Tower, 21st Floor
401 Church Street
Nashville, TN 37243-0435

Mr. Gerald Nicely, Commissioner
Tennessee Department of Transportation
James K. Polk Building, Suite K
505 Deaderick Street
Nashville, TN 37243-0349

Mr. Will Callaway, Executive Director
Tennessee Environmental Council
One Vantage Way, Suite D-105
Nashville, TN 37228

Local Agencies and Private Organizations

Ms. Betsy Peterson
Oak Ridge and Area Girl Scouts
115 Amanda Drive
Oak Ridge, TN 37830

Maureen O'Connell, Director
Save Our Cumberland Mountains
Post Office 479
Lake City, TN 37769

Mr. Mike Butler, Executive Director
Tennessee Wildlife Federation
300 Orlando Avenue
Nashville, TN 37909-3200

Ms. Dana Pittman
Tennessee Land Trust
1510 Bailey Morrison Drive
Somerville, TN 38068

Ms. Michele Myers, Recreation Director
Tennessee Marina Association
Post Office Box 298
Kuttawa, KY 42055

Ms. Liz Dixon
Tennessee State Chapter of Sierra Club
2021 21st Avenue, S., Suite 436
Nashville, TN 37212

Mr. Chance Finegan, President
CHS SPEAK, the Campus Greens
1710 Zeb Warren Road
Cookeville, TN 38506

Mr. Bill Clabough
Foothills Land Conservancy
307 South Washington Street
Maryville, TN 37804

Mr. Josh Collins, Director
Parks and Recreation, City of Oak Ridge
Post Office Box 1
Oak Ridge, TN 37831

Mr. Al Guidry
Atomic City Sportsman Club
Post Office Box 5591
Oak Ridge, TN 37831

Mr. Rick Gehrke
Cherokee Group of Sierra Club
9004 Wellthor Circle
Soddy Daisy, TN 37379

Mr. Wilker Hassler
Friends of Watts Bar Lake
480 Pine Ridge Circle
Crossville, TN 38555

Mr. Jefferson Keel, Lt. Governor
The Chickasaw Nation Headquarters
Post Office Box 1548
Ada, OK 74821

Ms. Kim K. Denton, CEcD
Oak Ridge Economic Partnership
1400 Oakridge Turnpike
Oak Ridge, TN 37830

Ms. Greta Stoutt Ownby, Executive VP
Oak Ridge Chamber of Commerce
1400 Oak Ridge Turnpike
Oak Ridge, TN 37830

Mrs. Dale D. Powers, Director
Office of Family Life and Adult Christian Living, Diocese of Knoxville
Post Office Box 11127
Knoxville, TN 37939

Ms. Sandra K. Goss, Executive Director
Tennessee Citizens for Wilderness Planning
130 Tabor Road
Oak Ridge, TN 37830

Individuals Notified That the Final EIS is Available:

Roger D. Aigner, Harriman, Tenn.
Mike Albertson, Rockwood, Tenn.
Brian and Wendy Arden, Knoxville, Tenn.
Donna Ashby, Kingsport, Tenn.
Margaret Bacon, Kingston, Tenn.
Stephen E. Bacon, Kingston, Tenn.
Jane Bailey, Ten Mile, Tenn.
Jim Baldwin, Spring City, Tenn.
Jean Bangham, Oak Ridge, Tenn.
William E. Barber, Spring City, Tenn.
Don Barger, Norris, Tenn.
Amanda Branch, Knoxville, Tenn.
Paul Bartizal, Spring City, Tenn.
Regina Batuk, Spring City, Tenn.
George F. Baungartner, Ten Mile, Tenn.
John Baxter, Harriman, Tenn.
Shelly Beasley, Spring City, Tenn.
C. F. Beets, Knoxville, Tenn.
Vickie Bell, Ten Mile, Tenn.
Richard Berry, Knoxville, Tenn.
V. Binder, Meigs County, Tenn.
Scottie Boles, Rockwood, Tenn.

Rhonda Bogard, Oak Ridge, Tenn.
James D. Boyd, Ten Mile, Tenn.
Stan Boyd, Hermitage, Tenn.
Steve Brooks, Knoxville, Tenn.
Linda Brown, Spring City, Tenn.
Robin Burchfield, Rogersville, Ala.
Chris Burkhart , Knoxville, Tenn.
Mary H. Burney, Kingston, Tenn.
Gretchen Byrge, Oliver Springs, Tenn.
Glenn and Phyllis Cada, Knoxville, Tenn.
Jim and Judy Callen, Spring City, Tenn.
Mark Campen, Knoxville, Tenn.
David Carden, Lake City, Tenn.
Debra J. S. Carpenter, Powell, Tenn.
Diane Cishel, Kingsport, Tenn.
Kathy Cisson, Rockwood, Tenn.
Carol T. Coffey, Knoxville, Tenn.
Una Coffman, Kingston, Tenn.
Nathan W. Cole, Rockwood, Tenn.
Ross L. Cole, Rockwood, Tenn.
David Collins, Knoxville, Tenn.
Josh Collins, Dalton, GA
Kay Comer, Clinton, Tenn.
Kristin Condict, Nashville, Tenn.
Greg Cooper, Clinton, Tenn.
Eugene F. Corcoran, Jr., Spring City, Tenn.
Steward Coulter, Tullahoma, Tenn.
Vivian Crump, Dalton, GA
Virginia Dale, Oak Ridge, Tenn.
Don and Mary Davis, Kingston, Tenn.
Tom Davis, Dayton, Tenn.
Bill Dean, Kingston, Tenn.
Mr. and Mrs. Don Denuyl, Ten Mile, Tenn.
Larry C. DeLoach, Jonesborough, Tenn.
Romney Dickinson, Crossville, Tenn.
Mary Lynn Dobson, Rockwood, Tenn.
Janelle Douglas, Georgia
Tracey Edgemor, Decatur, Tenn.
Bruce Eltzroth, Kingston, Tenn.
Justin Evans, Knoxville, Tenn.
Mr. and Mrs. Art Ewing, Monteagle, Tenn.
William J. Farnham, Knoxville, Tenn.
Joe Ferguson, Signal Mountain, Tenn.
Danny and Robert Fischer, Lenoir City, Tenn.
Jim Foster, Spring City, Tenn.
Mary Garrison, Spring City, Tenn.
Jean Gauger, Knoxville, Tenn.
Jerry C. Gilbert, Johnson City, Tenn.
Charles W. Goodman, Kingston, Tenn.
David E. Greenwood, Knoxville, Tenn.
Ellen M. Greenwood, Knoxville, Tenn.
Suzanna Griffin, Kingston, Tenn.
Linda Groome, Harriman, Tenn.
Sandra Goss, Oak Ridge, Tenn.
Tim Gultrie, Spring City, Tenn.
Terry A. Gupton, Harriman, Tenn.
James E. Hampton, Spring City, Tenn.
Dorothy R. Harris, Knoxville, Tenn.
Gary S. Hartman, Oak Ridge, Tenn.
Frederick D. Harvey, Kingston, Tenn.
Frances S. Hassler, Crossville, Tenn.
Doris Hassler, Crossville, Tenn.
Morris Hassler, Lenoir City, Tenn.
Terry Hassler, Crossville, Tenn.
Steve Hassler, Crossville, Tenn.
Marilyn E. Head, Kingston, Tenn.
J. Fred Heitman, Oak Ridge, Tenn.
Shirley A. Henich, Ten Mile, Tenn.
Charlie Hensley, Oak Ridge, Tenn.
Frank Hensley, Oak Ridge, Tenn.
Ted Hitchens, Crossville, Tenn.
Ron Higgs, Rockwood, Tenn.
Jim Hines, Rockwood, Tenn.
Roger A. Hinsdale, Spring City, Tenn.
Gregory Hogue, Atlanta, GA
Jane Howe, Oak Ridge, Tenn.
Chad Hulette, Loudon, Tenn.
Pat Hunsicher, Clinton, Tenn.
Yetta Jager, Knoxville, Tenn.
Pete James, Maryville, Tenn.
Amanda Johnson, Seymour, Tenn.
Dabeny Johnson, Oak Ridge, Tenn.
James S. Johnson, Jr., Oak Ridge, Tenn.
William J. Johnson, Lenoir City, Tenn.
Mike Jolley, Spring City, Tenn.
Emily Jones, Knoxville, Tenn.
Jan Jones, Jonesborough, Tenn.
Ken Jones, Decatur, Tenn.
Lenny Junkett, Lenoir City, Tenn.
Steve Kennel, Kingston, Tenn.
Cindy Kendrick, Knoxville, Tenn.
Graham Kimbrough, Meigs County, Tenn.
William Kirk, Ten Mile, Tenn.
Cheryl Kohlbuesir, Oak Ridge, Tenn.
Frank Kolski, Kingston, Tenn.

Marshall Koon, Kingston, Tenn.
Robert Kopala, Ten Mile, Tenn.
John Kueck, Knoxville, Tenn.
B. R. Ladd, Kingston, Tenn.
Clay and Nancy Landers, Kingston, Tenn.
Melissa M. Lange, Knoxville, Tenn.
Gerald Largen, Kingston, Tenn.
Jim La Rue, Kingston, Tenn.
Janice and Walter Laughrey, Spring City, Tenn.
James Matthew Ledford, Knoxville, Tenn.
Mark Leuox, Harriman, Tenn.
Eddie Lisi, Athens, Tenn.
JoAnne Logan, Knoxville, Tenn.
Charlie Lowery, Athens, Tenn.
Michael Lowrey, Flat Rock, Ala.
James Lummus, Knoxville, Tenn.
Bob Lundsford, Rockwood, Tenn.
Donna Lynch, Knoxville, Tenn.
William McAllister, Kingston, Tenn.
Joseph A. McCall, Niota, Tenn.
Laura McCall, Lynchburg, Tenn.
Michael McCall, Niota, Tenn.
James W. McCarter, Hixson, Tenn.
Wallace McClure, Jr., Knoxville, Tenn.
Barbara McCoin, Swan Pond, Tenn.
Michael McCollum, Knoxville, Tenn.
Faye McDonald, Oliver Springs, Tenn.
Jimmy McGinness, Chattanooga, Tenn.
Megan and Janet B. McKenzie, Decatur, Tenn.
James J. McNabb, Rockwood, Tenn.
Wayne McNeese, Spring City, Tenn.
Josh McManus, Rockwood, Tenn.
Dixie Mason, Kingston, Tenn.
Ed Mason, Kingston, Tenn.
Steve Mayo, Spring City, Tenn.
Charlie Mead, Rockwood, Tenn.
Darryl Meadows, Rockwood, Tenn.
Katherine and James Medlock, Knoxville, Tenn.
Darla Miller, Oak Ridge, Tenn.
Margaret Mills, Rockwood, Tenn.
Billy Minser, Knoxville, Tenn.
Ernestine L. Mitchell, Kingston, Tenn.
Martha Moneymaker, Clinton, Tenn.
Vanessa Morel, Knoxville, Tenn.
Roger Morris, Lebanon, Tenn.
Darrell and Lana Morken, Rockwood, Tenn.
Steve Moulton, Ten Mile, Tenn.
C. D. Mounger, Kingston, Tenn.
Catherine Murray, Johnson City, Tenn.
Dan Myers, Oak Ridge, Tenn.
Kelly Myers, Oak Ridge, Tenn.
Franklin V. Narbert, Ten Mile, Tenn.
Wolf Nargeli, Knoxville, Tenn.
Joan Nelson, Oak Ridge, Tenn.
Loren and Judith Nelson, Harriman, Tenn.
William A. Newcomb, Harriman, Tenn.
Tom Okulczyk, Rockwood, Tenn.
Gail Okulczyk, Rockwood, Tenn.
Robert Olszewski, Oliver Springs, Tenn.
Barbra Guettner Oody, Kingston, Tenn.
Earl Parker, Harriman, Tenn.
Diane Paxson, Bernville, Pa.
Joe Payne, New Tazewell, Tenn.
Mike Pazich, Kingston, Tenn.
Elizabeth K. Pease, Oliver Springs, Tenn.
George Peeler, Knoxville, Tenn.
Dana Peterka, Rockwood, Tenn.
Natalie Pheasant, Knoxville, Tenn.
Wendell L. Phillips, Spring City, Tenn.
James W. Pinkerton, Kingston, Tenn.
Jerry Poe, Spring City, Tenn.
Margaret Poole, Rockwood, Tenn.
Branden J. Ragland, Birchwood, Tenn.
Steve Randalph, Dayton, Tenn.
Rebecca Rayborn, Oliver Springs, Tenn.
David Reichle, Kingston, Tenn.
David Reister, Knoxville, Tenn.
Angela Ricketson, Rockwood, Tenn.
Axel C. Ringe, New Market, Tenn.
Everett Robertson, Dayton, Tenn.
Cliff Rodgers, Andersonville, Tenn.
Hira Roger, Knoxville, Tenn.
Lisa Rolik, Andover, Kans.
Nelson Ross, Jefferson City, Tenn.
Liane B. Russell, Oak Ridge, Tenn.
Martha Salk, Powell, Tenn.
Dawn Sagonias, Knoxville, Tenn.
Wayne H. Schacher, Clinton, Tenn.
Don Scruggs, Kingston, Tenn.
Julia H. Scruggs, Kingston, Tenn.
T. J. Selby, Crossville, Tenn.
Dinah L. Sexton, Knoxville, Tenn.
Fred Shanton, Powell, Tenn.

Iris D. Shelton, Rockwood, Tenn.
Kenneth Shepard, Kingston, Tenn.
Tom Sherrod, Kingston, Tenn.
Sarah Shinpock, Knoxville, Tenn.
Mark Shipley, Knoxville, Tenn.
William H. Skelton, Knoxville, Tenn.
Len Slack, Deer Lodge, Tenn.
Eric Slater, Kingston, Tenn.
Ellen Smith, Oak Ridge, Tenn.
Germaine Smith, Harriman, Tenn.
Alexander Solomon, Spring City, Tenn.
Linda Spencer, Spring City, Tenn.
Gargat G. Spore, Oak Ridge, Tenn.
Lisa Starbuck, Knoxville, Tenn.
Phil Starck, Louisville, Tenn.
Ed Staten, Spring City, Tenn.
Judy Staten, Spring City, Tenn.
Barry R. Stephens III, Nashville, Tenn.
Tena Stevens, Burlington, Kans.
David Stief, Kingston, Tenn.
John Sublett, Rockwood, Tenn.
Jack Suggs, Oak Ridge, Tenn.
Jim Talley, Spring City, Tenn.
JoAnn Thompson, Oak Ridge, Tenn.
Thom Thompson, Ten Mile, Tenn.
Robert M. Todd, Nashville, Tenn.
Dennis Tumlin, Dayton, Tenn.
Mark Tummons, Nashville, Tenn.
Karen Tustin, Kingston, Tenn.
Bob Van Hook, Kingston, Tenn.
Janet Vaughen, Knoxville, Tenn.
Victor C. Vaughen, Knoxville, Tenn.
Richard Vornehm, Knoxville, Tenn.
Raymond Walker, Dayton, Tenn.
Barbara A. Walton, Oak Ridge, Tenn.
Katie Warner, Maryville, Tenn.
Jamie Warren, Knoxville, Tenn.
David Watson, Knoxville, Tenn.
Melissa J. Weaver, Oak Ridge, Tenn.
Christopher Weisberg, Knoxville, Tenn.
William Wenzel, Bogertown, Pa.
Donna Whestbee, Oliver Springs, Tenn.
Dick Whiteman, Rockwood, Tenn.
Donald (Pete) Williams, Spring City, Tenn.
Ryan Wishart, Knoxville, Tenn.
Linda White, Kingston, Tenn.
Maxine Wiggins, Signal Mountain, Tenn.
W. F. Wiggins, Signal Mountain, Tenn.
Bill Wright, Harriman, Tenn.
Lynn and Paul Wright, Ten Mile, Tenn.
William Wright, Harriman, Tenn.
Jess Wynn, Wartburg, Tenn.
Janice R. Young, Johnson City, Tenn.
Ruth K. Young, Oak Ridge, Tenn.

CHAPTER 7

7. SUPPORTING INFORMATION

7.1. Literature Cited

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7.2. Glossary of Terms

100-year floodplain - The area inundated by the 1 percent annual chance (or 100-year) flood.

agricultural licensing - Some parcels or portions of parcels designated for other purposes or uses may also be suitable for interim agricultural licensing. These parcels have been identified using the criteria contained in TVA's agriculture instruction. Normal tenure for a TVA agricultural license is five years. Land with extreme erosion potential may not be licensed for agricultural use unless erosion and sediment controls, including the use of BMPs, can be successfully implemented. Further investigation and/or mitigation of adverse impacts to natural or cultural resources may be required prior to approval of license agreements.

benthic - Refers to the bottom of a stream, river, or reservoir.

controlled burn - A managed fire to remove vegetation for the benefit of silviculture or wildlife management.

cumulative impacts - Impacts which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions, regardless of what agency or person undertakes such actions (40 CFR 1508.7).

dam reservation - Lands generally maintained in a park-like setting by TVA to protect the integrity of the dam structure, hydroelectric facilities, and navigation lock. The reservation also provides for public visitor access to the TVA dam facilities and recreation opportunities, such as public boat access, bank fishing, camping, picnicking, etc.

direct impacts - Effects which are caused by the action and occur at the same time and place (40 CFR 1508.4).

dispersed recreation - Recreation of an informal nature such as hunting, hiking, biking, bird watching, photography, primitive camping, bank fishing, and picnicking, and etc that occur on TVA managed public land. These activities are not associated with developed facilities although some improvements may occur for access, heath and safety, or to protect the environment.

dissolved oxygen - The oxygen dissolved in water, necessary to sustain aquatic life. It is usually measured in milligrams per liter or parts per million.

drawdown - Area of reservoirs exposed between full summer pool and minimum winter pool levels during annual drawdown of the water level for flood control.

dredging - The removal of material from an underwater location, primarily for deepening harbors and waterways.

embayment - A bay or arm of the reservoir.

emergent wetland - Wetlands dominated by erect, rooted herbaceous plants, such as cattails and bulrushes.

endangered species - A species in danger of extinction throughout all or a significant portion of its range or territory. Endangered species recognized by the ESA or similar state legislation have special legal status for their protection and recovery.

floodplains - Any land area susceptible to inundation by water from any source by a flood of selected frequency. For purposes of the National Flood Insurance Program, the

floodplain, as a minimum, is that area subject to a 1 percent or greater chance of flooding (100-year flood) in any given year.

flowage easement tracts - Privately owned lakeshore properties where TVA has (1) the right to flood the land as part of its reservoir operations, (2) no rights for vegetation management, and (3) the authority to control structures, under Section 26a of the TVA Act.

fragmentation - The process of breaking up a large area of relatively uniform habitat into one or more smaller, disconnected areas.

hydrologic unit codes - Hydrologic unit codes (HUCs) are cataloging units assigned to each watershed by the U.S. Geological Survey for the purpose of assessment and management activities.

indirect impacts - Effects which are caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable (40 CFR 1508.4).

Important Bird Areas - The Important Bird Area Program is part of an international effort to identify the most critical bird habitat. TWRA has partnered with the National Audubon Society to compile a list of sites in Tennessee.

macroinvertebrates - Bottom-dwelling aquatic animals without vertebrates, such as mollusks and arthropods.

mainstream reservoirs - Impoundments created by dams constructed across the Tennessee River.

marginal strip - The narrow strip of land owned by TVA between the water's edge and the adjoining private property, on which the property owner may construct private water use facilities upon approval of plans by TVA.

maximum shoreline contour - An elevation typically 5 feet above the top of the gates of a TVA Dam. It is often the property boundary between TVA marginal strip property and adjoining private property.

National Ambient Air Quality Standards - Uniform, national air quality standards established by the USEPA that restrict ambient levels of certain pollutants to protect public health (primary standards) or public welfare (secondary standards). Standards have been set for ozone, carbon monoxide, particulates, sulfur dioxide, nitrogen, nitrogen dioxide, and lead.

nonattainment areas - Those areas of the U.S. that do not meet National Ambient Air Quality Standards as determined by measurements of air pollutant levels.

overbank - Refers to the reservoir water area outside the original river and stream channels; typically more shallow and preferred foraging areas for fishing birds and mammal species.

overstory - The tallest and dominant community of trees of a forest.

physiographic provinces - General divisions of land with each area having characteristic combinations of soil materials and topography.

plan tract - A numbered parcel of TVA fee-owned land that, prior to the plan, has had no long-term commitments affecting future land uses as assigned through the reservoir land planning process.

prime farmland - Generally regarded as the best land for farming, these areas are flat or gently rolling and are usually susceptible to little or no soil erosion. Prime farmland produces the most food, feed, fiber, forage, and oil seed crops with the least amount of fuel, fertilizer, and labor. It combines favorable soil quality, growing season, and moisture supply and, under careful management, can be farmed continuously and at a high level of productivity without degrading either the environment or the resource base. Prime farmland does not include land already in or committed to urban development, roads, or water storage.

riparian zone - An area of land that has vegetation or physical characteristics reflective of permanent water influence. Typically this is a streamside zone or shoreline edge.

riprap - Stones placed along the shoreline for bank stabilization and other purposes.

riparian - The communities of plants and animals that occur within the influence of a stream, river, or body of water.

riverine - Having characteristics similar to a river.

row crops - Agricultural crops, such as corn, wheat, beans, cotton, etc., which are most efficiently grown in large quantities by planting and cultivating in lines or rows.

Section 26a review process - Section 26a of the TVA Act requires TVA review and approval of plans for obstructions, such as docks, fills, bridges, outfalls, water intakes, and riprap before they are constructed across, in or along the Tennessee River and its tributaries. Applications for this approval are coordinated appropriately with TVA programs and USACE. USACE issues a joint public notice for those applications that are not covered by a USACE nationwide, general, or regional permit. The appropriate state water pollution control agency must also certify that the effluent from outfalls meets the applicable water quality standards.

scrub-shrub - Woody vegetation less than about 20 feet tall. Species include true shrubs, young trees, and trees or shrubs that are small or stunted because of environmental conditions.

Shipper savings - A standard metric for assessing the economic impact of inland navigation as mandated by the Office of Management and Budget. The dollar amount is equal to the cost of barge transportation subtracted from the next least costly mode of transportation, typically truck or rail.

shoreline - The line where the water of a TVA reservoir meets the shore when the water level is at the normal summer pool elevation.

Shoreline Management Zone - A barrier of permanent vegetation established or left undisturbed around a reservoir in order to buffer the adverse impacts resulting from development and increased human activity.

significant cultural resources - Some of the parcel descriptions state that “the parcel contains significant cultural resources” or that “cultural resource considerations may affect development of the parcel.” However, many of the parcel descriptions contain no reference to archaeological or other cultural resources. The lack of such references within a parcel description does not necessarily indicate that significant cultural resources do not exist. The use of any parcel for developmental purposes may require additional archaeological testing or mitigation of adverse impact to archaeological sites. The costs of required testing or mitigation would be the responsibility of the developer.

stratification - The seasonal layering of water within a reservoir due to differences in temperature or chemical characteristics of the layers.

substrates - The base or material to which a plant is attached and from which it receives nutrients.

sufferance agreement - The recordable documents used to allow unauthorized and impermissible structures encroaching on TVA land to remain at their present location, subject to specific terms and conditions, or until such time they are removed or destroyed.

summer pool elevation - The normal upper level to which the reservoirs may be filled. Where storage space is available above this level, additional filling may be made as needed for flood control.

threatened species - A species threatened with extinction throughout all or a significant portion of its range or territory. Threatened species recognized by the ESA or similar state legislation have special legal status for their protection and recovery.

tributary reservoirs - Impoundments created by dams constructed across streams and rivers that eventually flow into the Tennessee River.

turbidity - All the organic and inorganic living and nonliving materials suspended in a water column. Higher levels of turbidity affect light penetration and typically decrease productivity of water bodies.

TVARAM - TVA Rapid Assessment Method, a version of the Ohio Rapid Assessment Method designed specifically for the TVA region.

understory - The least dominant community of trees of a forest, consisting of shade tolerant species.

upland - The higher parts of a region, not closely associated with streams or lakes.

wetlands - As defined in *TVA Environmental Review Procedures*, “Wetlands are those areas inundated by surface or groundwater with a frequency sufficient to support and under normal circumstances do or would support a prevalence of vegetation or aquatic life that requires saturated or seasonably saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas, such as sloughs, potholes, wet meadows, mud flats, and natural ponds.

Wildlife Management Area (WMA) - Land and/or water areas designated by state wildlife agencies, such as the Tennessee Wildlife Resources Agency, for the protection and management of wildlife. These areas typically have specific hunting and trapping regulations as well as rules regarding appropriate uses of these areas by the public.

Appendix A – TVA Land Policy

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TVA Land Policy

Policy Governing the Tennessee Valley Authority's Retention, Disposal and Planning of Interests in Real Property

The Tennessee Valley Authority (TVA) has been charged by Congress with improving navigation, controlling floods, providing for the proper use of marginal lands, providing for industrial development and providing power at rates as low as feasible, all for the general purpose of fostering the physical, economic, and social development of the Tennessee Valley region. The lands which TVA stewards in the name of the United States are some of the most important resources of the region. They have provided the foundation for the great dams and reservoirs that protect the region from flooding and secure for its residents the benefits of a navigable waterway and low-cost hydro-electricity. TVA's lands are the sites for its power generating system and the arteries for delivering power to those that need it. Many of the region's parks, recreation areas, and wildlife refuges that are so important for the region's quality of life grew up from lands that TVA made available. And TVA's lands often have been the catalyst for public and private economic development activities that support all of these activities.

TVA originally acquired approximately 1.3 million acres of land in the Tennessee Valley. The construction and operation of the reservoir system inundates approximately 470,000 acres with water. TVA has already transferred or sold approximately 508,000 acres, the majority of which was transferred to other federal and state agencies for public uses. TVA currently owns approximately 293,000 acres which continue to be managed pursuant to the TVA Act.

As stewards of this critically important resource, TVA has a duty to manage its lands wisely for present and future generations. Accordingly, it is TVA's policy to manage its lands to protect the integrated operation of the TVA reservoir and power systems, to provide for appropriate public use and enjoyment of the reservoir system, and to provide for continuing economic growth in the Valley. Recognizing that historical land transfers have contributed substantially to meeting multipurpose objectives, it further is TVA's policy to preserve reservoir lands remaining under its control in public ownership except in those rare instances where the benefits to the public will be so significant that transferring lands from TVA control to private ownership or another public entity is justified. This policy is explicated below.

Reservoir Properties

Land Planning

TVA shall continue to develop reservoir land management plans for its reservoir properties with substantial public input and with approval of the TVA Board of Directors. The land use allocations will be determined with consideration of the social, economic and environmental conditions around the reservoir. TVA shall consider changing a land use designation outside of the normal planning process only for water-access purposes

for industrial or commercial recreation operations on privately owned backlying land or to implement TVA's Shoreline Management Policy. Reservoir properties that have become fragmented from the reservoir will be evaluated to determine their public benefit. If it is determined by TVA's Chief Executive Officer that these fragmented properties have little or no public benefit they shall be declared surplus and sold at public auction to the highest bidder in the same manner as surplus power or commercial properties.

Residential Use

TVA shall not allocate lands or landrights for residential use or dispose of reservoir properties for residential use.

Retail or Other Non-industrial Commercial Use

TVA shall not allocate lands for retail or other non-industrial commercial use or dispose of reservoir properties for such use.

Economic Development

TVA shall consider disposing of reservoir lands or land rights for industrial purposes or other businesses if the TVA property is located in an existing industrial park, or is designated for such purposes in a current reservoir land management plan and verified as suitable for such use by RSO&E and ED staff in a property survey. The TVA Board directs staff to complete this survey within six months of the approval of this policy. The TVA Board recognizes that property with water access, for either navigation or water supply, is a limited resource in the Valley and has preference for businesses that require water access. Future reservoir land management plans will consider industrial development opportunities as land allocations are made. TVA shall consider disposing of non-waterfront reservoir properties in industrial parks for any purpose permitted by the industrial park covenants. TVA shall not allocate lands or landrights for retail use or dispose of reservoir land or landrights for such use.

Recreation

TVA shall consider leasing or granting limited easements over lands for the development of commercial recreation facilities or public recreation purposes if the property is so designated in a reservoir land management plan and a survey conducted by RSO&E determines that the site remains suitable for recreational uses and a continued need exists for such use. The TVA Board directs staff to complete this survey within six months of the approval of this policy. Commercial recreation is defined as recreation with facilities that are provided for a fee to the public intending to produce a profit for the owner/operator. Public recreation is defined as recreation on publicly owned land with facilities developed by a public agency (or their concessionaire) and provides amenities open to the general public.

Commercial Recreation

TVA leases or easements for commercial recreation purposes shall limit the use primarily to water-based recreation designed to enhance the recreation potential of the natural resources of the river and be a stimulus for regional economic development. TVA leases or easements for commercial recreation purposes will contain restrictions against

residential use, and no long term accommodations or individually owned units will be permitted.

Public Recreation

TVA leases or easements for public recreation purposes will contain restrictions against residential use, cabins, or other overnight accommodations (other than campgrounds) except if a recreation area is owned by a State or State agency and operated as a component of a State Park system in which case cabins and other overnight accommodations will be permitted.

Deed Restrictions over Private Lands

The TVA Board recognizes that much of TVA's lands were transferred upon specific agreement among the parties to conduct activities that would enhance recreation opportunities in the Valley. TVA will continue to consider the release or modification of flowage rights no longer necessary to TVA to operate the river system. TVA will consider the removal or modification of deed provisions to facilitate industrial development. TVA will also consider the removal or modification of deed restrictions that result in the public having recreational access to the tract, or if the tract is already open to the public, maintains that access. TVA will not remove or modify other deed restrictions for the purpose of facilitating residential development. To the extent permitted by the language of deed or other transfer or contractual instrument, TVA will administer its interest in former TVA land to achieve the goals of this policy.

Operational Uses of TVA Properties

TVA shall continue to utilize reservoir properties to meet the operational needs of the agency and its distributors as well as provide for public infrastructure needs such as roads, water and sewer lines, and other utilities, but will only consider requests for private infrastructure where TVA determines no other practicable alternative exists. Nothing in this policy is intended to prevent the disposal of tracts of land upon the recommendation of the General Counsel to settle claims or litigation or to address issues of contamination or potential contamination. In addition, TVA will continue to work with development agencies (and other partners) throughout the Valley to implement previously executed agreements.

Power & Commercial Properties

TVA's nonreservoir property—primarily power and commercial properties and mineral holdings--shall continue to be managed as power assets. The TVA Board directs staff to undertake a review of TVA mineral holdings for later policy consideration. Retention and disposal decisions will be primarily based on business considerations consistent with the TVA Act and other applicable requirements. TVA may enter into special arrangements with the distributors of TVA power. In addition, TVA may relinquish transmission line rights, if they are determined to be unnecessary for present or future operations and the current owner agrees to pay the enhanced fair market value of the property. In all other instances, TVA shall emphasize sales that generate the maximum competition among bidders at public auction and where possible shall not include use restrictions other than those designed to protect TVA's program interests or to meet legal or environmental requirements.

Appendix B – Planned Land Information

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Table B-1. Comparison of Alternative A (No Action) to Alternative B (Modified Development and Recreation) and Alternative C (Modified Conservation and Recreation) by TVA Parcel (shaded areas indicate lands proposed for change)

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
1	1	C	10.5	6	10.5	2	2	TVA-managed boat ramp and parking; provides access to Watts Bar tailwater area.
2	4	C	23.8	2	23.8	2	2	Operation and maintenance of Watts Bar Dam/Hydro facilities and for public recreation use.
3	4	C	280.4	2	280.4	2	2	Operation and maintenance of Watts Bar Dam/Hydro facilities and for public recreation use/wildlife habitat development.
4	5	C	145.6	2	145.6	2	2	Operation and maintenance of Watts Bar Dam/Hydro facilities and for public recreation use.
5	Unplanned	C	249.0	6	249.0	6	6	Easement to Meigs County for public recreation; Meigs County Park.
6	Unplanned	C	4.2	7	4.2	7	7	Fronts Lots O' Lake Subdivision.
7	41, 42, 43	U	728.7	4	728.7	4	4	Large peninsula includes adjacent islands including Goat Island and contains diverse upland forest cover types and riparian zones creating excellent wildlife habitat; one of the most popular land parcels on Watts Bar for hunting.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
8	44	C	141.0	3	141.0	3	3	Management of Fooshee Small Wild Area and trail; this parcel offers outstanding scenic views.
9	45	U	122.5	6	122.5	6	4	This parcel has potential for expansion of Fooshee Pass Recreation Area.
10	46	C	78.4	6	78.4	6	4	Licensed for commercial recreation (campground); Fooshee Pass Recreation Area.
11	Unplanned	C	58.6	7	58.6	7	7	Fronts C. F. Scott, Goose Point, Georgia Point, and Lakeview subdivisions.
12-01	Unplanned	C	1.6	6	1.6	6	6	Fronts land transferred to the State of Tenn. XTWBR-1; under license to TWRA for public recreation.
12-02	Unplanned	C	3.0	6	3.0	6	6	Fronts land transferred to the State of Tenn. XTWBR-2; under license to TWRA for public recreation.
12-03	Unplanned	C	1.7	6	1.7	6	6	Fronts land transferred to the State of Tenn. XTWBR-3; under license to TWRA for public recreation.
12-04	Unplanned	C	4.5	6	4.5	6	6	Fronts land transferred to the State of Tenn. XTWBR-4; under license to TWRA for public recreation. Also known as the 'Wide Spot.'

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
12-06	Unplanned	C	5.1	6	5.1	6	6	Fronts land transferred to the State of Tenn. XTWBR-6; under license to TWRA for public recreation. Also known as the 'Hog Pen.'
12-08	Unplanned	C	3.4	6	3.4	6	6	Fronts land transferred to the State of Tenn. XTWBR-8; under license to TWRA for public recreation.
12-13	Unplanned	C	2.4	6	2.4	6	6	Fronts land transferred to the State of Tenn. XTWBR-13; under license to TWRA for public recreation.
12-16	Unplanned	C	2.9	6	2.9	6	6	Fronts land transferred to the State of Tenn. XTWBR-16; under license to TWRA for public recreation.
12-17	Unplanned	C	2.3	6	2.3	6	6	Fronts land transferred to the State of Tenn. XTWBR-17; under license to TWRA for public recreation. This site currently does not have any improvements.
12-18	Unplanned	C	2.1	6	2.1	6	6	Fronts land transferred to the State of Tenn. XTWBR-18; under license to TWRA for public recreation. Facilities include gravel parking lot and launching ramp

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
12-20	Unplanned	C	5.6	6	5.6	6	6	Fronts land transferred to the State of Tenn. XTWBR-20; under license to TWRA for public recreation. Contains TWRA launching ramp and courtesy dock.
12-22	Unplanned	C	4.3	6	4.3	6	6	Fronts land transferred to the State of Tenn. XTWBR-22; under license to TWRA for public recreation.
12-23	Unplanned	C	3.7	6	3.7	6	6	Fronts land transferred to the State of Tenn. XTWBR-23; under license to TWRA for public recreation.
12-24	Unplanned	C	3.3	6	3.3	6	6	Fronts land transferred to the State of Tenn. XTWBR-24; under license to TWRA for public recreation.
12-26	Unplanned	C	1.5	6	1.5	6	6	Fronts land transferred to the State of Tenn. XTWBR-26; under License to TWRA for public recreation. Trailhead for Whites Creek Small Wild Area trail.
12-27	Unplanned	C	2.3	6	2.3	6	6	Fronts land transferred to the State of Tenn. XTWBR-27; under license to TWRA for public recreation. This parcel currently does not have any improvements.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
12-29	Unplanned	C	4.9	6	4.9	6	6	Fronts land transferred to the State of Tenn. XTWBR-29; under license to TWRA for public recreation. Facilities include a gravel parking lot and launching ramp.
12-30	Unplanned	C	5.2	6	5.2	6	6	Fronts land transferred to the State of Tenn. XTWBR-30; under license to TWRA for public recreation.
12-31	Unplanned	C	1.4	6	1.4	6	6	Fronts land transferred to the State of Tenn. XTWBR-31; under license to TWRA for public recreation.
12-32	Unplanned	C	2.9	6	2.9	6	6	Fronts land transferred to the State of Tenn. XTWBR-32; under license to TWRA for public recreation. Launching ramp on site.
12-34	Unplanned	C	4.1	6	4.1	6	6	Fronts land transferred to the State of Tenn. XTWBR-34; under license to TWRA for public recreation. Facilities include gravel parking lot and a concrete launching ramp.
12-35	Unplanned	C	3.4	6	3.4	6	6	Fronts land transferred to the State of Tenn. XTWBR-35; under license to TWRA for public recreation. This parcel currently does not have any improvements.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
12-36	Unplanned	C	3.9	6	3.9	6	6	Fronts land transferred to the State of Tenn. XTWBR-36; under license to TWRA for public recreation. Facilities include: gravel launching ramp and gravel parking lot.
12-37	Unplanned	C	0.8	6	0.8	6	6	Fronts land transferred to the State of Tenn. XTWBR-37; under license to TWRA for public recreation. This small area is typically used as a public fishing area.
12-38	Unplanned	C	2.2	6	2.2	6	6	Fronts land transferred to the State of Tenn. XTWBR-38; under license to TWRA for public recreation.
12-39	Unplanned	C	6.7	6	6.7	6	6	Fronts land transferred to the State of Tenn. XTWBR-39; under license to TWRA for public recreation.
12-41	Unplanned	C	2.0	6	2.0	6	6	Fronts land transferred to the State of Tenn. XTWBR-41; under license to TWRA for public recreation.
12-43	Unplanned	C	0.8	6	0.8	6	6	Fronts land transferred to the State of Tenn. XTWBR-43; under license to TWRA for public recreation. Facilities include gravel parking area and concrete launching ramp.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
12-44	Unplanned	C	2.7	6	2.7	6	6	Fronts land transferred to the State of Tenn. XTWBR-44; under license to TWRA for public recreation. Facilities include gravel launch ramp and parking area.
12-45	Unplanned	C	1.6	6	1.6	6	6	Fronts land transferred to the State of Tenn. XTWBR-45; under license to TWRA for public recreation. This area is not currently used for public access. Affected by the December 2009 ash pond spill at KIF.
12-47	Unplanned	C	4.5	6	4.5	6	6	Fronts land transferred to the State of Tenn. XTWBR-47; under license to TWRA for public recreation. It is not currently used as a public access area.
12-48	Unplanned	C	10.2	6	10.2	6	6	Fronts land transferred to the State of Tenn. XTWBR-48; under license to TWRA for public recreation.
12-49	Unplanned	C	2.8	6	2.8	6	6	Fronts land transferred to the State of Tenn. XTWBR-49; under license to TWRA for public recreation.
12-50	Unplanned	C	8.4	6	8.4	6	6	Fronts land transferred to the State of Tenn. XTWBR-50; under license to TWRA for public recreation.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
12-51	Unplanned	C	1.2	6	1.2	6	6	Fronts land transferred to the State of Tenn. XTWBR-51; under license to TWRA for public recreation. Affected by the December 2009 ash pond spill at KIF.
12-53	Unplanned	C	6.1	6	6.1	6	6	Fronts land transferred to the State of Tenn. XTWBR-53; under license to TWRA for public recreation.
12-54	Unplanned	C	1.5	6	1.5	6	6	Fronts land transferred to the State of Tenn. XTWBR-54; under license to TWRA for public recreation. Access to this site is limited.
12-55	Unplanned	C	1.4	6	1.4	6	6	Fronts land transferred to the State of Tenn. XTWBR-55; under license to TWRA for public recreation.
12-56	Unplanned	C	2.6	6	2.6	6	6	Fronts land transferred to the State of Tenn. XTWBR-56; under license to TWRA for public recreation. Land below 745-foot contour is under land use permit to TWRA to regulate hunting and trapping.
12-57	Unplanned	C	1.4	6	1.4	6	6	Fronts land transferred to the State of Tenn. XTWBR-57; under license to TWRA for public recreation.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
12-59	Unplanned	C	3.8	6	3.8	6	6	Fronts land transferred to the State of Tenn. XTWBR-59; under license to TWRA for public recreation. Land below 745-foot contour is under land use permit to TWRA to regulate hunting and trapping.
12-60	Unplanned	C	1.7	6	1.7	6	6	Fronts land transferred to the State of Tenn. XTWBR-60; under license to TWRA for public recreation. Parcel has gravel launch ramp and parking area. Land below 745-foot contour is under land use permit to TWRA to regulate hunting and trapping.
12-62	Unplanned	C	1.6	6	1.6	6	6	Fronts land transferred to the State of Tenn. XTWBR-62; under license to TWRA for public recreation. Facilities include a launching ramp popular during the summer months.
12-63	Unplanned	C	3.2	6	3.2	6	6	Fronts land transferred to the State of Tenn. XTWBR-63; under licenses to TWRA for public recreation.
12-66	Unplanned	C	3.8	6	3.8	6	6	Fronts land transferred to the State of Tenn. XTWBR-66; under license to TWRA for public recreation. Facilities include a small parking area and concrete ramp.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
12-68	Unplanned	C	6.3	6	6.3	6	6	Fronts land transferred to the State of Tenn. XTWBR-68; under license to TWRA for public recreation. Facility includes concrete launching ramp, parking area, and courtesy pier.
12-69	Unplanned	C	5.2	6	5.2	6	6	Fronts land transferred to the State of Tenn. XTWBR-69; under license to TWRA for public recreation.
12-70	Unplanned	C	4.4	6	4.4	6	6	Fronts land transferred to the State of Tenn. XTWBR-70; under license to TWRA for public recreation. Closed to vehicular access.
13	Unplanned	C	5.2	6	5.2	6	6	Licensed for commercial recreation; used as part of Cherokee Point Campground. Backlying land may have deeded access rights across parcel.
14	Unplanned	C	1.8	6	1.8	6	6	Licensed to Watts Bar Properties, LLC, for Commercial Recreation (Sam's Boat Dock). Backlying land may have deeded access rights across parcel.
15	Unplanned	C	58.6	7	54.5	7	7	Fronts Ewing and Meigs subdivisions.
15a	Unplanned	C			4.1	3	3	Protection of significant forested wetlands.
16	Unplanned	C	28.2	7	20.8	7	7	Fronts Pledge Point

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
								Subdivision.
16a	Unplanned	C			3.0	3	3	Protection of significant bottomland hardwood forested wetland.
17	55	C	1.4	3	2.6	3	3	Protection and management of cultural resources.
17a	Unplanned	U			3.2	4	4	Consists of sweetgum, yellow poplar, elm, white and red oaks and Eastern red cedar.
18	Unplanned	C	10.2	6	10.2	6	6	Fronts land sold for commercial recreation; under easement to Euchee Marina for commercial recreation.
19	56	C	2.1	2	2.1	2	2	River Road right-of-way.
20	57	C	3.6	6	3.6	6	6	Licensed for commercial recreation (campground); Lakeside Properties, Inc. (Euchee Marina).
21	Unplanned	C	11.2	7	11.2	7	7	Fronts Meigs Subdivision.
22	58	C	58.1	6	58.1	6	6	Licensed for commercial recreation; Hornsby Hollow Campground. TVA has issued a request for proposal for long-term lease agreement.
23	Unplanned	C	17.4	6	17.4	6	6	Term easement for Recreation; Athens, Tenn., Board of Education
24	59	C	83.9	3	83.9	3	3	Protection and management of cultural resources.
25	Unplanned	C	90.8	7	90.8	7	7	Fronts Red Cloud Cottage and Red Cloud Shores-Section III subdivisions.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
26	61	C	7.6	3	7.6	3	3	Protection and management of cultural resources.
27	Unplanned	C	1.8	6	1.8	6	6	Licensed for commercial recreation; Campground on the Lakeshore. Backlying land may have deeded access rights across parcel.
28	Unplanned	C	36.8	7	36.8	7	7	Fronts sections of Red Cloud Subdivision.
29	Unplanned	C	2.3	6	2.3	6	6	Licensed for commercial recreation; The Landing, Inc. Backlying land may have deeded access rights across parcel.
30	63	U	7.6	4	7.6	4	4	Consists of upland hardwoods with fair to good riparian habitat; provides habitat for typical upland species.
31	64	U	6.7	4	6.7	4	4	Located in Pearl Harbor, this upland hardwood area provides important buffer between the reservoir and back-lying development.
32	Unplanned	C	18.6	7	18.6	7	7	Fronts Pearl Harbor embayment area.
33	65, 66	U	13.0	4	13.0	4	4	Consists of high-quality upland hardwood and exposed bluff areas; a small number of rare plants are found on a small portion of tract.
34	Unplanned	C	25.3	7	25.3	7	7	Fronts Indian Shadows Subdivision.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
35	67	U	18.2	4	18.2	4	4	Peninsular area is commonly used by various waterfowl / wetland wildlife species including nesting ospreys; under land use permit to TWRA for wildlife management.
36	Unplanned	C	54.3	7	54.3	7	7	Fronts Half Moon Shores Subdivision and a portion of Indian Shadows Subdivision. Significant wetlands on a portion of this parcel that may affect what can be permitted.
37	68, Unplanned	C	2.9	6	2.9	6	6	Licensed for commercial recreation; Blue Springs. Backlying land may have deeded access rights across parcel.
38	Unplanned	C	35.5	7	35.5	7	7	Fronts Williams and Bayside subdivisions.
39	68	U	7.5	4	7.5	4	4	Peninsular area with mixed hardwoods and pines; provides habitat for a variety of wildlife species and is suitable to support nesting herons and ospreys.
40	69, 70, 71	U	175.5	4	175.5	4	4	Highly important visual resources with predominantly old-age upland hardwoods on the largest islands; provides important habitat for bald eagles, ospreys, wading birds and numerous upland wildlife species.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
41	Unplanned	C	2.3	6	2.3	6	6	Licensed for commercial recreation; BBH Bayside Marina & Resort, LLC. Backlying land may have deeded access rights across parcel.
42	72	C	1.0	6	1.0	6	6	Licensed for commercial recreation (marina); Bayside Marina. Backlying land may have deeded access rights across parcel.
43	73	C	45.6	7	45.6	7	7	Fronts Irwinton Shores and Bayview subdivisions.
44	Unplanned	U	23.1	4	23.1	4	4	Consists of three distinct habitat types including mixed pine, upland/cove hardwood, and rocky bluff; provides good habitat for a variety of riparian wildlife species.
45	Unplanned	C	32.5	6	32.5	6	6	Fronts land sold for recreation (campground); Knoxville Presbytery of the Presbyterian Church (Camp John Knox).

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
46	91	C	784.9	3	784.9	3	3	Protect and manage visually significant Thief Neck Island, which contains cultural resources and sensitive wildlife species, in particular wintering bald eagles; a portion of the island is under land use permit to TWRA for wildlife management and is actively managed for quota white-tailed deer hunts.
47	93	C	21.8	3	21.8	3	3	Protection and management of cultural resources.
48	98	C	66.0	7	66.0	7	7	Fronts Shorewood, Woodland Cove, Bluff Shores, and Calvin Cannon subdivisions.
49	94	U	2.2	4	2.2	4	4	Divided into two segments and provides limited riparian habitat.
50	95	C	20.1	3	20.1	3	3	Protection and management of wetlands and cultural resources; includes multiple islands.
51	96A	U	42.2	4	42.2	4	4	Consists of multiple habitat types from upland hardwoods to scrub/shrub and emergent shoreline fringe wetlands with good to fair riparian condition; portion of area under active agricultural license.
52	96B	C	12.4	7	12.4	7	7	Fronts Robert Beard and Hensley Point subdivisions.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
53	98	C	45.4	7	45.4	7	7	Fronts Holiday Hills and Garlington Point subdivisions.
54	97	U	21.8	4	21.8	4	4	Provides a variety of habitat types from bottomland/riparian forest to shoreline wetland fringe; used by a variety of waterfowl and wetland wildlife species; includes two islands and one peninsula.
55	99A	U	10.0	4	10.0	4	4	Heavily disturbed riparian zone provides limited wildlife habitat and public use opportunities.
56	99B	C	61.7	7	61.7	7	7	Narrow strip of TVA land fronting portions of Lake Shadow and Lake Harbor subdivisions. Docks can be considered on the downstream portion of this property between TVA Markers 27-4 and 27-41.
57	100	C	8.1	3	8.1	3	3	Protection and management of cultural resources.
58	101	U	9.2	4	9.2	4	4	Contains riparian and fringe wetland habitat that is in fair condition due to on-site vegetation disturbance.
59	Unplanned	C	35.0	7	35.0	7	7	Fronts Idle Oaks Subdivision.
60	113A	U	1.5	4	1.5	4	4	Very small area provides limited upland hardwood forest and habitat for upland species.
61	113B, Unplanned	C	31.2	7	31.2	7	7	Fronts Tanglewood and Anderson Point subdivisions.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
62	Unplanned	U	4.9	4	4.9	4	4	Consists of bottomland hardwoods and fringe wetlands; disturbed riparian zone provides limited wildlife habitat.
63	114B; Unplanned	C	45.7	7	46.8	7	7	Fronts Ross Estates and Stenberg subdivisions.
64	114A	U	1.1	4				Combined with Parcel 63
65	115	C	10.4	3	10.4	3	3	Managed as Marney Bluff Habitat Protection Area; provides protection for rare plant population and a buffer for active bald eagle nest on adjoining private property.
66	Unplanned	C	28.7	7	28.7	7	7	Fronts Lakeview Home Sites Subdivision.
67	116	U	4.0	4	4.0	4	4	Disturbed riparian zone provides limited habitat and biodiversity.
68	117	C	24.3	6	24.3	6	6	Licensed for commercial recreation; Southwest Point Golf Course.
69	118	C	4.2	3	4.2	3	3	Island; provides visual buffer for cultural resources. Provides high-quality shoreline fringe wetlands and potential nesting substrate for wading/water birds and ospreys.
70	Unplanned	U	4.9	4	3.6	4	4	Webster Bluff; provides high-quality riparian habitat for a variety of wetland and upland wildlife species and supports a small, rare plant population in one location.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
70a	Unplanned	C			1.3	2	2	Navigation safety landing.
71	122; Unplanned	C	14.5	7	14.5	7	7	Requests for private water use facilities will be considered at this location.
72	123, 124	C	113.2	4	113.2	4	4	Contains a diversity of high-quality habitat types for a variety of wildlife species on two islands and a mainland segment; a portion of this parcel is under land use permit to TWRA for wildlife management purposes.
73	Unplanned	C	27.1	7	27.1	7	7	Fronts Henley Property, Angler's Cove, and Island Grove subdivisions.
74	125, 126	C	77.7	6	77.7	6	6	Under license for commercial recreation; Riley Creek Recreation Area.
75	121	C	15.4	3	15.4	3	3	Riley Creek islands; managed in conjunction with TWRA for protection of high-quality wetlands and wildlife habitat. Islands provide nesting substrate for wading/water birds and ospreys.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
76	126	U	29.9	4	29.9	4	4	Site contains a quality mixture of upland hardwood and mixed pine forest with the adjoining private land being managed intensively for wildlife and forest resources; area receives substantial use by white-tailed deer hunters.
77	Unplanned	C	10.7	7	10.7	7	7	Requests for private water use facilities will be considered at this location. Land below 745-foot contour is under land use permit to TWRA to regulate hunting and trapping.
78	127	C	82.6	3	82.6	3	3	Long Island; managed by TWRA as part of Watts Bar Lake Wildlife Management Area and receives substantial hunting use; shallow water areas with artificial nesting structures and islands support significant numbers of nesting ospreys, herons, and other waterfowl use.
79	Unplanned	U	3.8	4	3.8	4	4	Narrow shoreline strip contains upland hardwood riparian habitat that provides buffer for a new bald eagle nest on adjoining private property; land below 745-foot contour is under land use permit to TWRA to regulate hunting and trapping.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
80	128	U	14.9	4	14.9	4	4	Parcel contains multiple habitat types and will be managed for wildlife in cooperation with adjoining landowner and TWRA; land below 745-foot contour is under land use permit to TWRA to regulate hunting and trapping.
81	Unplanned	C	25.6	7	25.6	7	7	Fronts Laurel Creek Woods subdivisions and church group camp/conference center. Land below 745-foot contour is under land use permit to TWRA to regulate hunting and trapping.
82	129 & Unplanned	U	37.2	4	37.2	4	4	Located in upper Stamp Creek; this area contains high-quality bottomland hardwoods, fringe wetlands and upland cove-type hardwoods with rock outcrops; land below 745-foot contour is under land use permit to TWRA to regulate hunting and trapping.
83	Unplanned	C	19.0	7	19.0	7	7	Fronts Charles H. Halcomb Subdivision. Land below 745-foot contour is under land use permit to TWRA to regulate hunting and trapping.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
84	130	U	1.6	4	1.6	4	4	Former TWRA access site reconveyed to TVA and provides limited habitat for wildlife; receives moderate public use with the land below 745-foot contour under land use permit to TWRA to regulate hunting and trapping.
85	133	C	4.4	2	4.4	2	2	Navigation safety harbor. Land below 745-foot contour is under land use permit to TWRA to regulate hunting and trapping.
86	133	C	0.7	6	0.7	6	6	Parcel used for commercial recreation; Whitestone Country Inn. Land below 745-foot contour is under land use permit to TWRA to regulate hunting and trapping.
87	133	U	10.6	4	10.6	4	4	Bluff-type area adjacent to Whitestone Country Inn provides wildlife habitat and observation opportunities; land below 745-foot contour is under land use permit to TWRA to regulate hunting and trapping.
88	132, 133B	C	647.7	3	647.7	3	3	Managed by TWRA and TVA as Paint Rock Wildlife Refuge to protect sensitive wildlife resources and significant cultural resources; parcel includes Huffine Island and the general areas support numerous nesting ospreys and wading birds with bald eagles

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
								regularly nesting immediately adjacent upstream on private property.
89	134	U	31.1	4	35.0	4	4	Site contains mixed pine and upland hardwood riparian forest types with substantial shoreline erosion occurring in places; livestock grazing minimizes existing habitat quality.
90	Unplanned	C	5.3	4	1.4	2	2	Navigation Safety Harbor.
91	136	C	16.7	3	11.9	3	3	Management and protection of Marble Bluff Habitat Protection Area, which contains critical habitat for rare plants.
92	137A	U	33.9	4	34.9	4	4	Sizable riparian zone predominantly located in Polecat Creek contains good to fair habitat of a mixture of upland hardwood/cove forest, shoreline fringe wetlands, and open/early successional lands.
93	137B	C	10.4	3	10.4	3	3	Management and protection of high-quality wetlands for wildlife habitat and water quality improvement functions; extensive beaver activity and ponds.
94	138	C	9.2	3	11.2	3	3	Management and protection of Polecat Creek Slopes Habitat Protection Area. which contains critical habitat for rare plants and cultural resources.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
95	140; Unplanned	C	16.0	7	16.0	7	7	Fronts Lakeshore Wright Subdivision.
96	139	U	9.6	4	11.4	4	4	Consists of a variety of riparian habitat types and provides streamside protection functions.
97	134, 143, 153, 154, 156	C	39.1	3	39.1	3	3	Protection and management of bottomland hardwoods, significant wetlands and cultural resources; provides important island habitat for numerous wetland wildlife species including nesting herons and ospreys and includes all islands from TRMs 576-598.
98	141, 142	U	9.4	6	9.4	4	4	Fronts Tennessee National Golf Course.
99	155	C	10.2	6	10.2	6	6	Easement for recreation to the City of Loudon (XTWBR-143RE); Steekee Creek Park.
100	151, 152	U	11.2	4	11.2	4	4	Consists of very narrow riparian forest and good quality shoreline fringe wetlands; serious erosion is occurring in some locations.
101	150	C	21.5	3	21.5	3	3	Management and protection of high-quality forested, scrub/shrub and emergent wetlands, and cultural resources.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
102	146, 149, 145A	C	53.3	7	53.3	7	7	Fronts Lake-A-Wanna subdivisions. Significant wetlands are located on a portion of this parcel, which may affect what is permittable.
103	148B	C	14.9	3	14.9	3	3	Protection and management of significant forested and scrub/shrub wetlands in upper Hines Creek.
104	148A	U	7.2	4	7.2	4	4	Parcel consists of narrow riparian zone with limited management and public use opportunities.
105	147	U	1.8	4	1.8	4	4	Parcel provides informal, roadside public access opportunities with a small, gravel boat ramp.
106	145B	U	11.7	4	11.7	4	4	Site contains good to fair riparian vegetation for wildlife habitat and provides water quality improvement functions.
107	Unplanned	C	19.7	7	19.7	7	7	Fronts Dogwood Shores Subdivision.
108	144	U	21.9	4	21.9	4	4	Contains very high-quality riparian forest habitats and shoreline fringe wetlands that are used by a diversity of upland and wetland wildlife species.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
109	Unplanned	C	10.0	7	10.0	7	7	Requests for private water use facilities will be considered at this location; however, special conditions will apply. Significant wetlands are located on a portion of this parcel, which may affect what can be permitted; Fronts Marble Bluff Subdivision.
110	135	U	1.4	2	1.4	2	2	Road right-of-way.
111	Unplanned	C	15.1	7	15.1	7	7	Requests for private water use facilities will be considered at this location. Significant wetlands are located on a small portion of this parcel, which may affect what can be permitted.
112	131; Unplanned	C	25.8	7	25.8	7	7	Requests for private water use facilities will be considered at this location. Land below 745-foot contour is under land use permit to TWRA to regulate hunting and trapping. Significant wetlands are located on a small portion of this parcel, which may affect what can be permitted.
113	Unplanned	C	5.5	7	5.5	7	7	Fronts Sylvan Shores subdivisions. Land below 745-foot contour is under land use permit to TWRA to regulate hunting and trapping.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
114	Unplanned	C	4.0	6	4.0	6	6	Long Island Marina; committed use for recreation. Backlying land may have deeded access rights across parcel.
115	Unplanned	C	11.1	7	11.1	7	7	Fronts Drinnen Subdivision and portions of Edgewater Estates Subdivision.
116	Unplanned	C	7.5	6	7.5	6	6	Lakeside Golf Course under license for commercial recreation. Backlying land may have deeded access rights across parcel.
117	Unplanned	C	27.7	7	27.7	7	7	Fronts Crestwood Subdivision. Land below 745-foot contour is under land use permit to TWRA to regulate hunting and trapping.
118	Unplanned	C	25.2	7	25.2	7	7	Fronts Green Acres, Lawson Farm, and Villages of Center Farm subdivisions. A portion of the land below 745-foot contour is under land use permit to TWRA to regulate hunting and trapping.
119	Unplanned	C	8.4	7	8.4	7	7	Fronts Sequoyah Shores and L. E. Banker Property subdivisions.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
120	119, 120	C	18.8	2	18.8	2	2	This parcel has a land use permit to TWRA for the Watts Bar Lake Wildlife Management Area maintenance base and barge landing. This tract also has an easement to the City of Kingston for a wastewater treatment facility. The downstream portion is classified as a Navigation Safety Landing.
121	158A	C	24.7	6	17.1	6	6	Under various land agreements with the City of Kingston for public recreation, including two boat access areas/ramps, parking, and developed greenway trail.
122	158B	C	9.0	2	16.6	2	2	Location of TVA's Kingston Pump Station. A portion is under license to Roane County Department of Education for parking area.
123	Unplanned	C	19.6	7	19.6	7	7	Fronts Lakeshore #2, Lakewood Landing, and Woodhaven subdivisions.
124	Unplanned	C	16.5	7	16.5	7	7	Fronts River Oaks Subdivision.
125	161	C	1.9	6	1.9	6	6	Easement to City of Kingston for public recreation; Ladd Landing Park.
126	162	U	4.2	4	4.2	4	4	Contains cove hardwood forest and fair to good riparian zone and scattered fringe emergent wetlands; some shoreline erosion occurring in places.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
127	Unplanned	C	13.3	7	11.4	7	7	Fronts Ladd Landing Subdivision.
127a	Unplanned	C			1.9	2	2	Navigation Safety Landing.
128	163B; Unplanned	C	25.4	7	25.4	7	7	Fronts Youngs Creek, Merriwether Home Park, and Maple Lake subdivisions. Significant wetlands are located on a portion of this parcel, which may affect what can be permitted.
129	163A	U	24.2	4	24.2	4	4	Contains multiple forested habitat types with a small population of rare plants located at one site; provides quality riparian habitat for a wide variety of wildlife although some shoreline impacts have occurred.
130	164A	U	60.3	4	60.3	4	4	Long, linear parcel supports high-quality riparian vegetation and habitat; however, unauthorized vegetation clearing minimizes habitat value in places.
131	164B	C	4.4	2	4.4	2	2	Navigation Safety Landing.
132	174	C	4.9	3	4.9	3	3	Brashears Island; protection and management of high-quality wetlands and cultural resources.
133	166, 167	C	15.7	7	15.7	7	7	Fronts portion of Chestnut Hills Subdivision.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
134	169A, 169B	U	62.1	4	62.1	4	4	Long, linear parcel contains a variety of habitat types including bottomland hardwoods, bluffs, and open land pasture valuable to a wide variety of wildlife species; also supports some high-quality wetlands and rare plants in one location.
135	170	C	6.2	7	6.2	7	7	Requests for private water use facilities will be considered at this location. Fringe wetlands located on a portion of this parcel may affect what is permittable
136	171	C	11.8	6	11.8	6	6	Under license for commercial recreation (campground); Soaring Eagle Campground.
137	172A, 175	U	79.3	4	80.7	4	4	Long, riparian parcel contains a variety of habitat types including bottomland hardwoods, bluffs, and open land pasture of value to numerous wildlife species; parcel also managed to protect cultural resources and rare plants in one location.
137a		C			2.6	2	2	Navigation Safety Landing.
138	172	C	5.0	3	5.0	3	3	Grubb Island. Managed to protect high-quality wetlands, related wildlife habitat, and cultural resources.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
139	172B	C	18.6	3	18.6	3	3	Managed to protect high-quality forested, scrub/shrub, and emergent wetland habitat values and water quality improvement functions.
140	173	U	7.8	5	6.4	3	3	No longer considered suitable for Industrial use. Contains significant cultural resources.
141	174	C	63.3	3	63.3	3	3	Jones Island; agreement with the University of Tennessee for on-going forest research; managed to protect cultural resources and high-quality forest habitat. Also referred to as Blue Springs Island.
142	180B	U	319.5	5	302.5	2	4	Part of the former Clinch River Breeder Reactor site. Managed for high-quality upland and riparian habitat. Under land use permit to TWRA as part of the Oak Ridge Wildlife Management Area. Potential site for TVA project operations.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
143	179	U	391.3	5	181.6	2	4	Part of the former Clinch River Breeder Reactor site. Managed primarily for high-quality upland forest habitat and some bottomland forested wetland. Under land use permit to TWRA as part of the Oak Ridge Wildlife Management Area. Adjoins Grassy Creek Habitat Protection Area. Potential site for TVA project operations.
144	180	C	48.0	3	172.3	3	3	Protection and management for significant wetlands and cultural resources; part of the former Clinch River Breeder Reactor site.
145	180A	U	332.9	5	265.8	2	4	Part of the former Clinch River Breeder Reactor site allocated for potential mixed use development. Floodplains and fringe wetlands present, which may affect water use/industrial access facility requests. Potential site for TVA project operations.
146	178	C	98.6	3	265.5	3	3	Protection and management of Grassy Creek Habitat Protection Area; protection of rare plant habitat and population. Part of the former Clinch River Breeder Reactor site.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
147	176	U	43.4	5	54.4	5	5	This parcel is within the Clinch River Industrial Park; part of the former Clinch River Breeder Reactor site. Considered suitable for industrial use.
148	177	U	21.5	5	10.5	2	4	Located within the Clinch River Industrial Park. Part of the former Clinch River Breeder Reactor site. Potential site for TVA project operations.
149	165A	C	13.3	3	13.3	3	3	Protection and management of cultural resources and wetlands in Brashear Creek embayment; part of area receives substantial informal recreation use.
150	165B; Unplanned	C	7.4	7	7.4	7	7	Fronts Cedar Lake Retreat Subdivision.
151	Unplanned	C	16.6	7	16.6	7	7	Fronts Holiday Shores Subdivision.
152	181	C	6.4	3	4.2	3	3	Sugar Grove Habitat Protection Area; managed to protect rare plant population and habitat.
152a	181	U			2.2	4	4	Previously part of Sugar Grove Habitat Protection Area, this area is a narrow, relatively steep strip of typical shoreline with some serious erosion and vegetation clearing in places; requests for additional water use facilities will not be considered.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
153	186A; Unplanned	C	40.6	7	40.6	7	7	Fronts Gunters Field and Kile subdivisions.
154	Unplanned	C	31.1	7	31.1	7	7	Fronts Tri-County Subdivision.
155	187	U	10.4	4	10.4	4	4	Contains quality bottomland hardwoods and riparian zone as well as some open land; provides good wildlife habitat and positive water quality benefits.
156	186B, 188, 189B	U	15.2	4	15.2	4	4	Relatively steep riparian zone with mixed pine and upland hardwood forest; dissected by large TVA Transmission Line right-of-way.
157	190; Unplanned	C	27.0	7	27.0	7	7	Fronts Lancer Subdivision. Significant wetlands are located on a portion of this parcel, which may affect what can be permitted.
158	191, 192A, 192D Unplanned	U	22.5	4	22.5	4	4	Linear riparian zone contains a diversity of habitats including upland hardwoods, mixed pine/hardwood, bottomland hardwoods, and shoreline fringe wetlands; portions of area receive substantial informal recreation use.
159	192C, 193	C	3.4	3	5.7	3	3	Managed to protect significant wetlands primarily located on small islands.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
160	192B	C	14.8	7	14.8	7	7	Requests for private water use facilities will be considered at this location. Significant wetlands are located on a portion of this parcel, which may affect what is permittable.
161	192A	U	22.7	4	22.7	4	4	Contains bottomland hardwoods, shoreline fringe wetlands, riparian forest, and reverting open land; unauthorized vegetation clearing decreases the wildlife habitat value on this parcel, and portions of the area receive substantial informal recreation use.
162	Unplanned	C	10.2	7	10.2	7	7	Requests for private water use facilities will be considered at this location.
163	193A	U	6.0	4	6.0	4	4	Managed as a small bottomland forested area, this area provides limited habitat for a variety of wildlife species due to its small size and proximity to Webster Pike.
164	189A	C	9.9	7	9.9	7	7	Requests for private water use facilities will be considered at this location.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
165	188, 189, 194, 195, & Unplanned	U	47.9	4	47.9	4	4	Contains three distinct habitat types including old field/early successional, steep rocky/glade-like and bottomland hardwood/fringe wetlands; unauthorized vegetation clearing minimizes the habitat values on a portion of this parcel.
166	196, 199B, 200B	C	79.2	3	79.2	3	3	Managed for the protection of significant wetlands and uncommon northern cove hardwood habitat.
167	Unplanned	C	11.6	7	11.6	7	7	Fronts Hidden Acres Subdivision.
168	197, 198A, 199A	U	45.7	5	45.7	4	4	Peninsular portion of tract is under an active agricultural license and is managed for annual hay crops; site has resource management potential through conversion to native warm season grasses.
169	198B	C	16.4	3	16.4	3	3	Managed for the protection of significant forested/scrub-shrub/emergent wetlands and upland buffer.
170	200, 201	U	11.6	5	6.0	5	5	May be suitable for industrial or barge terminal development. Cultural Resource considerations may affect development.
171	201B	C	4.8	3	4.8	3	3	Managed for the protection of significant wetlands.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
172	202, 203, 204, Unplanned	U	21.2	4	26.8	4	4	Three widely separated narrow riparian zone segments make up this parcel with habitat value diminished due to the presence of invasive plant species and proximity to commercial land use; provides some informal recreation use opportunities.
173	202B	C	9.8	3	9.8	3	3	Managed for protection of significant wetlands; parcel provides important habitat for resident and migratory waterfowl and cavity-dwelling birds, and the beaver population is monitored and managed cooperatively with USDA-Wildlife Services.
174	201, 204	C	21.5	5	3.2	5	5	May be suitable for barge terminal.
175	203	C	3.4	6	23.2	6	6	Licensed to the City of Harriman for public recreation/launching ramp. Provides the only route for vehicle access to the downstream portion of Parcel #174.
176	204B	C	3.3	3	1.8	3	3	Management and protection of cultural resources.
177	205	C	6.4	2	6.4	2	2	Railroad right-of-way.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
178	Unplanned	U	1.8	4	1.8	4	4	Contains narrow, riparian forested zone and mowed field with invasive plants common; provides limited habitat for wildlife.
179	206, 207	U	56.0	4	53.8	4	4	Long, linear parcel contains a variety of habitat types including good quality low-lying riparian forest and rocky north-facing bluffs, which are of high value to many wildlife and plant species.
180	206	C	11.4	3	11.4	3	3	Managed to protect significant cultural resources.
181	207	U	8.4	5	7.0	5	5	May be suitable for use as a barge terminal for adjacent quarry operation.
181a	207	C			3.6	3	3	Managed to protect rare plants and their habitat.
182	188	U	36.9	4	36.9	4	4	Long, linear riparian zone contains a variety of habitat types including upland forest, bottomland hardwoods, and scattered shoreline fringe wetlands; valuable habitat for various mammal, bird, amphibian, and reptile species.
183	Unplanned	C	25.2	6	25.2	6	6	Licensed for commercial recreation; Swan Harbor.
184	Unplanned	C	28.8	7	28.8	7	7	Requests for private water use facilities will be considered at this location; Fronts Lakeshore Subdivision. Affected by the

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
								December 2009 ash pond spill at KIF.
185	185A	U	4.1	4	4.1	4	4	Small, two-segment parcel has unauthorized vegetation clearing and a high presence of invasive, exotic plant species in places that minimize the quality of the habitat and riparian zone; used for informal recreation, mostly by adjacent landowners.
186	185	C	13.7	3	13.7	3	3	Managed to protect and enhance high-quality forested and scrub/shrub wetlands.
187	183B	C	56.8	4	56.8	4	4	Contains a variety of site conditions including upland hardwoods, shoreline fringe wetlands, open land under active agricultural license, and bottomland/riparian hardwoods that provide quality habitat for numerous wildlife species; portions of area receive substantial informal recreation use, especially for bank fishing. Affected by the December 2009 ash pond spill at KIF.
188	183	C	25.3	3	25.3	3	3	Managed to protect significant forested, scrub/shrub and emergent-type wetlands; habitat is of particular importance to amphibians and certain bird species. Affected

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
								by the December 2009 ash pond spill at KIF.
189	182	U	22.2	4	19.9	4	4	Includes a peninsula and all Zone 4 islands in the Emory River embayment upstream from Kingston Fossil Plant and contains bottomland hardwoods and shoreline fringe wetlands of significant importance to various wading/water bird species; duck and goose hunting from blinds occurs on some of these areas. Affected by the December 2009 ash pond spill at KIF.
190	Unplanned	C	1258.1	2	1258.1	2	2	Kingston Fossil Plant; includes TVA/TWRA designated Wildlife Observation Area and land under permit to TWRA for management as Kingston Wildlife Refuge.
192	160A	U	6.0	4	6.0	4	4	Small, two-segment parcel contains some quality riparian zone vegetation and buffer for the significant wetlands located upstream; provides some important habitat for water birds, songbirds, and small mammals; however, vegetation clearing limits habitat value in some locations.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
193	160B	C	8.1	3	8.1	3	3	Managed to protect high-quality, significant forested, emergent, and scrub-shrub wetlands and riparian habitat functions.
194	159	C	6.8	3	6.8	3	3	Rayburn Bridge Habitat Protection Area; managed to protect state-listed rare plant populations and habitats with currently unresolved encroachments in places.
195	Unplanned	C	16.1	7	16.1	7	7	Fronts Roberts Heights Subdivision.
196	157	C	11.4	3	11.4	3	3	Stowe Bluff Habitat Protection Area; managed to protect state-listed rare plant populations and habitat.
197	Unplanned	C	27.1	7	36.8	7	7	Fronts Westshore Estates and Lake Forest Estates subdivisions.
198	112	C	5.4	2	5.4	2	2	Navigation Safety Landing; management and protection of cultural resources.
200	110, 111	U	55.8	4	46.1	4	4	Contains several habitat types including upland riparian zone, limestone outcrops, and shoreline fringe wetlands; receives substantial informal recreation use in places.
201	Unplanned	C	84.2	6	84.2	6	6	Fronts land transferred to Roane County for public recreation. Under permanent easement to Roane County for

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
								public recreation; Roane County Park.
202	109C	U	28.6	4	28.6	4	4	Long, linear parcel provides a buffer for adjacent commercial and residential land uses; proximity to development and major highway limits its habitat value.
203	109A, Unplanned	C	16.8	7	16.8	7	7	Fronts Dodson Subdivision.
204	109 B&C	U	23.9	4	21.4	4	4	Contains fair to good riparian bottomland and upland forest habitat; portions of the site receive substantial informal recreation use especially for bank fishing and camping. See Parcel 205 for description of transferred land.
205	108	U	5.0	3	7.5	4	4	Mostly open grassland cover; unauthorized vegetation clearing and mowing limits the habitat quality at this site. Sensitive resources were not present in original 5 acres. See Parcel 204 for description of transferred land.
206	109A	C	15.3	7	15.3	7	7	Requests for private water use facilities will be considered at this location.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
207	106, 107	C	19.1	2	12.0	2	2	Navigation Safety Harbor; management and protection of cultural resources.
207a	107	C			7.1	3	3	Management and protection of cultural resources.
208	Unplanned	C	17.4	7	17.4	7	7	Requests for private water use facilities will be considered at this location.
209	105	U	0.5	4	0.5	4	4	Much of this parcel is in open grassland cover; unauthorized vegetation clearing and mowing limits the habitat quality at this site.
210	Unplanned	C	12.1	7	12.1	7	7	Navigation Safety Harbor; management and protection of cultural resources.
211	104	C	11.4	2	11.4	2	2	Navigation Safety Harbor.
212	Unplanned	C	75.6	7	75.6	7	7	Fronts Lock Haven Estates subdivisions.
213	102	C	4.2	2	4.2	2	2	Navigation Safety Harbor.
214	92	C	13.9	3	13.9	3	3	Managed to protect low-lying islands with forested, scrub/shrub, and emergent wetlands and cultural resources; parcel provides valuable habitat for a variety of wading and water birds.
215	Unplanned	C	18.2	7	18.2	7	7	Requests for private water-use facilities will be considered at this location. Kindrick Cemetery is located on a portion of this parcel.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
216	Unplanned	C	31.5	7	31.5	7	7	Requests for private water use facilities will be considered at this location.
217	89	U	30.9	4	30.9	4	4	Contains mixed hardwood/pine upland forest stands and well-vegetated riparian zone; provides habitat for typical upland riparian wildlife species as well as herons and ospreys.
218	87, 88	U	61.4	5	56.8	4	4	Two active osprey nests are located on this parcel. No longer suitable for industrial development.
218a	88	C			4.6	5	5	Active barge terminal site with license to Philips Metals
219	Unplanned	C	69.4	6	69.4	6	6	Fronts land transferred to City of Rockwood for public recreation. Licensed for public recreation; City of Rockwood Park.
220	Unplanned	C	18.4	7	18.4	7	7	Fronts Crystal Cove subdivisions.
221	Unplanned	C	42.8	7	42.8	7	7	Requests for private water use facilities will be considered at this location.
221a	Unplanned	U	31.9	6	31.9	6	6	Adjacent to Camp Buck Toms boy scout camp. Backlying land may have deeded access rights across parcel.
222	Unplanned	C	4.6	6	4.6	6	6	Licensed for commercial recreation; Harbour Point Marina.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
223	86B	C	68.3	3	68.3	3	3	Management and protection of cultural resources and quality habitat types for a variety of plants and wildlife.
224	85, 86A	U	128.6	4	123.7	4	4	Contains a variety of high-quality riparian zones and habitat types including mixed pine and hardwood, shallow rocky shoreline, and steep rocky points with rare plants present at two locations.
224a	85, 86A	U			4.9	2	2	Navigation Safety Harbor.
225	84A, Unplanned	C	11.7	7	11.7	7	7	Fronts Cove Point, Bluebell Point, and Bella Mara subdivisions.
226	84B	U	19.4	4	19.4	4	4	Peninsular area consists of intact rocky shoreline and healthy pine/cedar forest and understory; provides habitat for a variety of wildlife species including ospreys, herons, and potentially bald eagles.
227	76	C	102.9	3	102.9	3	3	Known as Half Moon Island, this area will be managed to protect significant cultural resources as well as the scenic quality and diverse wildlife utilization of this distinct island, while allowing for appropriate levels of informal recreational use; portion of island under a land use permit to TWRA for wildlife management purposes.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
228	80, 82, 83	U	22.4	4	22.4	4	4	Consisting of four smaller tracts, this area contains a variety of forest cover types with mostly young upland hardwood and mixed pine with a small portion of bottomland/riparian cover; unauthorized vegetation clearing and other encroachments limits the habitat value on these sites.
229	Unplanned	C	44.7	7	44.4	7	7	Fronts Molyneux Subdivision.
229a	Unplanned	C			0.3	2	2	Road right-of-way.
230	Unplanned	C	19.1	6	17.2	6	6	Easement for commercial recreation; currently known as Brigadoon. Also adjacent to Shelton Campground.
230a	Unplanned	C			1.9	6	6	Part of easement for commercial recreation; currently known as Brigadoon. Backlying land may have deeded access rights across parcel.
231	81	U	4.2	4	4.2	4	4	Locally known as Half Dollar Island, this moderately steep area is comprised of upland hardwoods, which provide important habitat for water birds including ospreys; the island receives considerable informal recreation use.
232	Unplanned	C	41.6	7	41.6	7	7	Fronts Eagle Point Subdivision.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
233	79, 80	C	80.5	3	80.5	3	3	Managed to protect palustrine forested, scrub/shrub, and forested wetlands as well as cultural resources.
234	Unplanned	C	39.6	7	39.6	7	7	Fronts Whites Creek Subdivision. Significant wetlands located on a portion of this tract may affect what is permittable.
235	Unplanned	C	2.5	6	2.5	6	6	Fronts Lakeside Resort.
236	Unplanned	U	1.5	4	1.5	4	4	Contains typical riparian/shoreline vegetation; small size of the parcel along with the adjoining land uses limits the wildlife habitat value of this area.
237	78	C	87.5	3	87.5	3	3	Proposed addition to Whites Creek Small Wild Area to support trail expansion; contains a variety of riparian habitats, forest cover types and stand ages.
238	77	C	171.0	3	171.0	3	3	Management as Whites Creek Small Wild Area and trail; maintained through a partnership with Tennessee Citizens for Wilderness Planning.
239	Unplanned	C	24.1	7	24.1	7	7	Fronts Apollo Shores Subdivision.
240	74	U	6.5	6	6.5	4	4	No longer considered for Developed Recreation. Management for shoreline

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
								conservation, wildlife and visual buffer.
241	Unplanned	C	1.2	6	1.2	6	6	License for commercial recreation; Arrowhead Resort. Backlying land may have deeded access rights across parcel.
242	Unplanned	C	16.7	7	16.7	7	7	Fronts Arrowhead, Howell, Broyles, and True Estate subdivisions.
243	Unplanned	U	2.9	6	2.9	7	7	Formerly known as Bills Pier.
244	Unplanned	C	6.7	7	6.7	7	7	Fronts Bayshore, Sunset Hills Estates, and Terrace View Resort subdivisions.
245	Unplanned	C	1.1	6	1.1	6	6	Licensed for commercial recreation; Terrace View Marina. Backlying land may have deeded access rights across parcel.
246	75	U	3.4	4	3.4	4	4	Contains hardwood forest cover and cultural resources with some shoreline erosion; small size of the tract and proximity to adjacent land uses limit the habitat value.
247	Unplanned	C	10.2	7	10.2	7	7	Fronts Hickory Hills and Ewing subdivisions.
248	Unplanned	C	44.7	7	44.7	7	7	Fronts Watts Bar Estates Subdivision.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
249	54B, Unplanned	C	8.0	7	8.0	7	7	Requests for private water use facilities will be considered at this location; Fronts Eden of the Lakes Subdivision.
250	Unplanned	C	0.9	6	0.9	6	6	Licensed for commercial recreation; Eden of the Lakes Marina. Backlying land may have deeded access rights across parcel.
251	Unplanned	C	24.0	7	20.7	7	7	Fronts Goose Point and Red Cloud Colony subdivisions.
251a	Unplanned	C			3.3	6	6	Red Cloud Campground. Backlying land may have deeded access rights across parcel.
252	50B; Unplanned	C	12.2	7	12.2	7	7	Fronts Keys on the Lake Subdivision.
253	50A	C	19.2	3	19.2	3	3	Management and protection of cultural resources.
254	51	C	426.7	3	426.7	3	3	Known as Iron Hill Island, this site will be managed in concert with TWRA to protect cultural resources, wetlands, and high-quality wildlife habitat and associated public use; shoreline erosion is significant in places.
255	52	U	8.7	6	8.7	4	4	Known as Sand Island, this area will be managed for heavy informal recreation use and protection of cultural resources.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
256	Unplanned	C	34.2	7	34.2	7	7	Requests for private water use facilities will be considered at this location; Fronts Lakeside and Paradise Cove subdivisions.
257	48A	U	9.3	4	9.3	4	4	This parcel is part of what is locally known as Godsey Hollow. The parcel is relatively steep with various aspects surrounding a fairly large cove.
258	48B	C	14.1	2	14.1	2	2	Navigation Safety Landing.
259	Unplanned	C	12.2	7	12.2	7	7	Fronts Sherwood Shores subdivisions.
260	39A; Unplanned	C	48.6	7	48.6	7	7	Fronts Lake Village and Baldwin subdivisions.
261	39B	U	16.6	4	16.6	4	4	Moderate to steep in places and is comprised of mostly upland forest cover; unauthorized vegetation clearing and private water use facilities limit the habitat value of this parcel.
262	Unplanned	C	41.0	7	41.0	7	7	Fronts Hicks, Ware Farms, and Stewart Point subdivisions.
263	37A, 38	U	14.3	4	14.3	4	4	In two segments, area contains upland and bottomland hardwood riparian forest; habitat value to wildlife is limited due to small size and proximity to developed areas and roads. Portions of site receive substantial informal recreation use including

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
								camping and bank fishing.
264	Unplanned	C	5.2	6	5.2	6	6	Front property sold for commercial recreation; Piney Point Marina.
265	Unplanned	C	51.4	7	51.4	7	7	Fronts Piney Shores and Estes Woods Estates subdivisions. Significant wetlands located on a portion of this tract may affect what is permittable.
266	34	C	99.6	6	99.6	6	6	Former Rhea Spring Public Use Area.
267	31, 32, Unplanned	U	25.0	4	25.0	4	4	Consists of five smaller segments of land with a variety of habitat types and values; although impacted by invasive plant species in places, it provides fair to excellent habitat for a variety of upland and wetland wildlife species.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
268	32B	C	39.3	3	39.3	3	3	Managed to protect one of the most significant wetland complexes on Watts Bar Reservoir; wetlands vary from very diverse, reservoir fringe palustrine forested/scrub-shrub/emergent types to forested vernal pool areas toward the upper end of the tract and provide high habitat value function for wildlife.
269	Unplanned	C	38.0	7	38.0	7	7	Fronts Lake Haven Estates, Isaac's Estates, and Cedar Heights subdivisions. Significant wetlands located on a portion of this tract may affect what is permittable.
270	Unplanned	C	52.9	6	53.3	6	6	Easement to the town of Spring City for public recreation; Spring City Park (Veteran's Park and Dixie League Youth Ball fields). Spring City water intake.
271	29	U	14.0	4	14.0	4	4	Consists of mainly open land and forested riparian habitat on a moderate slope; area provides some limited habitat for wildlife and floodwater storage capacity during major flood events on the Piney River.
272	Unplanned	C	0.4	2				Combined with Parcel 270

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
273	Unplanned	C	8.4	7	10.5	7	7	Fronts Shang-ra-la, Sunrise Estates and Epperson Subdivisions. Requests for water-use facilities will be considered in this location.
274	Unplanned	C	5.2	7	1.1	2	2	Spring City sewer outfall.
274a	Unplanned	C			2.0	5	5	Existing license for use as small barge loading site for forest products. Backlying land may have deeded access rights across parcel.
275	Unplanned	C	1.1	6	1.1	6	6	License for commercial recreation; Rhea Harbor Marina. Backlying land may have deeded access rights across parcel.
276	28	C	48.6	3	48.6	3	3	Managed to protect significant wetlands and waterfowl wetland/wildlife habitat; two islands under land use permit to TWRA for wildlife management purposes.
277	Unplanned	C	12.2	6	12.2	6	6	Fronts property transferred to town of Spring City for public recreation; Spring City Boat Dock.
278	27	U	19.3	4	19.3	4	4	Contains both open land and young-aged riparian zone habitat; provides some water quality improvement functions.
279	25A, 26	U	23.4	6	23.4	6	6	Allocated for possible future expansion of Spring City Boat Dock Area.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
280	21, 22, 23A, 25B	U	70.6	4	70.6	4	4	Comprised of three separate segments, this site contains a variety of predominantly hardwood/pine riparian zones with some reverting open land and scattered shoreline fringe wetlands; vegetation clearing has occurred on portions of the area reducing its habitat value while some of the area receives substantial informal recreation use.
281	23B, 24B	C	7.9	3	7.9	3	3	Protection and management of significant forested, scrub-shrub, and emergent-type wetlands; provides high-quality wildlife habitat and water quality protection functions.
282	24A	C	168.8	2	168.8	2	2	Right-of-way for Highway 68 and railroad.
283	21, 22, 23A	U	131.5	4	131.5	4	4	Contains a variety of habitats including upland forest, Virginia pine stands, and open land reverting to scrub pines and hardwood; centrally located in this parcel is an informal recreation use area locally referred to as Jackson Island, which receives significant camping use during the spring and summer months and is maintained by Rhea County through an agreement with TVA.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
284	Unplanned	C	2.4	7	2.4	7	7	Requests for private water use facilities will be considered at this location; however, site constraints may limit what can be permitted.
285	21, 22, 23A	U	224.5	4	224.5	4	4	Significant sized parcel containing several habitat types including an approximate 30-acre loblolly pine plantation, upland hardwoods, mixed pine/hardwood forest, and steep bluff-type areas dominated by white pine and hemlock; some encroachments are present, and the area receives some substantial informal recreation use; an active bald eagle nest is located near the downstream end of the parcel.
286	30, 33, 34, 35, 36, 37B	U	43.2	4	43.2	4	4	Five islands with diverse vegetation structure provides important habitat for various wildlife species including nesting substrate for great blue herons; several of the islands, especially the one nearest Rhea Springs Campground, receive substantial informal recreation use.
287	20A, Unplanned	C	27.6	7	27.6	7	7	Fronts Hide-A-Way, Torbett's, and Lake Forest Estates subdivisions.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
288	20B, 40	C	8.9	3	8.9	3	3	Protection and management of significant cultural resources and valuable wading bird habitat; islands receive substantial informal recreation use.
289	Unplanned	C	37.7	7	37.7	7	7	Requests for private water use facilities will be considered at this location; a portion of this parcel fronts Hidden Harbor Subdivision.
290	18	U	10.1	4	10.1	4	4	Two-segment parcel made up of bottomland hardwood/fringe wetlands and a pine bark beetle-deadened area; moderate-quality habitat is limited by small size and adjacent residential land uses.
291	17	U	118.9	4	118.9	4	4	Comprised of three sizable islands with different habitat conditions ranging from mixed pine/hardwood with some old-growth areas, an area of loblolly pine harvested in 2000, and a large pine bark beetle-deadened area on the largest island; provides habitat for a diversity of wildlife, has active duck hunting blinds and a large informal recreation use area on the most upstream island.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
292	16	U	2.5	4	2.5	4	4	Comprised of four small islands in Lowe Branch, two of which are shallow to limestone with cedar/ash, while the others support young bottomland hardwoods; islands support nesting herons, and one area has been planted to bald cypress trees by TWRA to enhance fisheries habitat.
293	Unplanned	C	24.3	7	24.3	7	7	Fronts Sable Hills and Sable Cove subdivisions.
294	14	C	34.0	2	34.0	2	2	Maintenance of Watts Bar West Saddle Dam.
295	14	U	51.6	4	51.6	4	4	Consists of predominantly north-facing slope with very shallow soils dominated by eastern red cedar forest; in conjunction with adjoining parcels, provides quality habitat for a variety of wildlife species and substantial informal recreation use.
296	10	U	198.2	4	198.2	4	4	Linear parcel bisected by Old Dixie Highway and a TVA transmission line right-of-way, most of which is under an active agricultural license for hay production with adjoining mixed pine/hardwood forest; provides habitat for open land and forest edge wildlife species.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
297	12	U	245.0	5	245.0	5	4	This parcel, also known as 'The Pines,' contains a high-quality mixture of forest and open land habitats. It also receives extensive informal use, especially hunting. Considered highly suitable for industrial use.
298	13	U	34.4	5	34.4	5	4	This parcel, also known as 'The Pines,' contains a high-quality mixture of forest and open land habitats. It also receives extensive informal use, especially hunting. Considered highly suitable for industrial use.
299	11A	U	370.3	6	423.4	4	4	This parcel, also known as 'The Pines', contains a high quality mixture of forest and open land habitats. It also receives extensive informal use, especially hunting.
300	Unplanned	C	237.4	6	184.3	6	6	Licensed for commercial recreation; Watts Bar Resort.
301	6	C	35.3	2	35.3	2	2	Operation and maintenance of Watts Bar Dam/Hydro facilities; includes observation landing.
302	7, 8, 9	C	268.0	2	268.0	2	2	Location of former Watts Bar Fossil Plant.
303	10	C	85.3	2	85.3	2	2	Watts Bar Nuclear Plant Reservation
304	Unplanned	C	191.5	2	191.5	2	2	Location of former Watts Bar Fossil Plant.

Parcel	Original Parcel Number (1988 Plan)	Committed (C)/ Uncommitted (U)	Acreage Alternative A	Alternative A (No Action)	Alternatives B/C Acres	Alternative B (Preferred)	Alternative C	Brief Description of Allocated Parcels
305	Unplanned	C	993.2	2	993.2	2	2	Watts Bar Nuclear Plant Reservation, Nuclear Plant.
306	15, 39, 49, 53, 54, 60, 62, 68, 90, 103, 106, 116, Unplanned	U	54.0	4	54.0	4	4	Protection of wildlife habitat and shoreline vegetation; includes all Zone 4 islands located between TRMs 530-568, except islands associated with Foshee Peninsula, Tract 7.
307	191	C	1.7	2	1.7	2	2	Water intake for Cumberland Utility District for Roane and Morgan Counties

Appendix C – Scoping Information

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Scoping Document
Watts Bar Reservoir Land Management Plan
Environmental Impact Statement
Loudon, Meigs, Rhea, and Roane Counties, Tennessee
February 2005

Introduction

TVA develops reservoir land management plans to facilitate the management of reservoir properties in its custody. In general, TVA manages public lands to protect and enhance natural resources, generate prosperity, and improve the quality of life in the Tennessee Valley. Plans are submitted to the TVA Board of Directors for approval and adopted as policy to provide for long-term land stewardship and accomplishment of TVA responsibilities under the TVA Act.

TVA will prepare an Environmental Impact Statement (EIS) to assess the potential impacts of a proposed Reservoir Land Management Plan for TVA property on the Watts Bar Reservoir in East Tennessee (Loudon, Meigs, Rhea, and Roane Counties). TVA is considering updating a Reservoir Land Management Plan completed for Watts Bar Reservoir in 1988. The updated Land Plan would allocate lands to various categories of uses, which would then be used to guide the types of activities to be considered on TVA land. This would enable TVA to allocate additional lands that were not previously considered and to reassess past land use designations taking into account public needs, the presence of sensitive environmental resources, and TVA policies. The proposed land plan would involve approximately 14,000 acres of TVA land on Watts Bar Reservoir.

Background

Watts Bar Reservoir was completed in 1942 and is one of the multipurpose reservoirs operated by TVA for navigation, flood control, power production, recreation, and other uses. Water entering Watts Bar Reservoir flows from northeast to southwest through Loudon, Roane, Meigs, and Rhea counties in east Tennessee. The reservoir extends from Watts Bar Dam 72.4 miles to Fort Loudoun Dam on the Tennessee River and 23.1 miles on the Clinch River to Melton Hill Dam. It also includes portions of the Emory and Little Emory Rivers. TVA originally acquired 49,686 acres of land in fee simple ownership for reservoir construction. Of that, 38,600 acres are covered by water during normal summer pool. Subsequent transfers of land by TVA for economic, industrial, residential, or public recreation development have resulted in a current balance of approximately 14,200 acres of TVA land on Watts Bar Reservoir.

All lands under TVA control would be allocated in the planning process. Alternative approaches to land allocation would be analyzed in the EIS. In developing the new Watts Bar Reservoir Land Plan, lands currently committed to a specific use would likely be allocated to that current use; however, changes that support TVA goals and objectives would be considered.

The 1988 plan allocates land into 19 categories, including natural areas, forest and wildlife management, recreation, and industrial sites. The revised plan would propose options for allocating reservoir lands into land into the following categories: Zone 1 (Non TVA Shoreline), Zone 2 (Project Operations), Zone 3 (Sensitive Resource Management), Zone 4 (Natural Resource Conservation), Zone 5 (Economic Development), Zone 6 (Developed Recreation), and Zone 7 (Residential Access).

In addition to allocating TVA lands into land use zones, TVA proposes to incorporate Integrated Resource Management (IRM) planning by providing more detailed prescriptions for conserving, enhancing and integrating natural, cultural, visual, and recreation resources management on a reservoir-wide basis. IRM planning is proposed within the allocation zones for Project Operations, Sensitive Resource Management, Natural Resource Conservation, and Developed Recreation. This portion of planning would encompass the management or protection of public use and access, natural areas, forest health, exotic invasive species, nuisance wildlife, ecological diversity, water quality, scenic quality and uniqueness, archeological sites, historic structures and sites, and public outdoor recreation opportunities.

This EIS will tier from TVA's Final EIS, *An Assessment of Residential Shoreline Development Impacts in the Tennessee Valley*, which was issued in November 1998. TVA completed this EIS on possible alternatives for managing residential shoreline development throughout the Tennessee River Valley. In its May 24, 1999 Record of Decision, TVA decided to adopt the Blended Alternative identified in the Shoreline Management Initiative (SMI) EIS. Under the Blended Alternative, TVA sought to balance residential shoreline development, recreation use, and resource conservation needs in a way that maintains the quality of life and other important values provided by its reservoir system. Under this alternative, sensitive natural and cultural resource values of reservoir shorelines would be conserved under and retained by preparing a shoreline categorization for individual reservoirs; by voluntary donations of conservation easements over flowage easement or other shore land to protect scenic landscapes; and by adopting a "maintain and gain" public shoreline policy when considering requests for additional residential access rights.

In accordance with the TVA Shoreline Management Policy (SMP) which implements SMI, TVA categorized the residential shoreline of Watts Bar Reservoir based on resource data collected from field surveys. A resource inventory has been conducted for sensitive species and their potential habitats, archaeological resources, and wetlands along the residential shoreline of Watts Bar Reservoir.

Scoping Activities

The following scoping activities were undertaken to identify issues and define alternatives to be considered in the Watts Bar Reservoir Land Management Plan:

February 16, 2004	A Notice of Intent was published in the *Federal Register* alerting other agencies and concerned public of the EIS.
April 18, 2004	A Revised Notice of Intent was published in the *Federal Register* extending the scoping comment period to June 30, 2004.
August 16, 2004	An announcement of the September 28, 2004 Public Meeting and extension of the Public Comment period to October 8, 2004 was published in the *Federal Register.* The announcement also provided supplemental information regarding a preliminary proposal by Valley Land Corporation, for a 310 acre mixed use commercial/recreation development on TVA lands on Watts Bar Reservoir which could be included in the scope of the Land Plan EIS, if a formal proposal is submitted.
September, 2004	TVA Staff met with Stakeholder Groups and individuals in the Watts Bar Area.

September 28, 2004	A Public Scoping meeting was held at Roane State Community College in Kingston, Tennessee, attended by 142 people.
October 8, 2004	The scoping comment period concluded with over 200 comments on the proposal.

Public notices were also published in regional and local newspapers in August, 2004. In addition, several newspaper articles were published during the comment period. From March 2004 through October 2004, public participation was sought to assist the Watts Bar Clinch Watershed Team in developing a land management plan and EIS to identify specific future uses for TVA managed lands around Watts Bar Reservoir. TVA hosted a public meeting during which information forms, writing material, and a stenographer were available for people to make comments. Over 1,000 information forms were mailed to interested people and were distributed at over 20 briefing sessions with Stakeholder groups. Information about the proposed Watts Bar Reservoir Land Management Plan and an interactive information form were available on the TVA web site. TVA received 95 individual letters or emails from 88 individuals, 126 information forms either mailed or directly input on the web site, and a petition with 183 signatures. In total, TVA received specific comments from 214 individuals or a total of 397 individuals including the petition.

Key Action Alternatives

TVA proposes to develop a reservoir land management plan to guide land-use approvals, private water use facility permitting, and resource management decisions on Watts Bar Reservoir. Under all of the action alternatives, the plans would identify land use zones in broad categories. Land currently committed to a specific use would be allocated to that current use unless there is an overriding need to change the use. Such commitments include transfers, leases, licenses, contracts, power lines, outstanding land rights, and TVA-developed recreation areas.

As a result of public comments, TVA has decided to develop two action alternatives; one is based on accommodating proposed economic and community development strategies, and the other is based on the conservation of natural resources to the exclusion of any new economic or community development. These alternatives would frame the environmental issues identified during scoping and provide baselines for the analysis of likely environmental impacts. Integrated Resource Management (IRM) of the natural resources on TVA lands would be an integral part of either alternative. The economic and residential development strategy would lead to private residences, commercial, natural resource, and/or industrial development (“mixed-use” development) of large tracts (500 acres or greater) of public land. The amount of land allocated for TVA Project Operations (Zone 2), Sensitive Resource Management (Zone 3), and Residential Access (Zone 7) would remain the same under all the alternatives.

TVA has not received a formal proposal from Valley Land Corporation, to use 237 acres of Meigs County Park and 73 acres of TVA project lands for mixed-use development. Therefore this proposal is not included within the current scope of this EIS. However these same properties are included as part of the larger Lowe’s Branch proposal and would be considered for mixed use as described in the Development and Recreation alternative below.

No Action Alternative - Under the No Action Alternative, TVA would continue to use the 1988 Plan to guide land use decisions on TVA public land surrounding Watts Bar Reservoir. Except for the already approved Lower Watts Bar Unit (LWBU), resource

management activities would likely be limited to regulatory compliance and maintaining public health and safety.

The 1988 Plan documents actual and prospective uses indicated for the public land. Currently, proposed land use requests received from external applicants or internal TVA organizations are evaluated for consistency with the 1988 Plan. Requested land uses that are consistent with the 1988 Plan can either be approved or denied based on a review of potential environmental impacts and other administrative considerations. If the request is not consistent with the designated land use, then formal TVA Board of Directors' approval, following necessary review, would be required to change the designated allocation.

Balanced Development and Recreation - Under this Alternative, TVA would update the 1988 Plan. The majority of land not previously allocated, along with parcels defined in the 1988 Plan and the LWBU plan would be placed into one of the seven land use zones that best fits the existing land use. TVA would promote economic development and recreation. Mixed-use development (land that could be used for a variety of uses, including residential, commercial/light industrial, and recreation) would be designed and implemented at the former Clinch River Breeder Reactor site (about 1,200 acres) and the Lowes's Branch site (1,200 to 1,700 acres). Further TVA would propose allocating 22 percent of the land on Watts Bar Reservoir to Natural Resource Conservation (Zone 4), 17 percent to Economic Development (Zone 5), and 10 percent to Developed Recreation (Zone 6). Also, under this Alternative, TVA would use IRM on suitable lands not allocated for economic development.

Balanced Conservation and Recreation - Under this Alternative, TVA would update the 1988 Plan. The majority of land not previously allocated, along with parcels defined in the 1988 Plan and the LWBU plan would be placed into one of the seven land use zones that best fits the existing land use designation. TVA would promote conservation of natural resources and informal recreation by allocating about 40 percent of the land on Watts Bar Reservoir to Natural Resource Conservation (Zone 4), 8 percent of the land to Developed Recreation (Zone 6), and one percent of the land to Economic Development (Zone 5). IRM would be used to plan management activities on suitable TVA land in Zones 2, 3, 4, and 6 around Watts Bar Reservoir. This alternative would promote conservation of natural resources.

Significant Environmental Issues to Be Addressed in Detail

The majority of the public response to the NOI focused on the use of public lands for private residential and commercial development and the associated environmental impacts that could occur. Many comments were received expressing concerns about the importance of water quality, of terrestrial and aquatic ecology, and questioning the economic need of the proposal given the success of similar past projects. There were also many comments about TVA's management of public lands, the planning for the management and use of public lands, and the potential results of TVA's management and planning.

The public responses in support of the increasing economic and community development described the potential to have a positive impact to the area economy. Commenters cited increases in the local economy, land values, jobs, and taxes available for local government as positive results.

Opposing commenters stated that TVA should keep all land public and not develop it. Commenters were concerned that other public lands similarly designated would also be made available for development. Commenters stated that selling the land is contrary to public opinion, and would increase public distrust of TVA because it would also be contrary to past TVA decisions not to develop this public land.
Much public response focused on philosophical opposition to private residential and commercial development and use of public lands and the associated impacts that would occur. From all the comments provided, six predominant themes or general issues were identified: Natural Resources, Loss of Public Lands, Residential/Commercial Developments, Land Use Policy and Planning, Recreation Resources, and Proposals (i.e., Development of Lowe's Branch, and the former Clinch River Breeder Reactor Site), Of these, most comments were concerned with Loss of Public Lands, Natural Resources, Residential Commercial Developments, and Proposals.

Recreation - The majority of the comments on recreation focused on watercraft use, campgrounds and trails, and TVA recreation policies (e.g., marina placement, recreational opportunities, limiting commercial recreation). Commenters on watercraft use were concerned about noise and safety. They asked for speed limits, boater education, and enforcement of laws. Commenters on Campgrounds and Trails asked for better maintenance and management of trails and campgrounds, more primitive camping areas in several areas, and the reopening the Rhea Springs Campground.

Loss of Public Lands - Several stakeholder groups, Tennessee Conservation League (TCL), Tennessee Ornithological Society (TOS), Ducks Unlimited, and the Wildlife Society, as well as over 20 other commenters opposed the loss of TVA public lands. They stated that the idea of using public land to create economy is obsolete and unneeded and that the environmental and social uses of undeveloped land were of greater value.

Natural Resources - Comments received about natural resources included Air Quality, Wildlife (Terrestrial and Aquatic Ecology), Water Quality, Litter and Debris, Navigation, Shoreline Stabilization, Threatened and Endangered Species, Wetlands, Cultural Resources, and Aesthetics. In particular, the U.S Fish and Wildlife Service (USFWS) and Tennessee Department of Environment and Conservation (TDEC) identified sensitive species found in the Watts Bar area and provided suggestions for their management. Many respondents also expressed concern for the preservation of natural resources (e.g., natural areas, wildlife habitat, and wetlands) and the ways in which these resources may be compromised by increased development.

Residential/Commercial Development and Socio-economics - Comments from local city and county government organizations (e.g., Chambers of Commerce) and developers encouraged the use of key parcels of TVA land for residential and commercial development. They cited the opportunity to create jobs, commerce, increase tax bases, and infrastructure as important to their communities and the need for a new 'Mixed Use' TVA land zone utilizing any possible combination of allocation zones within a land parcel. However, several respondents on this issue commented on the need to limit or stop industrial, commercial and residential development on Watts Bar Reservoir, expressing a concern for the destruction of natural surroundings due to continued development. They felt that the loss of undeveloped natural land would decrease the socio-economic value of the area.

Land Use Policy and Planning - Some commenters said TVA should continue good management practices and adopt a comprehensive long-term flexible plan. They also stated that Zone 3 and 4 parcels are important, that contiguous undeveloped shoreline should not be developed, that TVA should provide adequate funds and personnel to enforce their policies, and that property owners controlled too much shoreline. They also identified alleged inconsistencies in the treatment of large development versus small land owners. Some stated that TVA should transfer the property to other federal agencies if TVA can't manage it. Many respondents expressed either support or opposition to the further proposed developments, particularly at the Lowe's Branch Area and the former Clinch River Breeder Reactor site.

Allocation Proposals - TVA received comments which either confirmed or requested changes for use allocations regarding 43 specific parcels of land around Watts Bar Reservoir. Requests to keep or change allocation to Zone 4 were most frequent by individuals, stakeholder groups including a petition. Local city and county governments requested large local tracts of TVA land to support commercial, residential, or recreation development. Specifically, the majority of the comments were concerned with the use allocation of parcels consisting of the former Clinch River Breeder Reactor Site and the Lowe's Branch site near Watts Bar Dam, with respondents expressing either support or opposition to the proposed developments. In general, opponents expressed concern that it would reduce wildlife and outdoor recreation opportunities in the area. Proponents of the proposed land exchange expressed that it would result in an increase in commerce and jobs for the area. Specific comments on the two sites are summarized below.

Former Clinch River Breeder Reactor Site: Respondents commented on a range of proposals for use of the land ranging from development to preservation. The City of Oak Ridge suggested the site should be developed, is a great opportunity for the area, and should be designated for mixed use. Advocates for the Oak Ridge Reservation (AORR) and Tennessee Citizens for Wilderness Planning (TWCP) provided a development plan recognizing previous disturbances and using TVA's existing land use zones. The Oak Ridge Convention and Visitors Bureau asked for the site to be leased (or control given) to the City of Oak Ridge to use for the Archery Shooters Association Tennessee Pro/Am Event for at least the next 5-years. Other commenters stated the site should not be developed and be left as a public wildlife management area.

Lowe's Branch Site: Rhea and Meigs County officials commented that development of the Lowe's Branch Area would be economically beneficial for Meigs and Rhea County, and that a 'Mixed Use' allocation zone could change the economic condition of the area. Conversely, a petition from the Friends of Watts Bar Lake, AORR, Tennessee Wildlife Resources Agency (TWRA), TCWP, TOS, and almost 40 individuals commented that the area was one of a few left for primitive recreation and should be allocated for Zone 4 and not be developed. Lastly, TWRA commented that the area is used heavily for hunting and other types of outdoor recreation and it should be transferred to TWRA.

Issues and Resources to be Addressed

Based on analysis of the scoping activities, TVA has identified the following resources and issues which would be affected by implementing a new Watts Bar Reservoir Land Management Plan. For each resource, the potential direct and indirect effects of each alternative will be analyzed and disclosed. In addition, other activities (existing and proposed) that may affect resources of concern for Watts Bar Reservoir Land Management

Plan will be identified, and the potential effect of these activities on Watts Bar Reservoir resources and trends in the resources would be assessed. The major resources categories that will be considered in the EIS are listed below.

Aesthetics and Visual Resources - The aesthetic setting of the reservoir would be characterized and scenic and distinctive areas frequently seen by reservoir users and adjacent reservoir residents would be identified. Those areas and parcels of TVA land having excellent and distinct visual qualities would be identified. The effect of each alternative on the natural beauty of the shoreline would be evaluated.

Cultural Resources - Archaeological and historic resources in the Watts Bar Reservoir area would be characterized, and known National Register sites discussed. Parcels proposed for allocations that may affect cultural resources would be surveyed to determine the presence of any resources eligible for inclusion on the National Register of Historic Places. In addition, cultural resources along the shoreline would be identified as part of the shoreline categorization effort (required by TVA's Shoreline Management Policy (SMP)). The potential effects of each alternative on historic and archaeological resources would be evaluated. The proposed reservoir land management plan would be reviewed by the Tennessee State Historic Preservation Officer (SHPO).

Endangered and Threatened Species - State or federally listed threatened and endangered plants and animals, known to exist in the vicinity of Watts Bar Reservoir, will be identified. In addition, parcels proposed for allocations that may provide endangered species habitat will be surveyed to determine if any populations exist. Endangered, threatened, and rare species found along the shoreline will be identified as part of the shoreline categorization effort (required by SMP). The effects of each alternative on endangered, threatened, and rare species in need of management would be evaluated. The proposed land plan would be reviewed by the USFWS.

Terrestrial Ecology - Ecosystems and broad natural community types found adjacent to Watts Bar Reservoir will be characterized and described. Significant natural features, including rare species habitat, important wildlife habitat, or locally uncommon natural community types will be identified. The effects of each alternative on terrestrial ecosystems in the vicinity of Watts Bar Reservoir will be evaluated.

Wetlands and Floodplains - Wetlands and floodplains found on TVA land and along the reservoir shoreline will be identified as part of the shoreline categorization effort (required by SMP). The functions provided by these wetlands will be identified. The effects of each alternative on wetlands and floodplains in the vicinity of Watts Bar Reservoir will be evaluated.

Recreation - Current recreation facilities available to meet public recreation needs will be identified, as well as, those lands that are important for consumptive and non-consumptive wildlife-oriented recreation. The effects of each alternative on recreation opportunities in the vicinity of Watts Bar Reservoir will be evaluated.

Water Quality and Shoreline - Current water quality status and activities in the hydrologic units affecting water quality will be identified. These include: surface water, litter and debris control, and activities that are causing shoreline erosion as well as agricultural, municipal, and industrial activities. Overall aquatic ecological conditions will be identified. The extent

to which each alternative may affect water quality and trends in reservoir water quality will be analyzed.

Aquatic Ecology - Aquatic biological resources found in Watts Bar Reservoir and its vicinity will be characterized. The Shoreline Aquatic Habitat Index for Watts Bar Reservoir will be calculated and compared to other reservoirs of similar physical characteristics. The effects of each alternative on aquatic habitat will be analyzed.

Socioeconomic - The current population, labor force, employment statistics, income, and property values for the Watts Bar region will be identified. Industrial sites and commercial and residential development near the reservoir will also be identified. The potential impacts of mixed use (a combination of residential, recreation, commercial, and light industrial development) would be analyzed for two sites. Current communities in the area of Watts Bar Reservoir will be identified, including those with minorities and low-income components.

Navigation - Current boat traffic on the reservoir will be reviewed. The effect of each alternative on recreational boat traffic and commercial navigation will be analyzed.

Prime Farmland - Prime farmland in the vicinity of Watts Bar Reservoir will be identified. The amount of prime farmland that could be converted to urban or industrial development in the vicinity as a result of implementation of the alternatives will be analyzed.

Land Use - The implications of TVA land use planning and policies will be identified and discussed, including the importance of contiguous undeveloped shoreline, enforcement of TVA policies, loss of public lands, and the affect on adjoining land use and backlying land.

Natural Areas - Special and unique natural areas in the vicinity of Watts Bar Reservoir will be identified. Impacts of the proposed alternatives to the natural areas will be discussed.

Probable Non-Significant Environmental Issues

Potential impacts to resources listed below were identified in scoping. At this time, impacts to these resources are not likely to be important issues. Therefore, TVA plans to mention them but does not plan to discuss them in detail in the EIS. However, if TVA finds that any alternative would result in significant changes to these resources, the changes will be discussed in detail in the EIS.

- air quality
- noise

Lead and Cooperating Agencies

TVA will be the lead Federal agency for this environmental review. The U. S. Department of Energy (USDOE) will be invited to be a cooperating agency because of its similar role with management of public land on Watts Bar Reservoir under its jurisdiction and its proximity to potential development areas. No other agencies were identified as potential cooperating agencies for the purposes of environmental review.

Related Environmental Documents

Watts Bar Reservoir Land Management Plan (TVA, 1988)
In August 1988, the TVA Board of Directors approved a land management plan to guide TVA resource management and property administration decisions on 10,405 acres of TVA land on Watts Bar Reservoir. A multidisciplinary TVA team undertook a detailed planning

process that resulted in the land use designation in the plan. Both public input and information from TVA specialists were analyzed in making land use decisions. It was determined that Watts Bar Reservoir supported 19 land use allocations. The 207 tracts of land on Watts Bar reservoir were allocated for one or more of these 19 uses.

Record of Decision for the Lower Watts Bar Reservoir (USDOE, 1995).
The Record of Decision for Lower Watts Bar Reservoir was prepared by the USDOE in accordance with the requirements under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) to present the remedy which addresses the contamination of the Watts Bar Reservoir Area by past USDOE operations. Remediation includes the continuance of institutional controls and long-term monitoring of water, sediment, and fish. Institutional controls are implemented primarily by the Watts Bar Working Group (WBWG), created in 1991, of which TVA is a signatory member along with the Environmental Protection Agency (EPA), TDEC, the US Army Corps of Engineers (USACE), and the USDOE. The WBWG implements a notification and screening methodology for member agency actions which may be impacted by the contaminants, whereby USDOE can then identify contaminants and provide appropriate remediation.

Proposed Sale of TVA Tract No. XWBR-688IE (Parcels 1 and 2) on Watts Bar Reservoir to Scientific Ecology Group, Inc. and Approval of Operations of Additional Facilities and Modifications to Existing Facilities, Environmental Assessment (TVA, 1995).
TVA assessed the environmental impacts associated with alternatives derived from a request by Scientific Ecology Group, Inc. (SEG) to purchase TVA tract XWBR-688IE. SEG had been using this land under a lease agreement with TVA. In addition SEG requested approval to build and operate additional waste management facilities and modify the operation of existing facilities. The preferred alternative allowed the sale and operation changes with commitments by SEG to reduce impacts to water quality, and expand and maintain the TVA Grassy Creek Habitat Protection Area onto adjacent portions of Parcels 1 and 2.

Shoreline Management Initiative (SMI): An Assessment of Residential Shoreline Development Impacts in the Tennessee Valley (TVA, 1998).
TVA completed an EIS on possible alternatives for managing residential shoreline development throughout the Tennessee River Valley. Under the alternative selected, sensitive natural and cultural resource values of reservoir shorelines would be conserved and retained by preparing a shoreline categorization for individual reservoirs; by voluntary donations of conservation easements over flowage easement or other shore land to protect scenic landscapes; and by adopting a “maintain and gain” public shoreline policy when considering requests for additional residential access rights. The Watts Bar Integrated Reservoir Land Management Plan EIS will tier from the Final SMI EIS.

Sale of Boeing Land, Environmental Assessment (USDOE, 2000)
USDOE prepared this EA to evaluate the impacts of selling a narrow strip of former TVA land on the Clinch River to a private developer. Sale of this property would reduced the amount of non-TVA owned publicly owned shoreline and changed it to shoreline available for residential access.

Final Supplemental Environmental Impact Statement: Kingston Fossil Plant Alternative Coal Receiving Systems (TVA, 1999)
In a Record of Decision dated March 10, 1997, TVA decided to implement an alternative from the 1997 Final Environmental Impact Statement on Kingston Fossil Plant (KIF)

Alternative Coal Receiving system which would reduce coal transportation costs by the construction of a new railroad spur from Harriman, Tennessee to KIF. This alternative would cross the Emory River and several streams and impact the Swan Pond area of Roane County including both private and TVA lands. Prior to implementation and construction of the alternative, TVA decided to implement another proposal providing railroad service to KIF using existing facilities. However, TVA plans to retain the property purchased before cancellation of the railroad spur.

Environmental Assessment, Agricultural Lands Licensing for 1999 through 2003 Crop Years; Fontana, Fort Loudoun, Melton Hill, Tellico and Watts Bar Reservoirs (TVA, 1999)
TVA evaluated the potential environmental impacts associated with licensing 74 tracts of TVA land totaling over 1,200 acres to individuals for agricultural use on lands around five TVA reservoirs in east Tennessee and North Carolina. Thirty-four of these tracts totaling 335 acres are on Watts Bar Reservoir, and are part of the TVA lands under consideration in the proposed plan. TVA is currently reassessing the continued licensing of these tracts.
Lower Watts Bar Management Unit Watts Bar Reservoir, Resource Management Plan and Environmental Assessment (TVA, 2000).
TVA completed an EA on possible alternatives for determining the scope and intensity of TVA's resource management activities for the Lower Watts Bar Management Unit (LWBU) and implementing a management plan for the LWBU. The 3,481-acre LWBU is a major component of the TVA land expected to be available for planning on the Watts Bar Reservoir. The LWBU plan will be incorporated into the Watt Bar Integrated Resource Management Plan and modified as appropriate.

Proposed Land Use Allocation Change and Request for a Commercial Recreation License and Section 26a Approval for Whitestone Country Inn, Environmental Assessment (TVA, 2001)
TVA reviewed the environmental impacts associated with the approval of a request by Whitestone County Inn to change the land use allocation from Wildlife and Forest Management, and historic preservation to Commercial recreation; issue approval under section 26a; and issue a commercial recreation license for a 6 boat slip marina for 0.76 acres of TVA land. Included in the approval conditions is the transfer of 11.47 acres of lakefront and shoreline property to TVA to replace resources degraded by the operation.

Modernization of Turbines at Watts Bar Hydro Plant, Rhea County, Tennessee; Environmental Assessment (TVA, 2001)
The environmental impacts attributed to the proposed modernization of the electric generating turbines at the Watts Bar Dam and Hydro Plant were reviewed. Commitments of the action alternative include the stabilization of shoreline on TVA land considered by the current planning process.

Proposed Issuance of Regulations Under Section 26a of the TVA Act for Non-navigable Houseboats, Storage Tanks, Marina Sewage Pump-Out Stations, Wastewater Outfalls and Septic Systems, and Development within Flood Control Storage Zones, Environmental Assessment (TVA, 2001)
TVA completed an EA for its issuance of regulations for non-navigable houseboats, storage tanks, marina sewage pump-out stations, wastewater outfalls, septic systems, and development within flood control storage zones of TVA reservoirs. The complete update of the 1971 Section 26a regulations, incorporating the standards for residential development in the SMI EIS and the miscellaneous updates above, became final on September 8, 2003. These regulations comprehensively updated the TVA requirements for development along

the shoreline of TVA reservoirs, including Watts Bar. The regulations for marina sewage pump-out stations and holding tanks, fuel storage tanks and handling facilities, and development within the flood control storage zones were new.

Commercial Recreation License and Marina Expansion for Blue Springs Marina, Roane County Tennessee, Environmental Assessment (TVA, 2002)
TVA identified the environmental impacts associated with approving and issuing a license for a request by Blue Springs Marina to expand and operate its marina on Watts Bar Reservoir. The proposal includes the addition of 104 boat slips and improvements to private property, the use of TVA land, and the modifications of the adjacent TWRA boat ramp facility.

Other Environmental Review and Consultation Requirements

Other environmental and permitting agencies, including the EPA, U.S. Army Corps of Engineers, USFWS, U. S. Geological Survey (USGS), USDOE, TDEC, Tennessee SHPO, and TWRA will be sent a copy of the Draft EIS for review.

Delegation of Work Assignments

River System Operations & Environment, Environmental Policy and Planning will have primary responsibility for management of the EIS process and assembly of the Draft EIS, in consultation with Resource Stewardship and the Office of General Counsel. Other TVA groups, including Environmental Research & Technical Services, River Operations, Economic Development, Facilities & Realty Management, and Fossil Power Group, may contribute to the analysis.

Interdisciplinary Team (IDT)

Tyler Baker, RS, Chattanooga ..... Surface Water
Steve Baugh ..... Fossil Power
Evelyn Benton, RS, Lenoir City ..... Maps and Data Management
Elizabeth Bouldin, RS, Lenoir City ..... Watershed Conditions/Water Quality
Chellie Cook, RS, Lenoir City ..... Clerical
Stephanie Chance, RS, Knoxville ..... Aquatic Threatened and Endangered Species
Pat Cox, RS, Knoxville ..... Botany
Nancy Greer, RS, Lenoir City ..... Watershed Team Manager
Mike Dobrogrosz, RS, Knoxville ..... Lands Planning Project Manager
Janice Dockery, EP&P, Chattanooga ..... Document Editor
Joe Feeman, RS, Norris ..... IRM Project Manager
Wes James, RS, Lenoir City ..... Forestry/Wildlife
Hill Henry, RS, Knoxville ..... Terrestrial Threatened and Endangered Species
A. Eric Howard, RS, Knoxville ..... Cultural Resources
George Humphrey, RS, Norris ..... Recreation
Jimmie Kelsloe, ER&TA, Muscle Shoals ..... Prime Farmland
Robin Kirsch, RO, Knoxville ..... River Operations
Carolynn Koroa, RO, Knoxville ..... Navigation
Barbara Martocci, C&GBCR, Knoxville ..... Communications
Lt. Rick McDowell, TVAP, Watts Bar ..... TVA Security
Mark McNeely, RS, Knoxville ..... Graphics
Randall McIntosh ..... Watts Bar Nuclear
Roger Milstead, RO, Knoxville ..... Floodplains
Jason M. Mitchell, RS, Knoxville ..... Natural Areas

Norris Nielson, ER&TA, Muscle Shoals ..... Air Quality
Donna Norton, RS, Lenoir City ..... Land Use
Robert Oswalt, FM, Watts Bar ..... TVA Facilities
Denny Painter, ED, Nashville..... Economic Development/Industrial
Chett Peebles, RS, Knoxville ..... Visual Resources
Ralph Perhac, ED, Nashville..... Social Economic Resources
Kim Pilarski, RS, Knoxville ..... Wetland Resources
Edwin Scott, RS, Knoxville..... Aquatic Ecology
Rusty Smith, RS, Knoxville ..... Environmental Coordination
Charles Tichy, RS, Knoxville..... Historic Resources
Richard L. Toennisson, EP&P, Knoxville ..... NEPA Project Manager

Prepared by Richard L. Toennisson (EP&P); Reviewed by Harold M. Draper (EP&P), Michael Dobrogrosz (RS), and Khurshid K. Mehta (OGC); Approved by Bridgette K. Ellis (RS).

Watts Bar Reservoir Land Management Plan

Summary of Public Participation

Tennessee Valley Authority

November 2004

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Overview

From March, 2004, through October, 2004, public participation was sought to assist the Watts Bar Clinch Watershed Team in developing a land management plan to identify specific future uses for TVA-managed lands around Watts Bar Reservoir. To gather public input regarding TVA public land, TVA hosted a separate public meeting. A total of 142 participants attended the public meeting in Harriman, Tennessee. TVA received 95 individual letters or e-mails from 88 individuals, 126 information forms either mailed or directly input on the web site, and a petition with 183 signatures. Altogether specific comments were received from 214 individuals (or a total of 397 including the petition). This summary includes the potential environmental issues and comment themes gleaned from all the public comments received during the scoping process.

Public Notification and Comment Opportunities:

Notification of TVA's intent to prepare an Environmental Impact Statement, requests for comments, and the public meeting announcement appeared in the Federal Register on February, April and August, 2004. Public notices appeared in regional and local newspapers in August, 2004. In addition, there were several newspaper articles appeared during the comment period.
During the public meeting, TVA personnel were available to answer questions and discuss land use allocations. Information forms, writing materials, and a stenographer were available at the meeting. Over 1,000 information forms were mailed to interested people, and information forms were distributed at over 20 briefing sessions with stakeholder groups. Comments were transcribed *verbatim* for analysis. In addition, information about the proposed Watts Bar Plan and an interactive information form were available on the TVA web site.

Additional Public Input:

In addition to the public meeting, TVA advertised public participation opportunities through local newspapers, paid ads, individual letters, and a Notice of Intent published in the *Federal Register* encouraging individuals to submit comments regarding the Watts Bar Reservoir Land Management Plan. TVA received comments via phone-calls, e-mails and letters.

Analysis:

Using qualitative methodology, all public comments were compiled and analyzed to identify the range of issues and concerns that should be considered as part of the public scoping process. Each comment was categorized by its major issue, and comments were sorted into themes. Information form results were computed using quantitative software.

Summary

Overall Public Comment Themes:

Six predominant themes or general issues were identified from all the comments provided. These included the following: Natural Resources, Loss of Public Lands, Residential/Commercial Developments and Socio-economic Issues, Land Use Policy and Planning, Recreation Resources, and Proposals (*i.e.*, Development of Lowe's Branch, and the Clinch River Breeder Site). Of these, most comments concerned Natural Resources, Loss of Public Lands, Residential Commercial Developments, and Proposals.

Summary of Predominant Themes:

Natural Resources

Natural resources related comments were received concerning Air Quality, Wildlife, Water Quality, Litter and Debris, Navigation, Shoreline Stabilization, Threatened and Endangered Species, Wetlands, Cultural Resources, and Aesthetics. In particular, the U.S. Fish and Wildlife Service (FWS) and the Tennessee Department of Environment and Conservation (TDEC) identified sensitive species found in the Watts Bar area and provided suggestions for their management. Many respondents also expressed concern for the preservation of natural resources (*e.g.*, natural areas, wildlife habitat, and wetlands) and the ways in which these resources may be compromised by increased development.

Loss of Public Lands

Several stakeholder groups, specifically, the Tennessee Conservation League (TCL), Tennessee Ornithological Society (TOS), Ducks Unlimited (DU), and The Wildlife Society (TWS) as well as over 20 other commenters opposed the loss of TVA public lands. They cited that idea of using public land to stimulate the economy is obsolete and unneeded and that the environmental and social uses of undeveloped land were of greater value.

Residential/Commercial Development and Socio-economics

Comments from local city and county government organizations (*e.g.*, Chambers of Commerce) and developers encouraged the use of key parcels of TVA land for residential and commercial development. They cited the opportunity to create jobs, boost commerce, increase tax bases, and improve infrastructure as important to their communities. Some stated the need for a new TVA land zone utilizing any possible combination of allocation zones within a land parcel or 'Mixed Use.' However, most respondents on this issue commented on the need to limit or stop industrial, commercial and residential development on Watts Bar Reservoir. These expressed a concern about the potential destruction of natural surroundings due to continued development, and that the loss of undeveloped natural land would decrease the socio-economic value of the area.

Land Use Policy and Planning

Commenters said TVA should continue good management practices and adapt a comprehensive, long term, flexible plan. Some comments stated that Zone 3 and 4 parcels are important, and that contiguous undeveloped shoreline should not be developed. The

point was made that TVA should provide adequate funds and personnel to enforce its policies and that property owners controlled too much shoreline. Other comments identified inconsistencies in the treatment of large development versus small land owners by TVA. Some comments stated that TVA should transfer the property to other federal agencies if TVA can't manage it. Many respondents expressed either support or opposition to the development of the Lowe's Branch Area and the former Breeder Reactor site. Opponents expressed concern that it would reduce wildlife and outdoor recreation opportunities in the area. Proponents of the land exchange expressed that it would result in increased commerce and additional jobs for the area.

Recreation

The majority of the comments on recreation focused on watercraft use, campgrounds and trails, and TVA recreation policies (*e.g.*, marina placement, recreational opportunities, limiting commercial recreation). Commenters on watercraft use were concerned about noise and safety. They asked for speed limits, boater education and enforcement of laws. Commenters on Campgrounds and Trails asked for better maintenance and management of trails and campgrounds, more primitive camping areas, and reopening the Rhea Springs Campground.

Summary of Public Comments by Parcel:

TVA received comments which either confirmed or requested changes for use allocations regarding 43 specific parcels of land around Watts Bar Reservoir. Requests to keep or change allocation to Zone 4 were most frequent by individuals, stakeholder groups and a petition. Local city and county governments requested large local tracts of TVA land to support commercial, residential, or recreation development. Specifically, the majority of the comments were concerned with the parcels consisting of the former Clinch River Breeder Reactor site and the Lowe's Branch site near Watts Bar Dam.

Former Breeder Reactor Site

Respondents commented on a range of proposals from development to preservation. The City of Oak Ridge suggested that the site should be developed and that the site is a great opportunity for the area and should be designated for mixed use. Advocates for the Oak Ridge Reservation (AORR) and the Tennessee Citizens for Wilderness Planning (TCWP) provided a moderate development plan recognizing previous disturbances and using TVA's existing zones. The Oak Ridge Convention and Visitors Bureau asked for site to be leased (or that control be given) to the City of Oak Ridge to use for the Archery Shooters Association Tennessee Pro/Am Event for at least the next 5-years. Other commenters stated the site should not be developed and should be left as a wildlife management area and used for public hunting.

Lowe's Branch Site

Rhea and Meigs Counties commented that development of the Lowe's Branch Area would be good economically for Meigs and Rhea County and that a 'Mixed Use' allocation zone could change the economic condition of the area. Conversely, the a petition from the Friends of Watts Bar Lake, AORR, the Tennessee Wildlife Resources Agency (TWRA), TCWP, TOS, and almost 40 individuals commented that the area was one of a few left for primitive recreation and should not be developed but be allocated Zone 4. Lastly, TWRA commented that the area is heavily used for hunting and other types of outdoor recreation and should be transferred to TWRA.

Summary of Questionnaire Results

Respondents were asked to select and rank order three activities that were most important to them when using Watts Bar Reservoir. Results are presented in Table 1. Pleasure boating (45 percent chose this as one of their first three most important activities), viewing scenery (44 percent chose this as one of their first three most important activities) and fishing from a boat (33 percent chose this as one of their first three most important activities) were the most popular activities chosen. Few respondents (2 percent for each activity) chose golfing, jet skiing and horseback riding as their top three important activities.

Part I:
Public Comments Identified By Issue

Abbreviations for Government Agencies and Stakeholder Groups

AFORR	Advocates for the Oak Ridge Reservation
DU	Ducks Unlimited
FWS	Fish and Wildlife Service
NNSA	National Nuclear Security Administration
NRCS	Natural Resource Conservation Service
ORCC	Oak Ridge Chamber of Commerce
SHPO	State Historical Preservation Officer
TCL	Tennessee Conservation League
TCWP	Tennessee Citizens for Wilderness Planning
TDEC	Tennessee Division of Environment and Conservation
TCWN	Tennessee Clean Water Network
TOS	Tennessee Ornithological Society
TWRA	Tennessee Wildlife Resources Agency

General Comments - Comments about non-environmental issues or non-specific comments.

Comments	Source
Received the form on Oct. 7, only one day allotted to fill out and return this is not adequate time to get meaningful input.	Individual
We are concerned that the TVA Board will ignore this scoping and management planning process for Watts Bar and other reservoirs and do whatever they want regardless of what the public thinks.	TCL, and an Individual
TVA needs federal funding back so that it can afford to address environmental issues and a better job of managing our property.	Individual
TVA should promote citizen involvement in TVA water and land management through media sources.	Individual
There is not enough law enforcement on Watts Bar Lake.	Individual
Examination of the source of this action (i.e. political pressure for development) causing re-examination of currently designated land uses for certain parcels suggests that this assessment has been prompted by special interest i.e. developmental) groups.	Individual
Please submit the draft Environmental Impact Statement to us for review and comment when it is ready.	SHPO, FWS, and an Individual
Where do I get a copy of the plan?	Individuals (4)
This plan obviously represents a lot of work and thought. I support the concept but I would only have a concern about how easily someone could apply and get a variance.	Individual
TVA management must commit to follow through with the plans and results of the NEPA process and EIS, and present a range of alternatives.	TOS
We have concerns about water level management by the River Operation System.	Individuals (3)
TVA should maintain a proactive staff to seek ways to influence public opinion about environmentalists' so-called "natural" environments.	Individuals (2)

Natural Resources Issues - Comments about potential impacts on natural resources (air quality, water quality, plants, animals, aesthetics, etc.)	
Comments	**Source**
Environmentalists generally want the “natural” environment on someone else’s property, not their own. A “natural” environment needs to be realistically defined in terms of today’s world.	Individual
The Natural Resource Conservation Zones should not be developed.	Individuals (2)
Fragmentation of land parcels due to proposed land use allocations and the resulting ecosystem effects should be studied.	Individual
We need more areas to be left wild and undeveloped along the shoreline. There is already too much development at Watts Bar. It has the potential to be one of the few lakes that looks primitive and wild. Lots of animals and birds use this area.	Individual
Reforestation should be considered, removing dead pine trees and replacing them.	Individual
There should be more beneficial habitat for rare species, especially BOBWHITE QUAIL.	Individual
I would like to see my land on Watts Bar be designated natural resource conservation. I feel this is very critical to the future of Watts Bar Lake. As private lands continue to be developed cleared and built on. I feel it's TVA public duty to preserve and protect a natural land buffer for wildlife, lake health, recreation users, and hunting purposes.	Individual
Maintaining and protecting unbroken forest tracts, caves, wetlands and riparian zones, especially along reservoir tributaries should be a priority.	TOS
If developers can recognize more value in leaving trees than in removing them they would do so.	Individual
There should be more native grass plantings on TVA land.	Individual
We support TVA and the services it offers to our area, however my family hopes you will consider keeping these natural areas available to the public.	Individual
Include areas for research and native grass demonstrations.	NRCS
The continued increase in development around Watts Bar makes the existing wildlife habitat even more important.	TWRA and DU
Increase and preserve environmentally sensitive and resource management areas.	Individuals (4)

Air Quality

Comments	Source
Loudon, Meigs, Rhea, and Roane Counties are currently in attainment for all air quality Standards in accordance with TDEC, Division of Air Pollution Control Chapter 1200-3-3 Ambient Air Quality Standards.	TDEC
"Quantitative" comparison of short- and long-term potential impacts to air quality from existing versus proposed development should be studied.	Individual

Wildlife - Terrestrial and Aquatic, Plants and Animals

Comments	Source
TVA needs to manage the forest lands and the wildlife on them. This is a great benefit to society, ecosystem, and expected of TVA.	Individual
We are also very concerned about the loss of natural habitat brought about by expanded population of homes being built on the lake.	Individual
Invasive plant removal should be a priority. This includes eradication of kudzu, Virginia creeper, wild roses, tree-of-heaven, privet, autumn olive, air potato, and oriental bittersweet. As an adjacent land owner we'd be happy to work with TVA towards this goal.	Individuals (5)
Secure funding and partners (Boy Scouts, TWRA) to protect native species, remove exotic, invasive, and repair riparian corridor of our wonderful river.	Individual
Introduction of any species along TVA shores, whether creatures of the air or ground, introduces that species to private property. Many species can be destructive to private property owners.	Individual
Concern for wildlife habitat... Watts Bar is one of the few TVA lakes with unspoiled shoreline and adequate wildlife & endangered species habitat.	Individual
Bald Eagle habitat is and important issue. We do not need to disturb the natural habitat of Bald Eagles. Continue the Osprey program and introduce Eagles.	Individuals (3)
We are starting to see more wildlife coming into our area. We have provided a safe haven to many endangered species example, the Eagles are slowly appearing on a regular basis.	Individual
The areas adjacent to Watts Bar Lake containing the two known caves with bat colonies should be considered for designation that will ensure their protection.	F&WS
Habitat for resident and migrating birds has been dwindling for many years. If future generations are going to enjoy nature's greatness, we must provide habitat for these creatures now.	Individual

Fish spawn and water level fluctuation needs to be studied and controlled so spawns and hatches take place.	Individual
I would like to see the wildlife sanctuary areas to remain unchanged.	Individual
Increase areas for wildlife habitat.	NRCS, and DU
It is difficult to separate beneficial wildlife from destructive wildlife. Wildlife on TVA land migrate to private land and destroy privately cultured trees.	Individual
The TVA public reservoir lands are like individual state parks and wildlife management areas - - dispersed recreational/wildlife opportunities scattered among seven states.	TCL
Please assure that a contiguous wilderness corridor remains in tact for migrating birds and other animals that need the forest for survival.	Individual

Water Quality

Comments	Source
TVA should maintain a proactive staff to seek ways to influence public opinion about water quality, and thereby enlist the efforts of the public.	Individual
"Quantitative" comparison of short- and long-term potential impacts to reservoir water quality from existing versus proposed development should be studied.	Individual
TVA should protect and improve water quality.	AFORR and Individuals (7)
Watts Bar should be a made a non-dumping lake.	Individuals (2)
Provide cleaner water by encouraging everyone to take home their garbage.	Individual
Keep industry that would cause ANY water pollution off/away from the water. Dumping of waste of any kind must be stopped and heavy fines imposed on those that do both personal and business.	Individual
Protecting native species on the widest possible buffer will save cities and towns money on water treatment in the future.	TCWP and Individuals (3)
Prevent the dumping of waste and sewage from the commercial boats (tows), pleasure boats, residences, and communities into the reservoir, this impacts water quality. The laws should be enforced.	Individuals (7)
There are potential acute and chronic water quality impacts from increased boating traffic (e.g. hydrocarbon and other releases from boats, shoreline erosion and sedimentation that stems from boating).	Individual
TVA should use its influence to pressure business and industrial operations along the streams and lakes to improve water quality.	Individual

We need more pumping stations for waste disposal.	Individual
Sediment is the #1 pollutant in the State. Planning should seek to reduce sediment pollution by maintaining parcels as wildlands as much as possible.	Individual
Industrial facilities requiring dredging of the lake so barges can better access their facilities will disturb the contaminants from Oak Ridge that is now resting on the bottom of Watts Bar Lake.	Individual
Correction of inadequate community sewage systems, which often overflow sewage to lakes, will not be funded by those communities unless public pressure is brought to bear.	Individual
Increased lake recreational usage will result in greater water pollution.	Individual
Improperly controlled runoff from large property development can result in the reduction water quality.	Individual

Litter and Debris

Comments	Source
Litter control is an issue, TVA should help prevent and remove trash and debris in the lake and on the shoreline.	Keep Roane Beautiful, and Individuals (6)
People caught littering around the lake should be cited. Officers won't cite them unless they are eyewitness.	Keep Roane Beautiful
We need to clean up this beautiful natural resource before it is too late.	Individual
TVA should provide a public relations campaign or publicly denounce public policies that introduce trash and garbage to the Reservoir.	Individuals (2)
If TVA restricts use from public in "Natural Areas" TVA should be responsible for stabilizing and cleaning up. We are doing this for TVA now. Currently a dock with gas grill has floated in to the back of this cove area. What do we do? We want to protect springs and water sources in the cove. Offer access in some forms for less development of bluff area or designated more "remote" areas for reserves/natural conservation. This area will not succeed as a natural habitat---too narrow.	Individual
A junkyard exists on TVA property on Buzzard Roost Road and should be removed.	Individual

Navigation

Comments	Source
Keep navigation in consideration at all times. East TN can greatly expand with commercial use on the waterways with the addition of a 600' lock at Chattanooga.	Individual

Shoreline Stabilization

Comments	Source
Increased lake recreational usage with larger greater powered boats, and wave runners cause larger wakes with larger wave action will increase bank erosion.	Individuals (3)
More shoreline stabilization is needed.	Individuals (2)
Changes in Lake level goals will make shoreline erosion worse.	Individual
Tree coverage on shorelines [the more tree covered shoreline that can be preserved, the better Watts Bar will be in the long run for the public and private interests]	Individual
Shoreline stabilization is very important for the Harriman Riverfront Park on the Emory River.	Individual
There should be better containment of runoff into the lake from construction near the lake.	Individual
Shoreline erosion is and important issue on Watts Bar Reservoir.	Individuals (3)
I would like to see action taken to stop erosion of the shoreline areas, especially the small islands where birds congregate.	Individuals (2)
We recommend that the management plan contain provisions that will permit development of docks and other recreational facilities such that shoreline erosion is avoided or minimized and that retains maximum forested buffers between the shoreline and developments.	FWS

Threatened and Endangered Species

Comments	Source
TVA should not be involved with endangered species except where dictated by law.	Individual
Endangered species collection records available to us indicate that the following federally listed endangered and threatened species may occur in the action area: Gray Bat – *Myotis grisescens* [E], Bald Eagle – *Haliaeetus leucocephalus* [T], Snail Darter – *Percina tanasi* [T], Orangefoot Pimpleback – *Plethobasus cooperianus* [E], Pink Mucket Pearlymussel – *Lampsilis abrupta* [E], Dromedary Pearlymussel – *Dromus dromas* [E], Anthony's Riversnail – *Athearnia anthonyi* [E], American Hart's Tongue Fern – *Asplenium scolopendrium var.*	FWS

americanum [T]. Watts Bar Reservoir and shoreline provide habitat for a diverse and numerous array of rare plants and animals including the following federally listed species: Gray Bat – *Myotis grisescens*, Bald Eagle – *Haliaeetus leucocephalus,* Spotfin Chub – *Hybopsis monacha*, Cumberland Rosemary – *Conradina verticllata*, and Virgina Spiracea – *Spiraea virginiana. TDEC Division of Natural Heritage [DNH] encourages TVA to continue preserving habitat of rare, threatened and endangered species as well as protecting unique wildlife habitats and ecologically sensitive sites.*	TDEC
Identify and protect areas with Bald Eagles. The areas around Watts Bar Lake containing the three known bald eagle nests should be considered for designation as 'Sensitive Resource Management Areas.'	FWS and an Individual
It is possible that one or more of the numerous caves in the vicinity of Watts Bar Lake provide suitable habitat for American hart's tongue fern and/or listed bat species. If so, the caves should be designated as sensitive areas or resource conservation areas.	FWS

Wetlands

Comments	Source
TVA should manage their current wetlands but not create new wetlands.	Individual
Areas around Watts Bar Lake under TVA jurisdiction containing forested or scrub-shrub wetlands should be designated for protection.	FWS

Cultural Resources

Comments	Source
TVA should protect cultural resources on its properties.	Individual
The project as currently proposed may adversely affect properties that are eligible for listing in the National Register of Historic Places.	TSHPO

Aesthetics

Comments	Source
TVA should provide access for the general public to those significant natural and scenic areas now found on TVA owned land and provide protection of those resources.	Individuals (2) and TOS
Please always retain the natural beauty. We can't afford to destroy this beautiful river and lake. The natural beauty of the lake cannot be recovered if the conservation lands are developed.	Individuals (3)
TVA should not allow any development on Zones 3 and 4 because it	Individual

will ruin the natural beauty of that portion of the lake. Watts Bar is one of the most beautiful lakes in the TN River system because of the large undeveloped areas.	

Loss of Public Land Issue - Comments about TVA giving up public land or the general loss of public lands.

Comments	Source
Thousands of acres of private lakefront around Watts Bar Reservoir have already been developed, and thousands more are vulnerable to development in coming years. Public lands should be maintained in a wild state to preserve the scenic beauty and wildlife value of the area. We should be preserving all the special tracts of public land that we can not giving it them up.	TCL, TOS, and an Individual
TVA should not sell public land for private or commercial use. The public doesn't want more development. TVA land should be preserved for public use and for natural resource conservation and management.	Individuals (15), DU, TOS and TWS
There should be no net loss of public land on Watts Bar Reservoir; any land lost for development should be replaced.	TCL
There is ample land in Tennessee for commercial and industrial development other than on Watts Bar.	Individuals (3), and TWS
Selling land is contrary to public opinion, this is a loss (breach) of trust (credibility) for TVA.	Individuals (5)
Selling off Watts Bar Lake-front property to build industrial and manufacturing facilities will not reverse the mass exodus of manufacturing jobs.	Individual
Private developers should not be allowed to purchase public lands since these were previously privately owned and relinquished for public use for the good of all citizens earlier in TVA history. This is a poor situation that benefits a very few individuals.	Individual
Please stop further commercial and residential development in favor of wilderness. I oppose the sale of public lands that are natural to be sold to private developers AT ANY COST FOR ANY REASON. We do not have enough public land in TN.	Individual
I say no in a loud and clear voice to any proposal by TVA to sell or develop even one acre of public TVA lands on any reservoir or other properties. I advocate a firm stand for zero development on any of our public lands that TVA manages and that currently are not developed. These lands were taken by eminent domain for public use not private use or corporate or private profit. When they are developed the public is evicted forever and the public loses and conservation loses. Too many people gave up too much of their land and their lives for "the public good" to now see their sacrifices squandered for private gain	TCL

when their land was taken for public use.	
We are losing the equivalent of one county per year in Tennessee to development. If development is to continue, and it will, let it happen on private land, not public land.	TCL
The public through an array of private and public groups and philanthropists are raising millions $ to purchase for public use tens of thousands of acres for outdoor recreation and conservation. It therefore makes absolutely no sense for TVA to consider selling or developing the best of what we already have.	TCL

Residential and Commercial Developments and Socio-economic Issues - Comments about future residential and commercial development on Watts Bar Reservoir, and the economic importance of land and TVA activities to the local communities.

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Socio-Economic Impacts

Comments	Source
Increased lakefront developments will provide greater tax base for counties and will be supported by the counties, with little County concern for effect on lake quality.	Individual
Increased population will result in increased lake front population.	Individual
Economic value and incentives would be lost be the continued development of the remaining undeveloped land, it is the undeveloped land that adds value to the area.	Individual
TVA land makes access to this wonderful lake available to those of us who can't afford huge lakefront houses. Camping on an island is a great family experience and is more affordable for most people than lakefront property.	Individual
We are no longer in the depression era 1930'3 and 40's when the South was impoverished - - no jobs, no industry, no development. Development can now take place just fine without assistance from TVA by selling our public lands.	TCL
The need to protect public lands has never been greater. The Knoxville area is experiencing some of the highest population and new housing growth in the state. The Knoxville Region has ranked in the top ten nationally for urban sprawl.	TOS, TWS
TVA should be more interactive with County zoning and control boards.	Individual
Developers will open many more access roads across wooded properties to lake fronts.	Individual
There is also nothing to support the idea that "...another Tellico Village [or two] will be good for everyone that now utilizes Watts Bar	Individual

Lake..." and selling off more residential property will just give TVA another group of lake-front property owners that continually complain whenever lake levels are lowered. Additionally, in preparing the draft EIS for the reservoir, we ask TVA to measure and evaluate the benefit of these public lands from the perspective of benefits that result from these lands remaining in public holding versus their loss. Examples of items to measure are: 1. Water quality protected by public shoreline from exacerbated erosion. 2. Value of fish and wildlife habitat on TVA public lands. 3. Value of protecting threatened, endangered and rare species habitat and cost of mitigating this habitat loss if lands were developed. 4. Survey public opinion in a 200 miles radius regarding public land use at Watts Bar reservoir. 5. Value of existing forests in terms of improving air quality. 6. Value of undeveloped shoreline to fisheries habitats and in turn to the economic benefit of quality fishing to the communities. 7. A comparison of the costs of maintaining these public lands on an annual basis as compared to cost of maintaining developed lands in the area. 8. How much revenue active forest management on TVA public lands, conducted utilizing sound scientific methods, would produce for TVA. Additionally, what revenues could be produced if TVA had their forested acres certified by the Sustainable Forestry Initiative or the Forest Stewardship Council systems and the premium prices timber would bring from such certified lumber. 9. How much revenue could be generated if a user permit was created for TVA public lands, like parks or wildlife management areas.	TCL

Residential and Commercial Development

Comments	Source
I am looking for opportunities for residential development and marinas.	Individual
There should be more Residential and Commercial development on Watts Bar.	Individuals (2)

The environment is fine. We need more space for development.	ORCC
I am interested in marketing and selling TVA land.	Individual (2)
We need additional lands available for economic development and developed recreation. Elected officials from the 10 Southeast Tennessee Counties unanimously endorsed the development of land adjoining to Watts bar Dam in Rhea and Meigs County.	Rhea County
I would like to say that I believe that TVA sponsors more than an adequate amount of commercial and industrial zones within the Tennessee Valley. I believe that TVA has provided sustainable economic growth (having reviewed some of the information on the website), and I would like to see TVA and other federal agencies expand their commitment to preserving the environment and enhancing the natural pleasures of Tennessee.	Individual
Concerned that too much commercial development along the lake areas [especially near the Kingston City Park area], will spoil and hide the lake view. This would detract from the reason why folks enjoy and appreciate the openness of the area in the first place.	Individual
There should be no further or minimal Residential, and Commercial or Industrial development of TVA Public lands on Watts Bar reservoir. These public lands should be maintained for public use including wildlife habitat.	Individuals (15), DU, and The Wildlife Society
There has been too much commercialization and residential development of TVA public land.	Individuals (3)
There has been tremendous development around Watts Bar Reservoir (and many plans for more), mostly in the form of residential development on private land. To balance this development, I recommend that TVA abstain from further development on its land holding and preserve what is left for natural resource conservation: A balance between the two is being lost.	Individual
Industrial sites can be found on existing privately owned land.	Individuals (2)
Increased lake front development will result in more multiple slip docks and boat houses to accommodate developers in their sales efforts. Such developments are no more than small marinas.	Individual
It seems like a similar "land-use plan" concerning the converting of about 400 acres on Nickajack to another "Tellico Village" came up a couple of years back. Thanks to public outcry, this idea back-fired and the lake-front property was left "as-is."	Individual

Land Use Policy and Planning Issues - Comments on TVA's management of public lands, the planning for management and use of public lands, or potential results of TVA's management and planning.

Land Use Policy and Issues

Comments	Source
There are too many yards reaching to the lake and no trees passing on those lands - what happened to the 750 mark. Lake homeowners are controlling to much around the lake area.	Individual
We encourage the TVA Board to adapt a comprehensive land use policy that is consistent for all TVA properties. We feel that this policy should place a high priority on maintaining natural habitats, discourage commercial and private recreational development and not allow for the sale of public land to developers or private citizens.	TOS
New developments who create hazards and reduced quality of life for current residents. Specifically in promising docks to interior lot buyers, then putting too many in small coves.	Individual
Continue good land management practices.	Individual
If TVA cannot continue to properly manage these properties as a result of their continual "downsizing", "right-sizing" and "cost-cutting" business-side initiatives, then TVA's "care taker" government-agency responsibilities need to be transferred to another Federal agency where the primary goal of upper management is not focusing solely on reducing the organization's debt and continually trying to wiggle out of their duties, responsibilities and obligations.	Individual
The protection of Zone 3 and 4 parcels is very important and we urge TVA to fund positions and leverage volunteers to enforce the zoning.	AFORR, TCWP and Individuals (3)
TVA should provide adequate funds and personnel to enforce their land rights and policies on TVA land.	Individuals (4)
Lake home owners controlling too much of lake.	Individual
Please think ahead and not behind. We are losing our natural areas to development (commercial, recreational, etc.). My fear is that one day, in the near future, we will wish those developed areas were used differently.	Individual
I feel like TVA should build more flexibility into their land use plans. I'm not suggesting that more land be set aside for guaranteed access rights, I'm suggesting that more land be set up so that at TVA's discretion, docks could be permitted. TVA could come in and subjectively look at the land to determine if a dock would be appropriate. It seems unfair that a developer could clear hundreds of acres in Rarity Ridge to build houses, marinas, etc. but yet I can't build a dock [ft. long], next to my neighbor's 30 ft. dock. And the reason is	Individual

because the orange-colored marginal strip area does not extend an additional 20 yards to my property. I feel like if more land was planned like parcel #122 was, then TVA could make more subjective decisions.	

Land use Planning

Comments	Source
We support the re-evaluation of the Watts Bar Land Use Plan	Individual
The Land Use Plan should consider future generations and the long term.	DU and an Individual
From a general tourism perspective it is crucial to find a balance between recreational, commercial and preservation needs. A well developed plan can provide a tremendous positive economic impact to the community, while at the same time preserve the natural elements that make it a special place. Guiding the growth will be the key to success in the future. I also believe it is important to have what I call a "flexible" plan. The needs/wants of people who will utilize Watts Bar in the future may be dramatically different then the needs of current users.	Individual
Are the seven different "zones" [such as Sensitive Resource Management and Natural Resource Conservation] drawn in such a way, that a specific area of land can meet both interests of the two of the zones? I think it would be a good idea if the Sensitive Resource zones could overlap with the Natural Resource Conservation and Developed Recreation zones. If possible, allowing specific areas of land to serve the dual interests of preserving species, etc., as well as allowing interested peoples the enjoyment of recreation, etc. I believe combining these interests would allow individuals to learn more about protecting the natural resources of the Tennessee Valley, and would encourage more persons to become active in such endeavors.	Individual
Contiguous land areas and undeveloped shoreline owned by TVA should not be developed.	Individual

Land Use Allocation

Comments	Source
All should be Zoned 3 or 4 if not already	Individual
I believe most of the land currently in Zone 4 should be moved to Zone 3. The natural beauty of the lake cannot be recovered if the conservation lands are developed.	Individuals (2)
Land & wildlife conservation should be the top priority.	Individual
Although the acreages allocated to Zones 3 and 4 appear to be relatively large, it should be noted that these zones take up a very small percentages of the total shorelines around the reservoir. Most of the acreage is on islands & peninsulas. Many more shoreline miles should be allocated to Zones 3 and 4 to improve scenery, protect	Individual

water quality, and provide shoreline experience for people using these zones.	
More public access for all subdivisions.	Individual
TVA should expand Zone 4 concepts into Zone 6 as well. The natural use of lands is currently being overtaken by the increase of concrete structures, parking lots, and motorized recreational vehicles.	Individual
The areas closest to Oak Ridge need to be left natural and the public land should not be used for industrial development since this is upstream of the natural areas which need to be preserved.	Individual
All Zone 4s should stay Zone 4.	TCWN
The proposed Zone 3 status for islands and peninsulas is very desirable for wildlife safe areas corridors and nesting birds, lake users, and natural viewsheds.	TCWP, TOS and Individuals (3)
All Zone 6 [Recreation] should stay open to the general public with no private development.	Individual
All Zone 5 [Economic Development] should be developed to Environmental areas such as Wildlife habitat. NOT ECONOMIC!!!	Individuals (2)
We support land use for the general public over other uses.	AFORR and Individuals (2)
Wild and scenic land in Tennessee should be protected.	TOS
TEDC supports a land allocation process that would enhance or expand ‘Small Wildlife Areas and Habitat Protection Areas’ on Watts Bar Reservoir.	TDEC

Mixed Use

Comments	Source
No lands should be allocated for "mixed-use" only the listed designations should be used.	Individual
An 8th Zone should be added to the plan for designation of mixed use of properties. Land designated as mixed use should be utilized for both residential and industrial development as well as for commercial development ancillary to its residential or industrial uses.	ORCC and Individuals (3)

Recreation Resources Issues - Comments about the recreational use of TVA property on Watts Bar Reservoir.

General Recreation

Comments	Source
Maintain areas primarily for recreation. Create more camping and hunting areas. Mix commercial and restricted in sparingly.	Individual
We have a large selection of marinas. I would like to see some pressure on the existing marinas to keep their facilities in good repair. I object to additional marinas while most of the currently permitted marinas are in poor shape and poorly used.	Individual
The recreation areas should be left the way they are now	Individual
All Marinas on Watts Bar should be on off-channel locations.	Individuals (2)
Golf communities do not constitute public recreation, and these lands would be unusable by the majority of the public.	Individual
Would like to have more public use areas for recreation [Camping, Hiking, Biking, Hunting, Fishing]	Individuals (2)
The Zone 6 [Recreation] areas should provide for capital development where the intent is to keep these areas developed at a minimum, to insure the scenic views. That is, not to overcrowd, since that could lead to empty sights that become unsightly.	Individual
We believe that the quality of life depends upon open space areas and the ability to recreate in these areas.	TWRA
Is there any way that restroom facilities could be added to boat launching ramp areas?	Individual
All relatively large undeveloped areas should be managed for low-impact recreation and hunting.	Individual
There is enough developed recreation on the rest of the TVA system - I do not believe we need more on Watts Bar than already exists.	Individual
Support and enlarge the Small Wild Areas.	Individual
Please keep the area free of concession development [campgrounds, resorts, etc…]	Individual

Watercraft

Comments	Source
There will be much boat traffic (jet skis and boats), causing erosion, noise, safety problems and over crowdedness.	Individual
Lack of control of boat speeds near the shoreline is of concern to preservation of the shoreline... many lakes limit vessel speed within certain distance from shore... watts bar seems only concerned with distance from marinas.	Individual
Reduce and enforce boating noise.	Individual
Educate boaters about safety and boating laws.	Individuals (2)
I would like to see more boat docks placed at launching areas to provide a place to tie up boats while parking cars and loading passengers.	Individual
I believe that the watts bar reservoir should be at summer level by memorial and be left at summer level through labor day, I have had trouble in the past getting my boat off its lift because of levels being lowered and the shallow water, this is my main concern, the recreation factor for my family.	Individual
Establish boat speed limits, distance from residential docks specific use areas for wake creating boats and better PWC use rules.	Individual

Campgrounds and Trails

Comments	Source
On primitive camping areas, and swimming areas there should be portable bathrooms and garbage dumpsters.	Individual
We trail ride a lot. Many families around here are looking for equestrian trails.	Individual
If you are going to make hiking/bike trails make them usable. It makes no sense to have an area to do mountain bike races etc and make it difficult for sponsors to setup booths at the races. Same things for triathlons and trail running events.	Individual
TVA campgrounds and boat ramps should be managed with a uniform set of rules set by TVA, and should be adhered to. Too many times we have tried to use a TVA operated campground and found that the "resident manager" makes his/her own sets of rules. I would like to see more areas available for "tent camping" without having to compete with RV's for waterfront properties. RV's and tent campers should only be allowed to keep a site for a certain number of days. Many seem to have set up permanent residence.	Individuals (2)
There should be better maintenance and policing of recreational areas.	Individuals (2)

TVA should provide more areas to hike, camp, or hunt.	Individuals (3)
TVA should encourage low impact recreation	Individual
TVA should not be involved in creation of Recreation areas on County Land	Individual
The roads on Zone 4 areas should be open, especially for primitive camping. Patrolling the roads should be used as a control instead.	Individual
The Rhea Springs Campground has been closed for 2 years and should be opened.	Individual (3)
Check on location of Bayside “No Wake” buoys, they seem too far out.	Individual

Part II:
Public Comments Identified by Parcel

Parcels Allocations
Comments about the allocation of specific TVA land parcels on Watts Bar Reservoir.

Parcels 142, 143, 144, 145, 147, and 148 - Old Clinch River Breeder Site

Comments	Source
There are Concerns about potential residential development at the 'Breeder Site' impacting DOE operations.	DOE
The Clinch River Breeder Site - I would use for residential.	ORCC
The Breeder site should be developed and is a great opportunity for the area.	City of Oak Ridge
The Clinch River Industrial Site 'Breeder Site' should be designated for mixed use property.	ORCC and City of Oak Ridge
The Clinch River Breeder Site should have a new zone for mixed use which includes industrial, commercial, residential, buffer.	ORCC and City of Oak Ridge)
Parcel 142 -148 on the Breeder site should be Zone 4, and 6. If it is sold for private development. I can't go there any more, nor will I get any use out of it.	Individual
On Parcels 142 to 148, limit industrial/commercial development to the former breeder reactor site [disturbed areas and adjacent lands] and reserve rugged upland areas for Zone 4.	Individual
Divide the parcel [Clinch River Breeder Site] so that the disturbed land as shown of Chestnut Ridge, including the wetlands along Grassy Creek to the river shoreline Zone 3. The shoreline from the existing road to the river should be classified Zone 3. The balance of the parcel [Site] should Zone 4.	Individual
We would like to see the Breeder Site leased [or control given] to the City of Oak Ridge to use for the Archery Shooters Association Tennessee Pro/Am Event for at least the next 5-years. This event has a regional economic impact of more than $1 million annually and also has limited environmental impact. This site also has the potential to be used for other outdoor events with limited environmental impact. We would also like the use of the Breeder Site to include a primitive or full-service campground to accommodate visitors.	Individual, and Oak Ridge Convention and Visitors Bureau)
The Clinch River Breeder Site should not be developed.	Individual

The Breeder Realtor site should be left as a wildlife management area and used for public hunting - Parcels 142, 143, 144, 145, 147, 148 leave as Zone 4.	Individuals (2)
Parcels 142, 143, 145 and 146 should change from Zone 5 to Zone 4	Individual
Highly disturbed land at Clinch River Breeder Reactor site should be developed. Shoreline and undisturbed uplands should be managed as natural areas, and for hunting, hiking, and general low-impact recreational activities.	Individual
TVA Clinch River Breeder site; designated land from the existing road to the river Zone 3. Designate land from the top of Chestnut Ridge to the Northern boundary zone 3. Designate land from top of Chestnut Ridge to below the power line zone 4. Change land North of Grubb Island to Zone 3. Balance should be Zone 5.	Individual
Development [Zone 5] on the Breeder site should be kept in the area that is already disturbed the rest of the site should be Zone 3 or 4.	Individuals (3)
On the Breeder Site, Zone 3 would protect wildlife habitat, wetlands, critical sites and threatened and endangered species. A portion of Zone 3 would provide a contiguous forest with DOE protected forest.	AFORR, TCWP and Individuals (4)
A strip between 75 m and 300 m wide should be maintained along the edge of the reservoir and designated Zone 3. This strip should reach approximately to the 70-foot contour line along most of the shoreline, dipping down to form a narrow strip only to the 760-foot contour line in the immediate vicinity of the old excavation. Parcel 144 - previously designated for natural resource management - and a similar strip of shoreline along parcel 142 could easily be incorporated into Zone 3.	AFORR, TCWP and Individuals (4)
Parcel 146 should remain as Zone 3 because of rare plants in the area.	AFORR, TCWP and Individuals (4)
On the Breeder Site, Zone 4 could provide activities such as hiking, hunting, etc. And will enhance wildlife habitat and forestry. This will also provide a contiguous forest with DOE protected forest.	AFORR, TCWP and Individuals (4)
Parcels 143, 144, 147, and 148 and most of parcel 142 should remain as Zone 4.	AFORR, TCWP and Individuals (4)
Parcels 142, 143, 146, 147, and 148 are not suitable for residential, commercial or industrial development because: most of this area is very steep and rugged; unsafe for development because they are down wind of the radioactive and mixed waste incinerators on Bear Creek Road; and parcel 143 is unsafe for residential development and would be noisy because parcel 143 is near a firing range.	AFORR, TCWP and Individuals (3)

On the Breeder Site, Zone 5 could include the previously disturbed breeder site and makes a good industrial site and if implemented as shown on map would cause negligible environmental impacts. This will provide an excellent light industrial site which could bring in jobs replacing those lost by DOE downsizing.	AFORR, TCWP and Individuals (3)
Portions of parcels 145 and 142 should be designated for Zone 5, but that the portions of parcels 145 and 142 designated for economic development should be limited to the area previously designated for economic development should be limited to the area previously disturbed by prior construction and immediately adjacent level land.	AFORR, and Individuals (3)
The NNSA is concerned that the land use for the Breeder Site might be changed to allow for residential development. Such a change in land use could adversely impact weapons training for our security forces due to noise complaints. Any residential development in that area would have to deal with disturbances from early morning and late night weapons fire from the Central Training Facility. Due to complaints by the public, similar weapons training facilities across the country have been forced to implement firing restrictions that severely impacted their ability to meet firearms qualifications. The NNSA strongly urges that land use for the Clinch River Breeder Site be designated as "Natural Resources and Informal Recreation" or "General Industrial." The NNSA is opposed to any land use change which would allow for residential development.	NNSA

Parcel 257

Comments	Source
Reallocate parcel 257 to allow commercial recreation consisting of a small commercial landing with facilities for lakefront dining [seasonal], rental boat slips, fueling, and a public boat launch and landing. The parcel [7.7 acres] consists of a marginal strip of shoreline occupying the interior of a cove surrounded by Godsey Hollow at the base of Wilson Ridge. The proposal seeks to combine this interior cove frontage with a contiguous 216 acres of private land to create a mixed use residential and commercial development.	Individuals (2)
Do not allow development on parcel 257 which would destroy its beauty, there is no need too and it should be left the way it is to provide habitat to wildlife.	Individuals (3)
Parcel 257 is an outstanding little wildlife refuge. I have built and mounted approximately 3 dozen Wood Duck nesting boxes in various places on the lake and we get two hatches from that cove each year. This year I observed a hatch of 11 and one of 5. It is about the only place for a half mile in either direction that larger animals can easily approach the waters edge. I have seen many deer swimming from this cove to Goat Island and towards Iron Island. It seems to allow wild life from Rhea County to migrate back	Individual

and forth to The Fooshee Peninsula and Iron Island Areas	
Do not change parcels 258 and 257.	Individual

Parcel 255 - Sand Island

Comments	Source
These are a few suggestions for the Sand Island area also known as Parcel 255. Anybody that uses the lower end of Watts Bar Lake knows how many people use this island as a recreational area. Sand Island is a high traffic area, many people use this location for recreation. Many times in the summer on an average Saturday there can be as many as 150 boats surrounding this island. I can't think of another place on any of the area lakes that has such a draw. I would think this would be enough reason to have some debate over funding and or potential changes that could enhance an area so important to so many peoples lake experience. Other than a couple of garbage cans and a very primitive bathroom, TVA has done little to make this place user friendly. The budget should be increased to make this more of a family friendly place. Suggestions would be; - Extend the beaches by clearing brush or grassy area. - Clean rest room regularly and or remodel, paint, etc. - Bring tables and bar-b-que grills [steel or concrete] nearer to beaches. - Add a dock in the deeper area of the island so that it could be used as a "drop off" location. Sometimes entering by stepping into the water limits the use of the island. - Add a large swing set or slide for the kids. - Request to TWRA that this should be a "no wake" zone in the summer months. - Add a covered area for picnics. - Add a walking trail around the island.	Individual
TVA should consider Zone 6 - Developed Recreation for Parcel 255.	Individual

Parcels 5, 283, 284, 285, 297, 298, and 299 - Lowe's Branch Area

Comments	Source
TVA may now allow development on the property near Watts Bar Dam. I have inquired on many occasions about this land and have been denied opportunity to purchase for development.	Individual
Development of the Lowe's Branch Area would be good economically for Meigs and Rhea County	Individuals (2)
A Mixed use zone around the Watts Bar Dam Area could change the economic condition of the area.	Individuals (2)
This property is currently being degraded by vandals and 4-wheelers.	Individual
I would like to see Lower Watts Bar Area left as Natural Resource Conservation (Hiking, hunting, camping. forestry) with a buffer zone by Watts Bar Dam.	Individual
Parcels 283, 285, 297, 298, 299 should not be developed and should remain as Natural Resource and Conservation areas. There should be more primitive camp sites cleared, but not developed commercially.	Individuals (18)
Parcel 296 should be business/light industrial - Zone 5.	Individual
Parcels 297, 298, and 299 should be Zone 6.	Individual
Parcel 5 should be Zone 6.	Individual
Parcels 297, 299, and 296 should remain as Zone 3, Sensitive Resource.	Individual
We need additional lands available for economic development and developed recreation. Elected officials from the 10 Southeast Tennessee Counties unanimously endorsed the development of land adjoining Watts bar Dam in Rhea and Meigs County.	Rhea County
Do not allow commercial development of parcels 283, 284, 285, 297, 298, 299 and Jackson Island, it is one of a few primitive areas left and should be Zone 4.	Individuals (27) and Friends of Watts Bar Lake petition with 183 signatures
The yet unzoned parcels 295, 296, 297, 298, and 299 should be Zone 4 and not developed.	TWRA, TCWP, TOC, Individuals (11)
Parcels 296-299, about 735 acres, is heavily used for hunting and other types of outdoor recreation. These parcels should be transferred to TWRA.	TWRA

Parcels 240 and 241 - Brigadoon Resort

Comments	Source
Want to purchase two small tracts [0.5 acres] adjoining Brigadoon Marina.	Individual
TVA should not transfer Parcels 240 and 241 to Brigadoon Marina.	Individual

Parcel 65 - Marney Bluff Habitat Protection Area

Comments	Source
Owners interested in exchanging land use along top of bluff for existing bald eagle, gold eagle, osprey and other birds of prey habitat protection area in exchange for unrestricted use of small cove on downstream of the bluff. The cove has been cultivated in the past. The area above the bluff and proposed habitat enlargement area is held for future residential subdivision development.	Individual
Parcel 65 - Cooperation with backlying landowners to exchange lake access for more protection of Bluff area for Eagles. As our property develops, the eagles will leave because the reserve area is so narrow. Also, TVA doesn't priorities stabilizing shorelines to protect this area washing away [Heavy barge traffic...critical erosion area.] We stabilized TVA's property on this tract. No partnering available. Area is still a critical erosion area.	Individual

Parcel 44

Comments	Source
Tract should be used in a maintain and gain proposal with Gerald Larger. Matt Caldwell is willing to extinguish rights on a tract at the Clinch and Emory and use Largen's shoreline in the proposal.	Individual

Parcel 153

Comments	Source
Access to peninsula currently includes people camping. Should this area be changed to recreation. The area should be developed into a day use area and opened up and maintained.	Individual

Parcels 237 and 238 - Whites Creek Small Wild Area

Comments	Source
This area provides for songbirds, wildlife, a hardwood forest, wetlands, and could provide a hiking trail.	TCWP, and an Individual
The Whites Creek Small Wild Area [parcel 238] should be maintained and be classified as Zone 3.	TCWP, and an Individual

The Whites Creek Land Area [parcel 237] should be classified as a Small Wild Area and be Zone 3.	TCWP, and Individuals (2)

Parcels 223 and 224 - The Fingers Area

Comments	Source
This area could provide hiking and canoeing activities, protect wetlands and wildlife habitat and provide a trail.	TCWP and an Individual
Parcels 223 and 224 should be designated as Zone 3.	TCWP and Individuals (2)

Parcel 266 - Rhea Springs Campground

Comments	Source
TWRA is interested in improving [riprap and parking lot] and operating the boat ramp and immediate area at Rhea Springs Campground.	TWRA

Parcels 119, 120, 121, 122, 123, and 12-65 - Kingston Water Front

Comments	Source
A study to determine opportunities for the development of the Kingston waterfront on Watts Bar is currently underway. We may request that Parcels 120 and 122 [Zone 2]; 121 and 12-65 [Zone 6] and; 119 and 123 [Zone 7] change to Zone 5.	City of Kingston

Parcel 218 - Rockwood Waterfront

Comments	Source
Propose to change Parcel 218 from Zone 5 to a new Zone 8 Mixed use. The industrial area is little used but would provide an excellent site for a marina/restaurant within the City of Rockwood.	City of Rockwood

Harriman Waterfront

Comments	Source
Harriman Riverfront Park - would like to see the park continue to develop along the Emory River with some private funds and help with government help [Federal and State level]	Individual

Parcel 12-53 - Sugar Tree Boat Launch

Comments	Source
I seldom use the sugar tree boat launch, but its located about a quarter mile from my house. It is a haven for drunks, dope attics and litter bugs. The place has no lighting and is well concealed from the road making an ideal place for people to park at night, get stoned or drunk and dump trash on a nightly bases. The problem could easily be solved if the tree line that blocks car lights form	Individual

shining on the area was removed. The tree line is only about 150 feet long and 50 feet wide. This action would make Peninsula Road a safer and cleaner road.

Parcels 7, 8, 9, and 10 - Fooshee Area

Comments	Source
Parcel 9 should be changed to Zone 4 to continue protection of Fooshee Small Wild area.	Individuals (3)
Parcels 7-10 should be managed as Zones 3 and 4 to the maximum extent possible, to maintain contiguous acreage to protect sensitive resources.	Individual
Do not change Parcels 7 and 8.	Individual
Fooshee Campground should not be expanded.	Individual

Southwest Point

Comments	Source
Suggest area for a resort and conference center be planned, it is just south of the SW Point golf course on Highway 58, believe the farm now owned by a John McMurrat.	Individual

Parcel 74 - Riley Creek Campground

Comments	Source
Please take a look at the parcel allocated for Riley Creek Campground. In the previous plan map, this area was split into two parcels [125-126]. I feel like parcel 126 should be allocated much like parcel 122 was in the old plan. Parcel 122's description is very similar to 126, except 122 states that private shoreline improvements have been approved and will be considered. I feel like more land should be allocated like this where TVA has the option, but not the guarantee to give a dock.	Individual

Parcels 2 and 3 - Watts Bar Reservation

Comments	Source
Parcel 2 and 3 should be opened for hunting.	Individual

Parcel 47 - Camp John Knox

Comments	Source
Can Parcel 47 be given to camp John Knox? It is protected for significant cultural resources, just like the Indian Mounds currently on the property. We would not develop it, but the addition would complete the peninsula that can't be used for any development or other purpose.	Individual

Parcel 227

Comments	Source
There is a duck blind on the island on Parcel 227 which should be removed. Neither TVA nor TWRA will have it removed, both claiming they have no authority.	Individual

Parcel 46, 267, and 268 - Thief Neck Island, Muddy Creek, and Whites Creek

Comments	Source
TWRA and DU would like to prose a joint venture to increase waterfowl habitat on Parcel 268 Muddy Creek area , Parcel 267, Parcel 46 Thief neck Island, and Whites creek.	DU

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PART III:

Information Form Results

Respondents were asked to indicate their preferences regarding facilities, areas, and services throughout the Watts Bar area. Altogether, 126 forms were completed at the public meeting, mailed to NEPA Administration, or completed on TVA's Web Site. The questions were divided into the following three themes: recreation, natural resource, and development preferences. Questions from each theme were analyzed independently.

Respondents were asked to select and rank order three activities they considered most important to them when using Watts Bar Reservoir. Results are presented in Table 1 below. Pleasure boating (45 percent chose this as one of their first three most important activities), viewing scenery (44 percent chose this as one of their first three most important activities) and fishing from a boat (33 percent chose this as one of their first three most important activities) were the most popular activities chosen. Few respondents (2 percent for each activity) chose golfing, jet skiing and horseback riding as their top three important activities.

Table 1. Important Activities

Activities:	Most Important	Medium Important	Least Important
Pleasure boating	32	13	9
Viewing scenery	16	17	20
Fishing from a boat	12	21	7
Wildlife viewing (including photography)	8	13	14
Swimming, informal area	3	5	14
Camping (at undeveloped sites)	12	4	3
Fishing from the bank	2	7	6
Hunting - small game	9	3	2
Camping in a developed campground	4	5	1
Hiking	1	3	7
Picnicking	2	2	6
Bicycle riding (other than mountain bikes)	2	3	4
Water Skiing	3	1	4

Hunting - big game	3	5	0
Sailing	1	3	3
Bicycle riding (mountain bikes)	3	1	2
Special event, festival, ect.)	2	1	3
Swimming designated area (beach park, etc.)	0	5	1
Golfing	1	1	2
Jet skiing	0	2	1
Horseback riding	0	0	3

Total respondents for this question were 120.

Respondents were asked to select and rank order the five most important land uses they would support on Watts Bar Reservoir (see Table 2). Respondents could chose from 25 different uses that were grouped into three land management categories. The most chosen use (62 percent of all respondents) was to preserve natural areas and open space. The most chosen responses from the Natural Resources and informal Recreation category was to preserve natural areas/open spaces (62 percent), trash and litter cleanup (37 percent), and wildlife habitat improvements (35 percent). The most chosen for the five uses under the Economic Development category was for commercial business (13 percent). Under the Developed Recreation category, year-round boat ramps with parking (29 percent) and greenways, sidewalks, and paved trails (22 percent) were the two most chosen uses.

Table 2. Importance of Land Issues

Land Uses:					
Natural Resources and Informal Recreation	**1st Choice**	**2nd Choice**	**3rd Choice**	**4th Choice**	**5th Choice**
Preserve natural areas/open space	54	10	7	3	3
Trash and litter cleanup	5	13	10	9	9
Wildlife habitat improvements	4	15	13	7	5
Wildlife observation/photography	1	9	7	13	8
Shoreline stabilization (e.g., riprap)	7	7	10	7	6
Forest management	1	11	7	5	11
Hiking trails (dirt paths)	3	4	11	7	6
Hunting areas (including big and small game)	11	3	5	5	4

Camping primitive (undeveloped campsites)	11	8	1	3	2
Equestrian trails	1	2	2	0	0

Economic Development	**1st Choice**	**2nd Choice**	**3rd Choice**	**4th Choice**	**5th Choice**
Commercial business	1	4	2	4	5
Manufacturing with water access	0	2	4	1	3
Light manufacturing	3	2	2	1	0
General industrial	3	1	2	3	0
Barge terminal	1	0	2	2	4

Developed Recreation	**1st Choice**	**2nd Choice**	**3rd Choice**	**4th Choice**	**5th Choice**
Year-round boat ramps with parking	1	3	12	6	14
Greenways; sidewalks; and paved trails	1	7	4	9	6
Full-service campgrounds (with electricity)	3	1	6	4	6
Recreation areas (swimming beaches, etc.)	2	4	2	7	4
Marina areas	2	6	2	6	2
Overnight lodging (cabins, resort lodges, etc.)	2	4	2	3	3
Campgrounds with designated sites	2	3	1	7	0
Fishing piers	0	0	2	3	6
Interpretive centers/museums	0	0	2	0	4
Commercial boat stack storage	2	0	0	1	1

Total respondents for this question were 123.

Respondents were asked to record their preferences regarding the allocation of public land for specific uses. Land uses included resource management, informal recreation, industrial and commercial development areas. The respondents identified how they felt about the amount of land already devoted to specific uses (see Table 3). Respondents to this question indicated that

more land was needed for informal recreation and resource management areas. Also, respondents indicated that about the right amount of land was currently being used for industrial, commercial development and commercial recreation areas.

Table 3. Land Use Allocation Use Categories

	Too Much Land	About Right Amount	Need More Land	No Opinion
Resource management areas (forests, wildlife areas, etc.)	10	4	61	5
Informal recreation areas (hiking trails, bike trails, primitive camping)	2	42	66	6
Industrial areas (barge terminals, industrial sites, etc.)	36	57	11	12
Commercial development (shops, restaurants, etc.)	37	42	29	4
Commercial recreation areas (commercially operated marinas, resorts, campgrounds, etc.)	27	57	29	2

Total respondents for this question were 123.

Reservoir Visitation

A total of 116 respondents indicated that during a typical year they used Watts Bar Reservoir on an average of 64 times per year. Respondents were evenly divided as to how they mostly access the Reservoir via areas managed by a public agency or from private residential areas. Fewer respondents (8 percent) reported they accessed the Reservoir through a commercial recreation area.

Attachment I: Questionnaire

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1. From the list below, please select the three activities that are most important to you when you use Watts Bar Reservoir and write the numbers of the activities below in order of importance. Please note that first (1st) is the most important and third (3rd) is the least important of the activities you prefer.

(1st)_____ (2nd)_____ (3rd)_____

1) Bicycle riding (mountain bikes)	8) Golfing	16) Picnicking
2) Bicycle riding (other than mountain bikes)	9) Hiking	17) Sailing
3) Pleasure boating	10) Horseback riding	18) Water Skiing
4) Camping (at undeveloped sites)	11) Hunting – small game	19) Special event, festival, etc.
5) Camping in a developed campground	12) Hunting – big game	20) Swimming – designated areas (beach park, etc.)
6) Fishing from the bank	13) Jet skiing	21) Swimming – informal areas
7) Fishing from a boat	14) Wildlife viewing (including photography)	22) Other (please specify) _____
	15) Viewing scenery	

2. From the following list, please select the five most important land uses you would support in an updated land plan and write the numbers of the land uses below in order of importance. Please note that first (1st) is the most important and fifth (5th) is the least important of the uses you prefer.

(1st)_____ (2nd)_____ (3rd)_____ (4th)_____ (5th)_____

Natural Resources and Informal Recreation	Economic Development	Developed Recreation
1) Preserve natural areas/open space	11) Commercial business	16) Full-service campgrounds (with electricity, water, sewer, etc.)
2) Camping primitive (undeveloped campsites)	12) Light manufacturing	17) Campgrounds with designated sites (without electricity, water, sewer, etc.)
3) Equestrian trails	13) Manufacturing with associated water access	18) Commercial boat stack storage
4) Hiking trails (dirt paths)	14) General industrial	19) Interpretive centers/museums
5) Hunting areas (including big and small game)	15) Barge terminal	20) Marina areas
6) Forest management		21) Overnight lodging (cabins, cottages, resort lodges, etc.)
7) Wildlife observation/photography		22) Greenways, sidewalks, and paved trails
8) Wildlife habitat improvements		23) Fishing piers
9) Trash and litter cleanup		24) Recreation areas (swimming beaches, public parks, picnic areas, and ball fields)
10) Shoreline stabilization (e.g., riprap)		25) Year-round boat ramps with parking
		Other Activities (please specify)
		26) _____

3. Are there specific TVA-managed lands on Watts Bar Reservoir that you use?

(*Check one*) ☐ No ☐ Yes

If you answered yes to question 3, please identify the parcel number from the maps provided and describe the nature of your use.

4. TVA is interested in your preference concerning the allocation of public land for specific uses. Using the draft allocation maps provided, how do you feel about the amount of land devoted to these uses?

Use Categories	*Too Much Land*	*About Right Amount*	*Need More Land*	*No Opinion*
Resource management areas (forests, wildlife areas, etc.)	☐	☐	☐	☐
Informal recreation areas (hiking trails, bike trails, primitive camping, etc.	☐	☐	☐	☐
Industrial areas (barge terminals, industrial sites, etc.)	☐	☐	☐	☐
Commercial development (shops, restaurants, etc.)	☐	☐	☐	☐
Commercial recreation areas (commercially operated marinas, resorts, campgrounds, etc.)	☐	☐	☐	☐
Other purposes (please specify) _____	☐	☐	☐	☐

5. Using the maps provided, do you believe that there are land allocations in Zones 4, 5, or 6 that should be changed? *Note: Zones 1, 2, 3, and 7 on the maps involve very specific land use rights or federal regulations that dictate their allocations.*

(*Check one*) ☐ No ☐ Yes ☐ No opinion

If you answered yes to question 5, please indicate the parcel number(s) you are referring to and use the list of zones below to indicate what zone you feel that parcel should be allocated to and why.

_____

_____

_____

_____

_____

Zone 4 - Natural Resource Conservation **Zone 5 - Economic Development** **Zone 6 - Developed Recreation**

6. When you use Watts Bar Reservoir, how do you typically access the reservoir?

(*Check one*) ☐ Areas managed by public agencies (TVA, state, county, city, etc.)
☐ Private residential areas
☐ Commercial areas (marinas, campgrounds, resorts, etc.)

7. In an average year, approximately how many trips of one or more days do you make to Watts Bar Reservoir for recreational purposes?

_____ trips

8. Please list any other environmental issues or concerns that should be addressed during this planning process.

_____

_____

_____

_____

_____

Appendix D – Supporting Data and Information

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Table D-1. Common Terrestrial/Wetland Wildlife Species, by Community Types, That May Occur in the Vicinity Of Watts Bar Reservoir

Species By Common Name	Scientific Name	Forest Lands	Managed Open Lands *	Wetland and Riparian Communities
Amphibians				
Bullfrog	*Rana catesbeiana*			X
Eastern narrowmouth toad	*Gastrophryne carolinensis*			X
Green frog	*Rana clamitans*			X
Cope's gray treefrog	*Hyla chrysoscelis*	X		X
Spring peeper	*Pseudacris crucifer*			X
Fowler's toad	*Bufo woodhousii fowleri*	X		X
Spotted salamander	*Ambystoma maculatum*	X	X	
Dusky salamander	*Desmognathus fuscus*	X		X
Longtail salamander	*Eurycea longicauda*	X		
Spring salamander	*Gyrinophilus porphyriticus*			X
Northern slimy salamander	*Plethodon glutinosus*	X		
Ravine salamander	*Plethodon richmondi*	X		
Red salamander	*Pseudotriton ruber*			X
Reptiles				
Black rat snake	*Elaphe obsoleta obsoleta*	X	X	
Eastern garter snake	*Thamnophis sirtalis sirtalis*	X	X	X
Northern ringneck snake	*Diadophis punctatus edwardsii*	X		
Northern water snake	*Nerodia sipedon sipedon*			X
Northern fence lizard	*Sceloporus undulatus hyacinthinus*	X		
Five-lined skink	*Eumeces fasciatus*	X	X	
Broadhead skink	*Eumeces laticeps*	X		
Common snapping turtle	*Chelydra serpentina serpentina*			X
Painted turtle	*Chrysemys picta spp.*			X
Red-eared slider	*Trachemys scripta elegans*			X
Eastern box turtle	*Terrapene carolina carolina*	X	X	X
Birds				
Bald eagle *	*Haliaeetus leucocephalus*			X
Osprey	*Pandion haliaetus*			X
Sharp-shinned hawk	*Accipiter striatus*	X		
Cooper's hawk *	*Accipiter cooperii*	X	X	
Broad-winged hawk	*Buteo platypterus*	X		
Red-shouldered hawk	*Buteo lineatus*	X		X
Red-tailed hawk	*Buteo jamaicensis*	X	X	
American kestrel	*Falco sparverius*		X	
Great horned owl	*Bubo virginianus*	X	X	X
Barred owl	*Strix varia*	X		X
Common screech owl	*Otus asio*	X	X	
Barn owl *	*Tyto alba*		X	

Species By Common Name	Scientific Name	Forest Lands	Managed Open Lands *	Wetland and Riparian Communities
Turkey vulture	*Cathartes aura*	X	X	
Black vulture	*Coragyps atratus*	X	X	
American crow	*Corvus brachyrhynchos*	X	X	
Hairy woodpecker	*Picoides villosus*	X		X
Pileated woodpecker	*Dryocopus pileatus*	X		X
Yellow-shafted flicker	*Colaptes auratus*	X	X	
Downy woodpecker	*Picoides pubescens*	X		X
Red-bellied woodpecker	*Melanerpes carolinus*	X	X	
Belted kingfisher	*Megaceryle alcyon*			X
Great blue heron	*Ardea herodias*			X
Green heron	*Butorides striatus*			X
Double-crested cormorant	*Phalacrocorax auritus*			X
Black-crowned night-heron	*Nycticorax nycticorax*			X
Spotted sandpiper	*Actitis macularia*			X
Ring-billed gull	*Larus delawarensis*			X
Black tern	*Chlidonias niger*			X
Wilson's snipe	*Gallinago gallinago*		X	X
American woodcock	*Scolopax minor*		X	X
Killdeer	*Charadrius vociferus*		X	X
Wild turkey	*Meleagris gallopavo*	X	X	
Bobwhite quail	*Colinus virginianus*		X	
Mourning dove	*Zenaida macroura*		X	
Canada goose	*Branta canadensis*		X	X
Wood duck	*Aix sponsa*			X
Mallard	*Anas platyrhynchos*			X
Blue-winged teal	*Anas discors*			X
American black duck	*Anas rubripes*			X
Hooded merganser	*Lophodytes cucullatus*			X
Bufflehead	*Bucephala albeola*			X
Red-breasted merganser	*Mergus serrator*			X
Ring-necked duck	*Aythya collaris*			X
Pied-bill grebe	*Podilymbus podiceps*			X
Northern cardinal	*Cardinalis cardinalis*	X	X	
Eastern bluebird	*Sialia sialis*		X	
American goldfinch	*Carduelis tristis*	X	X	
Grasshopper sparrow	*Ammodramus savannarum*		X	
Blue jay	*Cyanocitta cristata*	X		
Carolina chickadee	*Parus carolinensis*	X	X	
Red-winged blackbird	*Agelaius phoeniceus*		X	X
Rufous-sided towhee	*Pipilo erythrophthalmus*	X	X	
American robin	*Turdus migratorius*	X	X	
Northern mockingbird	*Mimus polyglottos*		X	
Carolina wren	*Thryothorus ludovicianus*	X	X	
Indigo bunting	*Passerina cyanea*		X	
Tufted titmouse	*Parus bicolor*	X		

Species By Common Name	Scientific Name	Forest Lands	Managed Open Lands *	Wetland and Riparian Communities
White-breasted nuthatch	*Sitta carolinensis*	X		X
Yellow-billed cuckoo	*Coccyzus americanus*	X	X	X
Black-and-white warbler	*Mniotilta varia*	X		
Wood thrush	*Hylocichla mustelina*	X		
Eastern wood pewee	*Contopus virens*	X		
Red-eyed vireo	*Vireo olivaceus*	X		
Pine warbler	*Dendroica pinus*	X		
Blue-gray gnatcatcher	*Polioptila caerulea*			X
Great crested flycatcher	*Myiarchus crinitus*	X		
Mammals				
Whitetail deer	*Odocoileus virginianus*	X	X	X
Gray squirrel	*Sciurus carolinensis*	X		
Southern flying squirrel	*Glaucomys volans*	X		
Eastern chipmunk	*Tamias striatus*	X	X	
Raccoon	*Procyon lotor*	X		X
Eastern cottontail rabbit	*Sylvilagus floridanus*		X	
Bobcat	*Lynx rufus*	X		X
Red fox	*Vulpes vulpes*		X	
Gray fox	*Urocyon cinereoargenteus*	X	X	
Coyote	*Canis latrans*		X	
Mink	*Mustela vison*			X
Muskrat	*Ondatra zibethicus*			X
Opossum	*Didelphis virginiana*	X	X	
Striped skunk	*Mephitis mephitis*	X	X	
Groundhog	*Marmota monax*	X	X	
White-footed mouse	*Peromyscus leucopus*	X	X	
Woodland jumping mouse *	*Napaeozapus insignis*	X	X	X
Meadow jumping mouse *	*Zapus hudsonius*	X	X	X
Deer mouse	*Peromyscus maniculatus*	X	X	
Allegheny woodrat*	*Neotoma magister*	X		
Southern bog lemming*	*Synaptomys cooperi*	X		X
Eastern mole	*Scalopus aquaticus*	X	X	
Least shrew	*Cryptotis parva*		X	X
Southeastern shrew *	*Sorex longirostris*	X		X
Short-tailed shrew	*Blarina brevicauda*	X		X
Gray bat *	*Myotis grisescens*			X
Indiana bat *	*Myotis sodalis*	X		X
Eastern small-footed myotis *	*Myotis leibii*	X		X

*Species listed as endangered, threatened, or in need of management federally, by the state of Tennessee, or recommended by the Tennessee Wildlife Resources Agency.

Table D-2. Plant Species Found in Loudon, Rhea, and Roane Counties (Tennessee Herbarium 2003)

Common Name	Scientific Name	Loudon	Rhea	Roane
Adam's needle	*Yucca flaccida*			X
Agave	*Manfreda virginica*	X	X	
Alabama lip fern	*Cheilanthes alabamensis*	X		
Allegheny brook saxifrag	*Boykinia aconitifolia*		X	
Allegheny foam flower	*Tiarella cordifolia*		X	X
Allegheny hawkweed	*Hieracium paniculatum*			X
Allegheny monkey flower	*Mimulus ringens*	X		X
Allegheny spurge	*Pachysandra procumbens*			X
Alligator weed	*Alternanthera philoxeroides*		X	
Alternate leaf dogwood	*Cornus alternifolia*			X
America blue hearts	*Buchnera americana*		X	X
American alumroot	*Heuchera americana*	X	X	X
American basswood	*Tilia americana var. heterophylla*		X	X
American beech	*Fagus grandifolia*		X	X
American bellflower	*Campanula americana*			X
American bittersweet	*Celastrus scandens*		X	X
American bur reed	*Sparganium americanum*	X		
American burnweed	*Erechtites hieraciifolia*			X
American chestnut	*Castanea dentata*		X	X
American clinging fern	*Lygodium palmatum*		X	X
American dog violet	*Viola conspersa*			X
American eelgrass	*Vallisneria americana*	X		
American elm	*Ulmus americana*			X
American false pennyroyal	*Hedeoma pulegioides*			X
American ginseng	*Panax quinquefolius*			X
American hazelnut	*Corylus americana*		X	X
American hogpeanut	*Amphicarpaea bracteata*	X	X	X
American holly	*Ilex opaca*		X	
American lily of the valley	*Convallaria majuscula*			X
American lopseed	*Phryma leptostachya*		X	X
American plum	*Prunus americana*	X		X
American pokeweed	*Phytolacca americana*	X		X
American spikenard	*Aralia racemosa*		X	
American sycamore	*Platanus occidentalis*		X	X
American water hoarhound	*Lycopus americanus*	X		X
American water plantain	*Alisma subcordatum*			X
American waterwillow	*Justicia americana*		X	X
American witch hazel	*Hamamelis virginiana*		X	X
Amur honeysuckle	*Lonicera maackii*	X		
Angularleaf milkvine	*Matelea gonocarpos*			X
Anisescented goldenrod	*Solidago odora*		X	X
Annual bastard cabbage	*Rapistrum rugosum*			X
Annual blue grass	*Poa annua*		X	
Annual marsh elder	*Iva annua*	X		
Appalachian barren strawberry	*Waldsteinia fragarioides*		X	X

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Appalachian blazing star	*Liatris squarrulosa*		X	X
Appalachian bugbane	*Cimicifuga rubifolia*			X
Appalachian bunch flower	*Melanthium parviflorum*		X	X
Appalachian false white goat's beard	*Astilbe biternata*		X	X
Appalachian polypody	*Polypodium appalachianum*		X	X
Appalachian sandwort	*Arenaria glabra*		X	
Apple of Peru	*Nicandra physalodes*		X	X
Aromatic aster	*Aster oblongifolius*			X
Arrowfeather threeawn grass	*Aristida purpurascens*			X
Arrowhead rattlebox	*Crotalaria sagittalis*			X
Arrowleaf tearthumb	*Polygonum sagittatum*	X		X
Arrowleaf violet	*Viola sagittata var. sagittata*		X	
Arrowwood	*Viburnum dentatum*		X	X
Ashy hydrangea	*Hydrangea cinerea*			X
Ashy sunflower	*Helianthus mollis*			X
Atlantic goldenrod	*Solidago arguta var. caroliniana*		X	X
Atlantic pigeonwing	*Clitoria mariana*		X	
Autumn coralroot	*Corallorhiza odontorhiza*	X	X	
Autumn goldenrod	*Solidago sphacelata*		X	X
Axilflower	*Mecardonia acuminata*		X	X
Azure blue; quaking ladies	*Houstonia caerulea*	X		X
Bagpod	*Glottidium vesicarium*	X		
Bailey's sedge	*Carex baileyi*			X
Bald spikerush	*Eleocharis erythropoda*			X
Barnyard grass	*Echinochloa crusgalli*			X
Bastard toadflax	*Comandra umbellata*		X	
beaked agrimony	*Agrimonia rostellata*		X	X
Beaked cornsalad	*Valerianella radiata*			X
Beaked hazelnut	*Corylus cornuta*		X	
Beaked panic grass	*Panicum anceps*			X
Bearded beggar ticks	*Bidens aristosa*	X	X	X
Bearded shorthusk grass	*Brachyelytrum erectum*		X	X
Bearded skeleton grass	*Gymnopogon ambiguus*			X
Beech drops	*Epifagus virginiana*		X	
Beefsteak plant	*Perilla frutescens*		X	
Bent sedge	*Carex styloflexa*		X	X
Bermuda grass	*Cynodon dactylon*			X
Biennal beeblossum	*Gaura biennis*	X		X
Big bluestem	*Andropogon gerardii*		X	X
Birdfoot deer vetch	*Lotus corniculatus*	X		
Bird's foot violet	*Viola pedata*		X	X
Bitter dock	*Rumex obtusifolius*			X
Bitternut hickory	*Carya cordiformis*			X
Black walnut	*Juglans nigra*	X		X
Blackjack oak	*Quercus marilandica*	X	X	
Black chokecherry	*Aronia melanocarpa*		X	

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Black cohosh	*Cimicifuga racemosa*			X
Black gum	*Nyssa sylvatica var. sylvatica*	X		X
Black highbush huckleberry	*Vaccinium fuscatum*			X
Black huckleberry	*Gaylussacia baccata*		X	X
Black locust	*Robinia pseudoacacia*			X
Black medic	*Medicago lupulina*		X	X
Black oak	*Quercus velutina*	X	X	X
Black raspberry	*Rubus occidentalis*	X		X
Black willow	*Salix nigra*			X
Blackberry lily	*Belamcanda chinensis*	X		
Black-edged sedge	*Carex nigromarginata*		X	X
Black-eyed Susan	*Rudbeckia hirta var. hirta*	X		X
Black-eyed Susan	*Rudbeckia hirta var. pulcherrima*			X
Blackseed plantain	*Plantago rugelii*			X
Black-stemmed spleenwort	*Asplenium resiliens*	X	X	X
Bladdernut	*Staphylea trifolia*		X	X
Bloodroot	*Sanguinaria canadensis*		X	X
Bloody butcher	*Trillium recurvatum*	X		
Blue beech	*Carpinus caroliniana*		X	X
Blue cohosh	*Caulophyllum thalictroides*			X
Blue field madder	*Sherardia arvensis*			X
Blue mist flower	*Conoclinium coelestinum*		X	X
Blue sedge	*Carex glaucodea*	X		
Blue skullcap	*Scutellaria lateriflora*	X	X	X
Blue waxweed	*Cuphea viscosissima*			X
Blunt broom sedge	*Carex tribuloides*	X		X
Blunt leaf bedstraw	*Galium obtusum*	X		
Blunt spikerush	*Eleocharis obtusa*	X		X
Bluntleaf waterleaf	*Hydrophyllum canadense*			X
Bluntlobe cliff fern	*Woodsia obtusa*	X	X	X
Bog yelloweyed grass	*Xyris difformis*		X	
Bosc's panic grass	*Dichanthelium boscii*	X	X	X
Bottomland aster	*Aster ontarionis*	X	X	X
Bouncing bet	*Saponaria officinalis*			X
Bowman's root	*Porteranthus trifoliatus*	X	X	X
Boxelder	*Acer negundo*			X
Bracken fern	*Pteridium aquilinum*	X	X	X
Bradley's spleenwort	*Asplenium bradleyi*		X	
Bristle leaf sedge	*Carex eburnea*			X
Bristlewort	*Ranunculus recurvatus*	X		X
Bristly buttercup	*Ranunculus hispidus var. hispidus*	X		X
Bristly buttercup	*Ranunculus hispidus var. nitidus*			X
Bristly greenbriar	*Smilax tamnoides*	X		
Bristly locust	*Robinia hispida*			X
Brittle water nymph	*Najas minor*		X	
Broad beech fern	*Phegopteris hexagonoptera*	X	X	X
Broad leaf arrowhead	*Sagittaria latifolia*	X	X	

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Broad loose flower sedge	*Carex laxiflora*	X	X	X
Broadleaf cattail	*Typha latifolia*			X
Broadleaf enchanter's nightshade	*Circaea lutetiana ssp. canadensis*		X	X
Broadleaf rosette grass	*Dichanthelium latifolium*			X
Broadleaf sedge	*Carex platyphylla*		X	
Broadleaf wild leek	*Allium ampeloprasum*			X
Brome fescue	*Vulpia bromoides*	X		
Broomcorn millet	*Panicum miliaceum*	X		
Broomsedge bluestem	*Andropogon virginicus*		X	X
Brown-eyed Susan	*Rudbeckia triloba*			X
Brownish beak sedge	*Rhynchospora capitellata*		X	X
Buckthorn	*Sideroxylon lycioides*			X
Bue ash	*Fraxinus quadrangulata*	X		X
Buffalo nut	*Pyrularia pubera*		X	X
Bulblet bladder fern	*Cystopteris bulbifera*	X	X	X
Bulbose woodrush	*Luzula bulbosa*		X	X
Bull crown grass	*Paspalum boscianum*	X		X
Bushclover	*Lespedeza bicolor*		X	
Bushy St. Johnswort	*Hypericum densiflorum*	X	X	X
Butler's parsley	*Ammoselinum butleri*	X		X
Butter and eggs	*Linaria vulgaris*	X		
Butterfly weed	*Asclepias tuberosa*	X	X	X
Butterweed	*Senecio glabellus*		X	
Button bush	*Cephalanthus occidentalis*		X	X
Calico aster	*Aster lateriflorus*			X
California bulrush	*Schoenoplectus californicus*		X	
Camphorweed	*Pluchea camphorata*			X
Canada blue grass	*Poa compressa*			X
Canada germander	*Teucrium canadense*			X
Canada goldenrod	*Solidago canadensis var. scabra*		X	X
Canada lettuce	*Lactuca canadensis*			X
Canada licorice root	*Ligusticum canadense*		X	X
Canada lily	*Lilium canadense*			X
Canada serviceberry	*Amelanchier canadensis*	X		
Canada white violet	*Viola canadensis*		X	X
Canada woodnettle	*Laportea canadensis*	X		X
Canadian black snakeroot	*Sanicula canadensis*	X	X	X
Canadian honewort	*Cryptotaenia canadensis*		X	X
Canadian lousewort	*Pedicularis canadensis*		X	X
Canadian summer bluet	*Houstonia canadensis*			X
Canadian clearweed	*Pilea pumila*		X	X
Candyroot	*Polygala nana*		X	
Cankerweed	*Prenanthes serpentaria*			X
Cardinal flower	*Lobelia cardinalis*	X	X	X
Carolina buckthorn	*Rhamnus caroliniana*	X	X	X
Carolina bugbane	*Trautvetteria caroliniensis*		X	X

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Carolina crab grass	*Digitaria cognata*			X
Carolina elephant's foot	*Elephantopus carolinianus*		X	X
Carolina foxtail grass	*Alopecurus carolinianus*			X
Carolina geranium	*Geranium carolinianum*	X		X
Carolina hickory	*Carya ovata var. australis*			X
Carolina holly	*Ilex ambigua var. ambigua*			X
Carolina horsenettle	*Solanum carolinense*			X
Carolina leaf-flower	*Phyllanthus caroliniensis*		X	X
Carolina moonseed	*Cocculus carolinus*			X
Carolina rose	*Rosa carolina*			X
Carolina sedge	*Carex caroliniana*		X	X
Carolina spring beauty	*Claytonia virginica*		X	X
Carolina vetch	*Vicia caroliniana*		X	X
Carolina wild petunia	*Ruellia caroliniensis*	X	X	X
Cat greenbriar	*Smilax glauca*			X
Chaffweed	*Anagallis minima*			X
Cheat grass	*Bromus tectorum*	X	X	X
Cheerful sunflower	*Helianthus x laetiflorus*	X		X
Cherokee sedge	*Carex cherokeensis*		X	
Chestnut oak	*Quercus montana*	X	X	X
Chickasaw plum	*Prunus angustifolia*	X	X	X
Chinese empress tree	*Paulownia tomentosa*			X
Chinese lespedeza	*Lespedeza cuneata*	X		X
Chinese privet	*Ligustrum sinense*	X	X	X
Chinese silvergrass	*Miscanthus sinensis*	X	X	
Christmas fern	*Polystichum acrostichoides*	X	X	X
Churchmouse threeawn grass	*Aristida dichotoma var. dichotoma*	X		X
Cinnamon fern	*Osmunda cinnamomea*		X	
Clammy goosefoot	*Chenopodium pumilio*		X	
Clammy ground cherry	*Physalis heterophylla*		X	
Clasping milkweed	*Asclepias amplexicaulis*		X	X
Clasping Venus looking glass	*Triodanis perfoliata var. perfoliata*		X	X
Climbing false buckwheat	*Polygonum scandens*		X	X
Clustered mountain mint	*Pycnanthemum muticum*		X	
Clustered black snakeroot	*Sanicula odorata*			X
Clustered dock	*Rumex conglomeratus*	X		X
Cockspur hawthorn	*Crataegus crus-galli*			X
Combleaf yellow false foxglove	*Aureolaria pectinata*	X	X	X
Common apple	*Malus pumila*		X	X
Common blue violet	*Viola sororia*		X	X
Common blue wood aster	*Aster cordifolius*	X	X	X
Common boneset	*Eupatorium perfoliatum*		X	
Common chickweed	*Stellaria media ssp. media*			X
Common cinquefoil	*Potentilla simplex var. simplex*	X		X
Common corn cockle	*Agrostemma githago*	X		
Common dittney	*Cunila origanoides*		X	
Common elderberry	*Sambucus canadensis*			X

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Common evening primrose	*Oenothera biennis*	X		X
Common gypsyweed	*Veronica officinalis*		X	X
Common milkweed	*Asclepias syriaca*			X
Common moonseed	*Menispermum canadense*	X		X
Common mullein	*Verbascum thapsus*			X
Common ninebark	*Physocarpus opulifolius*			X
Common pear	*Pyrus communis*			X
Common periwinkle	*Vinca minor*		X	X
Common selfheal	*Prunella vulgaris*	X	X	X
Common serviceberry	*Amelanchier arborea*		X	X
Common sheep sorrel	*Rumex acetosella*	X		X
Common sneezeweed	*Helenium autumnale*	X	X	X
Common spikerush	*Eleocharis palustris*			X
Common St. Johnswort	*Hypericum perforatum*	X		X
Common sunflower	*Helianthus annuus*	X		
Common threesquare	*Schoenoplectus pungens*	X		X
Common velvet grass	*Holcus lanatus*		X	
Common vipers bugloss	*Echium vulgare*			X
Common wheat	*Triticum aestivum*		X	
Common winterberry	*Ilex verticillata*		X	
Common woodrush	*Luzula multiflora*		X	X
Common wormwood	*Artemisia vulgaris*			X
Common yellow oxalis	*Oxalis stricta*	X	X	X
Common yellow rocket	*Barbarea vulgaris*	X		
Compact dodder	*Cuscuta compacta*			X
Coon's tail	*Ceratophyllum demersum*		X	X
Copperleaf	*Acalypha gracilens*			X
Copperleaf	*Acalypha ostryifolia*	X	X	
Copperleaf	*Acalypha rhomboidea*			X
Copperleaf	*Acalypha virginica*	X		X
Coral honeysuckle	*Lonicera sempervirens*			X
Coralberry	*Symphoricarpos orbiculatus*			X
Corn gromwell	*Buglossoides arvensis*			X
Corn speedwell	*Veronica arvensis*			X
Cornel leaf whitetop	*Doellingeria infirma*		X	
Cow oak	*Quercus michauxii*	X		X
Cranefly orchid	*Tipularia discolor*		X	X
Cream avens	*Geum virginianum*	X	X	X
Creeping aster	*Aster surculosus*		X	X
Creeping bent grass	*Agrostis stolonifera*			X
Creeping lespedeza	*Lespedeza repens*		X	X
Crested Iris	*Iris cristata*	X	X	X
Crimson eye rose mallow	*Hibiscus moscheutos ssp. moscheutos*	X		X
Crinkleroot	*Dentaria diphylla*			X
Crooked stem aster	*Aster prenanthoides*	X		
Cross vine	*Bignonia capreolata*		X	X

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Cucumber magnolia	*Magnolia acuminata*		X	X
Culver's root	*Veronicastrum virginicum*			X
Cumberland azalea	*Rhododendron cumberlandense*		X	
Cumberland mock orange	*Philadelphus hirsutus*		X	X
Curley top knotweed	*Polygonum lapathifolium*	X		X
Curly dock	*Rumex crispus*	X		X
Curly pondweed	*Potamogeton crispus*			X
Cursed buttercup	*Ranunculus sceleratus*			X
Curtis' threeawn grass	*Aristida dichotoma var. curtissii*	X		
Curtiss' milkwort	*Polygala curtissii*		X	X
Cutleaf coneflower	*Rudbeckia laciniata var. laciniata*			X
Cutleaf evening primrose	*Oenothera laciniata*		X	
Cutleaf geranium	*Geranium dissectum*			X
Cutleaf toothwort	*Dentaria laciniata*			X
Cypress panic grass	*Dichanthelium dichotomum*	X	X	X
Cypress spurge	*Euphorbia cyparissias*	X		
Dallas grass	*Paspalum dilatatum*			X
Dames rocket	*Hesperis matronalis*		X	X
Dandelion	*Taraxacum officinale*			X
Deadnettle	*Lamium purpureum*			X
Deerberry	*Vaccinium stamineum*			X
Deertongue	*Dichanthelium clandestinum*			X
Dense blazing star	*Liatris spicata*			X
Densetuff hair sedge	*Bulbostylis capillaris*		X	
Deptford pink	*Dianthus armeria*		X	X
Devil's beggar ticks	*Bidens frondosa*			X
Devil's bite	*Liatris scariosa*			X
Devil's darning needles	*Clematis virginiana*			X
Devil's grandmother	*Elephantopus tomentosus*		X	X
Devil's walking stick	*Aralia spinosa*		X	X
Diamond flowers	*Hedyotis nigricans*		X	X
Dimpled trout lily	*Erythronium umbilicatum*			X
Dissected grape fern	*Botrychium dissectum*		X	X
Ditch stonecrop	*Penthorum sedoides*	X	X	X
Dogtooth violet	*Erythronium americanum*		X	X
Doll's eye	*Actaea pachypoda*		X	X
Dotted smartweed	*Polygonum punctatum*	X	X	X
Dovefoot geranium	*Geranium molle*	X		
Downy carrion flower	*Smilax pulverulenta*	X		
Downy danthonia	*Danthonia sericea*	X	X	
Downy lobelia	*Lobelia puberula*		X	
Downy milkpea	*Galactia volubilis*	X	X	X
Downy phlox	*Phlox pilosa*		X	X
Downy yellow false foxglove	*Aureolaria virginica*	X	X	X
Downy yellow violet	*Viola pubescens*			X
Drooping sedge	*Carex prasina*		X	
Dropseed	*Sporobolus asper var. asper*			X

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Drummond's dropseed	*Sporobolus asper var. drummondii*			X
Dutchman's pipe	*Aristolochia macrophylla*		X	X
Dward hackberry	*Celtis tenuifolia*		X	
Dwarf chinkapin oak	*Quercus prinoides*			X
Dwarf cinquefoil	*Potentilla canadensis*		X	
Dwarf gentian	*Gentianella quinquefolia*			X
Dwarf larkspur	*Delphinium tricorne*			X
Dwarf snapdragon	*Chaenorhinum minus*		X	X
Dwarf spikerush	*Eleocharis parvula*			X
Dwarf St. Johnswort	*Hypericum mutilum*			X
Earleaf false foxglove	*Agalinis auriculata*			X
Early blue grass	*Poa cuspidata*			X
Early blue violet	*Viola palmata*		X	X
Early buttercup	*Ranunculus fascicularis*	X	X	X
Early goldenrod	*Solidago juncea*			X
Early saxifrage	*Saxifraga virginiensis*	X		X
Early yellow rocket	*Barbarea verna*		X	X
Eastern blue-eyed grass	*Sisyrinchium atlanticum*			X
Eastern bluestar	*Amsonia tabernaemontana*		X	X
Eastern cottonwood	*Populus deltoides*			X
Eastern daisy fleabane	*Erigeron annuus*			X
Eastern featherbells	*Stenanthium gramineum*	X		
Eastern gama grass	*Tripsacum dactyloides*	X		X
Eastern gray beard tongue	*Penstemon canescens*	X	X	X
Eastern hemlock	*Tsuga canadensis*		X	X
Eastern narrowleaf sedge	*Carex amphibola*	X		X
Eastern prickly gooseberry	*Ribes cynosbati*		X	
Eastern red Bud	*Cercis canadensis*			X
Eastern red cedar	*Juniperus virginiana*	X	X	X
Eastern silver aster	*Aster concolor*		X	X
Eastern smooth beard tongue	*Penstemon laevigatus*	X	X	X
Eastern sweetshrub	*Calycanthus floridus var. floridus*		X	X
Eastern sweetshrub	*Calycanthus floridus var. glaucus*			X
Eastern wahoo	*Euonymus atropurpureus*			X
Eastern woodland sedge	*Carex blanda*		X	
Ebony spleenwort	*Asplenium platyneuron*	X	X	X
Elf orpine	*Diamorpha smallii*		X	
Elliott's bluestem	*Andropogon gyrans*			X
Elmleaf goldenrod	*Solidago ulmifolia*		X	X
Enitreleaf yellow false foxglove	*Aureolaria laevigata*		X	X
Entangled hawthorn	*Crataegus intricata*		X	
Eastern bottlebrush grass	*Elymus hystrix*			X
European privet	*Ligustrum vulgare*	X		X
Evergreen magnolia	*Magnolia grandiflora*	X		
Eyebane	*Chamaesyce nutans*			X
Fairy wand	*Chamaelirium luteum*		X	
Fall panic grass	*Panicum dichotomiflorum*		X	X

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Fall phlox	*Phlox paniculata*			X
False boneset	*Brickellia eupatorioides*		X	X
False daisy	*Eclipta prostrata*			X
False dandelion	*Pyrrhopappus carolinianus*		X	X
False hop sedge	*Carex lupuliformis*	X		
False spotted St. Johnswort	*Hypericum pseudomaculatum*		X	X
False teeth skullcap	*Scutellaria pseudoserrata*			X
Fan club moss	*Diphasiastrum digitatum*	X		X
Fancy fern	*Dryopteris intermedia*		X	X
Farkleberry	*Vaccinium arboreum*		X	X
Fescue sedge	*Carex festucacea*	X		X
Few flowered nut rush	*Scleria pauciflora*		X	
Fewleaf sunflower	*Helianthus occidentalis*			X
Fibrous root sedge	*Carex communis*		X	
Field clover	*Trifolium campestre*			X
Field pansy	*Viola bicolor*		X	X
Field paspalum	*Paspalum laeve*	X		X
Field pepperweed	*Lepidium campestre*	X	X	
Field thistle	*Cirsium discolor*			X
Fire pink	*Silene virginica*		X	X
Five angled dodder	*Cuscuta pentagona*		X	X
Flat top goldentop	*Euthamia graminifolia*			X
Flaxleaf whitetop aster	*Aster linariifolius*			X
Florida paspalum	*Paspalum floridanum*			X
Flowering dogwood	*Cornus florida*		X	X
Flowering spurge	*Euphorbia corollata*		X	X
Fluxweed	*Isanthus brachiatus*	X	X	X
Fly poison	*Amianthium muscaetoxicum*	X		X
Forked bluecurls	*Trichostema dichotomum*		X	X
Fourleaf milkweed	*Asclepias quadrifolia*	X	X	
Fowl manna grass	*Glyceria striata*		X	X
Fox sedge	*Carex vulpinoidea*	X		X
Foxtail bristle grass	*Setaria italica*			X
Fragrant bedstraw	*Galium triflorum*	X	X	X
Fragrant flat sedge	*Cyperus odoratus*			X
Fragrant sumac	*Rhus aromatica*			X
Frank's sedge	*Carex frankii*		X	X
French grass	*Orbexilum onobrychis*	X		X
French mulberry	*Callicarpa americana*		X	
Fringed loosestrife	*Lysimachia ciliata*			X
Fringed sedge	*Carex crinita*	X	X	X
Fringeleaf wild petunia	*Ruellia humilis*	X	X	X
Frost grape	*Vitis vulpina*		X	X
Frosted hawthorn	*Crataegus pruinosa*			X
Fuller's teasel	*Dipsacus fullonum*			X
Galax	*Galax urceolata*			X
Gall of the earth	*Prenanthes trifoliolata*		X	

Common Name	Scientific Name	Loudon	Rhea	Roane
Gattinger's false foxglove	*Agalinis gattingeri*		X	
Gattinger's panic grass	*Panicum gattingeri*			X
Gay wings	*Polygala paucifolia*		X	X
Giant cut grass	*Zizaniopsis miliacea*		X	
Giant goldenrod	*Solidago gigantea*			X
Giant ironweed	*Vernonia gigantea*			X
Giant ragweed	*Ambrosia trifida*			X
Giant reed grass	*Arundo donax*		X	
Giant river cane	*Arundinaria gigantea ssp. gigantea*			X
Glade fern	*Diplazium pycnocarpon*	X		
Globe beaksedge	*Rhynchospora recognita*		X	
Globe flat sedge	*Cyperus echinatus*		X	
Glomerate sedge	*Carex aggregata*	X		
Goat's beard	*Aruncus dioicus*		X	X
Goatsbeard	*Tragopogon dubius*			X
Golden club	*Orontium aquaticum*			X
Golden eye saxifrage	*Saxifraga careyana*		X	X
Golden ragwort	*Senecio aureus*			X
Golden tickseed	*Coreopsis tinctoria*		X	X
Goldenseal	*Hydrastis canadensis*			X
Goldie's Wood fern	*Dryopteris goldiana*			X
Goosegrass	*Eleusine indica*			X
Granite gooseberry	*Ribes curvatum*		X	
Grassleaf rush	*Juncus marginatus*		X	X
Gray goldenrod	*Solidago nemoralis*		X	X
Gray's sedge	*Carex grayi*			X
Great blue lobelia	*Lobelia siphilitica*	X		X
Great indian plantain	*Arnoglossum muehlenbergii*			X
Great plains flat sedge	*Cyperus lupulinus*		X	
Great yellow wood sorrel	*Oxalis grandis*		X	
Greater bladder sedge	*Carex intumescens*		X	X
Greater marsh St. John's wort	*Triadenum walteri*			X
Greater periwinkle	*Vinca major*			X
Greater straw sedge	*Carex normalis*			X
Greater tickseed	*Coreopsis major*			X
Greater yellow lady's slipper	*Cypripedium pubescens*		X	
Green adder's mouth orchid	*Malaxis unifolia*		X	X
Green antelophorn	*Asclepias viridis*		X	
Green arrow arum	*Peltandra virginica*	X		
Green ash	*Fraxinus pennsylvanica*	X		X
Green bristle grass	*Setaria viridis var. major*			X
Green bristle grass	*Setaria viridis var. viridis*			X
Green bulrush	*Scirpus atrovirens*	X	X	X
Green carpetweed	*Mollugo verticillata*	X		X
Green comet milkweed	*Asclepias viridiflora*	X	X	X
Green dragon	*Arisaema dracontium*			X
Green fringed orchid	*Platanthera lacera*		X	

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Green violet	*Hybanthus concolor*	X	X	X
Grooved flax	*Linum sulcatum*			X
Ground nut	*Apios americana*	X	X	X
Ground pine	*Lycopodium obscurum*		X	X
Hairy alumroot	*Heuchera villosa var. villosa*	X	X	X
Hairy angelica	*Angelica venenosa*	X		X
Hairy bedstraw	*Galium pilosum*		X	X
Hairy bittercress	*Cardamine hirsuta*		X	X
Hairy buttercup	*Ranunculus sardous*	X		
Hairy chervil	*Chaerophyllum tainturieri*			X
Hairy crab grass	*Digitaria sanguinalis*			X
Hairy forked nailwort	*Paronychia fastigiata*		X	X
Hairy goldenrod	*Solidago hispida*		X	
Hairy joint meadow parsnip	*Thaspium barbinode*		X	X
Hairy leaf-cup	*Smallanthus uvedalius*		X	X
Hairy lespedeza	*Lespedeza hirta*	X	X	X
Hairy lip fern	*Cheilanthes lanosa*	X	X	
Hairy phlox	*Phlox amoena*	X	X	X
Hairy seed paspalum	*Paspalum pubiflorum*		X	X
Hairy skullcap	*Scutellaria elliptica var. elliptica*		X	
Hairy skullcap	*Scutellaria elliptica var. hirsuta*		X	X
Hairy small leaf tick trefoil	*Desmodium ciliare*		X	X
Hairy sunflower	*Helianthus hirsutus*	X	X	X
Hairy white old field aster	*Aster pilosus var. pilosus*	X		X
Hairy wild rye	*Elymus villosus*			X
Hairy woodland brome grass	*Bromus pubescens*		X	X
Hairy woodrush	*Luzula acuminata*			X
Halberd-leaf yellow violet	*Viola hastata*		X	X
Harper's three-part violet	*Viola tripartita var. glaberrima*		X	X
Harvest bells	*Gentiana saponaria*			X
Harvest lice	*Agrimonia parviflora*	X		X
Hayscented fern	*Dennstaedtia punctilobula*		X	X
Heart shaped peppervine	*Ampelopsis cordata*	X		X
Heartleaf hedge nettle	*Stachys nuttallii*		X	X
Heavy sedge	*Carex gravida*	X		
Hedge false bindweed	*Calystegia sepium*		X	X
Hedgehog woodrush	*Luzula echinata*		X	X
Heller's cudweed	*Gnaphalium helleri*			X
Heller's rosette grass	*Dichanthelium oligosanthes*	X		X
Helmet flower	*Scutellaria integrifolia*	X	X	X
Henbit	*Lamium amplexicaule*			X
Highbush huckleberry	*Vaccinium corymbosum*		X	X
Highland doghobble	*Leucothoe fontanesiana*		X	X
Hirstue sedge	*Carex complanata*	X	X	X
Hoary puccoon	*Lithospermum canescens*			X
Hoary skullcap	*Scutellaria incana var. incana*		X	X
Hoary skullcap	*Scutellaria incana var. punctata*		X	X

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Hoary tick trefoil	*Desmodium canescens*			X
Honey locust	*Gleditsia triacanthos*	X	X	X
Honeyvine	*Cynanchum laeve*			X
Hop sedge	*Carex lupulina*	X		X
Hophornbeam	*Ostrya virginiana*		X	X
Hornleaf river weed	*Podostemum ceratophyllum*	X		
Horsetail	*Equisetum hyemale var. affine*		X	X
Horseweed	*Conyza canadensis*			X
Huger's carrion flower	*Smilax ecirrata var. hugeri*	X		X
Husk tomato	*Physalis pubescens var. integrifolia*		X	X
Hybrid violet	*Viola x primulifolia*		X	X
Hyssop leaf thoroughwort	*Eupatorium hyssopifolium*		X	X
Illinois pinweed	*Lechea racemulosa*		X	X
Indian blanket	*Gaillardia pulchella*			X
Indian cucumber	*Medeola virginiana*		X	X
Indian grass	*Sorghastrum nutans*		X	X
Indian hemp	*Apocynum cannabinum*			X
Indian love grass	*Eragrostis pilosa*			X
Indian physic	*Porteranthus stipulatus*		X	
Indian pink	*Spigelia marilandica*		X	X
Indian pipe	*Monotropa uniflora*	X		X
Indian tobacco	*Lobelia inflata*		X	X
Inland rush	*Juncus interior*			X
Inland woodoats	*Chasmanthium latifolium*			X
Intermediate lespedeza	*Lespedeza intermedia*	X	X	X
Interrupted fern	*Osmunda claytoniana*		X	X
Italian rye grass	*Lolium multiflorum*			X
Ivyleaf morning glory	*Ipomoea hederacea*			X
Jack-in-the-pulpit	*Arisaema triphyllum*	X		X
Jacob's ladder	*Polemonium reptans*			X
Jagged chickweed	*Holosteum umbellatum*	X		X
Japanese bristle grass	*Setaria faberi*		X	X
Japanese brome grass	*Bromus japonicus*			X
Japanese clover	*Kummerowia striata*			X
Japanese honeysuckle	*Lonicera japonica*			X
Japanese stiltgrass	*Microstegium vimineum*			X
Java bean	*Senna obtusifolia*			X
Jerusalem artichoke	*Helianthus tuberosus*	X		X
Jimson weed	*Datura stramonium*		X	X
Johnson grass	*Sorghum halepense*			X
Jumpseed	*Polygonum virginianum*		X	X
Jungle rice	*Echinochloa colona*			X
Kentucky blue grass	*Poa pratensis*	X		X
Kidney leaf grass of Parnassus	*Parnassia asarifolia*		X	
King of the meadow	*Thalictrum pubescens*			X
Koren clover	*Kummerowia stipulacea*	X	X	X
Lace grass	*Eragrostis capillaris*		X	X

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Lanceleaf fogfruit	*Phyla lanceolata*	X		X
Lanceleaf loosestrife	*Lysimachia lanceolata*		X	X
Large brack tick trefoil	*Desmodium cuspidatum*		X	
Large bracted plantain	*Plantago aristata*	X	X	X
Large fruit black snakeroot	*Sanicula trifoliata*		X	
Large seed forget-me-not	*Myosotis macrosperma*	X		X
Large-flowered Barbara's button	*Marshallia grandiflora*			X
Largeleaf pond weed	*Potamogeton amplifolius*	X		
Late flowering thoroughwort	*Eupatorium serotinum*		X	X
Late purple aster	*Aster patens*	X	X	X
Lavendar old field aster	*Aster pilosus var. priceae*	X		X
Leafy bulrush	*Scirpus polyphyllus*	X		
Leafy pondweed	*Potamogeton foliosus*	X		X
Leathery rush	*Juncus coriaceus*	X	X	X
Leavenworth's sedge	*Carex leavenworthii*		X	
Lemon yellow false golden aster	*Heterotheca camporum*			X
Leonard's skullcap	*Scutellaria parvula var. missouriensis*		X	X
Lesser calaminth	*Calamintha nepeta*			X
Lesser snakeroot	*Ageratina aromatica*		X	
Lesser yellow lady's slipper	*Cypripedium parviflorum*	X		
Licorice bedstraw	*Galium circaezans*	X	X	X
Lillyleaf twayblade	*Liparis liliifolia*			X
Limestone adder's tongue	*Ophioglossum engelmannii*		X	
Limestone meadow sedge	*Carex granularis*	X		X
Limestone wild petunia	*Ruellia strepens*	X		X
Lindheimer panic grass	*Dichanthelium acuminatum var. lindheimeri*		X	X
Lined sedge	*Carex striatula*	X	X	X
Little barley	*Hordeum pusillum*	X	X	
Little bluestem	*Schizachyrium scoparium*	X	X	X
Little brown jug	*Hexastylis arifolia var. arifolia*			X
Little head nut rush	*Scleria oligantha*	X		X
Little ladies' tresses	*Spiranthes tuberosa*		X	X
Little leaf buttercup	*Ranunculus abortivus*	X		X
Littleflowered alumroot	*Heuchera parviflora*		X	
Lizard tail	*Saururus cernuus*		X	X
Lobed spleenwort	*Asplenium pinnatifidum*		X	
Lobed tickseed	*Coreopsis auriculata*		X	X
Longbeak arrowhead	*Sagittaria australis*	X	X	
Longhair sedge	*Carex comosa*	X		
Longleaf ground cherry	*Physalis longifolia var. subglabrata*	X		
Longleaf pondweed	*Potamogeton nodosus*	X		
Longleaf summer bluet	*Houstonia longifolia*	X	X	X
Longleaf woodoats	*Chasmanthium sessiliflorum*		X	X
Longspur violet	*Viola rostrata*		X	X
Longstalk cranesbill	*Geranium columbinum*	X		

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Longstyle sweet cicely	*Osmorhiza longistylis*	X		
Loomis' mountain mint	*Pycnanthemum loomisii*	X		
Lopsided rush	*Juncus secundus*		X	
Low spearwort	*Ranunculus pusillus*			X
Low spike sedge	*Kyllinga pumila*			X
Lowbush blueberry	*Vaccinium pallidum*		X	X
Lowland bladder fern	*Cystopteris protrusa*	X	X	X
Lowland rotala	*Rotala ramosior*	X		X
Lowry's blue wood aster	*Aster lowrieanus*		X	
Lyreleaf sage	*Salvia lyrata*	X	X	X
Maidenhair fern	*Adiantum pedatum*	X	X	X
Maidenhair spleenwort	*Asplenium trichomanes*		X	X
Man of the earth	*Ipomoea pandurata*	X	X	X
Many flower flat sedge	*Cyperus lancastriensis*	X		X
Maple leaf viburnum	*Viburnum acerifolium*		X	X
Marginal shield fern	*Dryopteris marginalis*		X	X
Marsh blue violet	*Viola cucullata*		X	X
Marsh bristle grass	*Setaria parviflora*			X
Marsh dayflower	*Murdannia keisak*			X
Marsh flat sedge	*Cyperus pseudovegetus*		X	
Marsh pea	*Lathyrus palustris*		X	
Marsh seedbox	*Ludwigia palustris*	X		X
Maryland golden aster	*Chrysopsis mariana*		X	X
Maryland meadow beauty	*Rhexia mariana var. mariana*		X	
Maryland senna	*Senna marilandica*			X
Matting rosette grass	*Dichanthelium meridionale*		X	X
May apple	*Podophyllum peltatum*		X	X
Meadow beauty	*Rhexia virginica*		X	X
Meadow brome grass	*Bromus catharticus*	X		
Meadow fescue	*Festuca pratensis*		X	X
Meadow foxtail grass	*Alopecurus pratensis*			X
Meadow garlic	*Allium canadense*			X
Meadow spike moss	*Selaginella apoda*	X	X	
Meadow zizia	*Zizia aptera*			X
Mercury spurge	*Euphorbia mercurialina*	X	X	X
Mexican tea	*Chenopodium ambrosioides*			X
Midland sedge	*Carex mesochorea*	X		
Mimosa	*Albizia julibrissin*	X		
Mockernut hickory	*Carya tomentosa*		X	X
Money plant	*Lunaria annua*	X		
Moth mullein	*Verbascum blattaria*			X
Mountain bush honeysuckle	*Diervilla rivularis*			X
Mountain camelia	*Stewartia ovata*		X	X
Mountain decumbent goldenrod	*Solidago curtisii*			X
Mountain false indigo	*Amorpha glabra*	X		
Mountain goldenrod	*Solidago flaccidifolia*		X	
Mountain holly	*Ilex ambigua var. montana*		X	

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Mountain laurel	*Kalmia latifolia*		X	X
Mountain meadow-rue	*Thalictrum clavatum*		X	
Mountain rosebay	*Rhododendron catawbiense*		X	
Mountain silverbell	*Halesia tetraptera*	X		X
Mountain spleenwort	*Asplenium montanum*	X	X	X
Mouse-ear cress	*Arabidopsis thaliana*		X	X
Mouseear hawkweed	*Hieracium venosum*	X	X	X
Multiflora rose	*Rosa multiflora*	X		X
Muscadine	*Vitis rotundifolia*		X	X
Naked flower tick trefoil	*Desmodium nudiflorum*		X	X
Narrowleaf bluecurls	*Trichostema setaceum*		X	X
Narrowleaf blue-eyed grass	*Sisyrinchium angustifolium*	X		X
Narrowleaf evening primrose	*Oenothera fruticosa ssp. fruticosa*			X
Narrowleaf mountain mint	*Pycnanthemum tenuifolium*		X	X
Narrowleaf plantain	*Plantago lanceolata*	X		X
Narrowleaf silkgrass	*Pityopsis graminifolia*		X	X
Narrowleaf vervain	*Verbena simplex*		X	X
Narrowleaf whitetop aster	*Sericocarpus linifolius*		X	X
Neckweed	*Veronica peregrina*		X	X
Needle grass	*Stipa avenacea*	X	X	X
Needleleaf rosette grass	*Dichanthelium aciculare*			X
Needlepod rush	*Juncus scirpoides*		X	
Needle-tip blue-eyed grass	*Sisyrinchium mucronatum*		X	
Netted chain fern	*Woodwardia areolata*		X	
Nettle leaf sage	*Salvia urticifolia*	X	X	X
New England aster	*Aster novae-angliae*			X
New Jersey tea	*Ceanothus americanus*		X	X
New York fern	*Thelypteris noveboracensis*		X	X
Nimblewill	*Muhlenbergia schreberi*			X
Nodding chickweed	*Cerastium nutans var. nutans*			X
Nodding fescue	*Festuca subverticillata*			X
Nodding ladies' tresses	*Spiranthes cernua*		X	
Nodding onion	*Allium cernuum*			X
Northern bush honeysuckle	*Diervilla lonicera*			X
Northern panic grass	*Dichanthelium boreale*			X
Northern red oak	*Quercus rubra*	X		X
Northern slender ladies' tresses	*Spiranthes lacera var. gracilis*	X	X	X
Northern white cedar	*Thuja occidentalis*			X
Norwegian cinquefoil	*Potentilla norvegica*		X	X
Nottoway Valley brome grass	*Bromus nottowayanus*		X	
Nuttall's lobelia	*Lobelia nuttallii*			X
Nuttall's tick trefoil	*Desmodium nuttallii*		X	
Obedient plant	*Physostegia virginiana ssp. praemorsa*		X	X
Obedient plant	*Physostegia virginiana ssp. virginiana*			X
October ladies' tresses	*Spiranthes ovalis*			X
Ohio buckeye	*Aesculus glabra*	X		X

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One seed bur cucumber	*Sicyos angulatus*			X
Ontario blazing star	*Liatris cylindracea*		X	X
Openflower rosette grass	*Dichanthelium laxiflorum*		X	X
Orange coneflower	*Rudbeckia fulgida var. fulgida*	X		X
Orange coneflower	*Rudbeckia fulgida var. umbrosa*		X	
Orange daylilly	*Hemerocallis fulva*			X
Orangegrass	*Hypericum gentianoides*		X	X
Orchard grass	*Dactylis glomerata*	X		X
Oriental lady's thumb	*Polygonum caespitosum var. longisetum*	X		X
Osage orange	*Maclura pomifera*	X		
Oval leaf sedge	*Carex cephalophora*	X	X	X
Oxeye daisy	*Leucanthemum vulgare*	X		X
Ozark dropseed	*Sporobolus vaginiflorus var. ozarkanus*	X	X	X
Painted buckeye	*Aesculus sylvatica*	X	X	X
Pale beard tongue	*Penstemon pallidus*			X
Pale green orchid	*Platanthera flava var. herbiola*			X
Pale indian plantain	*Arnoglossum atriplicifolia*		X	X
Pale leather flower	*Clematis versicolor*			X
Pale touch-me-not	*Impatiens pallida*		X	X
Palespike lobelia	*Lobelia spicata*	X	X	X
Panicled leaf tick trefoil	*Desmodium paniculatum*		X	X
Paper mulberry	*Broussonetia papyrifera*		X	
Parasol whitetop	*Doellingeria umbellata*			X
Parrot feather watermilfoil	*Myriophyllum aquaticum*	X		
Partridge berry	*Mitchella repens*		X	
Partridge pea	*Chamaecrista fasciculata*		X	X
Partridge pea	*Chamaecrista nictitans*		X	X
Passion flower	*Passiflora incarnata*	X	X	X
Pasture spike sedge	*Kyllinga gracillima*	X		
Path rush	*Juncus tenuis*		X	X
Pawpaw	*Asimina triloba*		X	X
Peach	*Prunus persica*			X
Pennsylvania sedge	*Carex pensylvanica*		X	X
Pennsylvania smartweed	*Polygonum pensylvanicum*	X	X	X
Peppermint	*Mentha x piperita*	X		X
Perennial rye grass	*Lolium perenne*		X	X
Perfoliate bellwort	*Uvularia perfoliata*	X	X	X
Perfumed plum	*Prunus mahaleb*	X		
Perplexed tick trefoil	*Desmodium perplexum*		X	X
Persimmon	*Diospyros virginiana*			X
Philadelphia daisy fleabane	*Erigeron philadelphicus*			X
Philadelphia panic grass	*Panicum philadelphicum*			X
Piedmont bedstraw	*Galium pedemontanum*	X		
Piedmont rhododendron	*Rhododendron minus*	X		X
Pignut hickory	*Carya glabra*		X	X

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Pinesap	*Monotropa hypopithys*		X	
Pink azalea	*Rhododendron periclymenoides*	X		X
Pink fussy bean	*Strophostyles umbellata*		X	X
Pink ladies	*Oenothera speciosa*	X		
Pink Lady's slipper	*Cypripedium acaule*	X	X	X
Pink thoroghwort	*Fleischmannia incarnata*	X		X
Pinnate prairie coneflower	*Ratibida pinnata*			X
Pitcher's sandwort	*Arenaria patula*	X		
Plantain leaf sedge	*Carex plantaginea*		X	
Pleatleaf knotweed	*Polygonum tenue*		X	
Plumleaf spiraea	*Spiraea prunifolia*			X
Pointed leaf tick trefoil	*Desmodium glutinosum*		X	
Poison ivy	*Toxicodendron radicans*			X
Poke milkweed	*Asclepias exaltata*		X	X
Poor robin's plantain	*Erigeron pulchellus*		X	X
Poorjoe	*Diodia teres*			X
Possum grape	*Vitis cinerea var. baileyana*		X	X
Post oak	*Quercus stellata*		X	X
Poverty dropseed	*Sporobolus vaginiflorus var. vaginiflorus*		X	X
Poverty oat grass	*Danthonia spicata*	X	X	X
Prairie cord grass	*Spartina pectinata*	X		
Prairie fleabane	*Erigeron strigosus var. strigosus*		X	X
Prairie rose	*Rosa setigera*	X		X
Prairie rosinweed	*Silphium terebinthinaceum*			X
Prairie tea	*Croton monanthogynus*		X	
Prairie threeawn grass	*Aristida oligantha*	X		X
Prairie wedgescale	*Sphenopholis obtusata var. obtusata*		X	X
Prairie willow	*Salix humilis var. humilis*			X
Prickly bog sedge	*Carex atlantica ssp. atlantica*			X
Prickly fan petals	*Sida spinosa*			X
Prickly lettuce	*Lactuca serriola*	X		
Prickly pear cactus	*Opuntia humifusa*			X
Prostrate tick trefoil	*Desmodium rotundifolium*			X
Poverty brome grass	*Bromus sterilis*		X	
Puffshealth dropseed	*Sporobolus neglectus*		X	X
Purple cliffbrake fern	*Pellaea atropurpurea*	X	X	X
Purple coneflower	*Echinacea purpurea*			X
Purple cudweed	*Gnaphalium purpureum*	X		X
Purple disk sunflower	*Helianthus atrorubens*	X	X	X
Purple false foxglove	*Agalinis purpurea*			X
Purple giant hyssop	*Agastache scrophulariifolia*			X
Purple loosestrife	*Lythrum salicaria*			X
Purple love grass	*Eragrostis spectabilis*	X		X
Purple milkwort	*Polygala sanguinea*	X		
Purple phacelia	*Phacelia bipinnatifida*	X	X	X
Purple rocket	*Iodanthus pinnatifidus*	X		

Common Name	Scientific Name	Loudon	Rhea	Roane
Purple sedge	*Carex purpurifera*		X	
Purpleheaded sneezeweed	*Helenium flexuosum*		X	X
Purpleleaf willow herb	*Epilobium coloratum*			X
Purpletop tridens	*Tridens flavus var. flavus*			X
Pussytoes	*Antennaria plantaginifolia*		X	X
Quack grass	*Elymus repens*			X
Queen Anne's lace	*Daucus carota*			X
Queendevil	*Hieracium gronovii*			X
Quill fameflower	*Talinum teretifolium*		X	
Rabbit tobacco	*Gnaphalium obtusifolium*	X	X	X
Racemed milkwort	*Polygala polygama*		X	
Ragweed	*Ambrosia artemisiifolia*		X	X
Rattan vine	*Berchemia scandens*		X	X
Rattlesnake fern	*Botrychium virginianum*	X	X	X
Rattlesnake master	*Eryngium yuccifolium*		X	X
Rattlesnake plantain	*Goodyera pubescens*		X	X
Ravenel's rosette grass	*Dichanthelium ravenelii*		X	X
Red buckeye	*Aesculus pavia*			X
Red chokecherry	*Aronia arbutifolia*		X	
Red clover	*Trifolium pratense*			X
Red Columbine	*Aquilegia canadensis*			X
Red fescue	*Festuca rubra*		X	
Red maple	*Acer rubrum*		X	X
Red mulberry	*Morus rubra*	X		X
Red trillium	*Trillium erectum*			X
Redring milkweed	*Asclepias variegata*	X		X
Redstar	*Ipomoea coccinea*	X	X	X
Redtop	*Agrostis gigantea*		X	X
Redtop panic grass	*Panicum rigidulum var. elongatum*			X
Redtop panic grass	*Panicum rigidulum var. rigidulum*	X		X
Reflexed sedge	*Carex retroflexa*	X	X	X
Resurrection fern	*Pleopeltis polypodioides var. michauxiana*	X	X	X
Ribbed sedge	*Carex virescens*		X	X
Rice button aster	*Aster dumosus*			X
Rice cutgrass	*Leersia oryzoides*	X	X	X
Richweed	*Collinsonia canadensis*		X	X
Ridged yellow flax	*Linum striatum*		X	X
River birch	*Betula nigra*		X	X
Riverbank wild rye	*Elymus riparius*		X	
Rock cap fern	*Polypodium virginianum*		X	
Rose pink	*Sabatia angularis*			X
Rosebay	*Rhododendron maximum*		X	
Rosy sedge	*Carex rosea*		X	X
Rough barnyard grass	*Echinochloa muricata var. muricata*	X		X
Rough boneset	*Eupatorium pilosum*		X	
Rough cocklebur	*Xanthium strumarium*			X

Common Name	Scientific Name	Loudon	Rhea	Roane
Rough dropseed	*Sporobolus clandestinus*	X	X	X
Rough flat sedge	*Cyperus retrofractus*			X
Rough leaf dogwood	*Cornus drummondii*			X
Round fruit hedge hyssop	*Gratiola virginiana*		X	X
Roundheaded lespedeza	*Lespedeza capitata*	X		X
Roundleaf catchfly	*Silene rotundifolia*		X	
Roundleaf greenbriar	*Smilax rotundifolia*		X	X
Roundleaf ragwort	*Senecio obovatus*			X
Roundleaf thoroughwort	*Eupatorium rotundifolium*		X	X
Roundlobed liverleaf	*Hepatica americana*	X	X	X
Roundseed panic grass	*Dichanthelium sphaerocarpon*	X	X	X
Roundseed panic grass	*Dichanthelium sphaerocarpon var. isophyllum*			X
Roundseed St. Johnswort	*Hypericum sphaerocarpum*		X	
Royal fern	*Osmunda regalis var. spectabilis*		X	X
Rescue grass	*Bromus commutatus*	X	X	X
Rue anemone	*Thalictrum thalictroides*		X	X
Rufous bulrush	*Scirpus pendulus*			X
Running strawberry bush	*Euonymus obovatus*			X
Russian olive	*Elaeagnus umbellata*			X
Rusty black haw	*Viburnum rufidulum*		X	X
Ruth's little brown jug	*Hexastylis arifolia var. ruthii*	X	X	X
Sampson's snakeroot	*Orbexilum pedunculatum*			X
Sand bittercress	*Cardamine parviflora*		X	X
Sand hickory	*Carya pallida*		X	X
Sand violet	*Viola affinis*			X
Sandbar love grass	*Eragrostis frankii*			X
Sandbar willow	*Salix exigua*	X		X
Sanddune wallflower	*Erysimum capitatum*			X
Sandplain flax	*Linum intercursum*			X
Sassafras	*Sassafras albidum*	X	X	X
Saw greenbriar	*Smilax bona-nox*	X		X
Scaldweed	*Cuscuta gronovii*			X
Scaly blazing star	*Liatris squarrosa*	X	X	X
Scarlet Indian paintbrush	*Castilleja coccinea*			X
Scarlett pimpernel	*Anagallis arvensis*			X
Seedbox	*Ludwigia alternifolia*	X		X
Sensitive fern	*Onoclea sensibilis*	X	X	X
Sessile leaf bellwort	*Uvularia sessilifolia*	X	X	
Shagbark hickory	*Carya ovata var. ovata*			X
Shaggy solider	*Galinsoga quadriradiata*	X		
Shallow sedge	*Carex lurida*		X	X
Sharpleaf St. Johnswort	*Hypericum denticulatum var. acutifolium*		X	X
Sharplobed liverleaf	*Hepatica acutiloba*		X	X
Sharpscale sedge	*Carex oxylepis var. oxylepis*	X		
Sharpscale sedge	*Carex oxylepis var. pubescens*			X

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Sharpwinged monkey flower	*Mimulus alatus*	X		X
Shiny wedgescale	*Sphenopholis nitida*	X	X	X
Shooting star	*Dodecatheon meadia*		X	
Shortbeaked sedge	*Carex brevior*	X		
Shortbristle horned beak sedge	*Rhynchospora corniculata*	X		
Shortleaf pine	*Pinus echinata*			X
Short's sedge	*Carex shortiana*			X
Showy goldenrod	*Solidago erecta*		X	X
Showy goldenrod	*Solidago speciosa var. rigidiuscula*			X
Showy goldenrod	*Solidago speciosa var. speciosa*			X
Showy orchid	*Galearis spectabilis*		X	
Shumard's oak	*Quercus shumardii*	X	X	X
Shrubby St. Johnswort	*Hypericum prolificum*			X
Sicklepod	*Arabis canadensis*			X
Sidebeak pencil flower	*Stylosanthes biflora*		X	X
Sideoats gamma grass	*Bouteloua curtipendula*			X
Silky dogwood	*Cornus amomum*		X	X
Silver beard grass	*Bothriochloa laguroides ssp. torreyana*			X
Silver maple	*Acer saccharinum*			X
Silver plume grass	*Saccharum alopecuroidum*		X	
Singleheaded pussytoes	*Antennaria solitaria*			X
Silver glade fern	*Deparia acrostichoides*			X
Sixweeks fescue	*Vulpia octoflora var. octoflora*			X
Sleepy catchfly	*Silene antirrhina*		X	X
Slender crab grass	*Digitaria filiformis*	X	X	X
Slender fimbry	*Fimbristylis autumnalis*		X	X
Slender leaf false foxglove	*Agalinis tenuifolia*		X	X
Slender lespedeza	*Lespedeza virginica*	X	X	X
Slender loose flower sedge	*Carex gracilescens*			X
Slender muhly	*Muhlenbergia tenuiflora*		X	X
Slender parsley piert	*Aphanes microcarpa*	X		X
Slender toothwort	*Dentaria heterophylla*			X
Slender wedgescale	*Sphenopholis obtusata var. major*			X
Slender woodland sedge	*Carex digitalis*		X	X
Slender woodoats	*Chasmanthium laxum*			X
Slenderstalk beeblossum	*Gaura filipes*	X	X	X
Slimleaf panic grass	*Dichanthelium linearifolium*	X	X	X
Slippery elm	*Ulmus rubra*		X	X
Small bonny bellflower	*Campanula divaricata*		X	X
Small carp grass	*Arthraxon hispidus*			X
Small flowered buttercup	*Ranunculus parviflorus*	X	X	X
Small flowered hawksbeard	*Crepis pulchra*		X	X
Small flowered phacelia	*Phacelia dubia var. dubia*			X
Small fruit primrose willow	*Ludwigia microcarpa*			X
Small green wood orchid	*Platanthera clavellata*			X
Small head blazing star	*Liatris microcephala*		X	X

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Small head rush	*Juncus brachycephalus*			X
Small pondweed	*Potamogeton pusillus*	X		
Small skullcap	*Scutellaria parvula var. parvula*			X
Small spike false nettle	*Boehmeria cylindrica*			X
Small woodland sunflower	*Helianthus microcephalus*	X	X	X
Smallflower baby blue eyes	*Nemophila aphylla*	X		
Small's beard tongue	*Penstemon smallii*	X		
Small's black snakeroot	*Sanicula smallii*	X		X
Small's ragwort	*Senecio anonymus*	X		X
Smooth blue aster	*Aster laevis var. laevis*			X
Smooth brome grass	*Bromus inermis*			X
Smooth carrion flower	*Smilax herbacea var. herbacea*			X
Smooth cliffbrake fern	*Pellaea glabella*			X
Smooth hedge nettle	*Stachys tenuifolia*			X
Smooth oxeye	*Heliopsis helianthoides*			X
Smooth phlox	*Phlox glaberrima*	X	X	X
Smooth rock cress	*Arabis laevigata var. laevigata*	X	X	X
Smooth serviceberry	*Amelanchier laevis*		X	X
Smooth sheath sedge	*Carex laevivaginata*			X
Smooth small leaf tick trefoil	*Desmodium marilandicum*		X	X
Smooth sumac	*Rhus glabra*			X
Smooth tick trefoil	*Desmodium laevigatum*		X	X
Smooth wood reed	*Cinna arundinacea*	X		X
Smooth yellow false foxglove	*Aureolaria flava*	X		X
Smoth crab grass	*Digitaria ischaemum*			X
Soft agrimony	*Agrimonia pubescens*	X	X	X
Soft beard plume grass	*Saccharum brevibarbe var. contortum*	X		
Soft rush	*Juncus effusus*	X	X	X
Softstem bulrush	*Schoenoplectus tabernaemontani*	X		X
Solomon's plume	*Smilacina racemosa*	X	X	X
Solomon's seal	*Polygonatum biflorum*	X	X	X
Sourwood	*Oxydendrum arboreum*		X	X
Southern adder's tongue	*Ophioglossum vulgatum*			X
Southern blackberry	*Rubus betulifolius*			X
Southern blue monkshood	*Aconitum uncinatum*			X
Southern crab apple	*Malus angustifolia*		X	
Southern hackberry	*Celtis laevigata*		X	
Southern Lady fern	*Athyrium filix-femina ssp. asplenioides*	X	X	X
Southern mountain mint	*Pycnanthemum pycnanthemoides*		X	
Southern pinxter azalea	*Rhododendron canescens*	X	X	
Southern prairie aster	*Aster paludosus ssp. hemisphericus*		X	
Southern red oak	*Quercus falcata*	X		X
Southern red trillium	*Trillium sulcatum*		X	X
Southern sedge	*Carex austrina*	X		
Southern woodland violet	*Viola hirsutula*			X
Southern yellow loosestrife	*Lysimachia tonsa*		X	X
Spanish needles	*Bidens bipinnata*			X

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Sparse-lobed grape fern	*Botrychium biternatum*			X
Spicebush	*Lindera benzoin*		X	X
Spike watermilfoil	*Myriophyllum spicatum*	X	X	
Spiked hoary pea	*Tephrosia spicata*		X	X
Spiny pigweed	*Amaranthus spinosus*	X		X
Splitbeard bluestem	*Andropogon ternarius*	X	X	X
Spotted geranium	*Geranium maculatum*	X	X	X
Spotted knapweed	*Centaurea biebersteinii*			X
Spotted lady's thumb	*Polygonum persicaria*	X	X	X
Spotted mandrin	*Disporum maculatum*		X	X
Spotted St. Johnswort	*Hypericum punctatum*	X	X	X
Spotted water hemlock	*Cicuta maculata*			X
Spotted wintergreen	*Chimaphila maculata*		X	X
Spreading hedge parsley	*Torilis arvensis*			X
Spreading sedge	*Carex laxiculmis*			X
Spreading yellow false foxglove	*Aureolaria patula*			X
Spring coralroot	*Corallorhiza wisteriana*			X
Spring draba	*Draba verna*		X	X
Spring ladies' tresses	*Spiranthes vernalis*		X	
Spurred butterfly pea	*Centrosema virginianum*		X	X
Square steam spikerush	*Eleocharis quadrangulata*			X
Squarrose sedge	*Carex squarrosa*			X
Squaw root	*Conopholis americana*			X
St. Andrew's cross	*Hypericum hypericoides*		X	X
St. Andrew's cross	*Hypericum stragulum*		X	
St. Anthony's turnip	*Ranunculus bulbosus*	X		X
Staggerbush	*Lyonia ligustrina*	X		X
Stalkless yellowcress	*Rorippa sessiliflora*	X		X
Star chickweed	*Stellaria pubera*		X	X
Star grass	*Hypoxis hirsuta*	X	X	X
Star of Bethlehem	*Ornithogalum umbellatum*	X		X
Star tickseed	*Coreopsis pubescens*			X
Starry rosinweed	*Silphium asteriscus*			X
Starved panic grass	*Dichanthelium depauperatum*		X	X
Steeplebush	*Spiraea tomentosa*		X	
Stellate sedge	*Carex albicans var. australis*		X	
Stickywillie	*Galium aparine*	X		X
Stiff cowbane	*Oxypolis rigidior*		X	X
Stiff dogwood	*Cornus foemina*			X
Stiff goldenrod	*Solidago rigida ssp. glabrata*			X
Stiff marsh bedstraw	*Galium tinctorium*	X	X	X
Stiff tick trefoil	*Desmodium obtusum*		X	X
Stiff yellow flax	*Linum medium var. texanum*		X	X
Stink grass	*Eragrostis cilianensis*		X	X
Stoneroot	*Collinsonia verticillata*		X	X
Strong quillwort	*Isoetes valida*			X
Straggling St. Johnswort	*Hypericum dolabriforme*	X	X	X

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Straw colored flat sedge	*Cyperus strigosus*		X	X
Strawberry bush	*Euonymus americanus*		X	X
Striped cream violet	*Viola striata*			X
Striped gentian	*Gentiana villosa*		X	
Stripped maple	*Acer pensylvanicum*		X	
Sugar cane plume grass	*Saccharum giganteum*			X
Sugar maple	*Acer saccharum ssp. saccharum*		X	X
Sulphur cinquefoil	*Potentilla recta*	X		X
Summer grape	*Vitis aestivalis var. aestivalis*		X	X
Summer grape	*Vitis aestivalis var. bicolor*		X	
Swamp dewberry	*Rubus hispidus*			X
swamp doghobble; fetterbush	*Leucothoe racemosa*			X
Swamp milkweed	*Asclepias incarnata ssp. incarnata*	X		X
Swamp smartweed	*Polygonum hydropiperoides*	X		X
Swamp sunflower	*Helianthus angustifolius*			X
Swan's sedge	*Carex swanii*		X	X
Sweet azalea	*Rhododendron arborescens*		X	
Sweet birch	*Betula lenta*		X	X
Sweet briar rose	*Rosa eglanteria*		X	
Sweet gum	*Liquidambar styraciflua*	X	X	X
Sweet Sagewort	*Artemisia annua*		X	
Sweet vernal grass	*Anthoxanthum odoratum*		X	
Sweetflag	*Acorus calamus*			X
Sweetscented joe pye weed	*Eupatorium purpureum*		X	X
Switch grass	*Panicum virgatum*			X
Tag Alder	*Alnus serrulata*	X	X	X
Tall blazing star	*Liatris aspera*	X		X
Tall false indigo	*Amorpha fruticosa*		X	
Tall fescue	*Festuca arundinacea*		X	X
Tall larkspur	*Delphinium exaltatum*			X
Tall morning glory	*Ipomoea purpurea*			X
Tall rattlesnake root	*Prenanthes altissima*		X	
Tall thimbleweed	*Anemone virginiana*	X		X
Tall thoroughwort	*Eupatorium altissimum*			X
Tall tickseed	*Coreopsis tripteris*		X	
Taper leaf water hoarhound	*Lycopus rubellus*			X
Tapered rosette grass	*Dichanthelium acuminatum*	X	X	X
Tapertip rush	*Juncus acuminatus*	X	X	X
Tarheel sedge	*Carex austrocaroliniana*		X	X
Teal love grass	*Eragrostis hypnoides*			X
Ten-lobed false foxglove	*Agalinis obtusifolia*		X	X
Tennessee leafcup	*Polymnia laevigata*		X	
Terrestrial water sandwort	*Callitriche terrestris*			X
Thicket bean	*Phaseolus polystachyus*		X	
Thicket sedge	*Carex abscondita*		X	X
Thin fruit sedge	*Carex flaccosperma*	X	X	
Thin paspalum	*Paspalum setaceum*	X	X	X

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Thin spike threeawn grass	*Aristida longespica*			X
Thinleaf late purple aster	*Aster phlogifolius*		X	
Thinleaf sunflower	*Helianthus decapetalus*			X
Three parted beggar tickes	*Bidens tripartita*			X
Threeawn grass	*Aristida virgata*			X
Thymeleaf sandwort	*Arenaria serpyllifolia*	X		
Thymeleaf speedwell	*Veronica serpyllifolia*			X
Timothy grass	*Phleum pratense*			X
Tiny bluet	*Houstonia pusilla*			X
Tiny mousetail	*Myosurus minimus*		X	X
Toothed spurge	*Euphorbia dentata*	X	X	X
Toothed whitetop aster	*Sericocarpus asteroides*			X
Touch-me-not; jewelweed	*Impatiens capensis*			X
Trailing arbutus	*Epigaea repens*			X
Trailing fuzzy bean	*Strophostyles helvula*			X
Trailing lespedeza	*Lespedeza procumbens*	X		X
Tree of Heaven	*Ailanthus altissima*			X
Trifoliate orange	*Ptelea trifoliata*	X		X
Trumpet creeper	*Campsis radicans*		X	X
Trumpet weed	*Eupatorium fistulosum*		X	
Tulip poplar	*Liriodendron tulipifera*		X	X
Twining snoutbean	*Rhynchosia tomentosa*		X	X
Twinleaf	*Jeffersonia diphylla*	X		X
Twisted sedge	*Carex torta*		X	X
Two flower dwarf dandelion	*Krigia biflora*	X	X	X
Two flower melic grass	*Melica mutica*			X
Two headed water sandwort	*Callitriche heterophylla*		X	X
Umbrella magnolia	*Magnolia tripetala*		X	X
Umbrella sedge	*Rhynchospora colorata*			X
Upland bent grass	*Agrostis perennans*		X	X
Upland boneset	*Eupatorium sessilifolium*		X	X
Upland white aster	*Aster ptarmicoides*		X	X
Variable leaf little brown jug	*Hexastylis heterophylla*			X
Variable panic grass	*Dichanthelium commutatum*	X	X	X
Vase vine	*Clematis viorna*			X
Vasey's trillium	*Trillium vaseyi*	X		X
Veiny pea	*Lathyrus venosus*		X	
Veiny skullcap	*Scutellaria nervosa*			X
Velvet leaf tick trefoil	*Desmodium viridiflorum*		X	X
Velvet panicum	*Dichanthelium scoparium*	X		X
Vente conmigo	*Croton glandulosus*			X
Venus' pride	*Houstonia purpurea var. calycosa*		X	X
Venus' pride	*Houstonia purpurea var. purpurea*	X	X	X
Violet wood sorrel	*Oxalis violacea*	X	X	X
Virginia bluebell	*Mertensia virginica*		X	
Virginia buttonweed	*Diodia virginiana*		X	X
Virginia creeper	*Parthenocissus quinquefolia*	X	X	X

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Virginia ground cherry	*Physalis virginiana*	X		
Virginia meadowsweet	*Spiraea virginiana*			X
Virginia pennywort	*Obolaria virginica*	X		X
Virginia pepperweed	*Lepidium virginicum*	X	X	X
Virginia plantain	*Plantago virginica*			X
Virginia snakeroot	*Aristolochia serpentaria*			X
Virginia spiderwort	*Tradescantia virginiana*		X	
Virginia strawberry	*Fragaria virginiana*	X	X	X
Virginia tephrosia, catgut	*Tephrosia virginiana*		X	X
Virginia water hoarhound	*Lycopus virginicus*	X	X	X
Virginia wild rye	*Elymus virginicus*		X	X
Virginia willow	*Itea virginica*	X	X	X
Virginia mountain mint	*Pycnanthemum virginianum*	X		X
Virginia pine	*Pinus virginiana*		X	X
Walking fern	*Asplenium rhizophyllum*	X	X	X
Wall-rue	*Asplenium ruta-muraria*			X
Water knotweed	*Polygonum amphibium*		X	
Water oak	*Quercus nigra*			X
Water speedwell	*Veronica anagallis-aquatica*			X
Watercress	*Rorippa nasturtium-aquaticum*	X		X
Waterthread pondweed	*Potamogeton diversifolius*	X		
Wavy hair grass	*Deschampsia flexuosa*		X	
Waxleaf aster	*Aster undulatus*		X	X
Waxy-leaf meadow-rue	*Thalictrum revolutum*		X	X
Weak rush	*Juncus debilis*		X	X
Weakstalk bulrush	*Schoenoplectus purshianus*			X
Weedy dwarf dandelion	*Krigia caespitosa*	X		
West Indian nightshade	*Solanum ptychanthum*			X
Western waterweed	*Elodea nuttallii*			X
Whip nut rush	*Scleria triglomerata*			X
White arrowleaf aster	*Aster urophyllus*			X
White ash	*Fraxinus americana*	X	X	X
White avens	*Geum canadense*			X
White bergamot	*Monarda clinopodia*			X
White blue-eyed grass	*Sisyrinchium albidum*	X		X
White clintonia	*Clintonia umbellulata*		X	
White clover	*Trifolium repens*			X
White crownbeard	*Verbesina virginica*		X	X
White edge sedge	*Carex debilis*		X	X
White flowered leafcup	*Polymnia canadensis*			X
White fringe tree	*Chionanthus virginicus*		X	X
White grass	*Leersia virginica*	X	X	X
White oak	*Quercus alba*	X	X	X
White panicle aster	*Aster lanceolatus*	X	X	
White pine	*Pinus strobus*	X	X	X
White poplar	*Populus alba*		X	X
White root rush	*Juncus brachycarpus*		X	X

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White snakeroot	*Ageratina altissima*	X	X	X
White sweet clover	*Melilotus albus*	X		X
White thoroughwort	*Eupatorium album var. album*		X	X
White tinged sedge	*Carex albicans var. albicans*			X
White vervain	*Verbena urticifolia*		X	X
White wood aster	*Aster divaricatus var. divaricatus*	X	X	X
Whitehair rosette grass	*Dichanthelium villosissimum*		X	X
Whitestar	*Ipomoea lacunosa*			X
WhiteTurtle head	*Chelone glabra*		X	X
Whorled milkweed	*Asclepias verticillata*	X	X	X
Whorled milkwort	*Polygala verticillata var. ambigua*		X	X
Whorled milkwort	*Polygala verticillata var. verticillata*			X
Whorled mountain mint	*Pycnanthemum verticillatum var. pilosum*		X	
Whorled rosinweed	*Silphium trifoliatum var. trifoliatum*		X	X
Widowcross	*Sedum pulchellum*	X		
Widow's frill	*Silene stellata*		X	X
Wild basal	*Satureja vulgaris*		X	X
Wild bergamot	*Monarda fistulosa*		X	X
Wild black cherry	*Prunus serotina*	X		X
Wild blue phlox	*Phlox divaricata*	X	X	X
Wild comfrey	*Cynoglossum virginianum*			X
Wild garlic	*Allium vineale*		X	X
Wild ginger	*Asarum canadense*			X
Wild goose plum	*Prunus munsoniana*			X
Wild honeysuckle	*Lonicera dioica*	X		X
Wild hyacinth	*Camassia scilloides*			X
Wild hydrangea	*Hydrangea arborescens*	X	X	X
Wild quinine	*Parthenium integrifolium*		X	X
Wild sweet William	*Phlox maculata ssp. pyramidalis*		X	X
Wild yam	*Dioscorea villosa*	X	X	X
Willdenow's croton	*Croton willdenowii*		X	
Willdenow's sedge	*Carex willdenowii*			X
Willow oak	*Quercus phellos*		X	X
Willow-leaf aster	*Aster pratensis*			X
Wineberry	*Rubus phoenicolasius*		X	
Winged elm	*Ulmus alata*		X	X
Winged sumac	*Rhus copallinum*	X		X
Wingleaf primrose willow	*Ludwigia decurrens*	X		X
Wingstem	*Verbesina alternifolia*			X
Winter bent grass	*Agrostis hiemalis*	X	X	X
Wirey panic grass	*Panicum flexile*	X	X	X
Wirestem muhly	*Muhlenbergia frondosa*			X
Witch grass	*Panicum capillare*			X
Withe rod	*Viburnum cassinoides*		X	
Wood anemone	*Anemone quinquefolia*		X	X
Woodland blue grass	*Poa sylvestris*			X

Common Name	Scientific Name	Loudon	Rhea	Roane
Woodland lettuce	*Lactuca floridana*	X	X	X
Woodland muhly	*Muhlenbergia sylvatica*		X	X
Woodland stonecrop	*Sedum ternatum*	X	X	X
Woodland sunflower	*Helianthus divaricatus*			X
Wool grass	*Scirpus cyperinus*			X
Wooly blueberry	*Vaccinium hirsutum*		X	
Wreath goldenrod	*Solidago caesia*		X	X
Wrinkle leaf goldenrod	*Solidago rugosa ssp. aspera*		X	
Yarrow	*Achillea millefolium*			X
Yellow birch	*Betula alleghaniensis*		X	
Yellow bristle grass	*Setaria glauca*	X		X
Yellow buckeye	*Aesculus flava*	X	X	X
Yellow chestnut oak	*Quercus muhlenbergii*			X
Yellow crownbeard	*Verbesina occidentalis*			X
Yellow fairy bells	*Disporum lanuginosum*		X	X
Yellow flat sedge	*Cyperus flavescens*	X	X	X
Yellow fruit sedge	*Carex annectens*		X	X
Yellow giant hyssop	*Agastache nepetoides*			X
Yellow jasmine	*Gelsemium sempervirens*		X	
Yellow meadow parsnip	*Thaspium trifoliatum var. flavum*		X	X
Yellow passion flower	*Passiflora lutea*		X	X
Yellow screwstem	*Bartonia virginica*		X	
Yellow sweet clover	*Melilotus officinalis*			X
Yellow trillium	*Trillium luteum*	X	X	X
Yellowdicks	*Helenium amarum*	X		X
Yellow-fruit horse gentian	*Triosteum angustifolium*			X
Yellowroot	*Xanthorhiza simplicissima*		X	X
Yellowseed false pimpernel	*Lindernia dubia*		X	X
Zigzag bladderwort	*Utricularia subulata*		X	
Zigzag goldenrod	*Solidago flexicaulis*		X	X
Zigzag spiderwort	*Tradescantia subaspera*		X	

*Species listed as endangered, threatened, or in need of management federally, by the state of Tennessee, or recommended by the Tennessee Wildlife Resources Agency.

Table D-3. Tennessee 2004 Proposed Final 303(d) Listing for Water Bodies in the Local Watts Bar Reservoir Watershed

County	Hydrologic Unit	Impaired Segment	Water Body	Miles/ Acres Impaired	Cause	Source
Rhea, Roane, Meigs	TN06010201-270 TN06010201-240 TN06010201-200 TN06010201-230 TN06010201-190 TN06010201-160	TN06010201 001-1000	Watts Bar Reservoir	34,075 acres	PCBs	Contaminated Sediments
Loudon	TN06010201-140	TN06010201 001-2000	Upper Watts Bar Reservoir from Sweetwater Creek to Fort Loudoun Dam	1,790 acres	Low DO, PCBs	Upstream Impoundment Contaminated Sediments
Loudon	TN06010201-140	TN06010201 065-1000	Steekee Creek	11.0 miles	Physical Substrate Habitat Alterations Loss of biological integrity due to siltation Escherichia coli	Pasture Grazing
Loudon/ Monroe	TN06010201-150	TN06010201 015-0100	Bacon Creek	10.2 miles	Escherichia coli	Pasture Grazing Feeding Operations (NPS)
Loudon/ Monroe	TN06010201-150	TN06010201 015-1000	Sweetwater Creek	29.3 miles	Nitrates Loss of biological integrity due to siltation Escherichia coli	Municipal Point Source Discharge, Channelization Land Development Animal Feeding Operations (NPS)
Loudon/ Roane	TN06010201-160	TN06010201 087-1000	Hines Creek	20.3 miles	Escherichia coli	Pasture Grazing
Loudon	TN06010201-160	TN06010201 1149-1000	Polecat Creek	13.1 miles	Escherichia coli	Pasture Grazing
Loudon/ Monroe	TN06010201-170	TN06010201 013-100	Mud Creek	7.2 miles	Escherichia coli	Pasture Grazing
Loudon/ Monroe	TN06010201-170	TN06010201 013-200	Greasy Branch	7.3 miles	Escherichia coli	Pasture Grazing

County	Hydrologic Unit	Impaired Segment	Water Body	Miles/ Acres Impaired	Cause	Source
Loudon/ Monroe	TN06010201-170	TN06010201 013-1000	Pond Creek	13.57 miles	Nitrates Physical Substrate Habitat Alteration Escherichia coli	Pasture Grazing Livestock in Stream Animal Feeding Operations (NPS)
Loudon/ Monroe	TN06010201-170	TN06010201 013-2000	Pond Creek	4.18 miles	Nitrates Escherichia coli	Pasture Grazing Livestock in Stream
Roane	TN06010201-180	TN06010201 011-1000	Paint Rock Creek	12.2 miles	Escherichia coli	Pasture Grazing
Roane	TN06010201-200	TN06010201 0620-1000	Cardiff Creek	3.8 miles	Chrome Hexavalent pH	CERCLA site
Roane	TN06010201-200	TN06010201 1621-1000	Caney Creek	13.2 miles	Physical Substrate Habitat Alteration Loss of biological integrity due to siltation Escherichia coli	Pasture Grazing Collection System Failure
Roane	TN06010201-230	TN06010201 040-0600	Black Creek (Whites Creek)	16.7 miles	Polycyclic Aromatic Hydrocarbons (PAHs) Organic Enrichment Physical Substrate Habitat Alterations Escherichia coli	Municipal Point Source Discharges Collection System Failures Resource Conservation and Recovery Act Hazardous Waste Channelization
Roane	TN06010207-040	TN06010207 001-0100	Watts Bar Reservoir-Clinch River Arm	2,336 acres	PCBs Chlordane Mercury	Industrial Point Source Contaminated Sediments
Anderson	TN06010207-040	TN06010207 247-1000	Whiteoak Creek	5.3	Cesium Strontium Biological integrity loss due to undetermined cause	CERCLA Site

County	Hydrologic Unit	Impaired Segment	Water Body	Miles/ Acres Impaired	Cause	Source
Roane	TN06010207-060	TN06010207 026-1000	East Fork Poplar Creek	9.7 miles	PCBs Mercury Escherichia coli Loss of biological integrity due to siltation Nitrates Phosphates	Industrial Point Source Municipal Point Source Contaminated Sediments Collection System Failure High-Density Municipal Area
Roane	TN06010207-060	TN06010207 026-0600	Bear Creek	10.87 miles	Nitrates Escherichia coli	CERCLA Site Undetermined Source
Anderson	TN06010207-060	TN06010207 026-2000	East Fork Poplar Creek	11.3 miles	PCBs Mercury Escherichia coli Loss of biological integrity due to siltation Nitrates Phosphates	Industrial Point Source Contaminated Sediments High-Density Municipal Area
Roane	TN06010207	TN06010207 247-0100	Melton Branch	2.0	Strontium	CERCLA Site
Roane	TN06010207	TN06010207 028-1000	Caney Creek	7.4 miles	Loss of biological integrity due to siltation Habitat loss due to alteration of streamside or littoral vegetative cover	Pasture Grazing
Cumberland	TN06010208-010	TN06010208 013-0400	Drowning Creek	13.1 miles	Loss of biological integrity due to siltation Physical Substrate Habitat Alterations	Animal Feeding Operations (NPS)
Cumberland	TN06010208-010	TN06010208 013-1000	Obed River		This 12.4 mile section of the Obed River has been identified as “threatened” by the division due to a document decline in diversity at biological stations	

County	Hydrologic Unit	Impaired Segment	Water Body	Miles/ Acres Impaired	Cause	Source
Cumberland	TN06010208-020	TN06010208 013-2000	Obed River	3.2 miles	Flow Alterations Habitat loss due to stream flow alterations	Discharges from MS4 area Upstream Impoundment
Cumberland	TN06010208-030	TN06010208 015-0510	Long Branch	2.2 miles	Loss of biological integrity due to siltation	Abandoned Mine Lands
Cumberland	TN06010208-040	TN06010208 015-0800	Byrd Creek	38.6 miles	Impairment undetermined	Undetermined Source
Cumberland	TN06010208-040	TN06010208 015-0810	One Mile Creek	8.5 miles	Loss of biological integrity due to siltation	Land Development
Morgan	TN06010208-070	TN06010208 008-2000	Clear Creek	1.41 miles	Oil	Petroleum Activities
Roane/ Morgan	TN06010208-110	TN06010208 001-1000	Watts Bar Reservoir-Emory River Arm	1,258.7 acres	PCBs Chlordane	Industrial Point Source Contaminated Sediments
Morgan	TN06010208-120	TN06010208 004-0200	Flat Fork	3.7 miles	Nitrates Physical Substrate Habitat Alterations Loss of biological integrity due to siltation	Pasture Grazing Channelization
Morgan	TN06010208-120	TN06010208 004-1000	Crooked Fork	6.9 miles	Nitrates	Municipal Point Source Discharge Pasture Grazing
Morgan	TN06010208-120	TN06010208 004-2000	Crooked Fork	16.7 miles	Nitrates Physical Substrate Habitat Alterations Loss of biological integrity due to siltation	Permitted Small Flows Abandoned Mining Channelization
Morgan	TN06010208-130	TN06010208 020-0100	Smith Branch	5.4	pH	Abandoned Mines
Morgan	TN06010208-130	TN06010208 020-0400	Golliher Creek	5.6	Manganese Iron pH	Abandoned Mines
Morgan	TN06010208-130	TN06010208 020-0500	Fagon Mill Creek	2.6	Manganese pH	Abandoned Mines
Morgan	TN06010208-130	TN06010208 020-0600	Laurel Creek	2.7	pH	Abandoned Mines

County	Hydrologic Unit	Impaired Segment	Water Body	Miles/ Acres Impaired	Cause	Source
Morgan	TN06010208-130	TN06010208 020-2000	Crab Orchard Creek	2.3	pH	Abandoned Mines
Morgan	TN06010208-130	TN06010208 020-3000	Crab Orchard Creek	7.9	Manganese pH	Abandoned Mines

Table D-4. Tennessee River - Watts Bar Reservoir Flood Profiles

River Mile	100-Year Flood	Flood Risk Profile*	Landmark
529.90	746.5	747.0	Watts Bar Dam
530.00	746.5	747.0	
531.00	746.5	747.0	
532.00	746.5	747.0	
532.03	746.5	747.0	
532.33	746.5	747.0	Piney River
533.00	746.5	747.0	
534.00	746.5	747.0	
534.16	746.5	747.0	
535.00	746.5	747.0	
536.00	746.5	747.0	
536.29	746.5	747.0	
537.00	746.5	747.0	
538.00	746.5	747.0	
538.07	746.5	747.0	Wann Branch
538.42	746.5	747.0	
539.00	746.5	747.0	
540.00	746.5	747.0	
540.55	746.5	747.0	
541.00	746.5	747.0	
542.00	746.5	747.0	
542.68	746.5	747.0	
543.00	746.5	747.0	
544.00	746.5	747.1	
544.71	746.5	747.1	Whites Creek
544.81	746.5	747.1	
545.00	746.5	747.1	
546.00	746.5	747.2	
546.94	746.5	747.2	
547.00	746.5	747.2	
547.51	746.5	747.2	Cane Creek
548.00	746.5	747.2	
548.28	746.5	747.2	Gordon Branch
549.00	746.5	747.2	
549.07	746.5	747.2	
550.00	746.5	747.2	
551.00	746.5	747.2	
551.20	746.5	747.2	
552.00	746.5	747.3	
552.85	746.5	747.3	King Creek
553.00	746.5	747.3	
553.32	746.5	747.3	
554.00	746.5	747.3	
555.00	746.5	747.4	
555.45	746.5	747.4	

River Mile	100-Year Flood	Flood Risk Profile*	Landmark
556.00	746.5	747.4	
556.58	746.5	747.4	Bolden Branch
557.00	746.5	747.5	
557.58	746.5	747.5	
558.00	746.5	747.5	
559.00	746.5	747.6	
559.71	746.5	747.6	
560.00	746.5	747.6	
561.00	746.6	747.7	
561.84	746.6	747.8	
562.00	746.6	747.8	
562.30	746.6	747.8	Caney Creek
563.00	746.7	747.8	
563.97	746.7	747.9	
564.00	746.7	747.9	
565.00	746.8	748.0	
565.97	746.9	748.1	
566.00	746.9	748.1	
567.00	747.0	748.3	
567.76	747.1	748.4	Clinch River
568.00	747.1	748.5	
568.20	747.2	748.5	Tennessee Highway 58
568.23	747.2	748.5	
569.00	747.3	748.9	
570.00	747.5	749.3	Riley Creek
570.36	747.5	749.5	
571.00	747.6	749.5	
571.50	747.6	749.6	Smith Creek
572.00	747.6	749.7	
572.49	747.6	749.8	
573.00	747.7	749.9	
574.00	747.8	750.1	
574.62	747.9	750.2	
575.00	747.9	750.3	Paint Rock Creek
575.20	747.9	750.4	
576.00	748.1	750.7	
576.72	748.2	750.9	
577.00	748.2	751.0	
578.00	748.4	751.5	
578.87	748.6	751.9	Polecat Creek
578.88	748.6	751.9	
579.00	748.7	751.9	
579.77	748.9	752.5	Pond Creek
580.00	749.0	752.7	
581.00	749.4	753.4	
581.01	749.4	753.4	
582.00	749.6	753.8	

River Mile	100-Year Flood	Flood Risk Profile*	Landmark
583.00	749.8	754.3	
583.13	749.9	754.3	Hines Creek
583.14	749.9	754.3	
584.00	750.1	754.7	
584.90	750.2	755.0	Interstate 75
585.00	750.3	755.1	
585.27	750.3	755.2	
585.48	750.5	755.4	Sweetwater Creek
586.00	750.7	755.8	
587.00	751.2	756.7	
587.39	751.4	757.1	
588.00	751.7	757.5	
589.00	752.1	758.1	
589.52	752.3	758.5	
590.00	752.4	758.7	
591.00	752.8	759.3	
591.32	752.9	759.5	Southern Railway
591.56	753.0	759.6	
591.58	753.0	759.6	U.S. Highway 11
591.73	753.1	759.8	Steekee Creek
592.00	753.3	760.0	
592.58	753.6	760.4	Clear Branch
593.00	753.8	760.7	
593.78	754.3	761.3	
594.00	754.4	761.5	
595.00	754.9	762.1	
595.91	755.4	762.7	
596.00	755.4	762.8	
597.00	756.2	763.8	
598.00	756.9	764.8	
598.04	756.9	764.9	
599.00	757.7	766.0	
600.00	758.6	767.1	
600.17	758.7	767.3	
601.00	759.2	768.1	
601.13	759.3	768.2	Little Tennessee River
601.20	759.4	768.3	Town Creek
602.00	759.9	769.0	Muddy Creek
602.30	760.0	769.3	Fort Loudoun Dam
*The Flood Risk Profile is equal to the 500-year flood from Mile 543.0 upstream to Fort Loudoun Dam.			

Table D-5. Clinch River - Watts Bar Reservoir Flood Profiles

River Mile	100-Year Flood	Flood Risk Profile*	Landmarks
0.00	747.1	748.4	
1.00	747.1	748.4	
2.00	747.1	748.4	
2.25	747.1	748.4	US Highway 70
2.40	747.1	748.4	Interstate Highway 40
3.00	747.1	748.4	
3.03	747.1	748.4	
3.24	747.1	748.6	
4.00	747.5	749.2	
4.20	747.6	749.4	
4.36	747.6	749.4	Emory River
5.00	747.6	749.5	
6.00	747.7	749.6	
6.30	747.7	749.6	
7.00	747.8	749.8	
8.00	747.9	750.0	
8.40	748.0	750.1	
9.00	748.2	750.3	
9.45	748.3	750.5	
10.00	748.5	750.8	
10.50	748.7	751.1	
11.00	748.8	751.2	
11.55	748.8	751.4	
12.00	748.9	751.4	Poplar Creek
12.60	749.0	751.5	
13.00	749.1	751.7	
13.65	749.3	752.1	
14.00	749.5	752.4	
14.04	749.6	752.4	State Route 58
14.59	749.9	752.9	Grassy Creek
14.70	750.0	753.0	
15.00	750.1	753.2	
15.75	750.4	753.6	
16.00	750.5	753.7	
16.80	751.0	754.2	
16.98	751.2	754.4	Caney Creek
17.00	751.2	754.5	
17.85	752.0	755.5	
18.00	752.1	755.6	
18.90	752.8	756.5	
19.00	752.9	756.6	
19.27	753.0	756.7	Papaw Creek
19.95	753.3	757.1	
20.00	753.3	757.1	
20.83	753.9	757.8	Whiteoak Creek

River Mile	100-Year Flood	Flood Risk Profile*	Landmarks
21.00	754.0	757.9	
21.70	754.3	758.3	State Route 95
22.00	754.5	758.5	
22.05	754.5	758.5	
23.00	755.2	759.1	
23.10	755.3	759.2	Melton Hill Dam
*The Flood Risk Profile is equal to the 500-year flood.			

Table D-6. Recreation Inventory Database for Watts Bar Reservoir

Area Name	Operating Sector	Operator	Parcel Number	River Mile	County	Facility Acres	Facilities Present
Ladd Landing Park	Public	City of Kingston	121	C 0.5 L	Roane	2	Picnic tables, Paved trails, Launching ramp
Arrowhead Resort	Private	Commercial	241	T 545.0 R	Rhea	60	Fish berm, Swimming beach, Playground, Play courts, Launching ramp, Camping, Boat slips, Fishing licenses sold, Restaurant, Rooms, Cabins
Bayside Marina	Private	Commercial	41/42	T 548.0 L	Roane	10	Swimming beach, Launching ramp, Camping, Boat slips, Fishing licenses sold, Restaurant
Belcove	Public	TWRA	12-43	T 569.4 R	Roane	2.7	Launching ramp
Hog Pen	Public	TWRA	12-6	T 540.5 L	Meigs	4	Launching ramp
Blue Springs	Public	TWRA	12-20	T 547.5 L	Roane	4.8	Launching ramp
Blue Springs Boat Dock	Private	Commercial	37	T 547.2 L	Roane	3	Picnic tables, Fish Berm, Swimming beach, Launching ramp, Camping, Boat slips, Fishing licenses sold, Restaurant
Brigadoon Resort	Private	Commercial	230	T 545.0 R	Roane	22	Picnic tables, Fish berm, Swimming beach, Playground, Play courts, Launching ramp, Camping, Boat slips, Restaurant, Cabins
Brown's Chapel	Public	TWRA	12-36	T 561.1 R	Roane	2.6	Launching ramp
Buck Toms Scout Camp	Quasi-public	Boy Scouts of America	221a	T 551.0 R	Roane	564	
Campground on the Lakeshore	Private	Commercial	27	T 541.0 L	Meigs	5	Fish berm, Swimming beach, Playground, Play courts, Launching ramp, Camping, Boat slips
Caney Creek Campground	Public	Roane County	201	T 562.3 R	Roane	30	Picnic tables, Pavilion, Unpaved trails, Camping
Caney Creek Marina	Private	Commercial	201	T 562.3 R	Roane	1	Launching ramp, Boat slips, Restaurant
Cedine Bible Camp	Quasi-public	Church Camp	Non-TVA Property	T 544.3 R	Rhea	25	
Cherokee Point Campground	Private	Commercial	13	T 538.5 L	Meigs	36	Paved trails, Launching ramp, Camping, Cabins
Eden Resort Marina	Private	Commercial	250	T 542.3 R	Rhea	6	Picnic tables, Swimming beach, Play courts, Launching ramp, Camping, Boat slips, Cabins

Area Name	Operating Sector	Operator	Parcel Number	River Mile	County	Facility Acres	Facilities Present
Euchee Marina and Campground	Private	Commercial	18/20	T 539.9 L	Meigs	20	Picnic tables, Swimming beach, Playground, Play courts, Launching ramps (2), Camping, Boat slips, Fishing licenses sold, Restaurant, Rooms, Cabins
Winton Chapel	Public	TWRA	12-29	T 551.3 R	Roane	3.8	Launching ramp
Fooshee Pass	Private	Commercial	10	T 538.0 L	Meigs	56	Picnic tables, Pavilion, Playground, Launching ramp, Camping
Fred's Bait and Tackle	Private	Commercial	Non-TVA Land	T 601.4 R	Loudon	<1	
Harbor Point Marina	Private	Commercial	222	T 551.8 R	Roane	10	Picnic tables, Launching ramp, Boat slips
Harriman City Ramp	Public	City of Harriman	175	E 10.5 R	Roane	3.7	Launching ramp
Harriman Riverfront Park	Public	City of Harriman	Non-TVA Property	E 12.5 R	Roane	10.4	Picnic Tables, Pavilions (2), Unpaved trails, Playground
Hogback	Public	TWRA	12-24	T 546.0 R	Roane	1.2	Launching ramp
Hornsby Hollow	Private	Commercial	22	T 540.0 L	Meigs	58	Pavilion, Fish Berm, Swimming beach, Playground, Play courts, Launching ramps, Camping, Boat slips
John Knox Presbytery Camp	Quasi-public	Church Camp	45	T 550.0 L	Roane	120	
Paint Rock at Johnson Valley	Public	TWRA	12-62	T 572.5 R	Roane	1.6	Launching ramp
Kingston	Public	TWRA	12-44	C 2.4 L	Roane	0.2	Launching ramps (2)
Kingston City Park	Public	City of Kingston	121	C 1.0 L	Roane	11	Picnic tables, Pavilions (2), Paved trails, Fish berm, Playground, Play courts, Launching ramps (3)
Kingston Fossil Plant Ramp	Public	TVA	190	C 2.7 R	Roane	1	Launching ramp
KOA	Public	TWRA	12-38	T 562.5 L	Roane	2.1	Launching ramp
Ladd Park	Public	City of Kingston	125	C 4.5 L	Roane	3	Picnic tables, Pavilions, Launching ramp
Wide Spot	Public	TWRA	12-4	T 539.0 L	Meigs	6.1	Launching ramp
Laurel Bluff	Public	TWRA	12-59	T 572.5 L	Roane	0.9	Launching ramp
Little Emory	Public	TWRA	12-48	E 0.5 R	Roane	6.1	Launching ramp
Long Island Marina	Private	Commercial	114	T 571.7	Roane	17	Picnic tables, Launching ramp, Boat slips
Meigs County Park	Public	Meigs County	5	T 531.0	Meigs	240	Pavilions (3), Play courts
Mourneys Cove	Public	TWRA	12-41	T 569.7 L	Roane	1.1	Launching ramp
New Hope	Public	TWRA	219	T 553.8 R	Roane	2.7	Launching ramp
Oak Ridge	Public	TWRA	Non-TVA Land	C 14.3 L	Roane	44.6	Launching ramp

Area Name	Operating Sector	Operator	Parcel Number	River Mile	County	Facility Acres	Facilities Present
Piney Point Resort	Private	Commercial	264	T 532.5 R	Rhea	5	Swimming pool, Launching ramp, Boat slips, Fishing licenses sold, Restaurant, Cabins
Pond Creek	Public	TWRA	12-68	T 579.6 L	Loudon	4.8	Launching ramp
Rector Branch	Public	TWRA	12-17	T 545.0 R	Rhea	0.8	Launching ramp
Red Cloud Campground	Private	Commercial	Non-TVA Property	T 542.0 R	Rhea	10	Launching ramp, Camping, Boat slips
Rhea Harbor	Private	Commercial	275	T 532.5 R	Rhea	4	Picnic tables, Fish berm, Swimming beach, Playground, Play courts, Launching ramp, Boat slips, Fishing licenses sold, Cabins
Rhea Springs	Public	TWRA	12-8	T 532.2 R	Rhea	1	Launching ramp
Riley Creek Recreation Area	Private	Commercial	74	T 570.0	Roane	79	Picnic tables, Swimming beach, Launching ramp, Camping
Riverside Park	Public	City of Loudon	99	T 591.7 L	Loudon	3.5	Picnic tables, Pavilion, Paved trails, Fish berm, Playground, Play courts, Launching ramp
Roane County Park	Public	Roane County	201	T 562.3 R	Roane	183	Picnic tables, Pavilions (5), Unpaved trails, Paved trails, Fish berm, Swimming beach, Playground, Launching ramp
Rockwood Community Park	Public	City of Rockwood	219	T 553.0 R	Roane	89	Picnic tables, Fish berm, Launching ramp
Rockwood First Baptist Church Camp	Quasi-public	Church Camp	Non-TVA Property	T 545.0 R	Roane	10	
Roddy	Public	TWRA	12-26	T 544.7 R	Rhea	1.5	Launching ramp
Sam's Dock	Private	Commercial	14	T 538.2 L	Meigs	6	Picnic tables, Pavilions, Fish berm, Swimming beach, Launching ramp, Camping, Boat slips, Restaurant, Cabins
Shady Grove	Public	TWRA	12-32	T 557.1 L	Roane	3.2	Launching ramp
Shelton's Campground	Private	Commercial	Non-TVA Property	T 545.0 R	Roane	10	Launching ramp, Camping
Soaring Eagle	Private	Commercial	136	C 17.0 L	Roane	48	Picnic tables, Pavilion, Fish berm, Swimming pool, Play courts, Launching ramp, Camping
Southwest Point	Public	City of Kingston	121	C 0.0 L	Roane	42	Picnic tables, Pavilion, Paved trails, Fish berm, Play courts, Visitor center, Overlook, Museum
Southwest Point Golf Course	Private	Commercial	68	T 567.0 L	Roane	0	Golf

Area Name	Operating Sector	Operator	Parcel Number	River Mile	County	Facility Acres	Facilities Present
Spring City Boat Dock	Public	Spring City	277	T 532.5 R	Rhea	32	Fish berm, Launching ramp, Camping, Boat slips, Restaurant, Cabins
Sugar Tree	Public	TWRA	12-53	E 0.8 L	Roane	3.7	Launching ramp
Terrace View Resort	Private	Commercial	245	T 545.0 R	Rhea	8.7	Swimming pool, Launching ramp, Boat slips, Fishing licenses sold, Restaurant, Rooms, Cabins
The Landing	Private	Commercial	29	T 541.5 L	Meigs	2	Fish berm, Launching ramp, Boat slips, Restaurant
Veteran's Park	Public	Spring City, Tennessee	270	T 532.5 R	Rhea	22	Picnic tables, Pavilions (2), Paved trails, Playground, Play courts, Launching ramp
Watts Bar Dam Reservation--Headwater	Public	TVA	4	T 530.0	Rhea/ Meigs	160.8	Picnic tables, Pavilions, Paved trails, Swimming beach, Playground, Play courts, Launching ramp
Watts Bar Lake Campground and Marina	Private	Commercial	Non-TVA Property	T 562.5 L	Roane	10	Fish berm, Swimming pool, Playground, Camping, Cabins
Watts Bar Marina and Resort	Private	Private Commercial	300	T 530.0 R	Rhea	185	Unpaved trails, Swimming pool, Play courts, Launching ramp, Boat slips, Fishing licenses sold, Restaurant, Cabins
Whites Creek SWA	Public	TVA	238	T 545.2 R	Rhea	171	Unpaved trails

C = Clinch River Mile
E = Emory River Mile
L = Left Bank
R = Right Bank
T = Tennessee River Mile

Table D-7. Invasive Exotic Pest Plants of Tennessee

Rank 1 — Severe Threat: Exotic plant species that possess characteristics of invasive species and spread easily into native plant communities and displace native vegetation

Common Name	Scientific Nomenclature
Air-potato	*Dioscorea oppositifolia L.*
Amur bush honeysuckle	*Lonicera maackii (Rupr.) Maxim.*
Asian bittersweet	*Celastrus orbiculata Thunb.*
Autumn olive	*Elaeagnus umbellata Thunb.*
Bush honeysuckle	*Lonicera x bella Zabel*
Camus Nepalgrass, Japanese grass	*Microstegium vimineum (Trin.) A.*
Chinese privet	*Ligustrum sinense Lour.*
Common privet	*Ligustrum vulgare L.*
Common reed	*Phragmites australis (Cav.) Trin. ex Steud.*
English ivy	*Hedera helix L.*
Eurasian water milfoil	*Myriophyllum spicatum L.*
Garlic-mustard	*Alliaria petiolata (Bieb.) Cavara & Grande*
January jasmine	*Lonicera fragrantissima Lindl. & Paxton*
Japanese honeysuckle	*Lonicera japonica Thunb.*
Japanese knotweed, Japanese bamboo	*Polygonum cuspidatum Seib. & Zucc*
Japanese spiraea	*Spiraea japonica L.f.*
Johnson grass	*Sorghum halepense (L.) Pers.*
Kudzu	*Pueraria montana (Lour.) Merr.*
Mimosa	*Albizia julibrissin Durz.*
Morrow's bush honeysuckle	*Lonicera morrowii A. Gray*
Multiflora rose	*Rosa multiflora Thunb.*
Princess tree	*Paulownia tomentosa (Thunb.) Sieb. & Zucc. ex Steud*
Purple loosestrife	*Lythrum salicaria L. [all varieties and cultivars]*
Sericea lespedeza	*Lespedeza cuneata (Dum.-Cours.) G. Don*
Tartarian honeysuckle, twinsisters	*Lonicera tatarica L.*
Thorny-olive	*Elaeagnus pungens Thunb.*
Tree of heaven	*Ailanthus altissima (Mill.) Swingle*
Tropical soda apple	*Solanum viarum Dunal*
Winter creeper	*Euonymus fortunei (Turcz.) Hand.-Mazz.*

Rank 2 — Significant Threat: Exotic plant species that possess characteristics of invasive species but are not presently considered to spread as easily into native plant communities as those species listed as Rank 1— Severe Threat

Common Name	Scientific Nomenclature
Alligatorweed	*Alternanthera philoxeroides* (Mart.) Griseb.
Asian spiderwort	*Murdannia keisak* (Hassk.) Hand.-Mazz.
Bicolor lespedeza, shrubby bushclover	*Lespedeza bicolor* Turcz.
Bull thistle	*Cirsium vulgare* (Savi) Ten.
Bunchy knotweed, oriental lady's-thumb	*Polygonum caespitosum* Blume
Burning bush	*Euonymus alata* (Thunb.) Sieb.
Canada thistle	*Cirsium arvense* L. (Scop.)
Chinese wisteria	*Wisteria sinensis* (Sims) DC.
Coltsfoot	*Tussilago farfara* L.
Common cocklebur, rough cocklebur	*Xanthium strumarium* L.
Common mullein	*Verbascum thapsus* L.
Common periwinkle	*Vinca minor* L.
Crown vetch	*Coronilla varia* L.
Curly pondweed	*Potamogeton crispus* L.
Cutleaf teasel	*Dipsacus laciniatus* L.
Dame's rocket	*Hesperis matronalis* L.
Foxtail-millet	*Setaria italica* (L.) P. Beauv.
Fuller's teasel	*Dipsacus fullonum* L.
Garden vetch	*Vicia sativa* L.
Green millet	*Setaria viridis* (L.) P. Beauv.
Hairy jointgrass	*Arthraxon hispidus* (Thunb.) Makino
Hayek watercress	*Rorippa nasturtium-aquaticum* (L.)
Hydrilla, water thyme	*Hydrilla verticillata* (L.f.) Royle
Japanese barberry	*Berberis thunbergii DC.*
Japanese bromegrass	*Bromus japonicus* Thunb. ex Murray
Japanese privet	*Ligustrum japonicum* Thunb.
Leatherleaf clematis	*Clematis ternifolia* DC.
Meadow brome	*Bromus commutatus* Schrad.
Meadow fescue	*Festuca pratensis* Huds.
Moneywort, creeping Jenny	*Lysimachia nummularia L.*
Mugwort, common wormwood	*Artemisia vulgaris* L.
Musk thistle, nodding thistle	*Carduus nutans* L.
Nandina, sacred-bamboo	*Nandina domestica* Thunb.
Nodding foxtail-grass, Japanese bristle-grass	*Setaria faberi* R.A.W. Herrm.
Oregon grape	*Mahonia bealei* (Fortune) Carriere
Parrot's feather, water milfoil	*Myriophyllum aquaticum* (Vell.) Verdc.
Poison hemlock	*Conium maculatum* L.
Rye brome	*Bromus secalinus* L.
Spotted knapweed	*Centaurea biebersteinii* DC.
Spreading hedge-parsley	*Torilis arvensis* (Huds.) Link
Tall fescue	*Festuca arundinacea* Schreb.
Thatch bromegrass, cheat grass	*Bromus tectorum* L.
White poplar	*Populus alba* L.
White sweet clover	*Melilotus alba* Medik.
Wild carrot, Queen Anne's-lace	*Daucus carota* L.
Wisteria	*Wisteria floribunda* (Willd.) DC.
Yellow foxtail, smooth millet	*Setaria pumila* (Poir.) Roem. & Schult.
Yellow sweet clover	*Melilotus officinalis* (L.) Lam.
Zebra grass, Chinese silver grass	*Miscanthus sinensis* Andersson

Rank 3 — Lesser Threat: Exotic plant species that spread in or near disturbed areas and are not presently considered a threat to native plant communities

Common Name	Scientific Nomenclature
Bachelor's button, cornflower	*Centaurea cyanus L.*
Balloonvine, love-in-a-puff	*Cardiospermum halicacabum L.*
Brazilian elodea, Brazilian water-weed	*Egeria densa Planch.*
Bromegrass, rescue grass	*Bromus catharticus Vahl*
California poppy	*Eschscholzia californica Cham.*
Chicory	*Cichorium intybus L.*
Chinaberry	*Melia azedarach L.*
Corn gromwell	*Lithospermum arvense (L.) I. M. Johnston*
Field garlic	*Allium vineale L.*
Giant reed, elephant grass	*Arundo donax L.*
Gill-over-the-ground, ground ivy	*Glechoma hederacea L.*
Hairy crabweed	*Fatoua villosa (Thunb.) Nakai*
Japanese clover	*Kummerowia striata (Thunb.) Schindl.*
Korean clover	*Kummerowia stipulacea (Maxim.) Makino*
Lady's thumb	*Polygonum persicaria L.*
Ox-eye daisy	*Chrysanthemum leucanthemum L.*
Pale-yellow iris	*Iris pseudacorus L.*
Paper mulberry	*Broussonetia papyrifera (L.) L'Her. ex Vent.*
Puncturevine	*Tribulus terrestris L.*
Russian olive	*Elaeagnus angustifolia L.*
Sicklepod senna	*Senna obtusifolia (L.) H. S. Irwin & Barneby*
Smooth bromegrass	*Bromus inermis Leyss.*
Spiny cocklebur	*Xanthium spinosum L.*
Star of Bethlehem	*Ornithogalum umbellatum L.*
Stinging nettle	*Urtica dioica L.*
Wild parsnip	*Pastinaca sativa L.*
Wineberry	*Rubus phoenicolasius Maxim.*
Yellow goat's-beard	*Tragopogon dubius Scop.*

Table D-8. Non-native, Non-invasive Species Suitable for Erosion Control/Stabilization Activities

Non-Native, Non-Invasive Species Suitable For Erosion Control/Stabilization Activities
Annual Ryegrass
Foxtail, Browntop, and Japanese Millets
Winter Wheat
Oats (Spring Variety)
Orchardgrass
Perennial Ryegrass
Redtop
Rye
Timothy
Weeping Lovegrass
Crimson, Red, and Ladino Clovers

Table D-9. Visual Consequences

Parcel	Alternative A (Acres)	Alternative A (No Action)	Alternatives B and C (Acres)	Alternative B (Preferred)	Alternative C	Reason for Change in Action Alternatives	Visual Consequence of Alt. B	Visual Consequence of Alt. C
1	10.5	6	10.5	2	2	Allocation Change	Potential minor visual impacts	Potential minor visual impacts
9	122.5	6	122.5	6	4	Allocation Change	No Change	Potentially Beneficial
10	78.4	6	78.4	6	4	Allocation Change	No Change	Potentially Beneficial
15	58.6	7	54.5	7	7	Decrease Acreage to Create new Parcel 15a	Potentially Beneficial	Potentially Beneficial
15a			4.1	3	3	New Parcel	Potentially Beneficial	Potentially Beneficial
16	28.2	7	20.8	7	7	Decrease Acreage to Create new Parcel 16a	No Change	No Change
16a			3.0	3	3	New Parcel	Potentially Beneficial	Potentially Beneficial
17	1.4	3	2.6	3	3	Increase in Acreage from other Parcels, Create New Parcel 17a	No Change	No Change
17a			3.2	4	4	New Parcel	Potentially Beneficial	Potentially Beneficial
63	45.7	7	46.8	7	7	Increase in Acreage from other Parcels	Potential minor visual impacts	Potential minor visual impacts
64	1.1	4				Merge with Parcel 63	Potential minor visual impacts	Potential minor visual impacts
70	4.9	4	3.6	4	4	Decrease Acreage to Create new Parcel 70a	Potential minor visual impacts	Potential minor visual impacts
70a			1.3	2	2	New Parcel	Potential minor visual impacts	Potential minor visual impacts
89	31.1	4	35.0	4	4	Increase in Acreage from other Parcels	Potentially Beneficial	Potentially Beneficial
90	5.3	4	1.4	2	2	Allocation Change and Decrease in Acreage	Potential minor visual impacts	Potential minor visual impacts
91	16.7	3	11.9	3	3	Decrease in Acreage	No Change	No Change

Parcel	Alternative A (Acres)	Alternative A (No Action)	Alternatives B and C (Acres)	Alternative B (Preferred)	Alternative C	Reason for Change in Action Alternatives	Visual Consequence of Alt. B	Visual Consequence of Alt. C
92	33.9	4	34.9	4	4	Increase in Acreage from other Parcels	No Change	No Change
94	9.2	3	11.2	3	3	Increase in Acreage from other Parcels	Potentially Beneficial	Potentially Beneficial
96	9.6	4	11.4	4	4	Increase in Acreage from other Parcels	Potentially Beneficial	Potentially Beneficial
98	9.4	6	9.4	4	4	Allocation Change	Potentially Beneficial	Potentially Beneficial
121	24.7	6	17.1	6	6	Decrease in Acreage	Potential minor visual impacts	Potential minor visual impacts
122	9.0	2	16.6	2	2	Increase in Acreage from other Parcels	Potential minor visual impacts	Potential minor visual impacts
127	13.3	7	11.4	7	7	Decrease Acreage to Create new Parcel 127a	Potential minor visual impacts	Potential minor visual impacts
127a			1.9	2	2	New Parcel	Potential minor visual impacts	Potential minor visual impacts
137	79.3	4	80.7	4	4	Increase in Acreage from other Parcels	No Change	No Change
137a			2.6	2	2	New Parcel	Potential minor visual impacts	Potential minor visual impacts
140	7.8	5	6.4	3	3	Allocation Change and Decrease in Acreage	Potentially Beneficial	Potentially Beneficial
142	319.5	5	302.5	2	4	Allocation Change, Decrease in Acreage to other parcels and to Create new Parcel 137a	No Change	No Change
143	391.3	5	181.6	2	4	Allocation Change and Decrease in Acreage	No Change	No Change
144	48.0	3	172.3	3	3	Increase in Acreage from other Parcels	Potentially Beneficial	Potentially Beneficial
145	332.9	5	265.8	2	4	Allocation Change and Decrease in Acreage	No Change	No Change

Parcel	Alternative A (Acres)	Alternative A (No Action)	Alternatives B and C (Acres)	Alternative B (Preferred)	Alternative C	Reason for Change in Action Alternatives	Visual Consequence of Alt. B	Visual Consequence of Alt. C
146	98.6	3	265.5	3	3	Increase in Acreage from other Parcels	Potentially Beneficial	Potentially Beneficial
147	43.4	5	54.4	5	5	Increase in Acreage from other Parcels	No Change	No Change
148	21.5	5	10.5	2	4	Allocation Change and Decrease in Acreage	No Change	No Change
152	6.4	3	4.2	3	3	Decrease Acreage to Create new Parcel 152a	No Change	No Change
152a			2.2	4	4	New Parcel	No Change	No Change
159	3.4	3	5.7	3	3	Increase in Acreage from other Parcels	No Change	No Change
170	11.6	5	6.0	5	5	Decrease in Acreage	Potentially Beneficial	Potentially Beneficial
172	21.2	4	26.8	4	4	Increase in Acreage from other Parcels	Potentially Beneficial	Potentially Beneficial
174	21.5	5	3.2	5	5	Decrease in Acreage	Potentially Beneficial	Potentially Beneficial
175	3.4	6	23.2	6	6	Increase in Acreage from other Parcels	Potentially Beneficial	Potentially Beneficial
176	3.3	3	1.8	3	3	Decrease in Acreage	No Change	No Change
179	56.0	4	53.8	4	4	Decrease in Acreage	Potential minor visual impacts	Potential minor visual impacts
181	8.4	5	7.0	5	5	Decrease Acreage to Create new Parcel 181a	Potentially Beneficial	Potentially Beneficial
181a			3.6	3	3	New Parcel	Potentially Beneficial	Potentially Beneficial
189	22.2	4	19.9	4	4	Decrease in Acreage	No Change	No Change
204	23.9	4	21.4	4	4	Merge Parcel 205 and Decrease Acreage to Create new Parcel 205	No Change	No Change

Parcel	Alternative A (Acres)	Alternative A (No Action)	Alternatives B and C (Acres)	Alternative B (Preferred)	Alternative C	Reason for Change in Action Alternatives	Visual Consequence of Alt. B	Visual Consequence of Alt. C
205	5.0	3	7.5	4	4	Merge Parcel with Parcel 204, Create new Parcel 205	No Change	No Change
207	19.1	2	12.0	2	2	Decrease Acreage to Create new Parcel 207a	Potentially Beneficial	Potentially Beneficial
207a			7.1	3	3	New Parcel	Potentially Beneficial	Potentially Beneficial
218	61.4	5	56.8	4	4	Allocation Change and Decrease in Acreage to Create new Parcel 218a	Potentially Beneficial	Potentially Beneficial
218a			4.6	5	5	New Parcel	No Change	No Change
224	128.6	4	123.7	4	4	Decrease Acreage to Create new Parcel 224a	Potential minor visual impacts	Potential minor visual impacts
224a			4.9	2	2	New Parcel	Potential minor visual impacts	Potential minor visual impacts
229	44.7	7	44.4	7	7	Decrease in Acreage	Potential minor visual impacts	Potential minor visual impacts
229a			0.3	2	2	New Parcel	Potential minor visual impacts	Potential minor visual impacts
240	6.5	6	6.5	4	4	Allocation Change	Potentially Beneficial	Potentially Beneficial
243	2.9	6	2.9	7	7	Allocation Change	Potential minor visual impacts	Potential minor visual impacts
251	24.0	7	20.7	7	7	Decrease Acreage to Create new Parcel 251a	Potentially Beneficial	Potentially Beneficial
251a			3.3	6	6	New Parcel	Potentially Beneficial	Potentially Beneficial
255	8.7	6	8.7	4	4	Allocation Change	Potentially Beneficial	Potentially Beneficial
270	52.9	6	53.3	6	6	Increase in Acreage from other Parcels	Potentially Beneficial	Potentially Beneficial
272	0.4	2				Merge with Parcel 270	Potential minor	Potential minor

Parcel	Alternative A (Acres)	Alternative A (No Action)	Alternatives B and C (Acres)	Alternative B (Preferred)	Alternative C	Reason for Change in Action Alternatives	Visual Consequence of Alt. B	Visual Consequence of Alt. C
							visual impacts	visual impacts
273	8.4	7	10.5	7	7	Increase in Acreage from other Parcels	No Change	No Change
274	5.2	7	1.1	2	2	Decrease Acreage to Create new Parcel 224a	Potential minor visual impacts	Potential minor visual impacts
274a			2.0	5	5	New Parcel	No Change	No Change
297	245.0	5	245.0	5	4	Allocation Change	No Change	Potentially Beneficial
298	34.4	5	34.4	5	4	Allocation Change	No Change	Potentially Beneficial
299	370.3	6	423.4	4	4	Allocation Change and Increase in Acreage	Potentially Beneficial	Potentially Beneficial
300	237.4	6	184.3	6	6	Decrease in Acreage	No Change	No Change

Notes:

Potential long-term incremental changes are likely to occur for Parcels 80 and 257 under Alternative B. Reallocating these parcels from Zone 4 to Zone 6 would incrementally change the aesthetic sense of place from relatively harmonious landscapes to more heavily human-altered environments. These changes could include shorelines that are naturally appearing that would be developed for beaches, boat ramps, or marinas.

Potentially beneficial visual impacts could occur for many parcels under Alternative C. These beneficial attributes would include reallocating some parcels from Economic Development (Zone 5) and Developed Recreation (Zone 6) to either Zone 3 or Zone 4.

Potentially negative aesthetic impacts could occur for Parcels 295, 296, 299, and 5 under Alternate B. These parcels would be reallocated from either Zone 4 or Zone 6 to Zone 5. In each scenario, the parcels would be allocated for Economic Development and would likely be managed for commercial business, light manufacturing, and general industrial purposes. These incremental changes in the landscape would result in long-term cumulative impacts for Watts Bar Reservoir.

Table D-10. Description of Soils With Characteristics to be Classified as Prime Farmland in the Watts Bar Land Plan Parcels

County	Soil Symbol	Description	Prime Farmland Acreage
Loudon			
	CmB2	Cumberland silty clay loam, eroded gently sloping	1
	Em	Emory silt loam	13
	HnA	Huntington loam, nearly level phase	19
	HnC	Huntington loam, sloping phase	7
	Ln	Lindside silt loam	30
	Lo	Lindside silt loam, local alluvium phase	1
	SaB	Sequatchie fine sandy loam, gently sloping phase	1
	ScB	Sequatchie loam, gently sloping phase	2
	ScC	Sequatchie loam, sloping phase	5
	Wo	Wolftever silt loam	4
		Total	**83**
Meigs			
	CaB	Capshaw silt loam, 2 to 5 percent slopes	9
	DaB2	Decatur silt loam, 2 to 5 percent slopes, eroded	12
	Eg	Egam silty clay loam	20
	Em	Emory silt loam	2
	EsB	Etowah silt loam, 2 to 5 percent slopes	4
	EtB	Etowah gravelly silt loam, 2 to 5 percent slopes	2
	HoB	Holston loam, 2 to 5 percent slopes	5
	Ln	Lindside silt loam	73
	Lv	Lobelville cherty silt loam	21
	MrC	Minvale cherty silt loam, 5 to 12 percent slopes	16
	Ne	Newark silt loam	45
	TlB	Tarklin silt loam, 2 to 8 percent slopes	2
	TnC	Tarklin cherty silt loam, 5 to 12 percent slopes	4
	WtB	Whitwell loam, 0 to 5 percent slopes	35
	WvB	Wolftever silt loam, 1 to 5 percent slopes	5
		Total	**255**
Rhea			
	AnB	Altavasta loam, 1 to 5 percent slopes	79
	CaB	Capshaw silt loam, 2 to 5 percent slopes	63
	Eg	Egam silty clay loam, 0 to 3 percent slopes	4
	EtB	Etowah loam, 2 to 5 percent slopes	200
	Ha	Hamblen silt loam, occasionally flooded	73
	HoB	Holston loam, 2 to 5 percent slopes	45
	ShB	Shady loam, 1 to 5 percent slopes	6
	Sm	Shady loam, 0 to 3 percent slopes, occasionally flooded	19
	TmB	Tasso-Minvale complex, 2 to 5 percent slopes	102
	WbB2	Waynesboro loam, 2 to 5 percent slopes, eroded	193
	WfB	Wolftever silt loam, 2 to 5 percent slopes	20
		Total	**804**

County	Soil Symbol	Description	Prime Farmland Acreage
Roane			
	Af	Allen very fine sandy loam	5
	Av	Apison very fine sandy loam	17
	Gs	Greendale silt loam	58
	Hl	Huntington silt loam (Arrington)	115
	Jg	Jefferson gravelly fine sandy loam	7
	Ll	Lindside silt loam	66
	Lv	Leadvale very fine sandy loam	85
	Nv	Nolichucky	78
	Pg	Pope gravelly fine sandy loam	70
	Pl	Pope loamy fine sand	169
	Ps	Philo very fine sandy loam (Sil)	63
	Pv	Pope very fine sandy loam	588
	Rg	Roane gravelly loam	91
	Sv	Sequatchie very fine sandy loam	217
	Ws	Wolftever silt loam	223
	Wv	Waynesboro very fine sandy loam	52
		Total	**1904**

Sources: Soil Surveys of Loudon, Meigs, Rhea, and Roane counties, USDA-NRCS

Table D-11. Acreage of Prime Farmland (greater than 1 acre) and Agricultural Land Use for Each Parcel Allocated to Zone 2

Parcel Number	Modified Alternative A (Acres)	Modified Alternative A Prime Farmland (Acres)	Modified Alternative A Allocation Zones	Modified Alternatives B and C (Acres)	Modified Alternatives B and C Prime Farmland (Acres)	Modified Alternative B Allocation Zones	Modified Alternative C Allocation Zones
1	11	11	6	11	11	2	2
3	280	137	2	280	137	2	2
4	146	10	2	146	10	2	2
5	249	22	6	249	22	6	6
7	729	9	4	729	9	4	4
8	141	8	3	141	8	3	3
9	123	13	6	123	13	6	4
10	78	9	6	78	9	6	4
11	59	6	7	59	6	7	7
12-08	3	3	6	3	3	6	6
12-18	2	2	6	2	2	6	6
12-29	5	2	6	5	2	6	6
12-30	5	3	6	5	3	6	6
12-32	3	1	6	3	1	6	6
12-35	3	2	6	3	2	6	6
12-36	4	3	6	4	3	6	6
12-44	3	2	6	3	2	6	6
12-48	10	2	6	10	2	6	6
12-50	8	1	6	8	1	6	6
12-53	6	3	6	6	3	6	6
12-54	2	1	6	2	1	6	6
12-60	2	1	6	2	1	6	6
12-66	4	2	6	4	2	6	6
12-68	6	2	6	6	2	6	6
12-70	4	1	6	4	1	6	6
13	5	3	6	5	3	6	6
15	59	8	7	55	8	7	7
16	28	1	7	21	1	7	7
16a		1		3	1	3	3
25	91	13	7	91	13	7	7
31	7	2	4	7	2	4	4
34	25	1	7	25	1	7	7
36	54	19	7	54	19	7	7
38	36	4	7	36	4	7	7
40	176	1	4	176	1	4	4
43	46	4	7	46	4	7	7
44	23	2	4	23	2	4	4

Parcel Number	Modified Alternative A (Acres)	Modified Alternative A Prime Farmland (Acres)	Modified Alternative A Allocation Zones	Modified Alternatives B and C (Acres)	Modified Alternatives B and C Prime Farmland (Acres)	Modified Alternative B Allocation Zones	Modified Alternative C Allocation Zones
45	33	7	6	33	7	6	6
46	785	17	3	785	17	3	3
48	66	22	7	66	22	7	7
50	20	20	3	20	20	3	3
51	42	8	4	42	8	4	4
53	45	28	7	45	28	7	7
54	22	20	4	22	20	4	4
56	62	10	7	62	10	7	7
59	35	13	7	35	13	7	7
60	2	1	4	2	1	4	4
61	31	8	7	31	8	7	7
62	5	5	4	5	5	4	4
63	46	23	7	47	24	7	7
64	1	1	4				
66	29	16	7	29	16	7	7
67	4	3	4	4	3	4	4
68	24	20	6	24	20	6	6
69	4	4	3	4	4	3	3
71	15	8	7	15	8	7	7
72	113	17	4	113	17	4	4
73	27	3	7	27	3	7	7
74	78	2	6	78	2	6	6
75	15	15	3	15	15	3	3
78	83	83	3	83	83	3	3
80	15	6	4	15	6	4	4
81	26	10	7	26	10	7	7
82	37	7	4	37	7	4	4
88	648	256	3	648	256	3	3
89	36	23	4	35	23	4	4
92	34	9	4	35	9	4	4
93	10	5	3	10	5	3	3
95	16	3	7	16	3	7	7
96	10	1	4	11	1	4	4
97	39	39	3	39	39	3	3
98	9	4	6	9	4	4	4
99	10	6	6	10	6	6	6
100	11	9	4	11	9	4	4
101	22	12	3	22	12	3	3
102	53	25	7	53	25	7	7

Parcel Number	Modified Alternative A (Acres)	Modified Alternative A Prime Farmland (Acres)	Modified Alternative A Allocation Zones	Modified Alternatives B and C (Acres)	Modified Alternatives B and C Prime Farmland (Acres)	Modified Alternative B Allocation Zones	Modified Alternative C Allocation Zones
103	15	2	3	15	2	3	3
104	7	2	4	7	2	4	4
107	20	18	7	20	18	7	7
109	10	7	7	10	7	7	7
112	26	10	7	26	10	7	7
113	6	2	7	6	2	7	7
116	8	3	6	8	3	6	6
117	28	13	7	28	13	7	7
118	25	8	7	25	8	7	7
119	8	1	7	8	1	7	7
121	25	9	6	17	9	6	6
122	9	3	2	17	3	2	2
123	20	2	7	20	2	7	7
127	13	10	7	11	10	7	7
128	25	16	7	25	16	7	7
129	24	4	4	24	4	4	4
130	60	20	4	60	20	4	4
132	5	4	3	5	4	3	3
133	16	5	7	16	5	7	7
134	62	35	4	62	35	4	4
137	79	50	4	81	50	4	4
138	5	3	3	5	3	3	3
139	19	9	3	19	9	3	3
140	8	8	5	6	8	3	3
141	63	60	3	63	60	3	3
142	320	6	5	303	6	2	4
143	391	2	5	182	2	2	4
144	48	28	3	172	28	3	3
145	333	8	5	266	8	2	4
146	99	8	3	266	8	3	3
147	43	5	5	54	5	5	5
148	22	2	5	11	2	2	4
149	13	5	3	13	5	3	3
150	7	5	7	7	5	7	7
151	17	9	7	17	9	7	7
153	41	18	7	41	18	7	7
154	31	23	7	31	23	7	7
155	10	8	4	10	8	4	4
156	15	2	4	15	2	4	4

Parcel Number	Modified Alternative A (Acres)	Modified Alternative A Prime Farmland (Acres)	Modified Alternative A Allocation Zones	Modified Alternatives B and C (Acres)	Modified Alternatives B and C Prime Farmland (Acres)	Modified Alternative B Allocation Zones	Modified Alternative C Allocation Zones
157	27	8	7	27	8	7	7
158	23	11	4	23	11	4	4
159	3	3	3	6	3	3	3
160	15	11	7	15	11	7	7
161	23	12	4	23	12	4	4
162	10	10	7	10	10	7	7
165	48	21	4	48	21	4	4
166	79	57	3	79	57	3	3
167	12	12	7	12	12	7	7
168	46	43	5	46	43	4	4
169	16	10	3	16	10	3	3
170	12	6	5	6	6	5	5
171	5	5	3	5	5	3	3
172	21	11	4	27	11	4	4
173	10	10	3	10	10	3	3
174	22	20	5	3	20	5	5
175	3	4	6	23	4	6	6
176	3	3	3	2	3	3	3
179	56	26	4	54	26	4	4
180	11	7	3	11	7	3	3
181	8	1	5	7	1	5	5
182	37	20	4	37	20	4	4
183	25	15	6	25	15	6	6
184	29	4	7	29	4	7	7
187	57	27	4	57	27	4	4
188	25	11	3	25	11	3	3
189	22	15	4	20	15	4	4
190	1258	4	2	1258	4	2	2
192	6	3	4	6	3	4	4
193	8	7	3	8	7	3	3
194	7	2	3	7	2	3	3
195	16	2	7	16	2	7	7
196	11	8	3	11	8	3	3
197	37	4	7	37	4	7	7
200	46	10	4	46	10	4	4
201	84	25	6	84	25	6	6
202	29	7	4	29	7	4	4
203	17	8	7	17	8	7	7
204	24	10	4	21	10	4	4

Parcel Number	Modified Alternative A (Acres)	Modified Alternative A Prime Farmland (Acres)	Modified Alternative A Allocation Zones	Modified Alternatives B and C (Acres)	Modified Alternatives B and C Prime Farmland (Acres)	Modified Alternative B Allocation Zones	Modified Alternative C Allocation Zones
206	15	7	7	15	7	7	7
207	19	3	2	12		2	2
207a				7	3	3	3
210	12	2	7	12	2	7	7
212	76	26	7	76	26	7	7
213	4	2	2	4	2	2	2
214	14	10	3	14	10	3	3
216	32	6	7	32	6	7	7
217	31	7	4	31	7	4	4
218	61	4	5	57	4	4	4
219	69	19	6	69	19	6	6
220	18	2	7	18	2	7	7
221	43	8	7	43	8	7	7
229	45	5	7	44	5	7	7
230	19	4	6	19	4	6	6
232	42	5	7	42	5	7	7
233	81	27	3	81	27	3	3
234	40	31	7	40	31	7	7
237	88	22	3	88	22	3	3
238	171	15	3	171	15	3	3
239	24	1	7	24	1	7	7
240	7	6	6	7	6	4	4
242	17	11	7	17	11	7	7
248	45	4	7	45	4	7	7
251	24	3	7	21	3	7	7
252	12	3	7	12	3	7	7
253	19	14	3	19	14	3	3
254	427	23	3	427	23	3	3
255	9	6	6	9	6	4	4
259	12	4	7	12	4	7	7
260	49	7	7	49	7	7	7
262	41	34	7	41	34	7	7
263	14	4	4	14	4	4	4
264	5	4	6	5	4	6	6
265	51	43	7	51	43	7	7
266	100	19	6	100	19	6	6
267	25	25	4	25	25	4	4
268	39	39	3	39	39	3	3
269	38	24	7	38	24	7	7

Parcel Number	Modified Alternative A (Acres)	Modified Alternative A Prime Farmland (Acres)	Modified Alternative A Allocation Zones	Modified Alternatives B and C (Acres)	Modified Alternatives B and C Prime Farmland (Acres)	Modified Alternative B Allocation Zones	Modified Alternative C Allocation Zones
270	53	8	6	53	8	6	6
273	8	7	7	11	7	7	7
274	5	2	7	1	2	2	2
276	49	22	3	49	22	3	3
277	12	7	6	12	7	6	6
278	19	18	4	19	18	4	4
280	71	11	4	71	11	4	4
281	8	8	3	8	8	3	3
282	169	51	2	169	51	2	2
283	132	4	4	132	4	4	4
285	225	73	4	225	73	4	4
286	43	5	4	43	5	4	4
287	28	4	7	28	4	7	7
288	9	7	3	9	7	3	3
289	38	19	7	38	19	7	7
290	10	2	4	10	2	4	4
291	119	17	4	119	17	4	4
292	3	2	4	3	2	4	4
293	24	10	7	24	10	7	7
294	34	19	2	34	19	2	2
296	198	46	4	198	46	4	4
297	245	34	5	245	34	5	4
299	370	18	6	423	18	4	4
300	237	3	6	184	3	6	6
305	993	5	2	993	5	2	2

Appendix E – Recreation and Industrial Assessment

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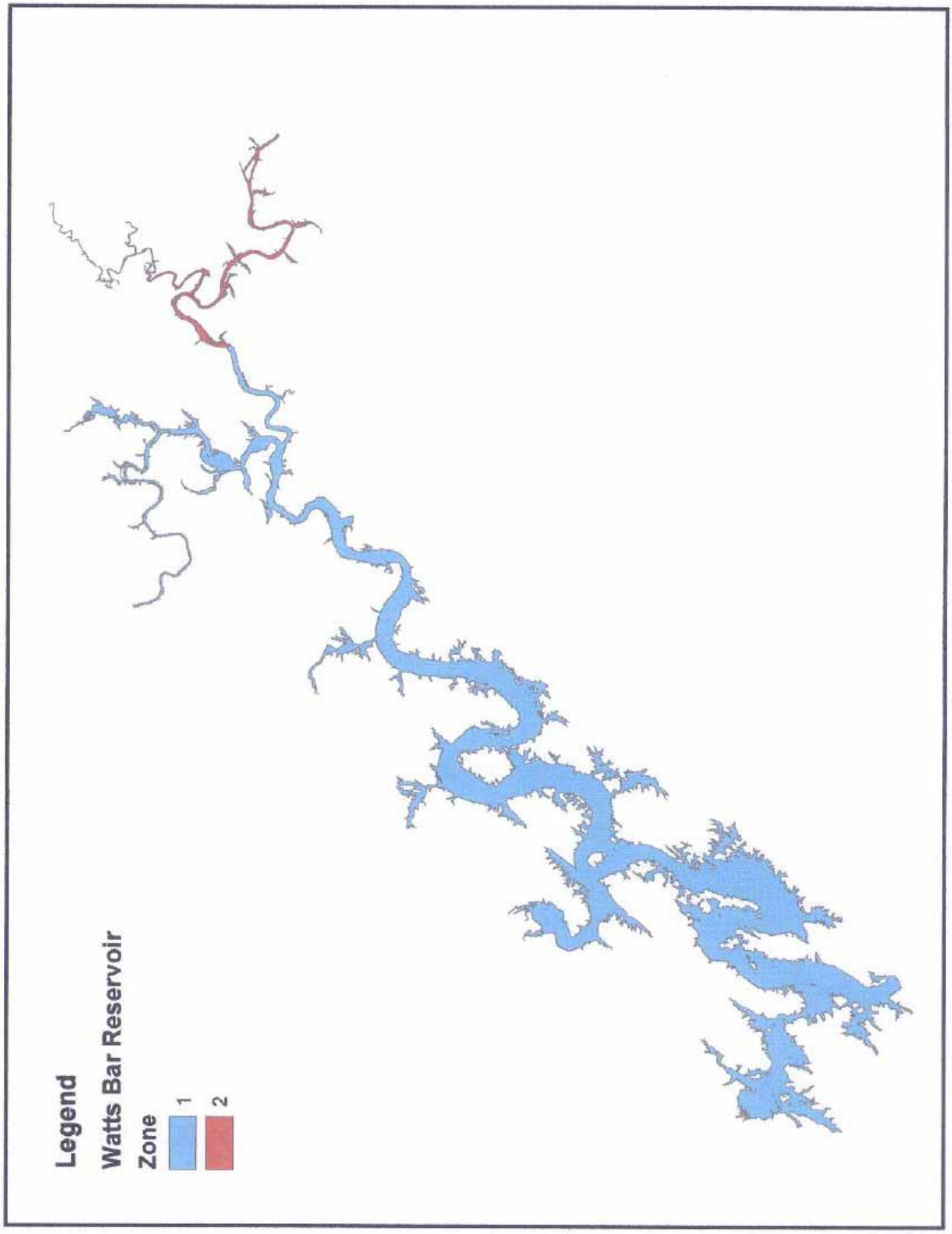
Legend
Watts Bar Reservoir
Zone
1
2

Attachment I
Land Policy Recreation Assessments
Ranking Continuing/Anticipated Needs

Watershed Team: Watts Bar-Clinch

Reservoir: Watts Bar, Zone I Suburban

	Continuing/Anticipated Recreation Demand (Select: High - Medium - Low)
(*See NSRE Activities Data Categories for Nature Based Land, Developed Setting Land, Water Based, Viewing/Learning, Outdoor Sports Individual, Outdoor Sports Team)	
Public Boat Access	High – Medium - Low
Commercial Marinas	High - Medium - Low
Campgrounds	High - Medium - Low
Lodging In Support of Reservoir Recreation/Tourism	High - Medium - Low
Developed Land Based Opportunities (Picnicking, Swimming Beaches, Formal Trails & Greenways, Fishing Piers…)	High - Medium - Low
Informal Dispersed Land Based Opportunities (Informal Camping, Hunting, Picnicking, Wildlife Observation, Bank Fishing, Informal Trails…)	High – Medium – Low

Additional Comments:

Attachment I

Land Policy Recreation Assessments
Ranking Continuing/Anticipated Needs

Watershed Team: Watts Bar-Clinch

Reservoir: Watts Bar, Zone II Rural Developed

	Continuing/Anticipated Recreation Demand (Select: High - Medium - Low)
(*See NSRE Activities Data Categories for Nature Based Land, Developed Setting Land, Water Based, Viewing/Learning, Outdoor Sports Individual, Outdoor Sports Team)	
Public Boat Access	High – Medium - Low
Commercial Marinas	High - Medium - Low
Campgrounds	High - Medium - Low
Lodging In Support of Reservoir Recreation/Tourism	High - Medium - Low
Developed Land Based Opportunities (Picnicking, Swimming Beaches, Formal Trails & Greenways, Fishing Piers…)	High - Medium - Low
Informal Dispersed Land Based Opportunities (Informal Camping, Hunting, Picnicking, Wildlife Observation, Bank Fishing, Informal Trails…)	High – Medium – Low

Additional Comments:

Attachment I
Land Policy Recreation Assessments
Ranking Continuing/Anticipated Needs

Watershed Team: Watts Bar-Clinch

Reservoir: Watts Bar

	Continuing/Anticipated Recreation Demand (Select: High - Medium - Low)
(*See NSRE Activities Data Categories for Nature Based Land, Developed Setting Lar Water Based, Viewing/Learning, Outdoor Sports Individual, Outdoor Sports Team)	
Public Boat Access	High – Medium - Low
Commercial Marinas	High - Medium - Low
Campgrounds	High - Medium - Low
Lodging In Support of Reservoir Recreation/Tourism	High - Medium - Low
Developed Land Based Opportunities (Picnicking, Swimming Beaches, Formal Trails & Greenways, Fishing Piers…)	High - Medium - Low
Informal Dispersed Land Based Opportunities (Informal Camping, Hunting, Picnicking, Wildlife Observation, Bank Fishing, Informal Trails…)	High – Medium – Low

Additional Comments:

Attachment II
Land Policy Recreation Assessments
Ranking Continuing/Anticipated Needs
Residential Shoreline

Watershed Team: Watts Bar-Clinch Reservoir: Watts Bar

Private Water Access

For this reservoir, record the SMP total percentage of shoreline open for private residential dock access. Break that figure into an estimate of percentage shoreline currently developed / permitted, and percentage of remaining shoreline open for future residential access. WIT's can help derive an estimate of percentage shoreline developed/ permitted.

Total Percentage Open SMP Shoreline: 45.29%

Current Percentage Shoreline Developed/Permitted: 46.72%

Percentage Open Shoreline Remaining --- Not Developed or Permitted: 53.28%

Additional Comments:

Attachment III

Land Policy Recreation Assessments
WROS Boating Capacity

Using professional judgment and available data or reports, try to assign a WROS Class to each reservoir that represents existing conditions, or if feasible to sections of each reservoir defined by river mile range, large embayments, or other logical means of division. Although we only have limited on-water boat count data, an approximation of the WROS boating capacity coefficient ranges can be estimated through a facility capacity approach using the developed facilities inventory and ALIS to calculate the reservoir's total public access parking spaces, number of wet and dry slips, and number of private docks (total boating units). A boating capacity coefficient is defined as the number of water surface acres adequate for each recreational boat in a particular WROS class. See Excel Sheet **Attachment IV** (Boating Capacity Work Sheet) for the calculation steps and data needed. After assigning a WROS class for existing conditions to the reservoir or reservoir sections, also assign a desired future (10 years-out) WROS class based on resource management needs, user safety and quality of recreational experience factors.

Recreation staff will establish assumptions on Attachment IV about the estimated percentage of boats that would be in use on a peak summer holiday/weekend day, and an average boating season weekday. Those percentages will be applied to total boating units and divided into summer pool surface acres to obtain acres per boat. The acres per boat figures can then be related to one of the six WROS classes.

Reservoir or Reservoir Subsections As Defined	*Existing Conditions Boating* Coefficients *Weekday / Peak Use*	*Future Desired* Boating *Coefficient Peak Use*
1 – Suburban	Rural Developed/ Urban	Suburban
2 – Rural Developed	Rural Natural/ Rural Developed	Rural Developed
Suburban	Rural Developed/ Urban	Suburban

Attachment IV - Boating Capacity Worksheet

Reservoir: Watts Bar Zone 1 Suburban
Watershed Team: Watts Bar-Clinch

	Estimated Private Access Boating Units
Total Permits From 26a Records	4597
Multiple Slips (+)	2298
Community Slips (+)	881
Commercial Marinas (-)	15
Adjusted Private Access Total	7791

	Estimated Boating Units - Total
Adjusted Private Access Boating Units	7791
Commercial Wet Slips	1390
Commercial Dry Slips	238
Subtotal Boating Units	9419

	Estimated Parking Spaces
Public Ramp Parking	1119
Private Community Ramp Parking	450
Subtotal Parking Spaces	1569

	Estimated % Boating Units In Use		
	Ave. Summer Weekday %	Ave. Summer Weekend Day %	Peak Holiday Summer %
Commercial Wet & Dry Slips	15%	25%	35%
Public/Private Ramp Parking	20%	60%	75%

Full Pool Surface Acres	36189.22

	Ave. Summer Weekday	Ave. Summer Weekend Day	Peak Holiday Summer
Est Boating Units in Use	1727	3296	4473
Surface Acres Per Boating Unit	21	11	8

Attachment IV - Boating Capacity Worksheet

Reservoir: Watts Bar Zone 2 Rural Developed
Watershed Team: Watts Bar-Clinch

	Estimated Private Access Boating Units
Total Permits From 26a Records	16
Multiple Slips (+)	8
Community Slips (+)	49
Commercial Marinas (-)	0
Adjusted Private Access Total	73

	Estimated Boating Units - Total
Adjusted Private Access Boating Units	73
Commercial Wet Slips	0
Commercial Dry Slips	0
Subtotal Boating Units	73

	Estimated Parking Spaces
Public Ramp Parking	15
Private Community Ramp Parking	10
Subtotal Parking Spaces	25

	Estimated % Boating Units In Use		
	Ave. Summer Weekday %	Ave. Summer Weekend Day %	Peak Holiday Summer %
Commercial Wet & Dry Slips	15%	25%	35%
Public/Private Ramp Parking	20%	60%	75%

Full Pool Surface Acres	1195.45

	Ave. Summer Weekday	Ave. Summer Weekend Day	Peak Holiday Summer
Est Boating Units in Use	16	33	44
Surface Acres Per Boating Unit	75	36	27

Attachment IV - Boating Capacity Worksheet

Reservoir: Watts Bar
Watershed Team: Watts Bar - Clinch

	Estimated Private Access Boating Units
Total Permits From 26a Records	4613
Multiple Slips (+)	2306
Community Slips (+)	930
Commercial Marinas (-)	15
Adjusted Private Access Total	7864

	Estimated Boating Units - Total
Adjusted Private Access Boating Units	7864
Commercial Wet Slips	1390
Commercial Dry Slips	238
Subtotal Boating Units	9492

	Estimated Parking Spaces
Public Ramp Parking	1134
Private Community Ramp Parking	460
Subtotal Parking Spaces	1594

	Estimated % Boating Units In Use		
	Ave. Summer Weekday %	Ave. Summer Weekend Day %	Peak Holiday Summer %
Commercial Wet & Dry Slips	15%	25%	35%
Public/Private Ramp Parking	20%	60%	75%

Full Pool Surface Acres	37384.67

	Ave. Summer Weekday	Ave. Summer Weekend Day	Peak Holiday Summer
Est Boating Units in Use	1743	3329	4518
Surface Acres Per Boating Unit	21	11	8

Attachment V

Tims Ford Boating Capacity Study
Boat Density Classes

As a second step, use the classification system from the Tims Ford boating capacity report to assign each defined reservoir section a boat traffic density class. This should be viewed as a first tier look at each reservoir that can help begin to identify areas of concern that may warrant a more rigorous review and analysis of boating capacity and crowding. Consultation is recommended with TVAP, state boating regulatory agencies, or other knowledgeable boating contacts to gain their perspectives. **Please provide a reservoir map with the boating density class section defined and marked.**

Class I	High to very high boat traffic density at peak use times and moderately high or high incidence of conflicts - or - Moderate density of boat traffic and high incidence of conflicts
Class II	Moderate or high boat traffic density at peak use times but low incidence of conflicts - or - Low to very low boat traffic density and moderate incidence of conflicts
Class III	High to very high boat traffic density at peak use times but low or moderate incidence of conflicts
Class IV	Low boat traffic density, even at peak use times, and low incidence of conflicts

Reservoir or Reservoir Subsections as Defined	***Boating Density Class***
Clinch 0-23	III
Emory 0-14	III
T 568-595.5	II
T 568-530	I

Attachment VI
TVA Land Policy
Zone 6 Recreation Assessments
Tracts Not Recommended As Suitable

Date: February 14, 2007

Watershed Team: Watts Bar-Clinch

Reservoir: Watts Bar

Tract / Parcel Number: 243

Briefly summarize why tract is considered unsuitable or there is insufficient continued need.

Marina operations have ceased. Docks are dilapidating or missing. Back lying property owner has no money. Demand for this marina does not exist. Property rights to request dock facilities are present.

For internal planning purposes, identify a recommended alternative use allocation zone and provide a brief justification.

Zone 7 Residential Access-ingress and egress rights exist, back lying property most likely to be residentially developed

Attachment VI

TVA Land Policy
Zone 6 Recreation Assessments
Tracts Not Recommended As Suitable

Date: February 13, 2007

Watershed Team: Watts Bar-Clinch

Reservoir: Watts Bar

Tract / Parcel Number: 257

Briefly summarize why tract is considered unsuitable or there is insufficient continued need.

This tract is more suitable for Zone 4 for the informal recreation opportunities that it provides and resource conservation. The back lying property is private and has no public access road leading to the parcel and does not lend to a public commercial marina. Due to the close proximity to several marinas and a private water use facility high density area, factors and demand do not exist for a commercial facility at this location.

For internal planning purposes, identify a recommended alternative use allocation zone and provide a brief justification.

Zone 4 to enhance informal recreation opportunities and resource conservation.

Attachment VI
TVA Land Policy
Zone 6 Recreation Assessments
Tracts Not Recommended As Suitable

Date: February 13, 2007

Watershed Team: Watts Bar-Clinch

Reservoir: Watts Bar

Tract / Parcel Number: 299

Briefly summarize why tract is considered unsuitable or there is insufficient continued need.

299 is being considered for Developed Recreation Opportunities, however, it would be more suitable in conjunction with tracts 295, 297 and 298 for a Zone 4 allocation. Current recreational uses of this area are hunting, hiking, wildlife viewing, informal camping and fishing. NSRE data shows a high demand in the watershed for visiting a wilderness or primitive area. This is a unique, undeveloped area of Watts Bar that has the potential to meet this demand.

For internal planning purposes, identify a recommended alternative use allocation zone and provide a brief justification.

Zone 4 in conjunction with 295, 297 and 298. Recommendation for use of area as a Natural Access Corridor. Meets resource and recreation demands in area.

Attachment VII

TVA Land Policy
Zone 6 Recommended
Recreation Use & Development

(It may be easier to use the Excel list of zone 6 tracts as Attachment VII)

Reservoir: Watts Bar

Watershed Team: Watts Bar-Clinch

Tract/. Parcel No.	Commercial or Public	Recommended Facility Development
300	Commercial	License Commercial Rec-Watts Bar Resort
279	Commercial	Expansion of Spring City Boat Dock
277	Public	Transfer for Municipal Park Purposes, Spring City Boat Dock
275	Commercial	License to Rhea Harbor
270	Public	Easement for Public Rec, Dixie League Youth Baseball Park & Veterans Park
12-8	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
266	Commercial	Rhea Springs Campground Informal rec opportunities
264	Commercial	License to Piney Point Marina
255	Public	Informal Camping, Sand Island
250	Commercial	License Eden Marina
12-16	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
245	Commercial	License Terrace View

12-17	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
12-18	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
241	Commercial	License to Arrowhead
240	Commercial	Future Expansion of Arrowhead
12-26	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
235	Commercial	License Lakeside Resort
12-27	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
230	Commercial	Easement for Commercial Rec below 750, 4ka Brigadoon Resort
12-24	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
221-A	Quasi	Camp Buck Toms
12-29	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
222	Commercial	License Harbor Point
219	Public	License Rockwood Community Park
218	Commercial	Potential Campground Operation
12-34	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation

12-35	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
12-30	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
12-31	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
12-36	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
201	Public	Transfer Roane County, Caney Creek RV Park & Marina & Roane County Park, Permanent Easement below 750 Public Recreation
12-44	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
12-51	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
12-45	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
183	Commercial	License Swan Harbor
175	Public	License Harriman Ramp
174	Public	Potential for Local Park
12-47	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation

12-48	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
12-49	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
12-50	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
12-53	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
12-54	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
136	Commercial	License Soaring Eagle CG
12-63	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
125	Public	Easement Ladd Landing
12-55	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
121	Public	License Kingston Greenway
12-43	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
116	Commercial	Lakeside Golf Course
114	Commercial	Long Island Marina 4ka
12-56	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation

12-62	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
12-66	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
12-70	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
99	Public	Easement Steekee Creek Park
98	Commercial	TN National Golf Course
12-69	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
12-68	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
86	Commercial	License Whitestone Country Inn
12-60	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
12-59	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
74	Commercial	Lease Riley Creek
12-57	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
12-41	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
68	Commercial	License SW Point Golf Course

12-39	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
12-38	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
12-32	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
12-23	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
12-22	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
45	Quasi	Camp John Knox
42	Commercial	License Bayside Marina
41	Commercial	License Bayside Marina
37	Commercial	License Blue Springs Marina
12-20	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
12-13	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
29	Commercial	License The Landing
27	Commercial	License Campground on the Lakeshore
12-6	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation

23	Public	Term Easement Rec Athens Board of Education, Camp OO-TAH-NEE-NOH-CHEE
22	Commercial	License Hornsby Hollow
20	Commercial	License Euchee
18	Commercial	Easement to Euchee
12-4	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
12-3	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
14	Commercial	License Sam's Boat Dock
12-2	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
13	Commercial	License Cherokee Point Campground
12-1	Public	TWRA Boat Ramp, Transfer Above 750, Easement Below 750 Public Recreation
10	Commercial	License Fooshe
9	Commercial	Future Expansion of Fooshe
5	Public	Easement Meigs County Park

Table E-1. Assessment of Industrial Lands on Watts Bar Reservoir

Parcel	Acres	Recommend	Comments
140	7.8	4	Core team felt tract was no longer necessary for industrial use.
142	319.5	5	Clinch River Breeder Reactor site location should be maintained as industrial for those able to maximize topography and those who may need buffer areas.
143	391.3	5	Clinch River Breeder Reactor site location should be maintained as industrial for those able to maximize topography and those who may need buffer areas.
145	332.9	5	Clinch River Breeder Reactor site with excellent potential for one or several large industrial tracts.
147	76.1	5	Sites adjacent to Clinch River Breeder Reactor site with some existing businesses and potential for others.
148	21.5	5	Sites adjacent to Clinch River Breeder Reactor site with some existing businesses and potential for others.
170	11.6	5	Back-lying property is industrial in nature, and future industrial use of the parcel could be needed.
174	21.5	5	Area reduced from previous acreage. Portion of Tract 174 changed to Zone 6 (Developed Recreation) at recommendation of team.
181	8.4	5	Back-lying property is rock quarry, and future industrial use of the parcel could be needed.
218	61.4	6	TVA Economic Developement recommended Zone 6 as a more suitable use for this parcel.
297	245.0	5	Site has excellent access to utilities, roads, rail right-of-way, and potential port. The site also has favorable shape and topography to make it marketable.
298	34.4	5	Excellent site for a single-use or multiuse barge terminal facility.

Appendix F – Public Comments and Responses

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PUBLIC COMMENTS
Received by TVA on the Watts Bar Reservoir Land Management Plan and Amended Draft Environmental Impact Statement
August 2007

Introduction
The amended draft environmental impact statement (DEIS) for the Watts Bar Reservoir Land Management Plan was distributed in August 2007). TVA received 152 comments by letters, electronic mail and oral statements during the comment period on the amended DEIS from August 10 to September 24, 2007. Following release of the amended DEIS, TVA held an information meeting at Harriman, Tennessee on August 21, 2007 where 102 people attended. The written and oral comments were received from 91 individuals, including 5 organizations, 2 local governments, and 10 interested agencies. TVA has reviewed all of the comments.

The comments and TVA responses to them appear below. In some cases the EIS was changed because of the information or issues presented in the comments. Due to their volume and frequent similarity, many of the comments were summarized to save space and provide joint responses. The names of those individuals and organizations providing comments appear after the comment text. Because the comments were summarized the precise wording could not always be used. However, TVA tried to retain all important issues and differences among similar comments. Also, commentors names may appear in more than one comment if they identified more than one issue. All original comments and letters are available from TVA upon request. Letters from agencies and some organizations providing more information appear in Appendix D (Document and Letters).

Comments were organized into logical topics and themes, their order of appearance has no bearing on their importance as all comments were reviewed and considered.

The largest grouping of the public responses to the amended DEIS focused on the types of use allocation for specific parcels of TVA managed land, in particular the former Clinch River Breeder Reactor site and Lowe Branch area. There were also many comments about the NEPA process and alternative selection, and stewardship of public lands. And there was interest in how TVA's land policy is applied and the management of various types of recreation on public lands.

The remainder of comments on the DEIS raised questions and provided comments on the identified environmental issues. Of these the issue of greatest concern was water quality, especially about waste water discharges. Other issues mentioned with concerns about impacts to the environment were; socioeconomic and environmental justice, terrestrial ecology, threatened and endangered species, forestry, aquatic ecology, and cultural resources.

Aquatic Ecology

1. ***[At]*** Clinch River mile 21.5 Roane and Loudon County, left bank. Plants are growing in River Bottom very thin plants every 12" -36" apart. (William J. Johnson)

   Response: Comment noted. Most TVA reservoirs and tailwater areas have some aquatic vegetation. During low flow/drought years, such as 2007, aquatic plant growth can be expected in some more shallow, slack water areas including some portions of the Clinch River arm of Watts Bar Reservoir.

Cultural Resources

2. We are unaware of any specific historic properties or traditional cultural, religious and/or sacred sites at this time. However, in the event of inadvertent discoveries, we expect all construction activities to cease and we be notified according to all applicable state and federal laws. (Jefferson Keel, Lt. Governor, Chickasaw Nation)

   Response: Comment noted.

3. As TVA is committed to following the stipulations in the PA *[programmatic agreement regarding reservoir land management plans in Tennessee*], we have no further comments. (Jennifer Barnett, Tennessee State Historic Preservation Office)

   Response: Comment noted. In earlier consultation (2004), the Tennessee State Historic Preservation Office and TVA developed a programmatic agreement regarding reservoir land management plans in Tennessee (PA) to address potential adverse effects. TVA will follow the stipulations in the PA. See Section 4.20, Summary of Proposed Mitigation Measures, in the final environmental impact statement (FEIS).

Floodplains

4. Is there a new flood plain map for Watts Bar? (Bob Ott)

   Response: Yes, the Federal Emergency Management Agency (FEMA) is in the process of updating the Flood Insurance Rate Maps for all of the counties in the state of Tennessee, along with the rest of the United States. To determine if Roane County has been updated, you may visit the FEMA Map Service Center Web site at: http://msc.fema.gov/webapp/wcs/stores/servlet/FemaWelcomeView?storeId=10001&catalogId=10001&langId=-1 or you may contact the Tennessee Local Planning Office in Knoxville at 865-994-6666. In order to learn more about the FEMA Map Modernization Program, please access the following FEMA Web site: http://www.fema.gov/plan/prevent/fhm/mm_main.shtm

Forest and Land Management

5. Although Zone 4 is named "Natural Resource Conservation", we note that timber management would be allowed there, as well as hunting. How will these activities be held to sustainable levels and will clearcutting still be allowed like in the 1988 Plan (pg. 21, Allocation #12)? In order to be a true conservation zone, we recommend that harvesting be limited to forest fuel thinning without clearcutting, and that hunting primarily also be for thinning growing populations for their benefit based on consultation with FWS and their state counterparts. In essence we recommend that harvesting and hunting be allowed to promote healthy forests and wildlife populations rather than for

silvicultural or high-yield purposes. (Heinz J. Mueller, Environmental Protection Agency [EPA])

Response: Timber harvests, including small clear-cuts (20 acres or less), would be utilized on Zone 4 properties to maintain healthy forests, create needed biodiversity and forest-age structure, and enhance wildlife habitats and populations. Timber harvests would not be conducted for revenue production from a high-yield perspective. Hunting on TVA-retained properties is allowed following rules and regulations established by individual state wildlife resource agencies, which, following guidance from the U.S. Fish and Wildlife Service (USFWS) for migratory species, are established to promote healthy and sustainable wildlife populations.

6. The DEIS would have been improved if the proposed Natural Resource Management Strategy that is to replace the IRM [*Integrated Resource Management*] was already prepared and presented as a draft or final strategy in an appendix. (Heinz J. Mueller, EPA)

Response: Comment noted.

Section 26a Approval

7. I'm a property owner on Watts Bar. Will the plan affect my access rights? (Vivian Crump)

Response: Access rights are determined by your deed and will not change as a result of the Watts Bar Reservoir Land Management Plan.

8. Will the land plan have any affect on my ability to expand my dock. (Janelle Douglas)

Response: Expanding your existing water use facility will require Section 26a approval from TVA. The Watts Bar Reservoir Land Management Plan will not affect that decision.

9. I also encourage you to enforce the rules for all new development around the water, minimizing the destruction of habitat. (Rhonda Bogard)

Response: TVA strives to complete its environmental commitments in agreements with developers. Please report any potential violations on TVA property to the Watts Bar-Clinch Watershed Team at Lenoir City, Tennessee.

10. My next comment is that TVA has no plan to fund enforcement and oversight of areas outlined in the land management plan that are allocated as informal dispersed land based opportunities. While TVA police have been responsive, the Watts Bar Reservoir is not adequately covered. TVA has failed to oversee current development. Examples are the cove of Apollo Shores developer *[where he]* was allowed to scalp the shoreline without the appropriate approvals by TVA. There's also some question on Terrace Views Marina docks, there not being adequate oversight for that. There is no funding outlined in the draft EIS on how additional oversight will be accomplished. (Gail Okulczyk)

Response: The land plan is programmatic and pertains to TVA's designating the use of public land under TVA management and not the enforcement of agreements. However, TVA does fund inspection and compliance activities through its watershed teams. These teams monitor the contract agreements and permits of individuals or organizations using public lands and any associated special or environmental commitments. TVA uses a variety of inspection and compliance actions. The most common methods are the annual shoreline inspections and random compliance inspections. The shoreline inspection process is designed to methodically look at the entire length of shoreline for every reservoir in the TVA system. The random compliance inspection process is performed to ensure compliance with conditions of each permit inspected. In addition, specific projects may receive additional inspection during construction to ensure compliance with existing agreements. TVA invites the public to report any suspected permit violations to the Watts Bar-Clinch Watershed Team.

Land Policy and Use

11. How can a TVA lease of public land to Rockwood allow private development? (David Baker)

Response: According to the 2006 TVA Land Policy, residential development will not be considered on TVA land. Any proposal for use of TVA land from Rockwood (or from any applicant) would have to comply with this policy (see Appendix A of the FEIS). Accordingly, TVA does lease land to private concerns for some types of specific development in the interest of the public. For example, TVA land is often leased to private marinas or campgrounds for public use. No decision has been made by TVA on the Rockwood proposal (as of August 2007).

12. There appears to be several descriptions regarding Parcel 240 provided in the DEIS and displayed at the public meeting. Some maps/documents list it as unplanned, unallocated, allocated, committed, uncommitted, etc. From Appendix B of the revised draft, the Parcel is uncommitted but allocated. (Gail Okulczyk)

Response: The terms planned, committed, and uncommitted are defined by definition or use in Section 2.1.2, The Planning Process for Action Alternatives. In summary, planned land is land included in the planning process completed in 1988, unplanned land is inferred as land not included in the 1988 Plan. Committed land includes those parcels where TVA currently has licenses, easements, project operations, identified sensitive resources, or with water access rights. Uncommitted lands are those parcels with none of the above agreements, uses, resources, or rights.

Parcel 240 was planned in the 1988 Plan and allocated as commercial recreation (interpreted currently as Zone 6). This allocation was made in order to allow for potential expansion of recreation facilities on adjacent private land. It is considered uncommitted because there are no existing licenses, easements, TVA project operations, sensitive resources, or water access permits. TVA proposed to allocate Parcel 240 to Zone 6 - Developed Recreation under Alternatives B and C in the 2007 DEIS. However, because of the lack of interest and occurrence of other developed

recreation in the area, TVA proposes to allocate Parcel 240 to Zone 4 - Natural Resource Conservation.

13. If the parcel was re-evaluated from the former land plan by the means described on page 29 AND comments used from the scoping process as stated in your revised draft, then TVA has to be aware of the roosting of the bald eagles, turkeys, pileated woodpeckers, and the vultures, along with all the other wildlife observed by those that signed our petition opposing the turnover of Parcel 240 to Arrowhead Resort. (Gail Okulczyk)

    Response: Yes, TVA is aware that these species could occur on Parcel 240. These species observed on this parcel either are occasional users or there is currently other habitat available for the species on Watts Bar Reservoir. Therefore, the parcel does not meet the criteria for allocation as Zone 3 - Sensitive Resource Management. However, TVA is proposing to allocate Parcel 240 as Zone 4 - Natural Resource Conservation. See response to Comment 12.

14. If TVA has allocated Parcel 240, does this mean Arrowhead Resort has the option to purchase or is the land given? During discussion at the Roane State meeting, I was told that Subdivisions such as Apollo Shores cannot be "given" the parcel. How does TVA allocate properties? By purchase or a transfer of deed with no cost? What is the process for an interested party, such as Apollo Shores or private citizen, to obtain an allocated status? Can a private citizen purchase or lease Parcel 240? (Gail Okulczyk)

    Response: According to the 2006 TVA Land Policy, if TVA were to allocate Parcel 240 as Zone 6 - Developed Recreation, then TVA can either lease or grant a limited easement to the developer, which could be a private or public entity. The developer must meet certain criteria to demonstrate their ability to develop, manage, and operate the property for the use allocated. If TVA were to allocate the parcel as Zone 4 - Natural Resource Conservation, then it could not be sold or transferred and would remain as a Zone 4 until the next land plan or the TVA Board of Directors changed the land policy. Currently, TVA is only authorized to sell reservoir lands for economic development purposes (Zone 5) or where land has been identified as fragmented reservoir property (no longer connected to the reservoir). More information on the TVA Land Policy may be found on TVA's Web site: http://www.tva.com/river/landandshore/land_policy.htm.

15. You mentioned that Arrowhead Resort had not indicated an interest in Parcel 240. Is this because they are under assumption that since TVA has "allocated" that they are required no further action and they will obtain the parcel? (Gail Okulczyk)

    Response: TVA has no agreement with Arrowhead Marina for Parcel 240. We understand they have no current interest in the parcel to expand their facility.

16. I find it interesting that Parcel 239, listed in Appendix B as Unplanned but Committed. A developer purchased an acreage totaling 161 lots in Apollo Shores where this parcel affronts and has significantly modified the shoreline, well below the 750 elevation. Was this parcel provided to or purchased by the developer (The Cove at Apollo Shores)? (Gail Okulczyk)

Response: Parcel 239 is public land managed by TVA over which the back-lying owners have access rights and may apply for water use facilities. It is allocated as Zone 7 in Alternatives B and C and continues to be unplanned in Alternative A. Please see Section 2.1.2 of the FEIS for a description of Marginal Strip Land. In any of the Alternatives Parcel 239 would remain in public ownership although it may contain private water use facilities.

17. I am a retired TVA employee who owns a Lake House on Watts Bar Lake. Following my wife's retirement recently, we find ourselves spending the majority of our time at the Lake House on what is now a beautiful Watts Bar Lake. We have been upset to hear about TVA's plans to possibly allow the construction of a Barge Terminal on the Slue where our Lake house is located. This is Zone 5. All of our neighbors are very upset. We feel the best option for the site should be Natural Resource Conservation. Many homes would be impacted by the loss of the natural view, and the potential impacts on the environment. Please consider our views. We are also contacting our congressional friends for their assistance. (James W. McCarter)

Response: As a part of TVA's broad regional resource development mission, TVA reservoir properties are managed to provide multiple public benefits, including recreation, conservation, and industrial development. In reservoir land management plans, TVA allocates parcels for industrial development and conservation. TVA recognizes the importance of striking a balance among the competing demands placed on the land and water resources.

Parcel 298 was considered for industrial development in the 1988 Plan. It meets the land policy criteria of being suitable for industrial use to support a water-based industry and is a potential site for a supporting barge terminal. The parcel is allocated for Zone 5 (Industrial) under Alternative B; however, under the conservation alternative (Alternative C), it is proposed for allocation to Zone 4 (Natural Resource Conservation).

18. I think the TVA board should reconsider the residential development as I believe many people did not understand exactly what options were being considered. There had been a lot of publicity about the purposed residential development. I think that is why there were more comments on that particular part. I don't think that the industrial possibilities had really been explained and many will be surprised by this type of development. I think TVA is responsible by not having enough public meetings in Rhea County, Meigs and Roane Counties so that more people are informed. Personally, I would rather see more residential than industrial along with public and commercial recreation. Please reconsider including residential development and pass these comments on to the new TVA board. (Shelly Beasley)

Response: TVA believes it has provided ample information about the Watts Bar Land Plan to the public and provided adequate opportunity for the public to make comments. See Sections 1.6 and 1.7 of the 2007 DEIS, which include the results of three public comment periods with public meetings, along with information meetings with stakeholders. Both residential and industrial uses were reduced in the 2007 Plan. As described in Section 1.3, residential development will no longer be permitted on TVA land. Furthermore, industrial allocations were reduced by 45 percent. In addition, see Sections 3.8.1 and 4.8.1 for anticipated land use around Watts Bar Reservoir.

19. What can I do to keep people from crossing my land to get to TVA property? Can I put up a fence at the TVA property line? (Beth Bowelle)

    Response: Under most circumstances private property owners have the right to prevent unwanted trespassing on their property. Please contact the Watts Bar-Clinch Watershed Team if the situation involves TVA managed public land.

20. We note that since the completion of Watts Bar Reservoir, TVA has sold or transferred over 9,000 acres (35 percent of the original TVA land base) to private, state, or federal ownership. Of the 721 miles of shoreline, 340 miles (47 percent) is available for Shoreline Access, which includes current development. By your own calculations, TVA land comprises only about 11 percent of the land within 0.25 mile of Watts Bar Reservoir. There are over 17,000 acres of platted residential property adjacent to public land on the reservoir; approximately half of the platted area has already been converted to residential housing. Additionally, there are 67 developed recreation areas on Watts Bar Reservoir, and over 50 paved boat ramps on the reservoir, 3,600 permitted docks, and marina facilities with about 1,500 boat docking slips (with an additional 200 plus out-of water storage slips). It seems obvious to us that more than sufficient Watts Bar Reservoir marginal lands have already been made available for residential, commercial, and industrial development. (Axel C. Ringe - Sierra Club)

    Response: Comment noted. None of the alternatives under consideration would make more public land available for residential development. The alternatives allocate varying amounts of land for commercial recreational and industrial development.

Land Use Designation

Parcels 256 and 257 - Godsey Hollow

21. We wish to express our concern, already too much development has occurred on Watts Bar Lake and that the remaining land be devoted to natural resource conservation as possible. Under the amended Watts Bar Reservoir Land Management Plan Allocation A, Panel 1, Parcel 257 Godsey Hollow is recommended under all three alternatives to continue in Zone *[4]* Natural Resource Conservation. However on page 219 of the draft, it also states that"...this parcel is being requested for use with the adjoining property (Parcel 256) for a potential marina development. Please don't let this happen. The cove is a wonderful haven for wildlife, and numerous Wood ducks, Owls, Blue herons. Bald eagles and Osprey nesting nearby which we enjoy very much. Converting this from Zone 4 to a different classification that would allow a Marina or boat docks would destroy one of the few remaining coves, and a beautiful natural resource would be lost forever. We would like to encourage TVA to reject any request to change its classification. (Ed and Judy Staten)

    Response: The sentence on page 219 of the 2007 DEIS requesting the use of Parcel 257 for a potential marina development is in error and has been corrected in the FEIS. TVA is unaware of any current proposal for use of this parcel or for the adjacent Parcel 256.

    In the 2005 DEIS, TVA considered allocating Parcel 257 for Developed Recreation (Zone 6) at the request of the adjacent landowner. This allocation would have allowed for the development of commercial recreation. TVA since reexamined the need for a commercial recreation facility in this

area and determined this parcel was best suited for Zone 4 (Natural Resource Conservation). This recommendation was based on the recent recreation assessment that showed a high density of water use facilities and marinas in the vicinity (see Appendix E). TVA now proposes to allocate Parcel 257 as Zone 4 (Natural Resource Conservation) under the Action Alternatives B and C.

22. I have particular concern for any marina development in Godsey Hollow. The report appears to be in conflict as to continuing the Zone 4 or allowing this marina. I would like to say that I am not in favor of such a development. We are all familiar with the elements from a marina that can pollute and damage or destroy the environment. There are very few natural coves remaining that offer such natural beauty. Please allow that to remain for the future generations to enjoy. (Linda Spencer)

    Response: See response to Comment 21.

23. Parcel #257 is currently under natural resource conservation. It should remain such in perpetuity and should under no circumstances be developed. It is noted that a marina development is proposed. My family and I are in absolute opposition as this would destroy a beautiful natural resource. (Alexander Solomon)

    Response: See response to Comment 21.

24. Allocation A Panel 1, designates Parcel 257 (Godsey Hollow) as zone 4 "Natural Resource Conservation" a developer owning adjacent property (Parcel 256) is requesting a change to allow for a potential marina development. We believe this would be detrimental to the wildlife on the lake. This cove contains numerous wildlife, waterfowl, and birds (Bats, Osprey, Geese, Ducks, Kingfishers, Blue Heron and Eagles). TVA should allow this cove *[to]* remain a Natural Resource Conservation area and not reclassify to allow a marina. (Paul Bartizal, Tim Gultrie, Jim Baldin, and William E. Barber)

    Response: See response to Comment 21.

Parcel 297 and 298 - Lowe Branch

25. Parcel 297 at Lowe Branch should be allocated to Zone 4, rather than to Zone 5. Creating an industrial park on this large parcel would render that land forever unusable by the public. (Dave Reichle)

    Response: As a part of TVA's broad regional resource development mission, TVA reservoir properties are managed to provide multiple public benefits, including recreation, conservation, and industrial development. In reservoir land management plans, TVA allocates parcels for industrial development and conservation. TVA recognizes the importance of striking a balance among the competing demands placed on the land and water resources.

26. Parcels 297 and 298 are all I can see from my lake home. We bought here because of the natural beauty and wild life from our home. The land needs to stay zoned Natural Resource Conservation. The last thing Watts Bar Lake needs is another water polluting industrial site on the lake. The Lowe branch area is a well known nesting area for the Great Blue Heron an industrial site here would destroy their habitat. It is common to see

Bald Eagles and Osprey soaring over the branch looking for food. Industrial development in this area would destroy all of this. Recreation would be hurt with added pollution. (Ted Hitchens)

Response: See response to Comment 25.

27. The proposed Barge Depot near the dam is opposed by every resident I know, and accepted only by residents that do not own or live on property on the lake. (Charles McCrosson)

Response: See response to Comment 25.

28. I am a resident of the Lowe's Branch area. Parcels 297 and 298 should not be changed to commercial and industrial but remain as natural resource conservation. This is a beautiful area and industry would just mess it up and we do not need the industry in the area. (Bran Hickman)

Response: See response to Comment 25.

29. I live at Saber Hill. There on that Parcel 297 and 298 that they've got zoned commercial and possibly making a barge terminal there, if they make barges and everything there, we live in that little area that when we look across the lake then the barges are all we're going to be able to see. That's our main exit going out to the river and to the dam there at Lowe's Branch. ……..But that was our concern because now when the barges go up and down the river, evidently they'll spill a lot of diesel fuel or oil or something and then they back the water up and it just comes all around our dock, just greasy stuff floating on top of the water. I came in the other night, and quick as I lifted my boat up out of the water, I had to wash it because it just had a greasy film on it. We live at the end of the slue and when they back it up, there's no other way for the water to go out except going back to the dam. That's our concern, is if they put in a barge *[terminal]* over there and everything, it's going to ruin our property on account of the small area that it's in and maybe block the area -- I don't want to see them do it. I've lived there for ten years. It's been natural wood area and all that in there ever since I've been there and I hate to see them put industry and all that and a barge *[terminal]* and everything right where we have to go by them every time we go out to the river. I just don't want to see them do it. I think it will ruin that area. I think below the dam where there are not so many houses they could probably put a *[terminal]* instead of putting it right there where there's a lot of houses in that small area and everyone is going to have to go in and out past the barges every time they go to the river. (Wayne McNeese)

Response: See response to Comment 25.

30. I have waterfront property along with about 30 or 40 other families. I respectfully have my concerns about these two parcels, number 297 and number 298. We do not want a barge facility in this zone. My family and 30 or more other families live on waterfront homes that look directly at these two zones. Further, using these two zones as a barge facility would be an injustice to the tax-paying families *[who]* would be affected by TVA's endeavors. We do not want increased amounts of oil slicks washing into our docks. We do not want the fears that our children cannot swim in the area due to poor water quality. We do not want the integrity of God's creation taken from us as to have to look at barges from our houses and docks as we go about our daily life. (Wendell L. Phillips)

Response: See response to Comment 25.

31. Parcel 297 at Lowe Branch should be allocated to Zone 4, rather than to Zone 5. Creating an industrial park on this large parcel would render that land forever unusable by the public. (Carol A. Grametbauer, Chance Finegan - The Campus Greens, Ruth K. Young, Dave Reichle, Barbara A. Walton, Natalie Pheasant, Ken Shepard and Mary Collins-Shepard, Sandra K. Goss - Tennessee Citizens for Wilderness Planning (TCWP), and Frank Hensley)

Response: Comment noted.

32. I support the request from TWRA for transfer of parcels 295, 297, 298, and 299 for inclusion in the WMA (Wildlife Management Area) program as a contiguous tract of land. (Jerry Poe)

Response: Comment noted.

33. Please do not let parcels 295 to 299 be used for industrial/commercial use. This is an area across from over 70 homes in a compact area of Lowe Branch (ours is one of these). All four Parcels 295, 297, 298, 299 should be kept as natural conservation and informal recreation areas. We urge you to consider a less populated area for commercial/industrial use. (Joe Ferguson)

Response: Comment noted.

34. There is adequate land for a barge facility in Parcel 298 and an access road could be built on the edge of Parcel 297 to Route 68. (Sandra K. Goss - TCWP)

Response: Comment noted.

35. We note that 92 acres of existing industrial sites (Zone 5) would still be part of Modified C. Barge terminals and marinas should be properly sited to protect the reservoir resource function. (Heinz J. Mueller - EPA)

Response: Comment noted.

Parcel 240 - Arrowhead

36. We oppose the allocation of Parcel 240 (Arrow Head Resort) to Zone 6 Recreation. (Regina Batuk, Tom Okulczyk, and Daniel R. Funk)

Response: Comment noted. Parcel 240 was planned in the 1988 Plan and allocated as commercial recreation. This was done in order to allow for potential expansion of recreation facilities on the adjacent private land. In the 2005 DEIS, TVA proposed to allocate Parcel 240 to Zone 6 - Developed Recreation under Alternatives B and C to support the expansion of Arrowhead Marina. However, because of the lack of interest by Arrowhead Marina, public comments, and occurrence of other developed recreation in the area, TVA now proposes to allocate Parcel 240 to Zone 4 - Natural Resource Conservation.

37. The Parcel *[Parcel 240]* appears to be a migratory "stopping point" for at least 2 varieties of vultures. During the Fall I've seen hundreds of vultures perched in the trees and browsing on the shoreline. (Tom Okulczyk)

    Response: Black and turkey vultures are common in the Watts Bar Reservoir area and often gather in large flocks, especially in the fall and spring of the year.

38. The shoreline *[Parcel 240]* has many fallen trees that bass fishermen love to fish - nearly 9 month of the year. During the spring months the crappie fishing is outstanding. (Tom Okulczyk)

    Response: Comment noted.

39. Ducks nest on that property *[Parcel 240]* and are in the cove year around. I've seen wood ducks on the shore of the property but haven't seen nests. (Tom Okulczyk)

    Response: Wood ducks typically nest in tree cavities or artificial nesting boxes with a minimum 4-inch-diameter hole opening and use many shoreline areas on Watts Bar Reservoir for brood-rearing habitat.

40. I've seen Bald Eagles perched in trees on the property *[Parcel 240]*. (Tom Okulczyk)

    Response: Bald eagles currently have several nests in the Watts Bar Reservoir area and forage or roost in many places along the shoreline.

41. A campground will destroy this sensitive area *[Parcel 240]* and significant*[ly]* impact adjacent property owners. (Tom Okulczyk)

    Response: Further environmental review would take place for any future activity proposed on Parcel 240.

42. Arrowhead Resort was allowed to use this property *[Parcel 240]* as a campground over 20 years ago and it was a disaster for surrounding landowners. Most weekends there were very loud intoxicated campers keeping everyone else up. My parents did not allow us to stay outside because of foul language echoing across the water. This also caused increased boat traffic in the cove the property is located on making it more dangerous for swimmers. TVA managed campgrounds have no alcohol policies and make sure that campers keep the sound levels low at night. That is not the case with a commercial campground. I now have children and do not want them to be endangered or subjected to the environment that was present in the past when Arrowhead controlled Parcel 240. (Daniel R. Funk)

    Response: Comment noted.

43. I'm also opposed to the allocation of parcel 240 to Arrowhead Resort for the following reasons. The area is a haven for wildlife. I have observed deer, bald eagles, vultures, piliated woodpeckers and turtles. The waters in the area attract fishermen for crappies and bass. (Gail Okulczyk)

    Response: Comment noted.

44. Arrowhead is a good neighbor, but the development of a campground by them in that area would eliminate the noise buffer that Parcel 240 provides. Development of a campground would devalue my property due to increased water traffic, litter, and noise. I'm requesting that TVA reallocate parcel 240 as a natural, undeveloped area. (Gail Okulczyk)

    Response: Comment noted. Further environmental review would take place for any activity proposed on Parcel 240.

45. Residents of Apollo Shores have signed a petition in opposition of Watts Bar Parcel 240 turnover to Arrowhead Resort and I'll be submitting that with this revised draft EIS. (Gail Okulczyk)

    Response: In September 2006, TVA received a petition from a total of 122 residents of Apollo Shores opposing the turnover of Parcel 240 to Arrowhead Marina for commercial recreation use.

Spring City Boat Dock

46. I live close to the Spring City Boat Dock and I have been very upset by the way that the Spring City Commissioners have allowed unauthorized development there. I have lived in Rhea Co most of my life and my family and I have fished and boated on Watts Bar Lake for years. My dad is now 75 years old and in declining health. He is no longer able to boat, but dearly loves bank fishing. Once the land has been turned over to private developers, there is no turning back. (Belinda McCampbell)

    Response: TVA is working with Spring City officials to resolve issues that have been identified by concerned citizens. There is a Tennessee Wildlife Resource Agency (TWRA) fishing pier on site that may be used by, and will remain open to, the public.

Parcel 219 - Rockwood

47. The City of Rockwood is requesting TVA approval of a lease for a marina and restaurant on city owned parcel 219 zoned for developed recreation use. The city will also request similar approval for adjoining parcel 218 (same zone 6) approval is vital for the future of Rockwood and the Southwest portion of Roane County. (Concerned Citizen)

    Response: Comment noted. The city does not own Parcel 219; however, it has a license to use the parcel for public recreation. The city does own the adjoining back-lying property.

48. Although a formal proposal for development of the Rockwood City property has not been presented as of this date. I have a few comments in the event a formal proposal is received by TVA. The cove adjacent to "Tom Fuller Park" is inhabited by Homeowners who for the most part have been residents and good stewards of the land for over 25 years. The land is kept pristine and the neighborhood is tranquil. I support the development, however I have two concerns: (1) a walking path "through the back yards would destroy the integrity of the neighborhood. No one wants a public thorough fare off their back porch. (2) If a marina is constructed on very close proximity - the homeowner should be allowed boat docks also. (Ron Higgs)

    Response: Comment noted.

Thief Neck and Goat Island

49. Leave Thief Neck and Goat Island as they are - Sensitive Resource Management and a natural resource. (James McNabb and Debra Liafsha)

    Response: Comment noted. Under both Action Alternatives B and C, Thief Neck Island is allocated for Zone 3 (Sensitive Resource Management) and Goat Island as Zone 4 (Natural Resource Management).

Parcels 142-146 - Former Clinch River Breeder Reactor Site

50. The previously disturbed site on parcel 145, along with 133 contiguous acres from parcel 142 for a total of 378 acres provide an excellent industrial site and should be allocated to Zone 5. The two mile riparian area from the road to the river (100 acres of parcel 145) should be Zone 3 so important wildlife habitat can be preserved as well as water quality. There are 350 acres, the remainder of parcel 142 and all of parcel 143, which should be Zone 4. This will provide habitat for wildlife including turkeys and deer and deep forest habitat for migratory birds. It also provides deer and turkey hunting opportunities. These parcels are contiguous with a forest on the DOE reservation as well as the Grassy Creek habitat protection area (parcel 146) and the 2.2 mile riparian area of parcel 144, thus extending protected habitat from the deep forest to the water's edge. This also provides a buffer for the DOE security training range located near the DOE/Breeder Site Boundary. The 265 acre Grassy Creek habitat protection area (parcel 146) should be a natural area as TVA has proposed. In addition, approximately 30 acres (less a narrow strip for access to industrial property) of parcel 145 should be added to the west end of parcel 146 since this is a very steep slope and would not be desirable for any type of industry. Parcel 144 is proposed as Zone 3 as it should be. This is a 2.2 mile riparian area that is very important for wildlife, as well as water quality. Another consideration that should be given to the allocation of breeder site land is the fact that if a nuclear type facility is located here, large buffer zones are very important. The allocations described above would surround any new facility by a buffer zone. (Carol A. Grametbauer, Chance Finegan - The Campus Greens, Ruth K. Young, Dave Reichle, Barbara A. Walton, Natalie Pheasant, Ken Shepard and Mary Collins-Shepard, Sandra K. Goss - TCWP, Axel C. Ringe - Sierra Club, and Frank Hensley)

    Response: TVA has reviewed the proposed land use allocation strategy submitted by the Tennessee Citizens for Wilderness Planning. TVA agrees that buffers are an important aspect in resource management and proposes to add an additional Zone 3 (Sensitive Resource Management) buffer area adjacent to Parcel 145 along the shoreline in Alternative B. This buffer would incorporate wetlands, cultural resources, and floodplains. TVA would, however, consider allowing potential development on Parcel 145 to access the water through a future corridor through the buffer, in compliance with the TVA Land Policy supporting industrial development with a preference for water-based access. This water access for future industry would be determined during the subsequent environmental review process that would occur should an industry request the use of this property.

    In Alternative A, TVA continues to support the allocation of Parcels 142, 143, and 145 for industrial development. In Alternative B, these parcels are proposed for allocation to Zone 2 (Project Operations) to support future TVA projects and facilities.

Alternatives B and C would add over 100 acres to the Grassy Creek Habitat Protection Area. The corridor from Bear Creek Road is the only access to the former Clinch River Breeder Reactor site and needs to be wide enough for future transportation facilities' proposals to support the use of the site. The buffer described in the response to Comment 50 would include some of the 30 acres mentioned for inclusion with Parcel 146.

51. I encourage TVA to designate most of parcels 145, 142, and 143 as zone 4 to provide for wildlife habitat, water quality, and maintain a natural area for future generations. It seems sensible to have the parcels 142 and 143 between the Grassy Creek Habitat Protection Area and the river designated as zone 4. The disturbed breeder reactor site and some of the surrounding area totaling 378 acres could still be suitable for industrial development. It is very important to maintain the riparian areas for wildlife as zone 3. (Joan Nelson)

Response: Comment noted. See response to Comment 50.

Other Parcels

52. We commend TVA for the following allocations:

- Zone 3 allocations, under both Alternatives B and C, for Parcel 238, the Whites Creek Small Wild Area (SWA), and for Parcel 237, listed as "Proposed addition to Whites Creek SWA to support trail expansion."
- The new Habitat Protection Area designation for the Whites Creek Alluvial Deposit Forest, at the upper end of Parcel 233.
- Zone 4 allocations for Parcels 224 and 226 and Zone 3 for Parcel 223.
- Zone 6 allocation for the Meigs County Park (Parcel 5).

(Carol A. Grametbauer, Chance Finegan - The Campus Greens, Ruth K. Young, Dave Reichle, Barbara A. Walton, Natalie Pheasant, Ken Shepard and Mary Collins-Shepard, Sandra K. Goss - TCWP, and Frank Hensley)

Response: Comment noted.

Managed Areas

53. *[In the 2007 DEIS]* Page 58, Section 3.4.6 Oak Ridge Reservation, line 3 - The current size of the Department of Energy (DOE) Oak Ridge Reservation (ORR) is approximately 33,718 acres. *[In the 2007 DEIS]* Page 73, Section 3.8.1, third paragraph, line 7 - The acreage cited for the DOE ORR property adjacent to TVA public lands is not accurate. The current size of the ORR is approximately 33,718 acres. (Gary Hartman - DOE)

Response: The Oak Ridge Reservation acreages given in Sections 3.4.6 and 3.8.1 of the 2007 DEIS were rounded up to 34,000 acres. The actual acreage of 33,718 acres is used in the FEIS.

Boating Safety

54. There are enough safety issues on the lake now--I can't tell you how many reckless incidents we see from our dock on a weekly basis. Please do not release land for further

development. If you want to push an agenda, back TWRA in mandatory boating safety courses in order to operate a boat. Only after TWRA is given the legislation they need to increase boating safety would I back a move to release land for development and substantially increase the traffic on the lake--particularly around Watt's Bar. (Mrs. Dale D. Powers - Diocese of Knoxville)

Response: Recreational boating safety requirements, responsibilities, and legislation are a responsibility of the states. TVA does cooperate with state agencies and has an agreement with the fish and wildlife agencies in Tennessee, Alabama, Mississippi, and Kentucky to share law enforcement responsibilities for recreational boating on the Tennessee River Waterway and tributaries. At the federal level, TVA and the U.S. Coast Guard both share enforcement responsibilities on the Tennessee River for commercial safety.

In Tennessee, legislation was passed a few years ago that requires individuals born after January 1, 1987, to take a mandatory boating safety course before they can legally operate some recreational boats, and there are similar laws in several other Valley states. Violators of these laws can be prosecuted.

Because the TWRA and the TVA Police cannot be in all locations all the time, TVA would urge you to report unsafe boating activity when you observe it to local law enforcement, TWRA, or the TVA Police.

NEPA and Alternatives

55. TVA should have had copies of the DEIS available at the *[public]* meeting, or at least extra copies of the maps for folks to take with them. (Iris D. Shelton)

Response: Copies of the DEIS and maps were available on request at the meeting.

56. This is a very well written document and I appreciate the information provided in it. Please mail me the final EIS and ROD when complete. (Iris D. Shelton)

Response: Comment noted.

57. The meeting for public comment is a good thing, everyone was helpful. (Debra Liafsha)

Response: Comment noted.

58. I think TVA has done a remarkable job on this project and kept everyone informed about what is happening with the land policy. (Anonymous)

Response: Comment noted.

59. Do we need to go to the public meeting to make a comment on the alternatives? (William J. Johnson)

Response: Mr. Johnson was informed that there were several ways to make a comment on any part of the DEIS and Land Plan.

60. It is therefore unclear why Table 2.2-1 (pg. 34) depicting allocations for the modified alternatives shows more land (92 ac) in Zone 5 for Modified C than Table 2.1-1 (pg. 18) depicting the original Alternative C shows (52 ac). Although not significantly different, the final EIS (FEIS) should discuss this. (Heinz J. Mueller - EPA)

    Response: The increase in acreage for Zone 5 was from the correction of an error in the original 2005 DEIS and was included as part of the discussion of changes to the 2005 Plan in Section 1.3.3. It will also appear in the FEIS.

61. EPA and other resource agencies previously provided NEPA comments on the TVA EIS for the 2005 Plan. In addition to EPA, page 14 indicates that U.S. Fish and Wildlife Service (FWS), Tennessee Wildlife Resources Agency (TWRA) and Tennessee Department of Environment and Conservation (TDEC) all favored Alternative C. EPA also recommended a hybrid or blended alternative between the development (B) and conservation (C) extremes, which was acknowledged in the present EIS (pg. 14). Despite the resource agencies' position on the original 2005 Land Plan and acknowledgement that Modified C is the "environmentally preferred" alternative (pg. 38), we note that TVA continues to prefer Modified B similar to its selection of Alternative B in the 2005 EIS. However, we appreciate the present modification toward increased allocation of lands for conservation in Modified B and assume that in part it was made in response to the agency selection of Alternative C. We are also aware of TVA's mandate to balance the environment with industrial and economic development in the Valley (pg. 1), which would favor Modified B over C. (Heinz J. Mueller - EPA)

    Response: Comment noted.

62. We rate this DEIS as "EC-1" (Environmental Concerns, some additional information requested). While we find that both Modified B and C have areas of environmental improvement over the original 2005 Land Plan, we prefer Modified C. This alternative would provide an important public land buffer for ongoing private land development around the Watts Bar Reservoir for wildlife habitat and reservoir water quality benefit. (Heinz J. Mueller - EPA)

    Response: Comment noted.

63. The present EIS is said to "amend" the 2005 EIS. Editorially, the NEPA term that is used in such instances is to "supplement" the original EIS, i.e., a "Supplemental EIS" rather than an "Amended EIS" is produced. Also relating to NEPA, it is unclear why the No Action Alternative would still use the 1988 Land Plan if selected as opposed to the 2005 Land Plan since that plan has recently undergone the NEPA process (even though it is being amended by the present EIS). (Heinz J. Mueller - EPA)

    Response: Comment noted. The 2005 Land Plan was not completed or formally adopted, and thus the 1988 Land Plan remains the No Action Alternative.

Alternative C

64. We support the Modified Alternative C which has the most TVA land allocated for natural resource conservation and the least land allocated for economic development. (Gail Okulczyk, David Reister - Conservation Chair of the Harvey Broome Group of the Sierra Club, Axel C. Ringe - Sierra Club, William Johnson, Rhonda Bogard, Iris D. Shelton, and two Anonymous Commenters)

Response: Comment noted.

65. We find that both Modified B and C alternatives are environmentally more attractive than the original B and C, with Modified C still providing the most overall protection for the environment. Modified C's correlation with less development reduces impacts to wetlands, aquatics, shorelines, riparian vegetation, terrestrial areas and other natural habitat as well as minimizing air and noise emissions. Sensitive habitat areas that would be protected include the former Clinch River Breeder Reactor site in Zones 3 or 4 (pg. 108) as a wildlife corridor. Accordingly, EPA continues to prefer the benefits of Alternative C and now Modified C. (Heinz J. Mueller - EPA)

Response: Comment noted.

66. The Tennessee Wildlife Resource Agency recommends and supports Modified Alternative C - Modified Conservation and Recreation. It is our opinion that the public and the natural resources of the state would benefit the most if this alternative were chosen. Outdoor recreational opportunities would be expanded under this alternative, impacts on prime farmlands would be no greater than with either of the other alternatives, the greatest benefit to rare aquatic and terrestrial species would likely occur under Modified Alternative C, water quality would be maintained under this alternative, and potential impacts to archaeological resources would be insignificant under Modified Alternative C. (Robert M. Todd -TWRA)

Response: Comment noted.

67. I believe we need to appropriately manage our resources for generations to come and Alternative C does the best job of protecting land and providing recreational activity to the public. (Rhonda Bogard)

Response: Comment noted.

68. To me if you don't develop the area like in Plan C, you can always develop it later if you need to. If you go with one of the other plans and you overdevelop it now, then we won't ever go back and reclaim from houses or run down factories. So to me it's better to lock it up and in years to come redo another impact study and develop it then if we need it. If you don't it, let it lay. (William Johnson)

Response: Comment noted.

69. We believe this Alternative C to be most consistent with the TVA Board's Land Management Policy, which responded to the overwhelming public call for no sales of TVA public land for private development. (Axel C. Ringe - Sierra Club)

Response: Comment noted.

Blend of Alternatives B and C

70. The Clinch River Breeder Reactor site should be an amalgam of Alternatives B and C. (Natalie Pheasant, Dave Reichle, Ken Shepard and Mary Collins-Shepard, Ruth K. Young, Chance Finegan - The Campus Green, Carol A. Grametbauer, Sandra K. Goss-TCWP, and Barbara A. Walton)

Response: Please see the response to Comment 50 where additional buffers are proposed for Parcel 145 in Alternative B. Note: the map and description the proposal provided by these commenters appears in Appendix D of the FEIS.

71. If Modified C in association with Section 26a permitting would not adequately satisfy the TVA mandate, we alternatively suggest consideration of a hybrid or blended alternative that would allocate more lands for industrial development (Zone 5) than in Modified C but less than in Modified B (i.e., more than 92 ac but notably less than 1,253 ac). We further suggest that such development be limited to light industry that depends on water access and has some environmental benefit such as barge terminals. (Heinz J. Mueller - EPA)

Response: Comment noted.

Alternative B

72. I support Alternative B, which has a more balanced plan. (Michael Atchison, Jim/Judy Callen, David Peterson, and Mark Tummons - TDED)

Response: Comment noted.

73. The Oak Ridge Chamber of Commerce and Oak Ridge Economic Partnership recommend serious consideration be given to adopting the Modified Development and Recreation Plan (Modified Alternative B.) The plan would provide for continued industrial development in the areas currently designated for industrial development, permitting TVA to continue its mission to encourage economic development in the Tennessee Valley. (Greta Stoutt Ownby - ORCC and Kim K. Denton - OREP)

Response: Comment noted.

74. I am in favor of restricting TVA property to be used mainly as public property, some industrial, and no residential development. (Belinda McCampbell)

Response: Comment noted.

Other Comments

75. I have previously written to your Athens Office but get no reply. Throughout the year - Spring to present -- military helicopter exercises have been landing on Long Island in Watts Bar. Is TWRA aware that this occurred during nesting season for water fowl? And it continues through hunting season. Who has given them permission for this and why? (Dave Reichle)

Response: Comment noted. TVA has no knowledge of military exercises taking place on Long Island. We have informed TWRA who manages the property for waterfowl.

76. Look into the impact on Rhea County schools in regards to Watts Bar Nuclear Plant Unit II. They are already stretch*[ed]* way too thin! (Jim/Judy Callen)

Response: This has been addressed in the FEIS issued by TVA in 2007 for the completion of Watts Bar Nuclear Plant Unit 2.

77. The Department of the Interior has reviewed the Amended Draft Environmental Impact Statement for the Watts Bar Reservoir Land Management Plan and has no comments to provide for your consideration. (Gregory Hogue - U.S. Department of the Interior)

Response: Comment noted.

78. In Appendix C, comments were incorrectly attributed and we ask that the attributions be corrected as follows: TCWP commented on the Fingers Area, page 277. (Sandra K. Goss -TCWP)

Response: Appendix C has been corrected in the FEIS.

Lake Levels

79. I have yet to understand why Watts Bar Lake is sacrificed for other areas. An example is the lake levels. Other lake levels have been dropped an average of 1 to 5 inches but Watts Bar Lake is dropped 15 to 18 inches. So far that many of us have not been able to use our boats most of this summer season, we can't get them away from the dock! Can this be explained to us? (Charles McCrosson)

Response: See the operating guide at http://www.tva.com/river/lakeinfo/op_guides/wattsbar.htm) for information about TVA's river operations and lake levels. Watts Bar Reservoir has been within its summer operating range of 740-741 feet above sea level for most of the summer of 2007.

80. In my prior correspondence I mentioned "Lake Levels" as an example. You responded that the levels had been kept as originally stated between 740 and 741 feet above sea level. Unfortunately you have been misled. Given poor information! The levels have fluctuated drastically during every 24 hours. At night levels are raised, readings are taken during the night and/or early morning, during the day the levels are dropped. On August 30, 2007 the reported "Watts Bar Lake Level" was 739.7. That is below the 741 and 740 stated but it drops much further during the day, as much as 7 to 12 inches and then brought back!! If support to these facts is necessary I have many persons that will verify my statements. Those persons providing you necessary information that you might respond to property owners correspondence and concerned others need to provide you with real facts that your statements are accurate. Failure to offer real facts puts a possible "Taint" on any future issue or statement! I am sure you as a professional realize the merit in this statement. I would appreciate a notification of any future open meetings on these issues that I might try to attend, now that you have my e-mail address. I would appreciate your looking into my claim with regard to lake levels and respond to my statements. It would do a lot for your credibility and that of TVA. I will share your words with others of similar concern. (Charles McCrosson)

Response: Please see the response to Comment 82. The reported Watts Bar Lake Level was 739.7 on August 30, 2007, which was slightly below the operating level of 740. This could have occurred for several reasons. Because Watts Bar is a very large reservoir, it is normal for minor fluctuations to occur along the reservoir, as with any large body of moving water. A variance of several inches at any point on a reservoir would not be uncommon as water moves through the system from multiple sources. There can be minor fluctuations in water levels to maintain minimum flows on other reservoirs, which are

required on the Tennessee River system to ensure sensitive aquatic habitats, public and industrial water supplies, and navigation. Furthermore, the Tennessee Valley region has experienced a severe drought, and there have been some further fluctuations and lower levels in the tributary reservoirs to ensure the minimum flows.

81. Since I live 2 miles below Melton Hill Dam, I have trouble with the water rising so much. When they had me riprap my place -- from the elevation, they had me riprap it to elevation 743 and now when they're using two generators, it gets to about 744 elevation. It's a foot above my riprap. I wondered if there are any plans in the future to not bring it up so high. Five years ago, it didn't run that high and now it does. (William Johnson)

    Response: There are no plans at this time to alter the way Melton Hill Dam is operated. Typically, TVA staff permits riprap to extend 2 feet above normal summer pool elevation. On Watts Bar Reservoir, the normal summer pool is the 741-foot-contour elevation. Please feel free to contact the Watts Bar-Clinch Watershed Team to discuss your situation.

82. I know we went to the line meeting when they was going to change the level of the water, filling it up in March -- I mean instead of April 15 having if full, they went to May 15 and they had a meeting there in Spring City. TVA wanted to hear everything everybody had to say and all the ones that -- Arrowhead and all of them that owned the fishing camps and everything down there was against it, but they had their mind made up before we got there because they told us what they was going to do. They didn't want to hear *[our]* side of it. We didn't even get to speak. (Wayne McNeese)

    Response: Comment noted.

83. Why can't TVA consider keeping the water level higher for fall, just by weeks would help out marina's, and people who live in the many coves near Watts Bar Lake? (Charles Romeo)

    Response: This issue was addressed in the Reservoir Operations Study (see TVA's Web site http://www.tva.gov/environment/reports/ros_eis/.) As a result of the study, TVA did not change the time of the winter drawdown on Watts Bar Reservoir, which begins on November 1 and is typically at its winter operating zone by November 30. However, the spring fill was adjusted. Weather permitting, the reservoir will fill halfway during the first week of April. The remaining half will fill over a five-week period by May 15.

Public Lands and Stewardship

84. The lake should be accessible to the people. (Belinda McCampbell)

    Response: Comment noted.

85. Please do not allow further commercial development along the lakefront. Single family homes are ok. Do not allow campgrounds to expand into TVA land. Boy Scout camps, girl scouts should be an exception. (John Kueck)

    Response: TVA has no control over the commercial or residential development of private property. TVA does have control over the development of its own

property. The TVA Board of Directors has adopted the TVA Land Policy, which describes the types of uses permissible on TVA land; see the discussion in Section 1.2 and the TVA Land Policy in Appendix A of the FEIS.

86. I was unable to travel to Harriman for the meeting at Roane State, but would be greatly concerned about further blocks of land being released by TVA for development. (Mrs. Dale D. Powers, Diocese of Knoxville)

Response: Comment noted.

87. No industrial development on Watts Bar please. (Eugene F. Corcoran, Jr.)

Response: Comment noted.

88. I would like to see that TVA did not allow any development in the Zone 6 - Developed Recreation areas, where there can be a spill like a marina, where there can be a fire like a marina, where there could be a spill like light industrial, or parking lots where you can have runoff into the water unless it's in an area that can be contained like a bay. I don't want to see them build any marinas or light industrial on the main channel of the Tennessee River or Watts Bar Lake. If it's in a cove, it's fine because it can be contained, any problems can contained. (William Wright)

Response: Zone 6 parcels are allocated for commercial or public recreation use in the land planning process. A majority (1,407 of the 1,621 acres being considered for Zone 6 in the preferred alternative) of the land designated for Zone 6 on Watts Bar is already committed for use with an existing land agreement. That is, the majority of the Zone 6 lands (1,407 acres) will not change from the current use.

89. I appreciate your information and am very aware that TVA is seeking input for their future plans with regard to lake usage. I must again state that industrial usage of the Watts Bar Lake area is not in the best interest of the property owners around this lake. I can only hope that our concerns will be considered prior to any final decision on lake usage. We, owners of property along the lake, sportsmen, frequent visitors and users of Watts Bar Lake are totally against industrial usage of Watts Bar Lake. I don't think I can put it any simpler nor clearer! We love our lake. We fear that the pollution, safety hazards, our views from our properties, values, all *[will]* be harmed and with little concern of those responsible for the industry nor by those who manage the lake operations. (Charles McCrosson)

Response: Comment noted.

90. The beauty and wildlife has been encroached upon by land development enough already. Further development *[will]* only detract from this resource! (Anonymous)

Response: Comment noted.

91. Do not allow Watts Bar *[to]* be overdeveloped like Tellico has become. The main beauty of Watts Bar is the natural shores. (Anonymous)

Response: Comment noted.

92. Do not sell anymore TVA lake frontage! The more undeveloped land on Watts Bar Lake the better. (Debra Liafsha)

Response: Comment noted.

93. Thanks to the board for freezing the areas for natural use. (Anonymous)

Response: Comment noted.

94. TVA couldn't be more wrong. Citizens of the State of Tennessee do want more access to home building sites on the unused shores of lakes managed by the Tennessee Valley Authority. Lake front home ownership is a dream of many Tennesseans and TVA needs to open much more property up to private home ownership and enjoyment. TVA took these lands from Tennesseans for development and now TVA wants to deny development opportunities to homeowners? I owned a home on Boone Lake in Washington County, and I know well the joys of lake front living. However, when I moved to Chattanooga in 1998, my wife and I quickly found that we could not approach affording a similar residence on Chickamauga Lake. Lake front living is celebrated in other parts of this country. TVA should not be putting a stop to further residential development on TVA lakes, especially when it says it wants to substitute residential development with industrial development. (Stan Boyd)

Response: The TVA Land Policy does not support the use of TVA land for residential development. Approximately 47 percent of the shoreline along Watts Bar Reservoir is zoned for Shoreline Access to support back-lying residential development. TVA estimates that only 20 percent of shoreline on Watts Bar currently has back-lying residential or is platted for future residential development. This leaves approximately 27 percent of shoreline open for access in the future.

95. I know that a great deal of work on TVA's part has been done in looking at the best for the properties around Watts Bar Lake. I am a native of the area and can see that over the course of TVA managing these properties, it has become a natural habitat to much wildlife. Development has a way of destroying that. (Linda Spencer)

Response: Comment noted.

96. Regardless of a preference for Modified B or C, it is unclear why TVA public lands should be offered for private sale (other than revenue) in either alternative since considerable private shorelands are already in private ownership along the Watts Bar Reservoir (Figure 1.1-1). Moreover, the DEIS indicates that such private lands are rapidly being developed, that the local growth rate is growing faster than that of the state and nation (pg. S-5), and that only 3.7 % of the land in the State of Tennessee is public (pg. 100) and only about 11 % of the lands along the reservoir shoreline are TVA public lands (pg. S-4). TVA public lands along Watts Bar Reservoir, which primarily have a conservation and recreation use, serve to buffer the reservoir from ongoing private development in the watershed. Moreover, TVA could continue to encourage its mandate for economic development by regulating private shoreline development along the Watts Bar Reservoir through its Section 26a permitting process. That is, TVA could allocate

more lands to conservation (Modified C) and still promote economic development at sustainable levels through its Section 26a permitting process for shoreline construction of private lands. (Heinz J. Mueller - EPA)

Response: According to the 2006 TVA Land Policy, only a limited amount of land would be designated for potential industrial use through private ownership. Land made available for future recreation uses would have easements or license agreements for that specific purpose.

97. It is time to strike that balance between economic development and environmental protection that is always paid lip service to by government and industry and make a decision that is in the best interests of the land, the water, and the affected communities for the long term rather than the quick economic gain for the short term. (Axel C. Ringe - Sierra Club)

Response: Comment noted.

98. It would be a real tragedy to allow more development in this and surrounding areas. It would add more activity, noise and stress to the now quiet community of land owners along TVA's Watts Bar Lake area. It would also make more boat traffic making the lake less safe. There are too many developments now! Bigger is not better. We bought our land for solitude, not to become apart of a village by the sea. Please respect our input and do not open up this land. There are already many parks and boating places that visitors can enjoy because of our TVA public land. Please continue to allow this, rather than sell out and make it commercialized. That will detract from what we have come to love about this area of East TN. Please refer back to the survey of the East Tennessee people that were overwhelmingly opposed to selling TVA land to developers. They are motivated by greed rather than what's best for the land owners. And please do not give into them or politicians, who should remember that elected politicians are suppose to represent the wishes of the people that elected them, not to be motivated by money or bend to special interest groups. (Nancy Powers Stutts, Barry, Dustin, and Misty Stutts)

Response: In November 2006, TVA finalized a new land policy governing planning, disposal, and retention of lands owned and managed by the agency. This policy was written with much public input and was designed to help TVA manage its lands to protect the integrated operation of the TVA reservoir and power systems, to provide for appropriate public use and recreation of the reservoir system, and to provide for continuing economic growth in the Valley. TVA will no longer dispose of public land for private residential development. Under certain conditions, TVA will continue to support the economy through the disposal of land for industrial development when there is a public benefit.

99. It has come to my attention that TVA is being approached by counties in the Watts Bar Lake area trying to get land for developing. As a land owner in the Lake Wood Village community I am adamantly opposed. The joy of having the property on the lake is to get away from the crowded busy life of the city, and enjoy the solitude of the country, wildlife and water activities. It has always been a place of refuge for me and my family, ever since I was a child. And now my children, and 4th generations in our family are enjoying the inner peace and sense of renewal obtained from even a weekend spent at Watts Bar Lake. We've even spent many family vacations and reunions there, instead of traveling

to the beach and spending our money out of state. (Nancy Powers Stutts, Barry, Dustin, and Misty Stutts)

Response: See the response to Comment 98.

100. PLEASE do not release land for further development. (Mrs. Dale D. Powers - Diocese of Knoxville)

Response: Comment noted.

Recreation

101. Very concerned about the sewage in the Blue Springs area from the large boats. (Diane Bowman)

Response: Water quality in Watts Bar Reservoir is described in Sections 3.5 and 4.5 of the FEIS. TVA monitors reservoir health through a variety of indicators including fish tissue and bacterial levels. There were 20 bacteriological monitoring sites on Watts Bar during 2006. Many of these sites were located at highly used recreational areas. The Blue Springs area was not one of the specific sites sampled in 2006. TDEC has authority to issue bodily contact advisories. Currently, there are no state advisories against swimming in Watts Bar Reservoir. Please visit www.tva.gov for additional information on reservoir health ratings for Watts Bar.

Specifically for sewage, reservoirs in Tennessee are designated by TDEC as either a 'discharge' reservoir (where vessels may discharge properly treated sewage overboard), or a 'no-discharge' reservoir (where no sewage, treated or untreated, may be discharged overboard). Watts Bar is a 'discharge' reservoir. Therefore, discharge into public waters is restricted to wastes treated by a Type I or II U.S. Coast Guard-approved marine sanitation device.

TWRA and TVA Police have enforcement rights over boating vessels with regard to sewage discharge. Both agencies perform patrols of reservoir areas. If you suspect illegal sewage discharges, please report them to TWRA at 1-800-332-0900. Please record the boat registration number and report vessels suspected to be dumping sewage or solid waste.

TVA and TWRA along with the Coast Guard Auxiliary also conduct an annual clean boating campaign outreach to boaters. During this campaign, vessel safety checks are completed, and information and supplies to support clean boating are distributed. In addition, TVA set up the Tennessee Valley Clean Marina Initiative to help protect water quality in relation to boating activities. This program addresses activities such as sewage management, oil and gas control, marina siting, and erosion prevention. For more information on clean boating, visit www.tva.com/environment/water/boating.htm.

102. I would encourage you to work with local parks and recreation agencies throughout the area to implement the plan. One point of concern might lie in the number of recreation user days per year. The Draft EIS points out that Watts Bar Reservoir receives an

estimated 1.9 million recreation user days per year, while your Reservoir Operations Study (ROS) - Final Programmatic EIS, 4.24-5 states that there are “4.0 million recreation user days across ALL 25 ROS projects.” This means that Watts Bar Reservoirs in the study utilize the other 50% of the recreation user days per year and the other 34 Reservoirs in the study utilizes the other 50%. This may not be a significant point, but it might skew the number results enough to consider other recreation endeavors, such as number of boat ramps, marinas, picnic areas, etc. (Mark Tummons - TDEC)

Response: As a part of TVA’s recreation strategy, we do work with a variety of partners (including local parks and recreation agencies) to achieve our goal of increasing diverse recreation opportunities along the reservoirs we manage. In the Reservoir Operations Study (ROS), three types of access to account for the overall recreation user days (public, private, and commercial) were identified. The figure of 4 million user days across all ROS reservoirs was specifically for the “public” measure. The 1.9 million user days for Watts Bar reported in the Plan were for public, private, and commercial measures combined. The total recreation user day estimates, for all ROS reservoirs, across all three measures were 21.8 million. Therefore, Watts Bar Reservoir receives approximately 9 percent of the total recreation user days across all three measures.

103. Do not allow docks to be built within 100 feet of launch ramp areas. Exception would be the dock that serves the launch ramp. Launch ramp areas in subdivisions are becoming too crowded, congested. (John Kueck)

Response: Comment noted. TVA takes into account the safety of the users at public ramps and typically does not permit docks and other structures in close proximity to these. While developing public ramp access, TVA takes into consideration the adjoining landrights. TVA does not manage use on private access ramps that are not available to the general public.

104. If Modified Alternative B were chosen additional impacts to informal recreation could occur, as stated on page 101 of the DEIS: "Specifically selection of this alternative would eliminate future stakeholder partnership opportunities and activities on Parcels 297 and 298 at Lowe Branch as well as eliminate from consideration a request from TWRA for the transfer of Parcels 295, 297, 298, and 299 from TVA for inclusion in its WMA program as a contiguous tract of land. Additionally, this alternative would eliminate, over time, the WMA hunting regulation agreement with TWRA for the former Clinch River Breeder Reactor Site area, which includes Parcels 142, 143, 144, 145, and 146." (Robert M. Todd - TWRA)

Response: Comment noted..

105. This letter is to inform you of the City of Rockwood’s interest in pursuing commercial recreation development opportunities on Parcel 218 as described in the proposed Watts Bar Reservoir Land Management Plan. This parcel, along with our public recreation property (Parcel 219) can provide the appropriate lake-oriented recreational opportunities that the City so desperately needs for future economic prosperity. We envision the use of Parcel 218 to provide recreational facilities typical of those found at Tennessee State parks. We will be submitting plans for potential uses of Parcel 218

once the TVA Board adopts the new Reservoir Land Management Plan. We look forward to working with TVA to secure the recreational and economic benefits that King Creek can provide to the City of Rockwood and Roane County. (Mike Miller - City of Rockwood)

Response: Comment noted. This parcel would be available for Developed Recreation if TVA selects Alternative B.

106. Modified Alternative C would expand informal recreational pursuits, such as wildlife and nature observation and hunting. As stated on page 102 of the DEIS, Modified Alternative C would: "Specifically, the selection of this alternative would maintain current stakeholder partnership opportunities and activities on Parcels 297 and 299 at Lowe Branch and keep open consideration of TWRA's request for the transfer of Parcels 295, 297, 298, and 299 for inclusion in its WMA." (Robert M. Todd - TWRA)

Response: Comment noted.

Caney Creek Campsites

107. We are concerned about an ongoing problem with TVA land that is located in front of our homes, however. We have the following list of complaints: 1 - campers are discharging human feces into Watts Bar Lake from the holding tanks of their motor homes and trailers. 2 - campers are using buckets as toilets, then dumping them in the lake. 3 - human feces and toilet tissue is left all over camping area. 4 - 14 days trash accumulation is scattered all over the ground. 5 - campers have loud drunken parties, drug use. 6 - vagrants are living in tents for months at a time. 7 - campers are building huge campfires, leaving them burning when they leave. 8 - numerous vehicles are parked on these small sites, destroying the vegetation. 9 - campers are using these small sites to launch their boats, further destroying the shoreline. We have listed just a "few" of the problems, our report is on record. We thank TVA for it's efforts to try and curb the problems we brought to your attention, namely by posting signs, asking campers to use the porta-john`s located 1 mile away at the public boat launching site, and warning campers to pick up trash, etc. Unfortunately, campers are ignoring the signs and all of the above problems, are still occurring on a daily basis, including dumping on these sites. They are an eyesore for this neighborhood. Also, we are just across the lake from Caney Creek Park, (a four minute drive) which offers every amenity people could want, including restrooms and trash cans. We are also distressed and baffled, because our neighbors down the street, who shared the same problems with campers, were given permission by TVA to chain off their parking areas, and by doing so, it discouraged campers from using the waterfront land in front of their homes. Our neighbors have cleaned up their TVA waterfront area, planted grass and made the sites very attractive to this community. We are asking for your permission to clean up the waterfront areas in front of our homes and to replant vegetation, etc., and in order to keep the waterfront clean, we respectfully request that you stop all camping. We observed that guardrail posts were being installed on the three lots we refer to. It appears that this solution would finally prevent campers from parking their vehicles in areas that already have their vegetation and shoreline destroyed. (Loren and Judith Nelson)

Response: Comments noted. TVA monitors reservoir health and reservoir properties through a variety of indicators including bacteriological monitoring and informal recreation area assessments. TDEC has authority to issue bodily

contact advisories for water bodies in Tennessee. The Caney Creek informal swim site was one of the sampling locations during 2006. While it did exceed the single sample maximum on 1 of 10 sampling events, there are currently no bodily contact advisories on Watts Bar per TDEC.

TVA has assessed the potential for informal recreation for this site. Based on the results of this assessment and input from the public, TVA has taken management actions including improved sanitary facilities, signage, and increased TVA Police patrols. The public has the right to use public land in a sustainable manner, and TVA will continue to monitor and manage the land as appropriate to address the environmental and social conditions in the Caney Creek area while allowing public access to public lands.

TVA welcomes assistance in litter cleanup on public lands. However, the planting of vegetation may require a permit and review. Please feel free to contact our field office at 865-632-1320 with specific questions about this process.

108. If TVA wants to provide free camping, it needs to find one area to make it possible. Allowing camping in residential areas is causing considerable distress for homeowners. (Anonymous)

Response: In general, TVA allows informal camping on lands designated as Zone 4. The demand for informal camping is increasing, and TVA supports the sustainable use of public land for informal recreation. In some instances, a conflict occurs between nearby landowners and the recreating public. TVA has established protocols for measuring environmental and social damage caused by this type of use. TVA attempts to take a holistic look, through these methods and responding to landowner concerns, to achieve an equitable solution in areas where conflict occurs.

Rhea Springs and Jackson Island

109. I'd like for the Jackson Island area to stay open, stay like it is. I'd like the Rhea Springs area and March Cemetery tract opened up for primitive camping. The Holloway Branch area and Jackson Island 125, 135 acres be opened up for primitive camping. I think now they worry about the four-wheel drives tearing up the property, but cell phones will take care of that from the campers. You can report them before they get out of the area. Of course, Holloway Branch, let it stay open also with Jackson Island. (Wilker Hassler - Friends of Watts Bar Lake)

Response: There are no land allocation changes proposed for the Jackson Island or Holloway Branch areas. Therefore, informal camping will remain an appropriate use for these areas.

Rhea Springs Campground has been closed for several years. The infrastructure is dilapidated to the point where it creates a safety hazard for the user and, therefore, cannot be opened at this time. TVA is in the process of looking at this area and developing a management strategy for its future use. Due to the condition of this area, a management strategy may take some time to develop.

110. We would like Rhea Springs Recreation Area opened back up for primitive camping or day use. We wouldn't mind to pay to use it. We would like to keep Jackson Island open for primitive camping. We would also like the Marsh Cemetery Tract added to Jackson Island camping. (Steven Hassler - Friends of Watts Bar Lake, Eugene F. Corcoran, Jr., Doris Hassler, and Frances Hassler)

Response: See response to Comment 109.

Sensitive (Endangered and Threatened) Species

111. Page S-3 and Table 3.3-2 (pg. 48) still lists the bald eagle as a federally-threatened species. We understand it has now been delisted, but recommend verification with the FWS before prospective development. (Heinz J. Mueller - EPA)

Response: The bald eagle was officially removed from the U.S. Fish and Wildlife Service (USFWS) list of threatened animals in 2007 while the DEIS was in preparation. Its status has been updated in the FEIS. In agreement with the USFWS, TVA continues to monitor bald eagle populations throughout the Tennessee River Valley. TVA has coordinated with the USFWS and will comply with guidelines outlined in the Bald and Golden Eagle Protection Act to minimize disturbance to nesting bald eagles on or adjacent to TVA-retained properties.

112. If either Modified Alternative A or Modified Alternative B were chosen, rather than Modified Alternative C, approximately 279.4 acres of habitat for the State Endangered Bachman's sparrow could be impacted due to the allocation of parcels 297 and 298 near Watts Bar Dam. As stated on page 49 of the DEIS, "Suitable habitat for Bachman's sparrows is limited and scattered throughout Watts Bar Reservoir lands. The species may be found in Parcels 3, 295, 297, 298, and 299 near Watts Bar Dam." Loss of habitat for the Bachman's sparrow is one of the greatest threats for the continued existence of this species. (Robert M. Todd - TWRA)

Response: Comment noted. State-listed Bachman’s sparrows have not been recorded on the Watts Bar Reservation land parcels where habitat occurs. In addition, Bachman’s sparrows have not been recorded from the area since 1987, and the habitat for them on TVA lands is marginal. TVA would review potential effects on all animal and plant species associated with any future industrial development proposals on Parcels 297 and 298.

113. I believe the rationale may have been that any adverse effects ***[on threatened and endangered species]*** would be addressed during site/project specific review and consultation at a later date. If there is no other rationale to support the determination, we may have a procedural issue that precludes us from being able to concur.

Consultation on the Land Management Plan is programmatic in nature. Just as the Land Management Plan sets direction and serves as an umbrella for the specific actions that will take place on the Consultation on the Land Management Plan is programmatic in nature. Just as the Land Management Plan sets direction and serves as an umbrella for the specific actions that will take place on the landscape, this consultation will serve as an umbrella for the site-specific consultations that occur later and tier back to the umbrella (programmatic) consultation. As such, the umbrella determination should encompass all likely determinations that will follow at the site specific level. Therefore, if

any specific action taking place under the Watts Bar Land Management Plan is likely to have an adverse effect on a listed species, the determination for the Land Management Plan (the umbrella) should also be "likely to adversely affect" and initiation of formal consultation on the Land Management Plan should be requested. Conversely, if no specific action is anticipated to result in an adverse effect to a listed species, then a determination of "not likely to adversely affect" is appropriate for the Land Management Plan. Often this "not likely to adversely affect" determination at the Land Management Plan (umbrella) level is supported by an agency's nondiscretionary commitment to adequately minimize the effects of specific actions so that the action is wholly beneficial, insignificant, or discountable. If a specific project could not be modified in a manner or to an extent that removes the adverse effect, it would not be implemented. The agency's commitment to minimize the effects of specific actions could be made in the Land Management Plan or in associated NEPA/decision documents. In such a case, we would provide concurrence with "not likely to adversely affect" for the plan, and we would review each specific action to ensure the effects have been minimized adequately and, if so, provide a project-specific letter of concurrence.

If you can explain the rationale for the "not likely to adversely affect" determination for the Watts Bar Land Management Plan in a little more detail, I will be able to evaluate how we should proceed on this concurrence request. Let me know if the determination was reached based on the fact that all future projects under this plan are likely to have effects to the listed species that are either wholly beneficial, insignificant, or discountable. If that determination is based on a commitment made in the plan or its NEPA documents, I'd appreciate it if you could let me know where to look (document and page). However, if you anticipate that some specific projects implemented in the future under this Land Management Plan will likely result in a determination of "likely to adversely affect" a listed species, we should discuss the need for initiation of formal consultation. If formal consultation is needed, we will attempt to expedite the consultation as much as possible. (Mary Jennings - USFWS, Cookeville Field Office)

Response: Formal consultation was initiated and a Biological Assessment prepared February 29, 2008 for review by the USFWS. USFWS provided a Biological Opinion on May 2, 2008, which said “You (TVA) have determined that there would be no effect on the Virginia spirea, Cumberland rosemary, fanshell, rough pigtoe, shiny pigtoe, orangefoot pimpleback, snail darter, spotfin chub, and the gray bat. Additionally, you (TVA) determined that this project would have no effect on designated critical habitat for the spotfin chub in the Obed or Emory rivers. You (TVA) have determined the proposed Land Plan is not likely to adversely affect the pink mucket, based on implementation of specific measures if TVA were to develop industrial facilities at the former Clinch River Breeder Reactor site. With implementation of these conditions and appropriate Best Management Practices, you have determined that only relatively minor impacts to federally listed mussels in the Clinch River are expected to occur. Typically, the Fish and Wildlife Services does not concur with a “not likely to adversely affect determination” at the programmatic consultation level when such determination is based on a commitment to consult on specific projects in the future when details become known. If there is a potential for a “likely to adversely affect” determination to be made during site-specific consultation in the future, the Service advises that “likely to adversely affect” is the appropriate determination at the programmatic consultation level also. However, after numerous discussions with your staff

and a thorough review of this project and associated conservation measures, we believe the likelihood of reaching a determination of “likely to adversely affect” at the site-specific consultation level in the future is discountable. Therefore, we concur with your conclusion that the proposed Land Plan is not likely to adversely affect the pink mucket. In view of this, we believe that the requirements of section 7 of the Endangered Species Act (Act), as they apply to this programmatic review, have been fulfilled.”

Socioeconomics and Environmental Justice

114. Property values have been generally good but industrial use of the lake will have a dramatic effect on these values which we have spent many dollars, in some cases our entire savings to create. To say that this will not happen, that TVA will police any industrial pollution activity, is not accurate based on your current track record. (Charles McCrosson)

Response: Under TVA's preferred alternative, Alternative B, 1,253 acres would be allocated for industrial use. This consists largely of five tracts that are part of the former Clinch River Breeder Reactor site in Roane County (957.4 acres) and two tracts in Rhea County in the area known as “The Pines" (279.4 acres). In addition, three small tracts in Roane County, with total acreage of 16.2 acres, are allocated for industrial use because of their possible suitability for industrial or barge terminal development. This is less than 8 percent of the land that TVA owns and manages on the Watts Bar Reservoir. Pollution control is under the jurisdiction of the designated federal and state agencies; any industrial development on these tracts would be subject to the restrictions and control of these agencies and the appropriate laws.

The former Clinch River Breeder Reactor site is bounded largely by the Clinch River and by the Department of Energy, Oak Ridge Reservation. The remaining portion runs generally along the southeastern side of Bear Creek Road. Due to this location, any negative impacts to surrounding property including property values would, at worst, be small except for possible temporary impacts during any construction that might occur. Depending on the nature of the development, property values could increase as a result.

The Rhea County site is bounded by the Tennessee River and by TVA-owned land designated largely for Natural Resource Conservation, with a smaller portion designated for Project Operations. Due to the location, development is unlikely to have noticeable negative impacts on property values.

The remaining sites are small tracts that could be used only to provide water access for barge use by back-lying industries that would be located on non-TVA properties. Use for Industrial or barge terminal access is compatible with current uses of adjacent property. Therefore, no noticeable impacts to property values are likely.

115. There is plenty of land in Rhea County for industrial development; leave the lake alone! (Ted Hitchens)

Response: Under TVA's preferred alternative, Alternative B, 1,253 acres would be allocated for industrial use. The only site allocated for industrial use in Rhea County are two adjacent tracts in the area known as “The Pines” (279.4 acres). This area is bounded by the Tennessee River and by TVA-owned land designated largely for Natural Resource Conservation, with a smaller portion designated for Project Operations. Preference for this site will be given for businesses that require water access. The availability of water access could provide opportunities not easily available elsewhere in the Rhea County area. Industrial use would affect only a very small portion of the reservoir shoreline and would not be likely to interfere with other uses or enjoyment of the reservoir.

116. Environmental Justice need not be an issue for this proposed project since minorities account for only 5.7 % of the population (compared to 22.1 % for the State of Tennessee). However, the reduction in commercial residential and industrial growth by all alternatives due to the proposed modification could reduce job opportunities in the area (pg. 140). We note that unemployment (5.3 %) in the area is already higher than the state and national average (pg. S-5). (Heinz J. Mueller - EPA)

Response: TVA acknowledges the possibility that the proposed land use modifications could reduce job opportunities in the area. However, there are potential privately owned sites that are adjacent to narrow strips of TVA-owned shoreline. TVA will consider changing land use designations to provide water-access for industrial or commercial recreation uses on privately owned back-lying land. In addition, most industrial opportunities would not require direct water access, and there are many potential private sites in the area that might be used for these. For these reasons, impacts on job opportunities are unlikely. Maintaining a good quality of life in the area is important to the economy of the area. Maintaining the quality of the environment and public views of and access to the water is a significant factor in maintaining that quality of life.

117. The East Tennessee Development District has completed its review of the above-mentioned proposal, in its role as a regional clearing house to review state and federally-assisted programs. ETDD review of this proposal has found no conflicts with the plans or programs of the District or other agencies in the region. However, ETDD or other reviewing agencies may wish to comment further at a later time. We appreciate the opportunity to work with you in coordinating projects in the region. (Terrence J. Bobrowsk - ETDD)

Response: Comment noted. If and when specific proposals are initiated they will have specific environmental reviews and be available for further study and comments.

118. We will need quality jobs in the Watts Bar Lake area after the work at *[Watts Bar Nuclear Plant]* Unit 2 is completed and all of those workers have moved on or we will have an economic vacuum. Encouraging development of new manufacturing facilities in Meigs and Rhea counties is essential. (David Peterson)

Response: See the response for Comment 116. In addition, Parcels 297 and 298 are zoned for Industrial, with preference given for businesses requiring water access.

119. Limiting waterfront residential development and encouraging off water residential development will result in more affordable homes. (David Peterson)

Response: New waterfront homes tend to be expensive because of the value of the water view and the proximity to the water. These attributes are scarce and therefore allow waterfront residential development to be restricted to a limited high-value market. However, this market would purchase expensive homes elsewhere if waterfront sites were not available. It seems unlikely that there would be a noticeable difference in the overall housing mix within the general area. However, it could affect the choice of location by retirees and persons buying second homes.

Terrestrial Ecology

120. Please patrol and cut down mature invasive species, Mimosa, etc., growing on your property along lake front. Mimosa is getting to a critical mess where it is going to be ***[hard]*** to get under control. (John Kueck)

Response: TVA recognizes that there are numerous issues with a number of invasive plant species on Watts Bar Reservoir properties. Currently, TVA places emphasis on the management and control of these invasive species on parcels where there are recognized sensitive resources such as rare plants and uncommon natural or native plant habitats. TVA natural resource management personnel are also willing to work with adjoining property owners to partner in an effort to control such invasive plants and to replace these with plantings of endemic native plant species on a case-by-case basis.

121. Impacts to terrestrial ecological resources where habitat alteration occurs under Modified Alternative A or Modified Alternative B would be greater than Modified Alternative C , as stated on page 101 of the DEIS, which would include "...the loss of some interior forest bird habitat, more habitat fragmentation and loss of biodiversity, and a concurrent increase in invasive plants and animals." (Robert M. Todd - TWRA)

Response: Comment noted.

122. This reallocation would maintain the area's current ecological state and allow TWRA to continue its interim management agreement. Specifically, this alternative would allow for continued management of natural resources on Parcels 295, 297, 298, and 299 with the possibility of designating a portion of this area as an Important Bird Area in conjunction with TWRA and the incorporation of prescribed burning regimes to better manage groups of wildlife species in conjunction with the Tennessee Division of Forestry. (Robert M. Todd - TWRA)

Response: Comment noted.

Water Quality and Shoreline Conditions

123. We have water front family property on Watts Bar between Loudon and Ft. Loudoun Dam. The waves from the traffic on the river are badly eroding our property. TVA should have a program or provide assistance for rip rap of the bank, especially where the river is narrow and more susceptible to erosion. (George Peeler)

Response: TVA provides information and advice about erosion-control methods to landowners who are experiencing shoreline erosion. In addition, TVA provides these landowners with contact information of contractors who perform stabilization work. TVA can provide advice about how to apply for the necessary permits and may waive the standard fee. Please contact the Watts Bar-Clinch Watershed Team for information.

124. Do not allow discharge of treated sewage into Watts Bar. No one checks to see if it is really treated. Tug boats and actual commercial vessels should be exceptions. Boats should be randomly checked to see if their heads do discharge directly into the lake. - Large fine if they do. (John Kueck)

Response: It is illegal to discharge untreated waste, oil, or trash into any federally controlled or Tennessee State waters for a variety of reasons:

Specifically for sewage, reservoirs in Tennessee are designated by TDEC as either a 'discharge' reservoir (where vessels may discharge properly treated sewage overboard), or a 'no-discharge' reservoir (where no sewage, treated or untreated, may be discharged overboard). Watts Bar is a 'discharge' reservoir. Therefore, discharge into public waters is restricted to wastes treated by a Type I or II U.S. Coast Guard-approved marine sanitation device.

TWRA and the TVA Police have enforcement rights over sewage discharge from boats. Both agencies perform patrols of reservoir areas. TWRA also monitors Marine Station 17. If you suspect illegal sewage discharges, please report them to TWRA at 1-800-332-0900. Please record the boat registration number and report vessels suspected to be dumping sewage or solid waste.

TVA and TWRA along with the Coast Guard Auxiliary also conduct an annual clean boating campaign. During this campaign, boat safety checks are completed, and information and supplies to support clean boating are distributed. In addition, TVA established the Tennessee Valley Clean Marina Initiative to help protect water quality in relation to boating activities. This program addresses activities such as sewage management, oil and gas control, marina siting, and erosion prevention. For more information on clean boating, visit www.tva.com/environment/water/boating.htm.

125. We have noticed in Indian Shadows sub-division that at times we have solid matter (foaming) floating down the lake and at our boat dock. It looks like sewage. Who do you contact to check this out? It makes a mess on our boat docks and boats. (Anonymous)

Response: If you believe the source of the sewage is untreated wastes from boating vessels, please record the boat registration number and report suspect

vessels to TWRA at 1-800-332-0900. If you believe the source of the sewage is from specific failing septic tanks or specific failing sewage treatment plants, you may report this condition to the Tennessee Department of Environment and Conservation at 1-888-891-TDEC (8332).

126. I am very concerned about the sewage in the Blue Springs area from the large boats. Does TVA test for it or monitor it in any way? (Diane Bowman)

Response: TVA monitors reservoir health through a variety of indicators including fish tissue and bacterial levels. There were 20 bacteriological monitoring sites on Watts Bar during 2006. Many of these sites were located at highly used recreational areas. The Blue Springs area was not one of the specific sites sampled in 2006 but possibly could be added as a future sampling regime. TDEC has authority to issue bodily contact advisories. Currently, there are no state advisories against swimming in Watts Bar Reservoir. Please see Sections 3.5 and 4.5 of the FEIS for additional information on reservoir health ratings for Watts Bar.

127. The TVA signs guiding campers to sanitary facilities at Caney Creek are a costly failure!!! Children are swimming in water that is contaminated with feces. The Health Department will be notified! The public will be notified. TVA is unresponsive to homeowners' complaints! (Anonymous)

Response: TVA monitors reservoir health and reservoir properties through a variety of indicators including bacteriological monitoring and informal recreation area assessments. TDEC has authority to issue bodily contact advisories for water bodies in Tennessee. The Caney Creek informal swim site was one of the sampling locations during 2006. While it did exceed the single sample maximum on 1 of 10 sampling events, TDEC has issued no bodily contact advisories on Watts Bar.

This area has also been assessed by TVA using informal recreation site protocol. Based on site assessment and input from the public, TVA has taken management actions including improved sanitary facilities, signage, and increased TVA Police patrols. The public has the right to use public land in a sustainable manner, and TVA will continue to monitor and manage the land as appropriate to address the environmental and social conditions in the Caney Creek area.

128. We recommend compliance with TVA's clean marina initiative and related programs (see TVA website), specifically pertaining to proper marina siting and selection of designs with adequate flushing to maintain water quality. (Heinz J. Mueller - EPA)

Response: Comment noted. There are currently over 75 marinas throughout the TVA reservoir system that are certified Clean Marinas. In addition, new marina proposals are reviewed for a variety of criteria including potential impacts to the environment.

129. I noted with interest the changes required to TVA operations during the recent peak cooling season combined with drought conditions. I urge caution on new industrial

zones that could increase water usage at such times. It is really important to this area to preserve water quality. (Barbara A. Walton)

Response: Comment noted. The potential impact to water resources and reservoir operations from water intakes and discharges associated with future industrial development will be considered as part of the approval process.

130. Do not allow any industry (to include marinas, factories or any other facility that could cause pollutants to be expelled into the waterway) to build on the main channel of the Tennessee River. They should be built in bays at inlets where if a spill, fire, or other accident happened, it could be contained. They would also be susceptible to accidents from barges and power boating. (Germaine Smith)

Response: Comment noted. Project location is one of the many attributes for which a proposed project is reviewed. During the approval process, potential impacts to resources such as water quantity, navigation, and potential for pollutant discharge are reviewed and considered in the decision-making process.

Wetlands

131. At this time we have no comments regarding environmental resources or possible environmental issues. We appreciate your awareness of our Regulatory Program and inclusion of language referencing the need for approvals in accordance with Section 404 of the Clean Water Act for disturbance to waters of the United States, including wetlands. Upon reaching a final decision, should there be development-related impacts subject to Section 404 and/or Section 10 of the Rivers and Harbors Act of 1899, please contact this office for necessary permits and approvals. (Kim Franklin - U.S. Army Corps of Engineers)

Response: Comment noted.

132. In addition to the Watts Bar Reservoir watershed being generally forested, forested wetlands is the most common wetland type (pg. 69). Selection of Modified C would likely protect these wetlands from development more than Modified B or A. Avoidance of wetlands (listed as a sensitive resource in Zone 3: pg. 24) through land allocation is preferable and generally more protective than wetland mitigation for filling wetlands due to development. (Heinz J. Mueller - EPA)

Response: Comment noted..

Appendix G – Correspondence

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TENNESSEE HISTORICAL COMMISSION
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
2941 LEBANON ROAD
NASHVILLE, TN 37243-0442
(615) 532-1550

March 8, 2004

Mr. Jon Loney
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, Tennessee 37902-1499

RE: TVA, WATTS BAR RESERVOIR INTEGRATED LAND PLAN,
UNINCORPORATED, MULTI COUNTY,

Dear Mr. Loney:

At your request, our office has reviewed the above-referenced Notice of Intent to Prepare and Environmental Impact Statement in accordance with regulations codified at 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739). Upon draft of the Environmental Impact Statement, please submit the document to this office for our review and comment.

Upon receipt of the draft document, we will continue our review of this undertaking as expeditiously as possible. Until such time as this office has rendered a final comment on this project, your Section 106 obligation under federal law has not been met. Please inform this office if this project is not funded or is canceled by the federal agency. Questions and comments may be directed to Jennifer Barnett (615) 741-1588, ext. 17.

Your cooperation is appreciated.

Sincerely,

Herbert L. Harper

Herbert L. Harper
Executive Director and
Deputy State Historic
Preservation Officer

HLH/jmb

September 21, 2004

Mr. Russell Townsend
Tribal Historic Preservation Officer
Eastern Band of the Cherokee Indians
Post Office Box 455
810 Acquoni Road
Cherokee, North Carolina 28719

Dear Mr. Townsend:

WATTS BAR RESERVOIR, LANDS PLANNING ENVIRONMENTAL ASSESSMENT, MULTIPLE COUNTIES

The Tennessee Valley Authority (TVA) is developing a Land Management Plan (LMP) for TVA lands on Watts Bar Reservoir. Watts Bar Reservoir is located between Watts Bar Dam and Fort Loudoun Dam and flows from northeast to southwest through four counties in east Tennessee; Roane, Loudon, Rhea, and Meigs. This LMP is similar to recent ones on Guntersville, and Norris Reservoirs. TVA prepares LMPs with the participation of public agencies and officials, private organizations and individuals to provide a clear statement of how TVA will manage public land. Identifying land for specific uses minimizes conflicting land uses and makes it easier to handle requests for use of public land. For the action proposed in the draft Environmental Impact Statement (EIS), which is currently being prepared, TVA Cultural Resources staff have identified the area of potential effects (APE) regarding cultural resources pursuant to 36 CFR Part 800.16(d) as the approximately 14,000 acres of TVA fee-owned land being planned or previously committed to specific land uses. Enclosed are a general description of the project and map of Watts Bar Reservoir. Specific maps of the draft LMP can be accessed on its website- www.tva.com/environment/reports/wattsbar/index.htm. However, if you require hard copies for your initial review, our office will be glad to furnish a set.

TVA Cultural Resources is conducting this consultation as prescribed pursuant to 36 C.F.R. Part 800.3(f)(2) of the Advisory Council's regulations. Please review your records and documentation within the project area regarding historic properties or areas that you have attached religious, cultural or traditional significance. Should such sites or areas of interest be present, TVA Cultural Resources is inviting your office to be a consulting party to the project. Please respond within thirty (30) calendar days after receipt of this letter. Because of the location involved with this project, TVA is inviting the following groups to be consulting parties to the proposed project:

- Cherokee Nation
- United Keetoowah Band
- Muscogee (Creek) Nation of Oklahoma
- Thlopthlocco Tribal Town
- Alabama-Coushatta Tribe
- Alabama-Quassarte Tribal Town
- Kialegee Tribal Town
- Absentee Shawnee
- Shawnee Nation
- Eastern Shawnee Tribe
- Chickasaw Nation

If you have any questions or need additional information, please contact Eric Howard at (865) 632-1403 or fax at (865) 632-1795.

Sincerely,

J. Bennett Graham, Manager
Cultural Resources

Enclosures

cc: Ms. Jennifer Barnett
Tennessee Division of Archaeology
5103 Edmondson Pike
Nashville, TN 37211

September 21, 2004

Ms. Jennifer Barnett
Tennessee Division of Archaeology
5103 Edmondson Pike
Nashville, TN 37211

Dear Ms. Barnett:

WATTS BAR RESERVOIR, LANDS PLANNING ENVIRONMENTAL ASSESSMENT, MULTIPLE COUNTIES

The Tennessee Valley Authority (TVA) is developing a Land Management Plan (LMP) for TVA lands on Watts Bar Reservoir. Watts Bar Reservoir is located between Watts Bar Dam and Fort Loudoun Dam and flows from northeast to southwest through four counties in east Tennessee; Roane, Loudon, Rhea, and Meigs. This LMP is similar to recent ones on Guntersville, and Norris Reservoirs. TVA prepares LMPs with the participation of public agencies and officials, private organizations and individuals to provide a clear statement of how TVA will manage public land. Identifying land for specific uses minimizes conflicting land uses and makes it easier to handle requests for use of public land. For the action proposed in the draft Environmental Impact Statement (EIS), which is currently being prepared, TVA Cultural Resources staff have identified the area of potential effects (APE) regarding cultural resources pursuant to 36 CFR Part 800.16(d) as the approximately 14,000 acres of TVA fee-owned land being planned or previously committed to specific land uses. Enclosed are a general description of the project and map of Watts Bar Reservoir. Specific maps of the draft LMP can be accessed on its website- www.tva.com/environment/reports/wattsbar/index.htm. Hard copies of these maps will be available in the draft EIS. However, if you require copies for your initial review, our office will be glad to furnish a set.

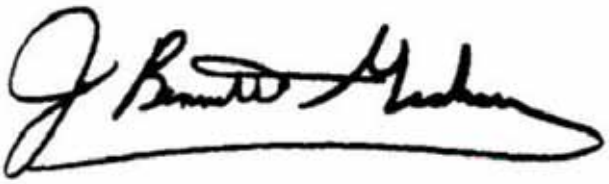
Pursuant to 36 CFR Part 800.4(b)(2) of the Advisory Council's regulations, TVA Cultural Resources is initiating consultation with your office and requests your office's comments regarding the potential effects on properties listed or eligible for listing on the National Register of Historic Places within the APE in Tennessee.

Pursuant to 36 CFR Part 800.3(f)(2) of the Advisory Council's regulations, TVA Cultural Resources is also inviting Indian tribes that might attach religious or cultural significance to historical properties in the area of potential effects to be consulting parties to this project. Because of the location involved with this project, TVA is inviting the following groups to be consulting parties to the proposed project:

- Cherokee Nation
- Eastern Band of Cherokee Indians
- United Keetoowah Band
- Muscogee (Creek) Nation of Oklahoma
- Thlopthlocco Tribal Town
- Alabama-Coushatta Tribe
- Alabama-Quassarte Tribal Town
- Kialegee Tribal Town
- Absentee Shawnee
- Shawnee Nation
- Eastern Shawnee Tribe
- Chickasaw Nation

If you have any questions or need additional information, please contact Eric Howard at (865) 632-1403 or fax at (865) 632-1795.

Sincerely,



J. Bennett Graham, Manager
Cultural Resources

Enclosures

cc: Dr. Joe Garrison
Deputy State Historic Preservation Officer
Tennessee Historical Commission
2941 Lebanon Road
Nashville, TN 37243-0442

Creek Nation of Oklahoma

Cultural and Historic Preservation

October 21, 2004

J. Bennet Graham
Tennessee Valley Authority
PO Box 1589
Norris, TN 37828-1589

RE:Land Management Plan (Multiple Counties) Watts Bar Reservoir, TN

Dear Mr. Graham,

Sorry for the delay in responding to your request and We thank you for inquiring with the Muscogee (Creek) Nation of Oklahoma. Looking at the site and in checking with our resources we do not foresee any impact by this project.

However, We expect to be notified in case of inadvertent discoveries which are pertinent to the Muscogee (Creek) Nation of Oklahoma as required by the Cultural and Historic Preservation Laws which are applicable. Also, please forward any reports/findings that are produced from the site.

Sincerely,

Tim Thompson
Cultural Research Specialist
(918) 732-7732 x7732

Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, Tennessee 37902-1401

August 11, 2005

Dr. Joe Garrison
Environmental Review Coordinator
Tennessee Historical Commission
Clover Bottom Mansion
2941 Lebanon Pike
Nashville, Tennessee 37243-0442

Dear Dr. Garrison: Joe –

TVA, PROGRAMMATIC AGREEMENT REGARDING THE PROPOSED LAND PLANS IN THE STATE OF TENNESSEE, MULTI-COUNTY

As discussed, enclosed is one copy of the Programmatic Agreement (PA) for TVA Land Management Plans proposed in the state of Tennessee and three signatory pages that have already been signed by TVA. TVA has consulted with the Advisory Council on Historic Preservation (ACHP), the Tennessee State Historic Preservation Officer, and other consulting parties during the development of this PA. It is being executed to minimize any adverse effects to historic properties affected by the land plans in Tennessee. Please return the signed originals to me.

We will forward the signed copies to the ACHP for their signature and return a completed copy to your office. We will attempt to get concurring party signatures on individual pages. If you have any questions or comments, please contact me at jbgraham@tva.gov or at (865) 632-2458.

Sincerely,

J. Bennett Graham, Manager
Cultural Resources

Enclosures

Preserving America's Heritage

October 11, 2005

Mr. J. Bennett Graham
Senior Archaeologist
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, TN 37902-1401

REF: Programmatic Agreement for proposed land plans in Tennessee

Dear Mr. Graham:

Enclosed is the executed Programmatic Agreement for the referenced program. By carrying out the terms of the Agreement, the Tennessee Valley Authority will have fulfilled its responsibilities under Section 106 of the National Historic Preservation Act and the Council's regulations.

We appreciate your cooperation in reaching this Agreement. If you have any questions, please call Dr. Tom McCulloch at 202-606-8554.

Sincerely,

Don L. Klima
Director
Office of Federal Agency Programs

Enclosure

ADVISORY COUNCIL ON HISTORIC PRESERVATION
1100 Pennsylvania Avenue NW, Suite 809 • Washington, DC 20004
Phone: 202-606-8503 • Fax: 202-606-8647 • achp@achp.gov • www.achp.gov

PROGRAMMATIC AGREEMENT
AMONG
THE TENNESSEE VALLEY AUTHORITY,
THE ADVISORY COUNCIL ON HISTORIC PRESERVATION,
AND THE TENNESSEE STATE HISTORIC PRESERVATION OFFICER
REGARDING THE IMPLEMENTATION OF RESERVOIR LAND MANAGEMENT PLANS IN TENNESSEE

WHEREAS, the Tennessee Valley Authority (TVA) has proposed to develop Reservoir Land Management Plans for TVA land holdings within the State of Tennessee, these reservoirs being Boone in Sullivan and Washington Counties; Cherokee in Grainger, Hamblen, Hawkins, and Jefferson Counties; Chickamauga in Bradley, Hamilton, McMinn, Rhea, and Meigs Counties; Douglas in Cocke, Jefferson, and Sevier Counties; Fort Loudoun in Blount, Knox, and Loudon Counties; Fort Patrick Henry in Sullivan and Hawkins Counties; Great Falls in Van Buren, Warren, and White Counties; Guntersville in Marion County; Kentucky in Benton, Decatur, Hardin, Henry, Houston, Humphreys, Perry, Stewart, and Wayne Counties; Melton Hill in Anderson, Knox, Loudon, and Roane Counties; Nickajack in Hamilton and Marion Counties; Nolichucky in Green County; Normandy in Bedford and Coffee Counties; Norris in Anderson, Campbell, Claiborne, Grainger, and Union Counties; Ocoee #1, #2, and #3 in Polk County; Pickwick in Hardin County; South Holston in Sullivan County; Watauga in Carter and Johnson Counties; Watts Bar in Loudon, Meigs, Rhea, and Roane Counties; Wilbur in Carter County; and the Beech River Project consisting of Beech, Cedar, Dogwood, Lost Creek, Pin Oak, Pine, Redbud, and Sycamore Reservoirs in Henderson County, Tennessee; and

WHEREAS, TVA has determined that the implementation of the Land Management Plans has the potential to affect historic properties that are eligible for listing in the National Register of Historic Places (NRHP); and

WHEREAS, TVA has consulted with the Advisory Council on Historic Preservation (Council), the Tennessee State Historic Preservation Officer (SHPO), the Eastern Band of Cherokee Indians, the United Keetoowah Band, the Cherokee Nation of Oklahoma, Chickasaw Nation, the Muscogee (Creek) Nation of Oklahoma, the Poarch Band of Creek Indians, the Alabama-Coushatta Tribe, the Alabama-Quassarte Tribal Town, the Kialegee Tribal Town, the Mississippi Band of Choctaw Indians, the Choctaw Nation of Oklahama, the Jena Band of Choctaw Indians, the Seminole Nation of Oklahoma, the Seminole Indian Tribe, the Eastern Shawnee Tribe of Oklahoma, and the Absentee-Shawnee Tribe of Oklahoma pursuant to 36 CFR Part 800, the regulations of the Council implementing Section 106 of the National Historic Preservation Act (16 U.S.C. 470f); and

WHEREAS, the Eastern Band of Cherokee Indians, the Chickasaw Nation, the Choctaw Nation of Oklahoma, and the Muscogee (Creek) Nation of Oklahoma have been invited to be a signatory to the Programmatic Agreement; and will assist TVA in determining NRHP eligibility of historic properties and appropriateness of treatment plans for historic properties which have religious or cultural significance to the Eastern Band of Cherokee Indians, Chickasaw Nation, the Choctaw Nation of Oklahoma, and/or the Muscogee (Creek) Nation of Oklahoma that will be adversely affected by TVA Land Management Plans; and

WHEREAS, TVA has conducted complete or partial investigations to identify historic properties on portions of lands considered in the Reservoir Land Management Plans; and

WHEREAS, 36 CFR Part 800.14(b) of the regulations of the Council encourages the use of Programmatic Agreements when effects on historic properties are regional in scope and cannot be fully determined prior to the approval of the undertaking; and

WHEREAS, TVA will develop a Reservoir Land Management Plan at each of these reservoirs which will clearly identify the area of potential effect (APE) for each reservoir;

NOW THEREFORE, TVA, the Council, the SHPO, the Eastern Band of Cherokee Indians, Chickasaw Nation, the Choctaw Nation of Oklahoma and the Muscogee (Creek) Nation of Oklahoma agree that the undertaking shall be implemented in accordance with the following stipulations to satisfy TVA's Section 106 responsibilities for Reservoir Land Management Plans. The TVA Federal Preservation Officer, or the designee thereof, shall act for TVA in all matters concerning the administration of this Agreement.

Stipulations

TVA will ensure that the measures outlined below are a part of all Reservoir Land Management Plans developed by TVA within the state of Tennessee, and that these provisions relating to identification, evaluation, and treatment of historic properties are carried out within the APE prior to the commencement of any ground-disturbing activities or activities that may have visual or other effects on a historic property. This Agreement allows phased identification, evaluation, and treatment of the historic properties located within the APE.

1. CONSULTATION:

TVA will seek comments from all appropriate consulting parties as defined at 36 CFR 800.2(c), and from signatories to this agreement on any undertaking proposed pursuant to a Reservoir Land Management Plan. All comments received in response to such requests for comments will be taken into consideration by TVA in its decision to proceed with such undertaking.

2. AREA OF POTENTIAL EFFECT (APE):

The APE is defined as all TVA fee lands described in the Reservoir Land Management Plan and those private or other non-TVA lands which may be affected by an undertaking on TVA fee land.

3. IDENTIFICATION:

A. TVA shall conduct surveys to identify all historic properties within the APE for each Reservoir Land Management Plan. Previous inventories of TVA lands have identified some but not necessarily all historic properties eligible and potentially eligible for listing in the NRHP.

B. The surveys will be carried out in a manner consistent with the *Secretary of the Interior's Standards and Guidelines for Identification* (48 FR 44720-23) and the Tennessee SHPO Standards and Guidelines for Architectural and Archaeological Resource Management Studies. Survey Plans will be provided to all signatories for thirty (30) days for review and comment, and TVA shall take all comments into account prior to implementation. A written report of the survey shall be submitted to the SHPO, Indian tribes, and the other signatories for thirty (30) days for review and comment. Existing information such as previous survey data, photographs, maps, drawings, building plans, descriptions, sketches, etc. shall be used along with new data.

4. EVALUATION:

A. TVA, in consultation with the SHPO, Indian tribes, and the other signatories to this Agreement, shall evaluate the National Register eligibility of properties identified through the surveys in accordance with 36 CFR Part 800.4(c). For properties that have been determined to be potentially eligible for listing in the NRHP, TVA shall conduct evaluation studies in a manner consistent with the *Secretary of the Interior's Standards and Guidelines for Identification and Evaluation* (48 FR 44720-26) and the Tennessee SHPO Standards and Guidelines for Architectural and Archaeological Resource Management Studies. The SHPO, Indian tribes, and the other signatories shall review and comment on the scope of work (SOW) prior to the evaluation. The evaluations shall be conducted in consultation with the SHPO, Indian tribes, and the other signatories, and a written report shall be submitted to all signatories for thirty (30) days for review and comment.

B. Properties which have been evaluated and have been found to meet National Register criteria shall be considered historic properties. Should a dispute arise on the eligibility of a historic property, TVA will consult with the SHPO to resolve the objection. If TVA and the SHPO do not agree with the determination of eligibility, or if the Council or the Secretary of the Interior (Secretary) so request, TVA shall obtain a determination of eligibility from the Secretary pursuant to 36 CFR Part 63. If an Indian tribe that attaches religious and cultural significance to a property off tribal land does not agree with the determination of eligibility, it may ask the Council to request the TVA Federal Preservation Officer to reassess the determination of eligibility.

5. TREATMENT PLANS:

A. AVOIDANCE, PROTECTION, AND MAINTENANCE:

(1) TVA, in consultation with the SHPO, Indian tribes, and the other signatories, shall ensure that historic properties determined eligible for listing in the NRHP are, to the extent prudent and feasible as determined by the consultation process, avoided and preserved in place while conducting activities that could affect the characteristics of such property. In the implementation of the Reservoir Land Management Plans, alternatives to avoid adversely affecting historic properties eligible for the NRHP will be considered. All eligible historic properties, that are avoided, will be protected by a buffer zone established in consultation with the SHPO, Indian tribes, and the other signatories.

(2) TVA will develop a protection and maintenance plan for historic properties on a particular reservoir within two (2) years of the completion of a Reservoir Land Management for that reservoir as specified under Stipulation10.B. of this Agreement. This plan will be consistent with the standards for archaeological resources set forth in *Treatment of Archaeological Properties* (Advisory Council on Historic Preservation 1989), and with the recommended approaches to rehabilitation of historic structures set forth in the *Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings* (U.S. Department of the Interior, National Park Service, 1983). Furthermore, this plan will be developed in consultation with the SHPO, Indian tribes, and the other signatories. TVA will seek and consider the views of other consulting parties pursuant to 36 CFR Part 800.3(f).

B. DATA RECOVERY:

(1) When historic properties eligible for the NRHP will be adversely affected by unavoidable physical destruction or damage and all avenues of avoidance have been considered, and a treatment plan for data recovery is found through consultation with the signatories to this Agreement and Indian tribes having a cultural affiliation with the historic properties to be the appropriate treatment, data recovery will be implemented. In such an instance, TVA shall develop a data recovery plan in consultation with the SHPO, Indian tribes, and the other signatories for the recovery of historic and archaeological data from properties that are determined to be eligible for inclusion in the NRHP.

(2) The data recovery plan shall be developed in accordance with 36 CFR Part 800.5 and 800.16 and will be consistent with 36 CFR Part 800 and the standards set forth in *Archeology and Historic Preservation: Secretary of Interior's Standards and Guidelines.* The data recovery plan shall specify, at a minimum:

(a) the property, properties, or portions of properties where data recovery is to be carried out;

(b) any property, properties, or portions of properties that will be destroyed without data recovery;

(c) the research questions to be addressed through data recovery, with an explanation of their relevance and importance;

(d) the field and laboratory methods to be used, with an explanation of their relevance to the research questions;

(e) the methods to be used in analysis, data management, and dissemination of data, including a schedule;

(f) the proposed disposition of recovered materials and records. The proposed location of this material will be at the University of Tennessee, McClung Museum except for items specified under Stipulation 9 below;

(g) proposed methods for involving the interested public in data recovery;

(h) proposed methods for disseminating results of the work to the interested public;

(i) a proposed schedule for the submission of progress reports to the SHPO; and

(j) a plan, developed in consultation with the SHPO, Indian tribes, and the other signatories, delineating the manner in which historic properties, human remains, and associated funerary objects discovered subsequent to the ratification of this Agreement document would be treated.

(3) TVA shall provide all signatories an opportunity to monitor the implementation of the data recovery plan.

6. POST REVIEW DISCOVERIES:

Previously unidentified historic properties discovered during the implementation of the Reservoir Land Management Plans will be subject to the evaluation process under Stipulation 4 and treated according to the process under Stipulation 5.

Should historic properties be discovered on TVA lands, the discovered historic properties shall be protected and stabilized to prevent any further disturbance until TVA can make an informed decision about further steps to take to meet Federal agency obligations under Section 106 and the terms of this Agreement.

7. REPORTS:

TVA shall ensure that all historical and archaeological investigations undertaken for compliance with this Agreement are recorded in formal written reports that meet the *Archeology and Historic Preservation: Secretary of Interior's Standards and Guidelines* and the Tennessee SHPO Standards and Guidelines for Architectural and Archaeological Resource Management Studies. The SHPO, Indian tribes, and the other signatories shall be afforded thirty (30) days to review and comment on any archaeological or historical reports submitted under this Agreement.

8. SHORELINE STABILIZATION:

Consistent with its obligations under Section 110 of the NHPA, TVA will monitor reservoir shorelines to determine whether any historic properties are being affected by reservoir operation and/or vandalism. TVA will implement appropriate measures, in consultation with the SHPO, Indian tribes, and the other signatories to protect eligible historic properties that are determined to be adversely affected by such causes.

Since fiscal year 1999, TVA has been pursuing a systematic effort in identifying the most significant and endangered archaeological sites along its reservoir shorelines and stabilizing/protecting them. All stabilization to date has been coordinated with the requisite SHPO and Indian tribes.

9. TREATMENT OF HUMAN REMAINS:

A. TVA shall ensure that the treatment of any human remains discovered within the APE complies with all State and Federal laws, including the Native American Graves Protection and Repatriation Act (NAGPRA), concerning archaeological sites and treatment of human remains. Regarding human remains identified on State lands, TVA shall ensure that the remains be treated in a manner that is consistent with the Advisory Council of Historic Preservation's *Policy Statement Regarding the Treatment of Human Remains and Grave Goods* (1988), and in accordance with Tennessee Code Annotated (T.C.A.) 46-4-101 et seq. "Termination of Use of Land as a Cemetery," and T.C.A. 11-6-116b, "Notification and Observation," and T.C.A. 11-6-119 "Reinterment" with implementing Tennessee Rules and Regulations Chapter 0400-9-1 "Native American Indian Cemetery Removal and Reburial." Should human remains be encountered during historic properties investigations or post-review discovery, all ground disturbing activities in the vicinity of the human remains will be ceased immediately. TVA will notify signatories within three (3) business days and invite them to comment on any plans developed to treat the human remains.

B. After consultation with signatories and culturally affiliated Indian tribes in accordance with the provisions of NAGPRA, if any Native American human remains and/or associated funerary objects are excavated during the survey, evaluation, or data recovery of historic properties, TVA shall ensure that these remains and associated objects will be repatriated in accordance with the provisions of NAGPRA within sixty (60) days of completion of any investigations specified in the research design. The temporary curation of the human remains and associated funerary objects will be at the University of Tennessee, McClung Museum during this interim.

10. TIMETABLES FOR COMPLIANCE:

A. Consistent with Stipulation 11 that allows phased compliance, TVA shall ensure that the commitments in this Agreement are met prior to commencement of any ground-disturbing activities. In the event that previously unidentified historic properties should be encountered during the implementation of any ground-disturbing activities, consultation with the SHPO, Indian tribes, and the other signatories will be conducted to determine where work can resume while the effects to the historic property are addressed.

B. Within two (2) years of completion of a Reservoir Land Management plan in Tennessee, TVA will develop a plan for protection and maintenance of historic properties at that particular reservoir. The plan will be submitted to the SHPO, Indian tribes, and the other signatories for review pursuant to Stipulation 5.A(2).

C. Throughout this agreement, unless otherwise stated, the SHPO, Indian tribes, and the other signatories shall have thirty (30) days to review and comment on all reports concerning investigations of historic properties and proposed data recovery plans provided by TVA. Comments received from the signatories shall be taken into consideration in preparing final plans. A copy of the final reports and data recovery plans shall be provided to the signatories.

11. PHASED COMPLIANCE:

Consistent with 36 CFR Part 800.4(b)(2), this Agreement allows phased identification, evaluation, and treatment of historic properties in order to meet the requirements of Section 106 of the National Historic Preservation Act (NHPA).

12. LAND TRANSFER OF PROPERTY RIGHTS:

The instrument of conveyance for the transfer, lease or sale, of any parcel containing or that may contain a historic property from the Federal Government to a third party will include provisions to ensure that all requirements of Section 106 of the NHPA and its implementing regulations (36 CFR Part 800) are met. The instrument of conveyance shall contain, when necessary to protect historic properties, a legally binding preservation covenant for the protection of such properties prepared in consultation with the SHPO, Indian tribes, and the other signatories. TVA may release the grantee from the preservation covenant in whole or in part, as appropriate, pursuant to the terms of the covenant and after consultation with the SHPO, Indian tribes, and the other signatories. The covenant may be enforced by TVA or the United States of America.

13. ADMINISTRATIVE CONDITIONS:

A. If Stipulations 1 - 12 have not been implemented within ten (10) years, this Agreement shall be considered null and void, unless the signatories have agreed in writing as provided in Paragraph 13.B. below to an extension for carrying out its terms. If no agreement is reached on an extension at the end of this 10-year period, TVA and the SHPO will resume consultation pursuant to 36 CFR Part 800.

B. If Stipulations 1 - 12 have not been implemented within nine (9) years from the date of this Agreement's execution TVA and the SHPO shall review the Agreement to determine whether the Agreement should be extended. If an extension is deemed necessary, TVA, the Council, and the SHPO and other signatories will consult to make appropriate revisions to the Agreement.

C. The signatories to this Agreement shall consult at least once every year to review implementation of the terms of this Agreement. Prior to the reviews, TVA shall provide to the signatories a report detailing how it has carried out its obligations pursuant to this Agreement.

D. The Council, SHPO, Indian tribes and the other signatories may monitor activities carried out pursuant to the Agreement, and the Council will review such activities if so requested. TVA will cooperate with the Council, SHPO, Indian tribes and the other signatories in carrying out their monitoring and review responsibilities.

E. The signatories to this Agreement may agree to amend the terms of the Agreement. Such amendment shall be effective upon the signatures of all signatories to this Agreement, which shall be appended to the Agreement as an attachment.

F. Should the SHPO, Indian tribes and the other signatories object within thirty (30) days after receipt of any plans, specifications, contracts, or other documents provided for review pursuant to this Agreement, TVA shall consult with the SHPO to resolve the objection. If TVA determines that the objection cannot be resolved, TVA shall request the further comments of the Council pursuant to 36 CFR Part 800. Any Council comment provided in response to such a request will be taken into account by TVA in accordance with 36 CFR Part 800 with reference only to the subject of the dispute; TVA's responsibility to carry out all actions under this Agreement that are not the subjects of the dispute will remain unchanged.

G. In the event the SHPO is unable to fulfill its responsibilities pursuant to this Agreement, TVA shall consult with the Council on an appropriate course of action for implementing the terms of this Agreement.

H. If the Council determines that the terms of this Programmatic Agreement are not being carried out, or if this Agreement is terminated, TVA shall comply with subpart B of 36 CFR Part 800 with regard to individual Reservoir Land Management Plans covered by this Agreement.

I. TVA shall ensure that public involvement in addition to its outreach to the signatories to this Agreement is conducted pursuant to 36 CFR Part 800.14 by inviting comment through Public meetings, Public notices, or other appropriate mechanisms as may be agreed upon by the signatories.

Execution and implementation of this Programmatic Agreement evidences that TVA has taken into account the effects on historic properties resulting from its action to develop Reservoir Land Management Plans in Tennessee and TVA has thereby complied with its obligations under Section 106 of National Historic Preservation Act for these actions..

SIGNATORIES:

ADVISORY COUNCIL ON HISTORIC PRESERVATION

By:_____ Date: 10/11/05
[ ]

TENNESSEE VALLEY AUTHORITY

By:_____ Date: 7.20.05
[ ]

TENNESSEE STATE HISTORIC PRESERVATION OFFICER

By: Herbert L. Harper, DSHPO Date: 8/23/05
[ ]

CONCURRING PARTIES:

EASTERN BAND OF CHEROKEE INDIANS

By:_____ Date:_____
[ ]

CHICKASAW NATION

By:_____ Date:_____
[ ]

CHOCTAW NATION OF OKLAHOMA

By:_____ Date:_____
[ ]

MUSCOGEE (CREEK) NATION OF OKLAHOMA

By:_____ Date:_____
[ ]

By:_____ Date:_____
[ ]

By:_____ Date:_____
[ ]

Southeast Tennessee Rural Planning Organization
Resolution 2007-2

RESOLUTION BY THE TECHNICAL COMMITTEE OF THE SOUTHEAST TENNESSEE RURAL PLANNING ORGANIZATION (RPO) IN SUPPORT OF THE TENNESSEE VALLEY AUTHORITY (TVA) LAND USE DESIGNATION FOR A DEEP WATER PORT IN RHEA COUNTY

WHEREAS, the Technical Committee of the Southeast Tennessee RPO was created to identify, study and prioritize multi-modal transportation projects in southeast Tennessee; and

WHEREAS, the Technical Committee of the Southeast Tennessee RPO has recognized the importance of the Tennessee River as a significant waterway for navigation and the movement of goods both upriver and downriver from southeast Tennessee; and

WHEREAS, TVA was created to oversee resource management of the Tennessee River and its tributaries for power generation, navigation, flood control, recreation and economic development; and

WHEREAS, TVA currently manages 11,000 acres of public shoreline through its land use management plan, which is currently under review; and

WHEREAS, 35-40 acres of TVA land with shore access is located in Rhea County within the Watts Bar Reservation; and

WHEREAS, that acreage is currently designated for industrial/commercial development as a deep water barge/terminal site;

BE IT THEREFORE RESOLVED that the Technical Committee of the Southeast Tennessee Rural Planning Organization offers its support for the identified acreage to remain designated for industrial/commercial use as a potential public or private barge/terminal site on the Tennessee River.

Adopted this 10th day of April, 2007.

John Graham
Technical Committee Chair
Southeast Tennessee Rural Planning Organization

State of Tennessee
Department of Environment and Conservation
Recreation Educational Services Division
10th Floor, L&C Towers, 401 Church Street
Nashville, Tennessee 37243-0435

August 13, 2007

Mr. Jon M. Loney, Manager
NEPA Policy - Environmental Stewardship and Policy
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, Tennessee 37901-1401

Dear Mr. Loney:

Thank you for allowing the Recreation Educational Services Division (RES), Tennessee Department of Environment and Conservation, the opportunity to once again review and comment on the draft EIS for Watts Bar Reservoir Land Plan.

While there are valid points to implementing either Alternative B is a good process to follow. I would encourage you to work with local parks and recreation agencies throughout the area to implement the plan.

One point of concern might lie in the number of recreation user days per year. The Draft EIS points out that Watts Bar Reservoir receives an estimated 1.9 million recreation user days per year, while your Reservoir Operations Study - Final Programmatic EIS, 4.24-5 states that there are "4.0 million recreation user days across ALL 25 ROS projects." This means that Watts Bar Reservoirs in the study utilize the other 50% of the recreation user days per year and the other 34 Reservoirs in the study utilizes the other 50%. This may not be a significant point, but it might skew the number results enough to consider other recreation endeavors, such as number of boat ramps, marinas, picnic areas, etc.

If RES can assist in other ways with this or future planning, we'll be glad to do so.

My best,

Mark Tummons

the Chickasaw Nation HEADQUARTERS
Arlington at Mississippi / Box 1548 / Ada, OK 74821-1548 / (580) 436-2603

Bill Anoatubby
Governor
Jefferson Keel
Lieutenant
Governor

August 22, 2007

Ms. Pat Ezzell
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, TN 37902-1499

Dear Ms. Ezzell:

Thank you for your letter of notification regarding the Tennessee Valley Authority Projects listed on the attachment.

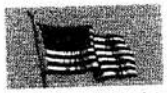
We are unaware of any specific historic properties or traditional cultural, religious and/or sacred sites at this time. However, in the event of inadvertent discoveries, we expect all construction activities to cease and we be notified according to all applicable state and federal laws.

If you have any questions, please contact Ms. Gingy Nail, historic preservation officer, at (580) 332-8685.

Sincerely,

Jefferson Keel, Lt. Governor
The Chickasaw Nation

Attachment



God Bless America!

Tennessee Valley Authority Projects

County	Description
Multiple Counties	Watts Bar Reservoir, Lands Planning Environmental Impact Statement
Decatur County	Proposed development at the Tennessee River Golf Course
Tishomingo County	Yellow Creek Port, Pickwick Reservoir

Watts Bar Reservoir Land Management Plan
Attn.: Rick Toennisson
TVA NEPA Administration
400 West Summit Hill Dr.
Knoxville, TN 37902

In regard to the Amended Draft EIS Watts Bar Reservoir Land Management Plan, I offer the following comments:

1. **Clinch River Breeder Reactor site—See map on reverse**
   The Clinch River Breeder Reactor site should be an amalgam of Alternatives B and C. The previously disturbed site on parcel 145, along with 133 contiguous acres from parcel 142 for a total of 378 acres provide an excellent industrial site and should be allocated to Zone 5. The two mile riparian area from the road to the river (100 acres of parcel 145) should be Zone 3 so important wildlife habitat can be preserved as well as water quality.

   There are 350 acres, the remainder of parcel 142 and all of parcel 143, which should be Zone 4. This will provide habitat for wildlife including turkeys and deer and deep forest habitat for migratory birds. It also provides deer and turkey hunting opportunities. These parcels are contiguous with a forest on the DOE reservation as well as the Grassy Creek habitat protection area (parcel 146) and the 2.2 mile riparian area of parcel 144, thus extending protected habitat from the deep forest to the water's edge. This also provides a buffer for the DOE security training range located near the DOE/Breeder Site Boundary.

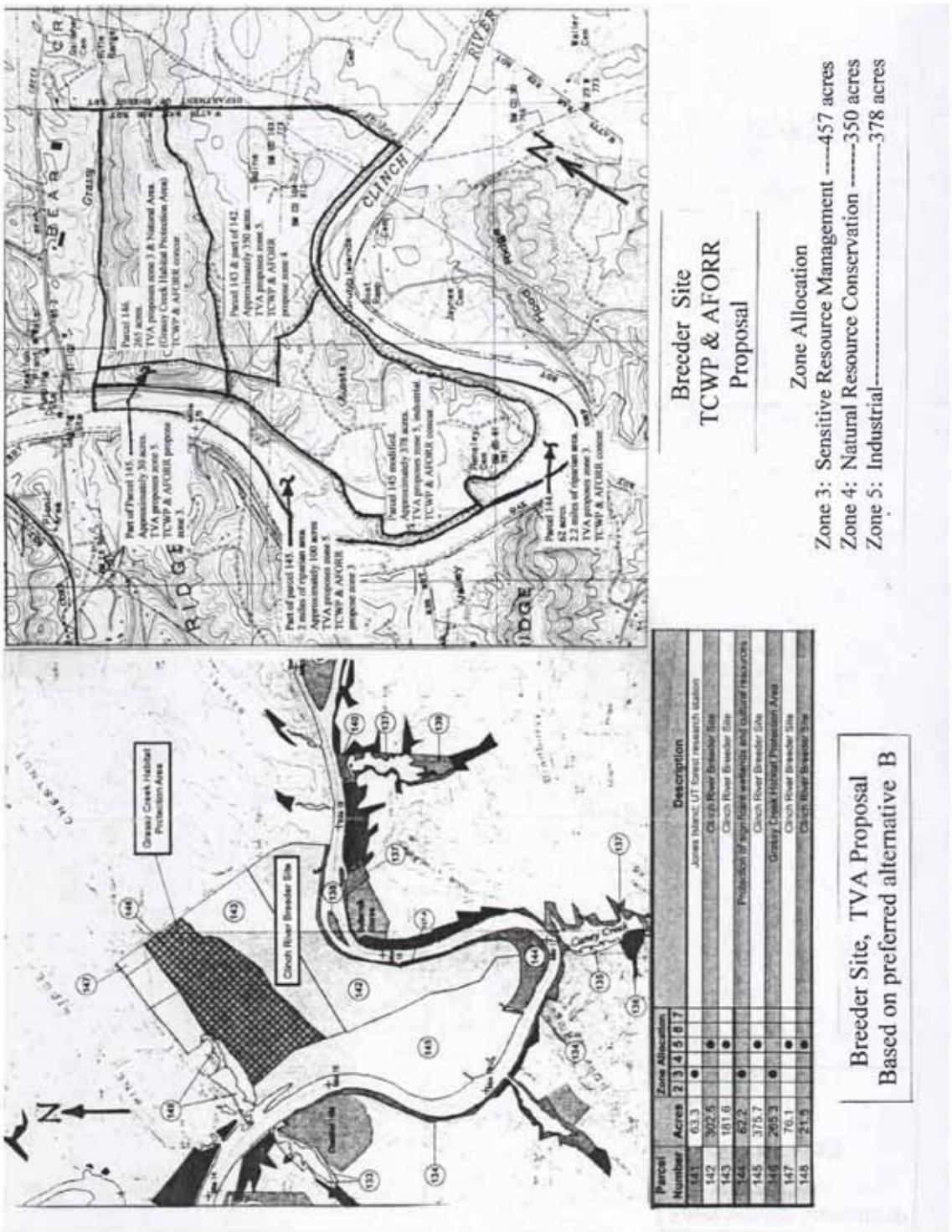
   The 265 acre Grassy Creek habitat protection area (parcel 146) should be a natural area as TVA has proposed. In addition, approximately 30 acres (less a narrow strip for access to industrial property) of parcel 145 should be added to the west end of parcel 146 since this is a very steep slope and would not be desirable for any type of industry. Parcel 144 is proposed as Zone 3 as it should be. This is a 2.2 mile riparian area that is very important for wildlife, as well as water quality.

   Another consideration that should be given to the allocation of breeder site land is the fact that if a nuclear type facility is located here, large buffer zones are very important. The allocations described above would surround any new facility by a buffer zone.

2. **Other parcels**
   I commend TVA for the following allocations:
   - Zone 3 allocations, under both Alternatives B and C, for Parcel 238, the Whites Creek Small Wild Area (SWA), and for Parcel 237, listed as "Proposed addition to Whites Creek SWA to support trail expansion."
   - The new Habitat Protection Area (HPA) designation for the Whites Creek Alluvial Deposit Forest, at the upper end of Parcel 233.
   - Zone 4 allocations for Parcels 224 and 226 and Zone 3 for Parcel 223.
   - Zone 6 allocation for the Meigs County Park (Parcel 5).

   Parcel 297 at Lowe Branch should be allocated to Zone 4, rather than to Zone 5. Creating an industrial park on this large parcel would render that land forever unusable by the public.

From Hensley
136 Revere Cir
Oak Ridge, Tn. 37830
Phone 4830849


Breeder Site
TCWP & AFORR
Proposal
Zone Allocation
Zone 3: Sensitive Resource Management ----457 acres
Zone 4: Natural Resource Conservation ------350 acres
Zone 5: Industrial----------378 acres
Breeder Site, TVA Proposal
Based on preferred alternative B
Grassy Creek Habitat Protection Area
Clinch River Breeder Site
RIDGE
CLINCH
RIVER
BEAR
Grassy
Parcel Number
Acres
Zone Allocation
2 3 4 5 6 7
Description
141 63.3 Jones Island, UT forest research station
142 302.5 Clinch River Breeder Site
143 181.6 Clinch River Breeder Site
144 82.2 Protection of significant wetlands and cultural resources
145 375.7 Clinch River Breeder Site
146 285.3 Grassy Creek Habitat Protection Area
147 76.1 Clinch River Breeder Site
148 21.5 Clinch River Breeder Site

TENNESSEE WILDLIFE RESOURCES AGENCY

ELLINGTON AGRICULTURAL CENTER
P. O. BOX 40747
NASHVILLE, TENNESSEE 37204

Tennessee Valley Authority Attention: Jon M. Loney, Manager NEPA Administration
Environmental Policy and Planning 400 West Summit Hill Drive Knoxville, TN 37902-1499

September 20, 2007

Re: Comments Regarding the Draft Environmental Impact Statement - Watts Bar Reservoir Land Plan, Loudon, Meigs, Rhea, and Roane Counties, Tennessee

Dear Mr. Loney:

The Tennessee Wildlife Resource Agency has reviewed the Draft Environmental Impact Statement (DEIS) - Watts Bar Reservoir Land Plan and provides the following comment. The Tennessee Wildlife Resource Agency recommends and supports Modified Alternative C - Modified Conservation and Recreation. It is our opinion that the public and the natural resources of the state would benefit the most if this alternative were chosen. Outdoor recreational opportunities would be expanded under this alternative, impacts on prime farmlands would be no greater than with either of the other alternatives, the greatest benefit to rare aquatic and terrestrial species would likely occur under Modified Alternative C, water quality would be maintained under this alternative, and potential impacts to archaeological resources would be insignificant under Modified Alternative C.

If either Modified Alternative A or Modified Alternative B were chosen, rather than Modified Alternative C, approximately 279.4 acres of habitat for the State Endangered Bachman's sparrow could be impacted due to the allocation of parcels 297 and 298 near Watts Bar Dam. As stated on page 49 of the DEIS, "Suitable habitat for Bachman's sparrows is limited and scattered throughout Watts Bar Reservoir lands. The species may be found in Parcels 3, 295, 297, 298, and 299 near Watts Bar Dam." Loss of habitat for the Bachman's sparrow is one of the greatest threats for the continued existence of this species.

Impacts to terrestrial ecological resources where habitat alteration occurs under Modified Alternative A or Modified Alternative B would be greater than Modified Alternative C , as stated on page 101 of the DEIS, which would include "...the loss of some interior forest bird habitat, more habitat fragmentation and loss of biodiversity, and a concurrent increase in invasive plants and animals." If Modified Alternative B were chosen additional impacts to informal recreation could occur, as stated on page 101 of the DEIS: "Specifically selection of this alternative would

eliminate future stakeholder partnership opportunities and activities on Parcels 297 and 298 at Lowe Branch as well as eliminate from consideration a request from TWRA for the transfer of Parcels 295, 297, 298, and 299 from TVA for inclusion in its WMA program as a contiguous tract of land. Additionally, this alternative would eliminate, over time, the WMA hunting regulation agreement with TWRA for the former Clinch River Breeder Reactor Site area, which includes Parcels 142, 143, 144, 145, and 146." Modified Alternative C would expand informal recreational pursuits, such as wildlife and nature observation and hunting. As stated on page 102 of the DEIS, Modified Alternative C would: "Specifically, the selection of this alternative would maintain current stakeholder partnership opportunities and activities on Parcels 297 and 299 at Lowe Branch and keep open consideration of TWRA's request for the transfer of Parcels 295, 297, 298, and 299 for inclusion in its WMA program. Additionally, this alternative would change the allocation of the former Clinch River Breeder Reactor site (Parcels 142, 143, 145, and 148) from Zone 5 (Industrial) to Zone 4 (Natural Resource Conservation). This reallocation would maintain the area's current ecological state and allow TWRA to continue its interim management agreement. Specifically, this alternative would allow for continued management of natural resources on Parcels 295, 297, 298, and 299 with the possibility of designating a portion of this area as an Important Bird Area in conjunction with TWRA and the incorporation of prescribed burning regimes to better manage groups of wildlife species in conjunction with the Tennessee Division of Forestry."

The Tennessee Wildlife Resources Agency supports and recommends that the Tennessee Valley Authority chose Modified Alternative C for the Watts Bar Reservoir Land Plan.

Thank you for the opportunity to comment.

Sincerely,

Robert M. Todd
Fish and Wildlife Environmentalist

cc: Bobby Brown, Region III Habitat Biologist
John Mayer, Region III Manager
Dr. Lee Barkley, U.S. Fish and Wildlife Service
Darryl Williams, Environmental Protection Agency

City of Rockwood

110 North Chamberlain Avenue
Rockwood, TN 37854-2309
Phone: 865.354.0611
FAX: 865.354.0348

ROCKWOOD

September 21, 2007

Donna Norton, Manager
Watts Bar Reservoir
Tennessee Valley Authority
260 Interchange Park Dr., LCB 1A-LCT
Lenoir City, TN 37772-5664

Dear Ms Norton:

This letter is to inform you of the City of Rockwood's interest in pursuing commercial recreation development opportunities on Parcel 218 as described in the proposed Watts Bar Reservoir Land Management Plan. This parcel, along with our public recreation property (Parcel 219) can provide the appropriate lake-oriented recreational opportunities that the City so desperately needs for future economic prosperity. We envision the use of Parcel 218 to provide recreational facilities typical of those found at Tennessee State parks.

We will be submitting plans for potential uses of Parcel 218 once the TVA Board adopts the new Reservoir Land Management Plan. We look forward to working with TVA to secure the recreational and economic benefits that King Creek can provide to the City of Rockwood and Roane County.

Thank you for your continued cooperation. Please contact Jim Hines if you need any additional information.

Sincerely,

Mike Miller, Mayor
City of Rockwood

Cc: Mike Farmer
Jim Hines

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

September 21, 2007

Mr. Richard Toennisson
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, Tennessee 37902

Subject: EPA NEPA Review of TVA DEIS for "Watts Bar Reservoir Land Management Plan"; Loudon, Meigs, Rhea, and Roanne Counties; CEQ# 20070338; ERP# TVA-E65073-TN

Dear Mr. Toennisson:

The U.S. Environmental Protection Agency (EPA) has reviewed the subject Tennessee Valley Authority (TVA) Draft Environmental Impact Statement (DEIS) in accordance with our responsibilities under Section 102(2)(C) of the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act. TVA proposes to amend its recent EIS regarding the 2005 Land Plan (which updated the 1988 Land Plan) to modify it in response to TVA's November 2006 Land Policy, other administrative changes and public comments.

The Watts Bar Reservoir is a 65-year-old, multipurpose reservoir in Tennessee with a shoreline of 721 miles. The current TVA land plan covers approximately 16,200 acres of public lands owned and managed by TVA. The Watts Bar Reservoir area includes the Watts Bar Nuclear Plant, Kingston Fossil Plant, Watts Bar Dam Reservation, and the former Clinch River Breeder Reactor site.

In its 2005 EIS, TVA identified a preference for the "Balanced Development and Recreation Alternative" (Alternative B) over the "Balanced Conservation and Recreation Alternative" (Alternative C) and the No Action Alternative (Alternative A). These three original alternatives were modified in the present EIS to the "Modified Development and Recreation Alternative" (Modified B), the "Modified Conservation and Recreation Alternative" (Modified C) and the "Modified No Action Alternative" (Modified A). Primarily, TVA modifications (pg. S-2) involved land use allocation changes to Zone 3 ("Sensitive Resource Management"), Zone 4 ("Natural Resource Conservation"), Zone 5 (name also changed from the original "Economic Development" zone to the "Industrial" zone) and Zone 6 ("Developed Recreation"). Overall, when the original alternatives (Table 2.1-1: pg. 18) are compared to the modified alternatives (Table 2.2-1: pg. 34), more land was notably moved to conservation (Zone 3) for both Modified B and C. Moreover, "...the residential component of mixed use development, independent retail

businesses, and some specific types of commercial recreation…are no longer provided for in the TVA Land Policy." As such, land transfer requests from TVA public lands to private lands for the purposes of developing residences, retail businesses and certain commercial recreation facilities would not be approved by TVA, although industrial development (Zone 5) could still be approved. In addition, the proposed modification would discontinue the Integrated Resource Management Plan (IRM) and formulate other administrative changes. A "Natural Resources Management Strategy" is being developed to replace the IRM.

Overall, EPA supports the changes proposed by the present modification. When compared to the original 2005 Land Plan alternatives, we note that most of the beneficial changes were made to Modified B. Specifically, more lands were allocated to Zone 3 (Sensitive Resource Management), Zone 4 (Natural Resource Conservation) and Zone 6 (Developed Recreation), with less allocation to Zone 5 (Industrial). The additions to Zones 3 and 4 and reductions to Zone 5 appear beneficial while the addition to Zone 6 is somewhat neutral. The greatest environmental benefit appears to be the additions to sensitive and conservation areas and reduction to industrial sites. For Modified C, more lands were also allocated to Zones 3 (Sensitive Resource Management) and 5 (Industrial), but less to Zones 4 (Natural Resource Conservation) and 6 (Developed Recreation). The additions to Zone 3 and reduction to Zone 6 are beneficial, but the reductions to Zones 4 and addition to 5 are not beneficial. We note, however, that the addition to the industrial development (Zone 5) in Modified C is minimal (92 ac vs. 52 ac) and that these areas are existing industrial sites. The greatest environmental benefit appears to be the addition in sensitive areas and reduction in recreational areas. The change in TVA policy to no longer entertain requests for residential development for both Modified B and C is also beneficial to the environment.

We find that both Modified B and C alternatives are environmentally more attractive than the original B and C, with Modified C still providing the most overall protection for the environment. Modified C's correlation with less development reduces impacts to wetlands, aquatics, shorelines, riparian vegetation, terrestrial areas and other natural habitat as well as minimizing air and noise emissions. Sensitive habitat areas that would be protected include the former Clinch River Breeder Reactor site in Zones 3 or 4 (pg. 108) as a wildlife corridor. Accordingly, EPA continues to prefer the benefits of Alternative C and now Modified C.

We note that 92 acres of existing industrial sites (Zone 5) would still be part of Modified C. Barge terminals and marinas should be properly sited to protect the reservoir resource function. We recommend compliance with TVA's clean marina initiative and related programs (see TVA website), specifically pertaining to proper marina siting and selection of designs with adequate flushing to maintain water quality.

EPA and other resource agencies previously provided NEPA comments on the TVA EIS for the 2005 Plan. In addition to EPA, page 14 indicates that U.S Fish and

Wildlife Service (FWS), Tennessee Wildlife Resources Agency (TWRA) and Tennessee Department of Environment and Conservation (TDEC) all favored Alternative C. EPA also recommended a hybrid or blended alternative between the development (B) and conservation (C) extremes, which was acknowledged in the present EIS (pg. 14). Despite the resource agencies' position on the original 2005 Land Plan and acknowledgement that Modified C is the "environmentally preferred" alternative (pg. 38), we note that TVA continues to prefer Modified B similar to its selection of Alternative B in the 2005 EIS. However, we appreciate the present modification toward increased allocation of lands for conservation in Modified B and assume that in part it was made in response to the agency selection of Alternative C. We are also aware of TVA's mandate to balance the environment with industrial and economic development in the Valley (pg. 1), which would favor Modified B over C.

Regardless of a preference for Modified B or C, it is unclear why TVA public lands should be offered for private sale (other than revenue) in either alternative since considerable private shorelands are already in private ownership along the Watts Bar Reservoir (Figure 1.1-1). Moreover, the DEIS indicates that such private lands are rapidly being developed, that the local growth rate is growing faster than that of the state and nation (pg. S-5), and that only 3.7 % of the land in the State of Tennessee is public (pg. 100) and only about 11% of the lands along the reservoir shoreline are TVA public lands (pg. S-4). TVA public lands along Watts Bar Reservoir, which primarily have a conservation and recreation use, serve to buffer the reservoir from ongoing private development in the watershed. Moreover, TVA could continue to encourage its mandate for economic development by regulating private shoreline development along the Watts Bar Reservoir through its Section 26a permitting process. That is, TVA could allocate more lands to conservation (Modified C) and still promote economic development at sustainable levels through its Section 26a permitting process for shoreline construction of private lands.

If Modified C in association with Section 26a permitting would not adequately satisfy the TVA mandate, we alternatively suggest consideration of a hybrid or blended alternative that would allocate more lands for industrial development (Zone 5) than in Modified C but less than in Modified B (i.e., more than 92 ac but notably less than 1,253 ac). We further suggest that such development be limited to light industry that depends on water access and has some environmental benefit such as barge terminals.

We rate this DEIS as "EC-1" (Environmental Concerns, some additional information requested). While we find that both Modified B and C have areas of environmental improvement over the original 2005 Land Plan, we prefer Modified C. This alternative would provide an important public land buffer for ongoing private land development around the Watts Bar Reservoir for wildlife habitat and reservoir water quality benefit.

We appreciate the opportunity to review this DEIS. Should you have questions on our above comments as well as the enclosed *Additional Comments*, please contact Chris Hoberg of my staff at 404/562-9619 or hoberg.chris@epa.gov.

Sincerely,

Heinz J. Mueller, Chief
NEPA Program Office

Enclosure – *Additional Comments*

ADDITIONAL COMMENTS

* **Modified C** – It is therefore unclear why Table 2.2-1 (pg. 34) depicting allocations for the modified alternatives shows more land (92 ac) in Zone 5 for Modified C than Table 2.1-1 (pg. 18) depicting the original Alternative C shows (52 ac). Although not significantly different, the final EIS (FEIS) should discuss this.

* **Zone 4** – Although Zone 4 is named "Natural Resource Conservation", we note that timber management would be allowed there, as well as hunting. How will these activities be held to sustainable levels and will clearcutting still be allowed like in the 1988 Plan (pg. 21, Allocation #12)? In order to be a true conservation zone, we recommend that harvesting be limited to forest fuel thinning without clearcutting, and that hunting primarily also be for thinning growing populations for their benefit based on consultation with FWS and their state counterparts. In essence we recommend that harvesting and hunting be allowed to promote healthy forests and wildlife populations rather than for silvicultural or high-yield purposes.

* **EJ** – Environmental Justice (EJ) need not be an issue for this proposed project since minorities account for only 5.7 % of the population (compared to 22.1 % for the State of Tennessee). However, the reduction in commercial residential and industrial growth by all alternatives due to the proposed modification could reduce job opportunities in the area (pg. 140). We note that unemployment (5.3 %) in the area is already higher than the state and national average (pg. S-5) .

* **Bald Eagle** – Page S-3 and Table 3.3-2 (pg. 48) still lists the bald eagle as a federally-threatened species. We understand it has now been delisted, but recommend verification with the FWS before the prospective development of the final EIS.

* **Wetlands** – In addition to the Watts Bar Reservoir watershed being generally forested, forested wetlands is the most common wetland type (pg. 69). Selection of Modified C would likely protect these wetlands from development more than Modified B or A. Avoidance of wetlands (listed as a sensitive resource in Zone 3: pg. 24) through land allocation is preferable and generally more protective than wetland mitigation for filling wetlands due to development.

* **NEPA Process** – The present EIS is said to "amend" the 2005 EIS. Editorially, the NEPA term that is used in such instances is to "supplement" the original EIS, i.e., a "Supplemental EIS" rather than an "Amended EIS" is produced. Also relating to NEPA, it is unclear why the No Action Alternative would still use the 1988 Land Plan if selected as opposed to the 2005 Land Plan since that plan has recently undergone the NEPA process (even though it is being amended by the present EIS).

* **IRM** – The DEIS would have been improved if the proposed Natural Resource Management Strategy that is to replace the IRM was already prepared and presented as a draft or final strategy in an appendix.

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
Richard B. Russell Federal Building
75 Spring Street, S.W.
Atlanta, Georgia 30303

TAKE PRIDE IN AMERICA

ER 07/685
9043.1

September 24, 2007

Mr. Rick Toennisson
TVA NEPA Administration
400 West Summit Hill Drive
Knoxville, TN 37902

RE: Watts Bar Reservoir Land Management Plan

Dear Mr. Toennisson:

The Department of the Interior has reviewed the Watts Bar Reservoir Land Management Plan and has no comments for your consideration. You can contact me at 404-331-4524 if you should have any questions.

Sincerely,

Gregory Hogue
Regional Environmental Officer

cc:
OEPC, Washington

OAK RIDGE ECONOMIC PARTNERSHIP

Oak Ridge Economic Partnership Position Statement
TVA Watts Bar Reservoir Land Management Plan

Background

The Tennessee Valley Authority (TVA) is proposing to update its 1988 Watts Bar Reservoir Land Management Plan to better reflect changing community needs and current TVA policies.

A Draft Environmental Impact Statement was issued in May, 2005 which proposed three alternatives:

1) No Action
2) Balanced Development and Recreation
3) Balanced Conservation and Recreation

Oak Ridge Economic Partnership Position

The Oak Ridge Economic Partnership recommends serious consideration be given to adopting the Modified Development and Recreation Plan (Modified Alternative B). This plan would provide for continued industrial development in the areas currently designated for industrial development, permitting TVA to continue its mission to promote sustainable economic development in the Tennessee Valley region.

1400 Oak Ridge Turnpike
Oak Ridge, Tennessee 37830
(865) 483-1321
(865) 483-1678 fax
www.orcc.org

Appendix H – Biological Assessment

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
446 Neal Street
Cookeville, TN 38501

May 2, 2008

Ms. Peggy W. Shute
Manager, Heritage Resources
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, Tennessee 37902-1499

Re: FWS #07-I-0991

Dear Ms. Shute:

Fish and Wildlife Service (Service) personnel have reviewed the biological assessment regarding the Watts Bar Reservoir Land Management Plan (Land Plan) and the Amended Draft Environmental Impact Statement for the project. The biological assessment describes the potential future effects on federally listed species and designated critical habitat present in and around Watts Bar Reservoir, in Loudoun, Meigs, Rhea, and Roane counties, Tennessee, resulting from actions facilitated by land use designations on property owned or controlled by Tennessee Valley Authority (TVA). Ten federally listed species are reported from the project area, including Virginia spiraea (*Spiraea virginiana*), Cumberland rosemary (*Conradina verticillata*), fanshell (*Cyprogenia stegaria*), rough pigtoe (*Pleurobema plenum*), pink mucket (*Lampsilis abrupta*), shiny pigtoe (*Fusconaia cor*), orangefoot pimpleback (*Plethobasus cooperianus*), snail darter (*Percina tanasi*), spotfin chub (*Cyprinella monacha*), and the gray bat (*Myotis grisescens*). Additionally, designated critical habitat for the spotfin chub occurs on the Obed and Emory rivers.

The Land Plan results in an overall increase in lands designated for resource protection (Zones 3 and 4) and the reduction in land available for industrial uses (Zones 2 and 6). We commend you for this, as it will likely provide a net benefit to federally listed species in the project area when compared to the current land plan. We understand that the highest potential for impacts to listed species occurs on lands designated as Zone 2 (Project Operations) or Zone 5 (Industrial). The majority of these parcels are either located in areas where no listed species are found (most Zone 5 parcels) or have no future actions that would occur within the planning cycle (10 years) of the Land Plan. The one exception to this is the Breeder Site on the Clinch River. Because it is retaining this parcel as Zone 2, TVA has much more control over potential future activities on the Breeder Site. You indicate in the biological assessment that any future action potentially affecting a threatened or endangered species would be the subject of consultation with the

Service, and project specific avoidance or mitigation measures would be developed as a part of that consultation.

You have determined that there would be no effect on the Virginia spirea, Cumberland rosemary, fanshell, rough pigtoe, shiny pigtoe, orangefoot pimpleback, snail darter, spotfin chub, and the gray bat. Additionally, you determined that this project would have no effect on designated critical habitat for the spotfin chub in the Obed or Emory rivers.

You have determined the proposed Land Plan is not likely to adversely affect the pink mucket, based on implementation of specific measures if TVA were to develop industrial facilities at the former Clinch River Breeder Reactor site. These measures include:

1. TVA would consult with the Service in order to determine if the proposed action could affect listed mussels present in the area.
2. Pre-construction mussel surveys would be conducted in all areas of the Clinch River (Watts Bar Reservoir) that would be affected by construction and use of the terminal associated infrastructure (e.g. barge terminal, water intakes or water outfalls).
3. Any listed mussels found during these surveys would be dealt with according to terms and conditions imposed as a result of the consultation process. These could consist of minimization or avoidance measures implemented during construction and operation, or relocation of the mussels encountered if effects are unavoidable

With implementation of these conditions and appropriate Best Management Practices, you have determined that only relatively minor impacts to federally listed mussels in the Clinch River are expected to occur.

Typically, the Fish and Wildlife Service does not concur with a "not likely to adversely affect determination" at the programmatic consultation level when such determination is based on a commitment to consult on specific projects in the future when details become known. If there is a potential for a "likely to adversely affect" determination to be made during site-specific consultation in the future, the Service advises that "likely to adversely affect" is the appropriate determination at the programmatic consultation level also. However, after numerous discussions with your staff and a thorough review of this project and associated conservation measures, we believe the likelihood of reaching a determination of "likely to adversely affect" at the site-specific consultation level in the future in discountable. Therefore, we concur with your conclusion that the proposed Land Plan is not likely to adversely affect the pink mucket. In view of this, we believe that the requirements of section 7 of the Endangered Species Act (Act), as they apply to this programmatic action, have been fulfilled. However, obligations under section 7 of the Act must be reconsidered if: (1) new information reveals that the proposed action may affect listed species in a manner or to an extent not previously considered, (2) the proposed action is subsequently modified to include activities which were not considered in this biological assessment, or (3) new species are listed or critical habitat designated that might be affected by the proposed action. Because this is a programmatic level consultation on the Land Plan, site-specific consultations will still be needed, but can tier back to this consultation. It is incumbent

upon both of our agencies to coordinate adequately in the future so as to minimize the likelihood of any specific actions resulting in an adverse effect to listed species.

Your interest and initiative to protect endangered and threatened species is greatly appreciated. If you have questions or if we can be of further assistance, please contact Mary Jennings of my staff at (931) 528-6481, extension 203.

Sincerely,

Mary E Jennings

for Lee A. Barclay, Ph.D.
Field Supervisor

Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, TN 37902-1499

February 29, 2008

Dr. Lee Barclay
U.S. Fish and Wildlife Service
446 Neal Street
Cookeville, TN 38501

Dear Lee:

The enclosed Biological Assessment (BA) describes the potential future effects on federally listed species and designated critical habitat present in and around Watts Bar Reservoir, Loudon, Meigs, Rhea, and Roane Counties, Tennessee, resulting from actions facilitated by land use designations on TVA-owned or controlled property on Watts Bar Reservoir. TVA is submitting this BA pursuant to Section 7(a)(2) of the Endangered Species Act (ESA) to ensure that future actions resulting from the proposed land allocations are not likely to jeopardize the continued existence of listed species or adversely modify designated critical habitat for these species.

Because the Watts Bar Land Plan is a programmatic document, it considers the assignment of broad use zones or activities to parcels of TVA-controlled land. It does not consider any specific potential future actions that might occur on planned lands as a result of the assignment of these use zones. These future actions, should they occur, will be considered in appropriate future environmental review and your office would be consulted as appropriate. However, a range of potential effects can be identified for these use zones, and potential future impacts to endangered species are addressed in the BA. Federally-listed species are only found in three areas that could be affected by land actions addressed in the Land Plan; the Clinch River downstream of Melton Hill Dam, downstream of Ft. Loudoun Dam, and downstream of Watts Bar Dam.

TVA has determined that there would be no effect on the two plants present in the project area, Virginia spirea and Cumberland rosemary; four of the five mussels, fanshell, rough pigtoe, shiny pigtoe, and orangefoot pimpleback; the two fish, snail darter and spotfin chub; and the one mammal, gray bat. TVA has determined that this project is not likely to adversely affect the pink mucket. This project would not result in adverse modification of designated critical habitat for the spotfin chub in the Obed or Emory Rivers. We respectfully request your concurrence on these endangered species determinations for the programmatic Watts Bar Reservoir Land Plan.

If you have questions, contact John (Bo) Baxter at (865) 632-3360.

Sincerely,

Peggy W. Shute, Manager
Heritage Resources

Enclosure

Biological Assessment

Watts Bar Reservoir Land Management Plan and Amended Draft Environmental Impact Statement (Land Plan)

Tennessee Valley Authority
29 February 2008

***Watts Bar Reservoir Land Management Plan and Amended Draft Environmental Impact Statement* (Land Plan) - Biological Assessment**
Tennessee Valley Authority
29 February 2008

1. Introduction
This Biological Assessment (BA) describes the potential future effects on federally listed species and designated critical habitat present in and around Watts Bar Reservoir, Loudoun, Meigs, Rhea, and Roane Counties, Tennessee resulting from actions facilitated by land use designations on TVA-owned or controlled property on Watts Bar Reservoir. A total of ten federally listed plant species are reported from the project area - two plants; Virginia spirea and Cumberland rosemary, five mussels; fanshell, rough pigtoe, pink mucket, shiny pigtoe, and orangefoot pimpleback, two fish; snail darter and spotfin chub, and one mammal; gray bat. Tennessee Valley Authority (TVA) is submitting this BA pursuant to Section 7(a)(2) of the Endangered Species Act (ESA) to ensure that future actions resulting from the proposed land allocations are not likely to jeopardize the continued existence of listed species or adversely modify designated critical habitat for these species.

A. Project History
The Watts Bar Reservoir, which is part of the Watts Bar project, is a multipurpose reservoir operated by TVA for navigation, flood control, power production, recreation, and economic development. The Land Plan is intended to be consistent with the purposes of the Watts Bar project. The Land Plan also seeks to address issues and concerns raised by the general public. Each reservoir land management plan is submitted for approval to the TVA Board of Directors and adopted as policy to provide for long-term stewardship and accomplishment of TVA responsibilities under the TVA Act of 1933

In May 2005, TVA issued a *Watts Bar Reservoir Land Management Plan and Draft Environmental Impact Statement* (2005 Plan) proposing to update the 1988 Plan for approximately 16,200 acres of TVA public land on Watts Bar Reservoir in Loudon, Meigs, Rhea, and Roane counties, Tennessee (TVA 2005a). Three alternatives were proposed in the 2005 Plan. These were a No Action Alternative to continue to use the 1988 Plan with accrued updates, a Balanced Development and Recreation Alternative with an emphasis on economic development and developed recreation, and a Balanced Conservation and Recreation Alternative with an emphasis on natural resource conservation and informal recreation activities.

In August 2007, TVA issued the *Watts Bar Reservoir Land Management Plan and Amended Draft Environmental Impact Statement* (Land Plan) to revise the 2005 Plan by incorporating the changes derived from implementation of the TVA Land Policy (November 2006). The Land Plan would allow an additional opportunity to assess environmental impacts of a reasonable range of alternatives for allocating TVA public land on Watts Bar Reservoir and provide a means for additional public involvement in the decision-making process. The proposed updated Reservoir Land Management Plan (Land Plan) would guide land use approvals, private water use facility permitting, and resource management decisions on Watts Bar Reservoir. The proposed Land Plan allocates land into broad categories or "Zones," including Project Operations, Sensitive Resource Management, Natural Resource Conservation, Industrial, Developed Recreation, and Shoreline Access.

In response to TVA's request for comments on the Land Plan, the U. S. Fish and Wildlife Service (FWS) recommended that TVA consult on this programmatic EIS. This Biological Assessment (BA) was prepared to address these comments and present TVA's rationale for a 'Not Likely to Adversely Affect' determination regarding the potential for this Land Plan to affect federally listed species.

B. Federal Action History (Discussion of Past Actions Relevant to the Proposed Project)

Watts Bar Reservoir Land Management Plan (TVA 1988)

In August 1988, the TVA Board of Directors approved a land management plan to guide TVA resource management and property administration decisions on 10,405 acres of TVA land on Watts Bar Reservoir. This review did not account for all TVA lands present on Watts Bar. Additional TVA lands are addressed in the current EIS. A multidisciplinary TVA team undertook a detailed planning process that resulted in the land use designation in the plan. Both public input and information from TVA specialists were analyzed in making land use decisions. It was determined that Watts Bar Reservoir supported 19 land use allocations (see Section 2.1). The 207 parcels of land on Watts Bar Reservoir were allocated for one or more of these 19 uses.

Record of Decision for the Lower Watts Bar Reservoir (USDOE 1995)

The record of decision for lower Watts Bar Reservoir was prepared by USDOE in accordance with the requirements under the Comprehensive Environmental Response, Compensation, and Liability Act to present the remedy that addresses the contamination of the Watts Bar Reservoir area by past USDOE operations. Remediation includes the continuance of institutional controls and long-term monitoring of water, sediment, and fish. Institutional controls are implemented primarily by the Watts Bar Working Group (WBWG), created in 1991, of which TVA is a signatory member along with the U.S. Environmental Protection Agency (USEPA), Tennessee Department of Environment and Conservation (TDEC), U.S. Army Corps of Engineers (USACE), and the USDOE. The WBWG implements a notification and screening methodology for member agency actions that may be impacted by the contaminants, whereby USDOE can then identify contaminants and provide appropriate remediation.

Shoreline Management Initiative (SMI): An Assessment of Residential Shoreline Development Impacts in the Tennessee Valley Final Environmental Impact Statement (TVA 1998)

TVA completed an environmental impact statement (EIS) on possible alternatives for managing residential shoreline development throughout the Tennessee River Valley. Under the alternative selected, sensitive natural and cultural resource values of reservoir shorelines would be conserved and retained by preparing a shoreline categorization for individual reservoirs; by voluntary donations of conservation easements over flowage easement or other shoreland to protect scenic landscapes; and by adopting a "maintain and gain" public shoreline policy when considering requests for additional shoreline access rights. This Land Plan will tier from the final SMI EIS.

The residential shoreline on Watts Bar Reservoir comprises 340 miles or 47 percent of the total 721 miles of shoreline. In accordance with the TVA Shoreline Management Policy (SMP), TVA categorized the residential shoreline for previous land plans based on resource data collected from field surveys. A resource inventory was conducted for sensitive species

and their potential habitats, archaeological resources, and wetlands along the residential shoreline.

Sale of Boeing Land Environmental Assessment (USDOE 2000)
USDOE prepared this environmental assessment (EA) to review the impacts of selling a narrow strip of former TVA land on the Clinch River to a private developer. Sale of this property reduced the amount of non-TVA-owned public shoreline and changed it to private shoreline available for shoreline access.

Agricultural Lands Licensing for 1999 Through 2003 Crop Years for Fontana, Fort Loudoun, Melton Hill, Tellico, and Watts Bar Reservoirs Environmental Assessment (TVA 1999)
TVA reviewed the environmental impacts associated with licensing 74 tracts of TVA land totaling over 1,200 acres to individuals for agricultural use on lands around five TVA reservoirs in east Tennessee and North Carolina. Thirty-four of these tracts totaling 335 acres are on Watts Bar Reservoir and are part of the TVA lands currently being planned. TVA is currently reassessing the continued licensing of these tracts.

Lower Watts Bar Management Unit Watts Bar Reservoir, Resource Management Plan and Final Environmental Assessment (TVA 2000)
TVA completed an EA on alternatives for TVA's resource management activities for the Lower Watts Bar Management Unit (LWBU) and implementing a management plan for the LWBU. The 3,481-acre LWBU is a major component of the TVA land that is the subject of the current planning process.

Modernization of Turbines at Watts Bar Hydro Plant, Rhea County, Tennessee Environmental Assessment (TVA 2001a)
The environmental impacts attributed to the proposed modernization of the electric generating turbines at the Watts Bar Dam and Hydro Plant were reviewed. Commitments of the action alternative include the stabilization of shoreline on TVA land included in the current planning process.

Proposed Issuance of Regulations Under Section 26a of the TVA Act for Nonnavigable Houseboats, Storage Tanks, Marina Sewage Pump-Out Stations, Wastewater Outfalls and Septic Systems, and Development Within Flood Control Storage Zones Environmental Assessment (TVA 2001b)
In 2001, TVA completed an EA for its issuance of regulations for nonnavigable houseboats, storage tanks, marina sewage pump-out stations, wastewater outfalls, septic systems, and development within flood control storage zones of TVA reservoirs. The complete update of the 1971 Section 26a regulations, incorporating the standards for residential development in the SMI EIS and the miscellaneous updates above, became final on September 8, 2003. Taken together, these regulations comprehensively updated the TVA requirements for development along the shoreline of TVA reservoirs, including Watts Bar. The regulations for marina sewage pump-out stations and holding tanks, fuel storage tanks and handling facilities, and development within the flood control storage zones were new. Actions requiring Section 26a approval by TVA frequently are requested and occur on TVA reservoir lands and consequently are governed by TVA Section 26a regulations.

Routine Operations and Maintenance of TVA's Water Control Structures in the Tennessee River Watershed (TVA 2005a)
TVA formally consulted with U.S. Fish and Wildlife Service (FWS) under Section 7 of the Endangered Species Act on the potential for routine operation and maintenance activities

on the TVA Reservoir system to affect species on the U.S. Endangered Species List. TVA and FWS biologists determined that 65 of the 101 federally listed plant and animal species found within the Tennessee River watershed could be affected by TVA's activities. In the mainstem Tennessee River (including Watts Bar Reservoir, and portions of the Clinch River system) five mussels (fanshell, pink mucket, white wartyback, orangefoot pimpleback, and sheepnose) apparently successfully reproduce at some localities. However, in spite of this, all five are considered to be in decline, for unknown reasons. Important habitat parameters may be affected by altered daily and seasonal flow patterns at these mainstem dams.

Individuals of five other mussel species (spectaclecase, dromedary pearlymussel, oyster mussel, ring pink and rough pigtoe) persist and are living out their long lifespans at some scattered localities. Although their demise is believed to be a result of habitat alterations that resulted from creating the reservoirs and is not believed to be the direct result of TVA's routine operations, these old individuals may also be affected by altered daily and seasonal flow patterns at mainstem dams.

Completion of Watts Bar Nuclear Plant Unit 2, Rhea County, Tennessee, Supplemental Environmental Impact Statement and Record of Decision (TVA 2007)
TVA has issued a Supplemental EIS (SEIS) for the completion and operation of Watts Bar Nuclear Plant (WBN) Unit 2 in July 2007. TVA is proposed this action as a means of meeting the demand for additional baseload electrical generating capacity on the TVA system and maximizing the use of its existing assets. The unit would be completed as originally designed, alongside its sister unit, WBN Unit 1, which has been operating since 1996. No expansion of the existing site footprint would be required.

The final SEIS augments the analyses in the draft SEIS by further discussing WBN cooling water systems, hydrothermal conditions in the Tennessee River for two-unit operation, and chemical additives to raw water. It also updates these sections: need for power, socioeconomic, floodplains, nuclear plant safety and security, radiological effects, and decommissioning. The final SEIS concluded that WBN Unit 2 could be completed and operated without significant adverse impacts on the environment.

On August 2, 2007, the TVA issued a Record of Decision for the proposed completion and operation of WBN Plant Unit 2. TVA intends to implement the preferred alternative identified in its final SEIS for the Completion and Operation of Watts Bar Nuclear Plant Unit 2, Rhea County, Tennessee.

TVA determined that activities associated with completion of WBN Unit 2 are not likely to adversely affect listed species in this reach of the Tennessee River. FWS has concurred with these findings.

TVA Land Policy (TVA 2006)
In November 2006, the TVA Board instituted a TVA Land Policy governing TVA's retention, disposal, and planning of its lands. This policy describes residential, economic development, recreation, and other uses for TVA's reservoir lands; provides specific definitions of these uses; and requires a suitability assessment of all TVA land allocated for recreation and economic development use. This policy in being implemented through TVA's reservoir land plans currently under design and review.

II. Description of the Action and Action Area

A. Discussion of Federal Action and Legal Authority / Agency Discretion
TVA has been charged by Congress with improving navigation, controlling floods, providing for the proper use of marginal lands, providing for industrial development, and providing power at rates as low as feasible, all for the general purpose of fostering the physical, economic, and social development of the Tennessee Valley region.

As stewards of this important resource, it is TVA's policy to manage its lands to protect the integrated operation of the TVA reservoir and power systems, to provide for appropriate public use and enjoyment of the reservoir system, and to provide for continuing economic growth in the Valley. TVA recognizes that historical land transfers have contributed substantially to meeting these multipurpose objectives, and it is TVA's policy to preserve reservoir lands remaining under its control in public ownership except where different ownership would result in significant benefits to the public.

TVA proposes to amend the *Watts Bar Reservoir Land Management Plan and Draft Environmental Impact Statement* (2005 Plan), issued in May 2005, and to update the 1988 *Watts Bar Reservoir Land Management Plan* (1988 Plan) for approximately 16,200 acres of TVA public land on Watts Bar Reservoir in Loudon, Meigs, Rhea, and Roane counties, Tennessee. The proposed updated *Watts Bar Reservoir Land Management Plan and Amended Draft Environmental Impact Statement* (Land Plan) would guide land use approvals, private water use facility permitting, and resource management decisions on Watts Bar Reservoir. The proposed Land Plan allocates land into broad categories or "zones," including Project Operations, Sensitive Resource Management, Natural Resource Conservation, Industrial, Developed Recreation, and Shoreline Access.

This Land Plan incorporates modifications to the three alternatives proposed in the 2005 Plan as a result of TVA's November 2006 Land Policy and other administrative changes. These alternatives are a No Action Alternative to continue to use the 1988 Plan with accrued updates; a Modified Development and Recreation Alternative, providing suitable industrial use and developed recreation; and a Modified Conservation and Recreation Alternative, providing an emphasis on natural resource conservation and informal recreation activities. TVA's preferred alternative is the Modified Development and Recreation Alternative.

B. Description of the Project Purpose and Objectives
TVA proposes to update the 1988 *Watts Bar Reservoir Land Management Plan* (1988 Plan) for TVA public land around Watts Bar Reservoir.

Watts Bar Reservoir is a 65-year-old multipurpose impoundment of the Tennessee River formed by Watts Bar Dam and Lock, which is located at Tennessee River Mile (TRM) 530 in Meigs and Rhea counties, Tennessee. Currently, TVA owns and manages about 16,200 acres of land on the reservoir. TVA proposes to use an updated *Watts Bar Reservoir Land Management Plan and Amended Draft Environmental Impact Statement* (Land Plan) to guide future decision making and manage these reservoir properties.

The reservoir flows from the northeast to southwest through Loudon, Meigs, Rhea, and Roane counties in east Tennessee. The reservoir extends 72.4 miles up the Tennessee River to Fort Loudoun Dam, and 62.5 miles to Melton Hill Dam on the Clinch River. It also includes parts of the Emory and Little Emory Rivers. At full pool, the reservoir shoreline length is 721 miles, and the surface area is about 39,000 acres. Of the

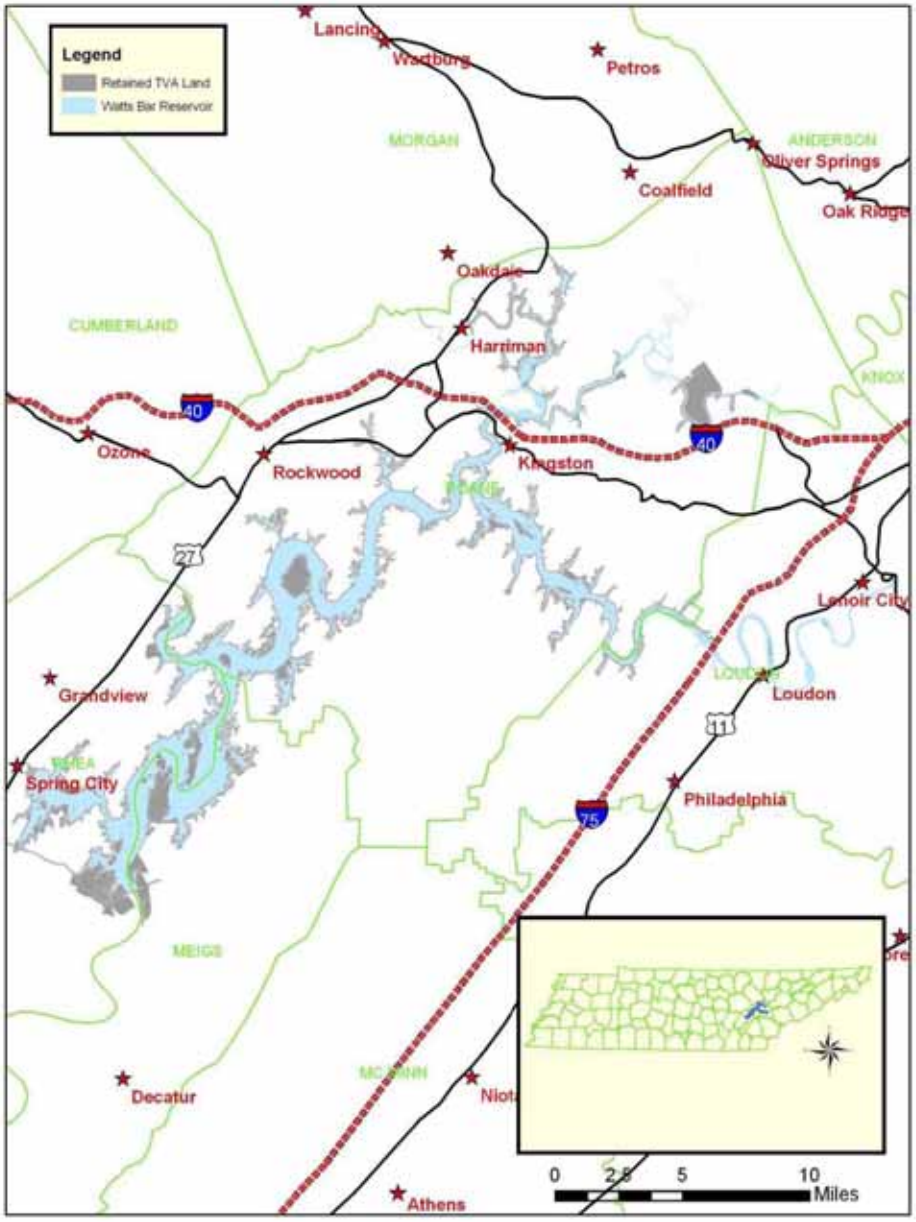

Figure 1. Map of Watts Bar Reservation and Vicinity

721 miles of shoreline, 340 miles (47 percent) are available for Shoreline Access uses (where TVA sold tracts with deeded or implied rights for access and/or water use facilities across TVA land), which include current development. The available area also includes previously planned lands determined by TVA policy to be available for consideration of water use facilities.

TVA originally acquired approximately 55,000 acres of land for the Watts Bar project including flowage and easements (TVA 1949). Subsequent purchases for fossil and nuclear plants, for transfers and/or sales of land to U.S. Department of Energy (USDOE), and for various commercial, industrial, residential, and recreational uses have resulted in a current balance of about 16,200 acres of TVA public land being available for lands planning.

TVA manages public land on Watts Bar Reservoir to protect and enhance natural resources, generate prosperity, and improve the quality of life in the Tennessee Valley. This TVA public land, together with adjoining private land, is used for public and commercial recreation, economic development, natural resource management, and a variety of other community needs. The purpose of the land planning effort is to apply a systematic method of evaluating and identifying the most suitable use of public land under TVA stewardship. Public input and resource data are used to help allocate land to the following land management categories or allocation zone. These allocations are then used to guide the types of activities that would be considered on each parcel of land. Each reservoir land management plan is submitted for approval to the TVA Board of Directors and adopted as policy to provide for long-term stewardship and accomplishment of TVA responsibilities under the TVA Act of 1933.

TVA LAND USE ZONES

Zone 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 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 and/or limit structures. Flowage easement rights are generally purchased to a contour elevation. Since construction on flowage easement land is subject to TVA's 26a permitting requirements, the SMP guidelines discussed in the definition of Zone 7 would apply to the construction of residential water use facilities fronting flowage easement land. SMP guidelines addressing land-based structures and vegetation management **do not** apply.
- ***Privately owned reservoir land***—This was 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.

Zone 2 - 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 informal 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 dayboards 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.***

Zone 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 viewscape or natural environment.

Recreational natural resource 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 archaeological resources***.
- TVA public land 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 public land under easement, lease, or license to other agencies/individuals for resource protection purposes***.
- ***TVA public 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 FWS, state-listed species, and any unusual or exemplary biological communities/geological features.
- ***Ecological Study Areas***—These TVA Natural Areas are designated as 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 informal, 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 public 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.***

Zone 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, timber management to promote forest health, wildlife observation, and camping on undeveloped sites. Areas included are:

- ***TVA public land under easement, lease, or license*** to other agencies for wildlife or forest management purposes.
- ***TVA public land fronting land owned by other agencies*** for wildlife or forest management purposes.
- ***TVA public land*** managed for wildlife or forest management projects.
- ***Informal recreation areas*** maintained for passive, informal 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 back-lying property that are managed for wildlife, water quality, or visual qualities.
- ***Wildlife Observation Areas***—TVA Natural Areas with unique concentrations of easily observed wildlife that are managed as 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.***

Zone 5 - Industrial

Land managed for economic development including businesses in distribution/processing/assembly and light manufacturing. Preference will be given for businesses requiring water access. Parcel descriptions should describe the primary type of use.

Access for water supply or structures associated with navigation such as barge terminal, mooring cell, etc.

Land-based development potential.

Areas included are:

- **TVA public land under easement, lease, or license to other agencies/individuals** for purposes described above.
- **TVA public land fronting land owned by other agencies/individuals for industrial** purposes described above.
- **Sites planned for future use supporting sustainable development**

Types of development that can occur on this land are:

- ***Business Parks***—TVA waterfront land which would support businesses and light manufacturing activities. Business parks should not include retail, service-based businesses like laundry, fast food, grocery stores, gas stations, daycares, or any walk-in-type businesses.
- ***Industrial access***—Access to the waterfront by back-lying property owners across TVA property for water intakes, wastewater discharge, or conveyance of commodities (i.e., pipelines, rail, or road). Barge terminals are often 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 may have both offshore and onshore facilities.
- ***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.

Zone 6 - Developed Recreation

The designations below are based on levels of development and the facilities available to the public, graduating from informal use to more developed uses. Parcel descriptions should describe the primary type of use and identify access potential for infrastructure and potential for development.

Water Access – small parcels of land, generally less than 10 acres, and typically shoreline areas conveyed to public agencies for public access.

Public – more recreational opportunities, some facilities more than just launching a boat and typically greater than 10 acres. This includes areas conveyed for public recreation.

Commercial – property suitable and capable to support commercial water-based operations. This includes areas conveyed for commercial recreation.

All reservoir land managed for concentrated, active recreational activities that require capital improvement and maintenance, including:

- **TVA public land under easement, lease, or license to other agencies/individuals for recreational purposes.**
- **TVA public land fronting land owned by other agencies/individuals for recreational purposes.**
- **TVA public 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:

Water access – e.g., areas that tend to be informal and can include: launching ramp, courtesy pier, canoe access, parking areas, picnic area, trail, etc.

Public recreation – recreation on publicly owned land. These areas typically have facilities or uses developed by a public agency and provide amenities open to the general public. Facilities at "public recreation" areas could include: playgrounds/play structures, picnic facilities, tennis courts, horseshoe areas, play courts, recreation center, athletic fields, trails, natural areas, amphitheaters, food concessions (vending, snack bar), access to water for fishing and boating, swimming areas and swimming pools, marina facilities owned by the public entity, parking, and campgrounds.

Public recreation, will not include residential use, cabins, or other overnight accommodations (other than campgrounds) except if a recreation area is owned by a state agency and operated as a component of a state park system in which case cabins and other overnight accommodations will be permitted, e.g., local, state, and federal parks and recreation areas.

Public recreation uses typically include areas and facilities owned and operated by the federal, state, county, or local government (municipalities/communities) and in some cases by park and school districts. However, private entities may operate recreation facilities on public property as concessionaires under agreement with the public entity controlling the property. Recreation uses may be structured and formal or unstructured and informal. These may be offered free or for a fee. This does not allow for public/private partnership where facilities are owned by private investors. All structures and facilities should be owned by the public entity.

Commercial Recreation – is defined as recreation amenities that are provided for a fee to the public intending to produce a profit for the owner/operator. These primarily water-based facilities typically include: marinas and affiliated support facilities like restaurants

and lodges; campgrounds; cabins; military vessel attractions; and excursion tour vessels (restaurant on the water). These uses and activities can be accommodated through changes in existing conveyance agreements. These areas do not include residential use, long-term accommodations or individually owned units. Where applicable, TVA will request appropriate compensation for use of the property.

Greenways – e.g., linear parks or developed trails 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.

Zone 7 - Shoreline Access

TVA-owned land where Section 26a applications and other land use approvals for private shoreline alterations are considered. Requests for private 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 for in the SMP, shoreline access would be divided into three categories based on the presence of sensitive ecological resources and navigation restrictions. The categories are: (1) Shoreline Protection, where no shoreline access alterations would be permitted; (2) Shoreline Access Mitigation, where special analysis would be needed; and (3) Managed Shoreline Access, where no known sensitive resources exist. Types of development/management that can occur on this land are:

- ***Private water use facilities***, e.g., docks, piers, launching ramps/driveways, marine railways, boathouses, enclosed storage space, and nonpotable water intakes.
- ***Shoreline 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 shoreline access shoreland.
- ***Conservation easements*** for protection of the shoreline.
- ***Other activities***, e.g., fill, excavation, grading, etc.

C. Project Descriptions

The preferred Alternative (Modified Alternative B - Table 1) would continue to provide suitable economic and recreation opportunities as prescribed by the TVA Land Policy and the minor changes from the 2005 Draft Land Plan would be included. When compared to the original Alternative B this Modified Development and Recreation Alternative would allocate less land to Zone 5 (Economic Development or Industrial) and more to Zones 3, 4, and 6 (Sensitive Resource Management, Natural Resource Conservation, and Developed Recreation) than the original Alternative B, but more than the original Alternative C.

Table 1. Proposed Land Uses for the 2007 Plan by Alternatives

Existing (1988) Allocation Categories	2007 Land Use Zones	Alternative A - No Action		Alternative B	
		Acres	%	Acres	%
Retained Developed[1] Previously Unplanned[2]	Zone 2 - Project Operations	3578	22%	4373	27%
Historic Preservation, Habitat Protection, Visual Management and Protection, Small Wild Areas	Zone 3 -Sensitive Resource Management	3474	21%	3781	23%
Wildlife Management Forest Management Agriculture, Open Space, Right-of-Way Protection	Zone 4 - Natural Resource Conservation	3357	21%	3854	24%
Industrial Sites, Barge Terminal Sites, Minor Landings, Fleeting Area, Industrial Access	Zone 5 -Economic Development	1531	9%	376	2%
Public Recreation, Commercial Recreation, Water Access, Informal Recreation	Zone 6 - Developed Recreation	2003	12%	1560	10%
Previously Unplanned[3]	Zone 7 - Shoreline Access	2303	14%	2302	14%
Total		16,246	100	16,246	100

Under the Preferred Alternative 3,781 acres of land could be allocated to sensitive resource management-type uses; 3,854 acres could be allocated to natural resource conservation-type uses. This results in an increase of 806 acres in these allocations when compared to the current plan. Less land would be allocated for industrial use (Zone 5) at the Lowe Branch site than under the No Action Alternative and the majority of the Former Breeder Site would be retained as Zone 2 - Project Operations or placed in a conservation buffer (Zone 4), resulting in a net reduction of 360 acres available for industrial-type uses. Three hundred and seventy-six (376) acres could be allocated to non-TVA industrial development uses; and 1,560 acres could be allocated to developed recreational use (a 443 acre reduction).

[1] Retained development - A TWRA maintenance area (9 acres) and Kingston Pumping Station (16 acres) are the only inclusions from the1988 Plan.
[2] Primarily consists of TVA project lands from dam and electric power plant reservations.
[3] Consists of TVA lands described as marginal strip in the 1988 Plan.

Table 2. Comparison of Acres Allocated to Sensitive and Natural Resource Uses

Modified Alternative	Allocation	Acres
Alternative A - No Action Alternative	Historic Preservation, Habitat Protection, Visual Management and Protection, Small Wild Areas, Wildlife Management, Forest Management, Agriculture, Open Space, Right-of-Way Protection	6,831
Alternative B - Preferred Alternative	Zone 3 – Sensitive Resource Management Zone 4 – Natural Resource Conservation	7,635

Under the preferred alternative, TVA would continue to conduct individual environmental reviews prior to the approval of any proposed development or activity on public land to address site-specific issues. This alternative would guide TVA resource management and property administration decisions on the TVA public land surrounding Watts Bar Reservoir until the Land Plan is revised in the future, which is expected to be about 10 years.

D. Projected Future Land Use

Future land use on TVA-owned or controlled parcels on Watts Bar Reservoir would be guided by decisions made in this Land Plan. The primary land use on Watts Bar Reservoir (on TVA lands and privately held lands) is expected to be residential development (47% of available shoreline). One large tract; the Lowes Branch Industrial site would likely be developed for industrial uses under the preferred alternative. Several other small parcels (all <10 acres) would also be developed for industry. The former Clinch River Breeder site had been proposed for industrial development in the Draft 2007 Land Plan, but would be retained by TVA as part of its Project Operations (Zone 2) lands in the final Land Plan. The majority of remaining available shoreline is designated for resource protection, natural resource conservation, managed recreation, and project operations lands. This lands plan allocates uses for land under TVA control and considers impacts to private land.

E. Project Area

This biological assessment is to address planning of the approximately 16,200 acres of TVA public land on Watts Bar Reservoir in Loudon, Meigs, Rhea, and Roane counties, Tennessee and the streams, rivers and reservoirs immediately adjacent to these public lands. In addition to the lands that will actually be managed under this plan, potential direct, indirect, and cumulative impacts to receiving waters within the Watts Bar watershed will be addressed. Waterbodies discussed include; segments of the Clinch River from its confluence with the Tennessee River upstream to Melton Hill Dam (CRM 22.0), the Emory River from its confluence with upstream to river mile 11.0, and the Tennessee River from TRM 516 (downstream of Watts Bar Dam) upstream to Ft. Loudoun Dam (TRM 602). These areas (and specific parcels mentioned in the discussion) and their relationship to the river miles listed above can be seen on the maps included with the draft Land Plan (Panels 1-4).

Lands that are not under TVA control (non-TVA lands) are not considered part of the planning process and will not be analyzed with regard to direct or indirect effects. Non-TVA lands will be discussed as they relate to cumulative effects on protected species. TVA proposes no actions for lands not under its control (non-TVA Land) and these lands are not part of the planning process. Impacts to non-TVA lands will be discussed as they pertain to TVA actions on TVA controlled land.

Status of Species and Critical Habitat -
This section describes the occurrence of federally listed species and designated critical habitat segments in areas potentially affected by land use authorized under this Lands Plan. Species accounts, including current range-wide status of these species, species trends, and habitat and biological requirements for these species are included in Appendix A. Species occurrence data and status information discussions are summarized from data in the TVA Natural Heritage database.

Table 3. Federally listed species currently known to occur in Loudon, Meigs, Rhea, or Roane County, Tennessee. The project area is defined as those parcels of TVA-owned or controlled land considered as part of this planning process or areas directly or indirectly affected by development or use of these parcels.

Common Name	Scientific Name	Federal Status	Reported from the Project Area since 1980?
Plants			
Virginia spirea	*Spirea virginiana*	Threatened	No
Cumberland rosemary	*Conradina verticillata*	Threatened	No
Mussels			
Fanshell	*Cyprogenia stegaria*	Endangered	Yes
Rough pigtoe	*Pleurobema plenum*	Endangered	Yes
Pink mucket	*Lampsilis abrupta*	Endangered	Yes
Shiny pigtoe	*Fusconaia cor*	Endangered	No
Orangefoot pimpleback	*Plethobasus cooperianus*	Endangered	Yes
Fish			
Snail darter	*Percina tanasi*	Threatened	Yes
Spotfin chub	*Erimonax monachus*	Threatened	No
Mammals			
Gray bat	*Myotis grisescens*	Endangered	Yes

Plants
At present, no populations of plants listed under the ESA as threatened or endangered are known to occur on or immediately adjacent to Watts Bar Reservoir lands. Four populations of Virginia spirea and one population of Cumberland rosemary occur within one mile of the reservoir on the Emory River. However, all of the land parcels in this area non-TVA lands and are not included in this planning process. In addition, there is a historical record of American hart's tongue fern, last observed in 1849 in a cave approximately two miles west of Caney Creek. This species is no longer known from within the project area.

Mussels

Individuals or populations of federally listed mussels are present in three areas within the project area; the mainstem of the Clinch River between Melton Hill Dam and Poplar Creek (CRM 22 - CRM 12), the mainstem of the Tennessee River downstream of Loudoun Dam (TRM 602 - TRM 588), and the mainstem of the Tennessee River downstream of Watts Bar Dam (TRM 530 - TRM 516).

Clinch River - Melton Hill tailwater

One federally listed mussel (pink mucket) and one federal candidate species (sheepnose) occur in the Clinch River downstream of Melton Hill Dam. Surveys in the Clinch River have resulted in the collection of only a few, older individuals of these species. Relict shells of several other federally listed or candidate species (fanshell, ring pink, orangefoot pimpleback, shiny pigtoe, fine-rayed pigtoe, and Alabama lampmussel) have been collected from this reach, but no live individuals have been reported.

Land designations in this reach are primarily Zone 3 - Sensitive Resource Management, Zone 4 - Natural Resource Conservation, or Zone 1 - non-TVA land. The former Clinch River Breeder Reactor Site (Breeder Site) would be designated as Zone 2 - Project Operations. This site would be completely surrounded by a conservation buffer between the Breeder Site and the Clinch River. With this buffer Parcel 145 will be reduced by approximately 100 acres. This "buffer" will be included in parcel 144. Two small areas (< 25 acres) in this reach are designated as Zone 7 - Shoreline Access and one campground (~ 12 acres) is designated as Zone 6 - Developed Recreation. These areas are located in embayments of Watts Bar Reservoir and not on the main channel of the Clinch River where federally listed mussels are present.

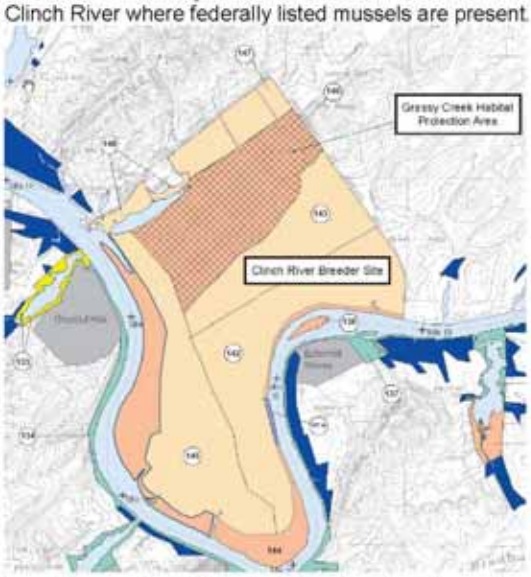

Figure 2. Map of Clinch River Breeder site and associated conservation buffer (Parcel 144).

Tennessee River - Ft. Loudoun Tailwater
Individuals of the pink mucket and orangefoot pimpleback mussels have been collected from the mainstem of the Tennessee River downstream of Ft. Loudoun Dam. While individual mussels were collected in the area, they were older specimens, and no evidence of reproduction or of a viable population of the species has been seen in the Ft. Loudoun Dam tailwater. Habitat alteration due to impoundment and displacement of host fish for these species has likely rendered these areas permanently unsuitable for future reproduction the pink mucket or orangefoot pimpleback. Most of the parcels in this area are non-TVA lands and will not be part of this planning process. The remaining parcels are assigned to Zone 3 - Sensitive Resource Management or Zone 4 - Natural Resource Conservation, with the exception of a small park operated by the City of Loudoun (Steekee Creek Park).

Tennessee River - Watts Bar Tailwater
Populations of the fanshell, rough pigtoe and pink mucket mussel are present in the mainstem of the Tennessee River downstream of Watts Bar Dam. Relict shells of the dromedary pearlymussel have also been collected from this reach. All parcels adjacent to these populations are currently designated as Zone 2 - Project Operations and are part of the Watts Bar Dam Reservation. No changes in designation are proposed for these parcels.

Fish
Tennessee River
The snail darter occurs in Sewee Creek, downstream of Watts Bar Dam, and is present in the mainstem of the Tennessee River downstream of the dam. All parcels adjacent to this population are currently designated as Zone 2 - Project Operations and are part of the Watts Bar Dam Reservation or are part of the Watts Bar Nuclear site. No changes in designation are proposed for these parcels.

Snail darters are also present in the mainstem of the Tennessee River downstream of Ft. Loudoun Dam. Most of the parcels in this area are non-TVA lands and will not be part of this planning process. The remaining parcels are assigned to Zone 3 - Sensitive Resource Management or Zone 4 - Natural Resource Conservation, with the exception of a small park operated by the City of Loudoun (Steekee Creek Park).

Emory River/Clinch River system
A stable population of the spotfin chub is present in the Emory River. This species is generally intolerant of reservoir conditions but may be occasionally found in the Emory River embayment of Watts Bar Reservoir. Spotfin chubs have only been collected upstream of Emory River Mile 13, in areas relatively unaffected by the impoundment. Only non-TVA parcels are located in this area. One specimen of spotfin chub was collected from the Poplar Creek drainage in 2003. The mouth of Poplar Creek is approximately 8 miles upstream from the mouth of the Emory River. This species has not been reported in subsequent collections and the single specimen reported is likely an individual that dispersed upstream from the Emory River population. It is the opinion of TVA biologists that a viable population of spotfin chub is not present in the Poplar Creek system.

Mammals

Gray bats roost in caves and forage over open water habitats. They have been reported from six caves within the vicinity of Watts Bar Reservoir. Only one of these caves is located on Watts Bar Reservoir land. Results of recent TVA surveys at this cave indicate that gray bats roost at this site on a transitional basis during spring and fall migration. This parcel containing this cave is designated as Zone 3 - Sensitive Resources Management and is included as part of the Marble Bluff Habitat Protection Area.

Designated Critical Habitat Segments

The Emory River is designated as critical habitat for the spotfin chub, beginning at approximately RM 14.6 and extending upstream in the system. No lands available for planning are present within or adjacent to the designated critical habitat segments.

IV. Environmental Baseline

Much of the environmental baseline for these species in the Tennessee River system is discussed in the 2005 TVA Biological Assessment titled 'Routine Operations and Maintenance of TVA's Water Control Structures in the Tennessee River Watershed' (TVA 2005). Many of the rivers in the Tennessee River drainage have been significantly modified from their original condition through impoundment and channel modifications designed to facilitate navigation. Specific conditions for federally listed species present in the Watts Bar project area are discussed below.

Plants
As described above, no federally listed plants are known from within the project area.

Mussels
Clinch River - Melton Hill tailwater
Pink mucket and sheepnose mussels are represented in this area by only a few, older individuals of these species. No evidence of reproduction has been seen in these populations, and mussel densities are extremely low. While live individuals of these species persist, it is not likely that a viable population of these species is present in this reach of the Clinch River. Habitat alteration (including impoundment of Watts Bar Reservoir, Melton Hill Reservoir and Ft. Loudoun Reservoir, cold water releases from Norris Reservoir and subsequent displacement of host fish for these species) has likely rendered these areas unsuitable for successful reproduction of these species (TVA 2005).

Relict shells of several other federally listed or candidate species (fanshell, ring pink, orangefoot pimpleback, shiny pigtoe, fine-rayed pigtoe, and Alabama lampmussel) have been collected from this reach, but no live individuals have been reported.

Tennessee River - Ft. Loudoun Tailwater
Individuals of the pink mucket and orangefoot pimpleback mussels have been collected from the mainstem of the Tennessee River downstream of Ft. Loudoun Dam. While individual mussels were collected in the area, they were older specimens, and no evidence of reproduction or of a viable population of the species was seen in the Ft.

Loudoun Dam tailwater. Habitat alteration due to impoundment of Watts Bar Reservoir and Ft. Loudoun Reservoir and subsequent displacement of host fish for these species has likely rendered these areas unsuitable for successful reproduction of the pink mucket or orangefoot pimpleback in these areas (TVA 2005).

Tennessee River - Watts Bar Tailwater

Populations of the fanshell, rough pigtoe and pink mucket mussel are present in the mainstem of the Tennessee River downstream of Watts Bar Dam. There is evidence that some more common mussel species are reproducing in this reach of the Tennessee River and that conditions might be suitable for reproduction of these listed species. Populations of common mussels seem to be relatively stable, and there are no significant threats to the remaining mussel resources in the Watts Bar tailwater. Relict shells of the dromedary pearlymussel have also been collected from this reach but it is not likely that a viable population of this species exists in the Watts Bar tailwater (TVA 2005).

Fish

Snail darters are known from Sewee Creek, downstream of Watts Bar Dam, and specimens have been collected from the mainstem of the Tennessee River downstream of Watts Bar. The Sewee Creek population has persisted since at least the early 1980's and the population in Sewee Creek and the Tennessee River downstream of Watts Bar Dam appear to be stable.

Snail darters are also known from the Tennessee River arm of Watts Bar Reservoir downstream of Ft. Loudoun Dam. Habitat conditions are marginal for this species in the area, and the occurrences of snail darter in the Ft. Loudoun tailwater may be the result of downstream drift of young from good populations of this species in French Broad and Holston Rivers. It is difficult to adequately survey areas downstream of Ft. Loudoun Dam. Therefor, the size and viability of this population has not been assessed.

A stable population of the spotfin chub is present in the Emory River. A single specimen of spotfin chub collected from the Poplar Creek drainage by Department of Energy (DOE) biologists in 2003 is likely a fluke occurrence. In spite of numerous, regular surveys in Poplar Creek, spotfin chubs have not been encountered, with the exception of the specimen collected in 2003. Streams in the Poplar Creek system are seriously impacted by past land use, and contaminant issues stemming from the Oak Ridge National Laboratories (ORNL) complex. Habitat conditions are poor and this system does not appear to support a viable population of spotfin chubs.

Mammal

Gray bats roost in caves and forage over open water habitats. They have been reported from six caves within the vicinity of Watts Bar Reservoir. Only one of these caves is located on Watts Bar Reservoir land. Results of recent surveys at this cave indicate that gray bats roost at this site on a transitional basis during spring and fall migration. This parcel is designated as Zone 3 - Sensitive Resources Management and is part of the Marble Bluff Habitat Protection Area.

V. Effects of the Action

Watts Bar LMP Effects Matrix

The following effects matrix (Table 4) shows future potential land actions that may be facilitated by Land Planning Zone designations resulting from the Land Plan. Each potential use is assigned either a 'Low', 'Medium', or 'High' potential to adversely affect listed species, and a 'Low', 'Medium', or 'High' potential to benefit listed species. If no species are present in areas that could see a potential future use (or areas that could be affected by that use) they are assigned a 'Low' potential for both adverse effects and beneficial effects. As an example: No species are present on or adjacent to Zone 2 - Project Operations - land adjacent to existing navigation operations. Therefore lands in this classification are assigned both a 'Low' potential to adversely affect listed species, and a 'Low' potential to benefit listed species. These potential future uses are not addressed in detail in the Biological Assessment (BA).

Lands that have federally listed species on or adjacent to them and have a 'Low' potential to adversely effect listed species and/or a 'Low' potential to benefit listed species are likewise not addressed in further detail in the BA.

Lands where federally listed species are known or likely to occur are addressed in more detail in the BA if a Land Use has a 'Medium' or 'High' potential to affect listed species, or a 'Medium' or 'High' potential to benefit listed. The majority of these areas identified would have primarily beneficial effects (Zones 3 and 4). The other areas where planned Land Use would have a 'Medium' potential to affect listed species occur within or adjacent to Zone 2 - Project Operations parcels (particularly the Former Breeder Site on the Clinch River).

Zone 1 (non-TVA Lands) are included in the matrix, but because TVA does not have control over planning of future land use on these parcels, they are not directly addressed as part of the BA. Potential future actions on non-TVA lands could have 'Low', 'Medium', or 'High' potential to either adversely affect, or benefit federally listed species. Some, but not all, of these actions would be subject to future review by TVA as part of the 26a permitting process.

Table 4. Matrix of Potential Land Actions resulting from Parcel Allocation and Potential Effects to Listed Species.

	Land Use and Potential Land Actions	Land Zoned For This Use in the Vicinity of Federally Listed Species Occurrences?	Potential To Adversely Affect Federally Listed Species or Habitat - High, Medium, Low	Potential to Benefit Federally Listed Species or Habitat - High, Medium, Low
Zone 1 - Non TVA Shoreland				
	Flowage easement land	Yes- but these lands are not under direct or indirect TVA control, and are not considered "plannable"	Low, Medium, High	Low, Medium, High
	Privately owned reservoir land	Yes- but these lands are not under direct or indirect TVA control, and are not considered "plannable"	Low, Medium, High	Low, Medium, High
Zone 2 - Project Operations				
	Land adjacent to established navigation operations	No	Low	Low
	Land used for TVA power projects operations	Yes - Ft. Loudoun Tailwater, Watts Bar Tailwater, Clinch River (Old Breeder Site)	Medium	Low
	Dam reservation land	Yes - Ft. Loudoun Tailwater, Watts Bar Tailwater	Low	Low
	Navigation safety harbors/landings	Yes - Ft. Loudoun Tailwater, Watts Bar Tailwater, Clinch River (Old Breeder Site)	Low	Low
	Navigation dayboards and beacons	Yes - Ft. Loudoun Tailwater, Watts Bar Tailwater, Clinch River (Old Breeder Site)	Low	Low
	Public works projects	No	Low	Low
Zone 3 - Sensitive Resource Management				
	Significant archaeological resources	Yes - Ft. Loudoun Tailwater, Watts Bar Tailwater, Clinch River (Old Breeder Site)	Low	Medium - indirect benefits from development restrictions

	Land Use and Potential Land Actions	Land Zoned For This Use in the Vicinity of Federally Listed Species Occurrences?	Potential To Adversely Affect Federally Listed Species or Habitat - High, Medium, Low	Potential to Benefit Federally Listed Species or Habitat - High, Medium, Low
	Sites/structures listed on or eligible for listing on the National Register of Historic Places	No	Low	Low
	Wetlands	Yes - Ft. Loudoun Tailwater, Watts Bar Tailwater, Clinch River (Old Breeder Site)	Low	Medium - indirect benefits from development restrictions
	TVA public land under easement, lease, or license to other agencies/individuals for resource protection purposes	Yes - Gray bats in vicinity of Paint Rock Wildlife Refuge	Low	Medium, High - direct and indirect benefits from management activities
	TVA public land fronting land owned by other agencies/ individuals for resource protection purposes	Yes - Gray bats in vicinity of Paint Rock Wildlife Refuge	Low	Medium, High - direct and indirect benefits from management activities
	Habitat Protection Areas	Yes - Gray Bats - Marble Bluff HPA	Low	Medium, High - direct and indirect benefits from management activities
	Ecological Study Areas	No	Low	Low
	Small Wild Areas	No	Low	Low
	River corridor with sensitive resources	Yes - Clinch River	Low	Medium, High - direct and indirect benefits from management activities
	Significant scenic areas	No	Low	Low
	Champion tree sites	No	Low	Low
Zone 4 - Natural Resource Conservation				
	TVA public land under easement, lease, or license to other agencies for wildlife or forest management purposes	Yes - Gray bats in vicinity of Paint Rock Wildlife Refuge	Low	Low, Medium - some forest management practices may benefit some species
	TVA public land fronting land owned by other agencies for wildlife or forest management purposes	Yes - Gray bats in vicinity of Paint Rock Wildlife Refuge	Low	Low, Medium - some forest management practices may benefit some species

	Land Use and Potential Land Actions	Land Zoned For This Use in the Vicinity of Federally Listed Species Occurrences?	Potential To Adversely Affect Federally Listed Species or Habitat - High, Medium, Low	Potential to Benefit Federally Listed Species or Habitat - High, Medium, Low
	TVA public land managed for wildlife or forest management projects	No	Low	Low
	Informal recreation areas	Yes	Low	Low
	Shoreline Conservation Areas	Yes	Low	Medium, High - direct and indirect benefits from management activities
	Wildlife Observation Areas	No	Low	Low
	River corridor without sensitive resources present	No	Low	Low
	Islands of 10 acres or less	Yes	Low	Low
Zone 5 - Industrial				
	Access for water supply or structures associated with navigation such as barge terminal, mooring cell, etc	No	Low	Low
	Land-based development potential	No	Low	Low
	TVA public land under easement, lease, or license to other agencies/individuals for purposes described above	No	Low	Low
	TVA public land fronting land owned by other agencies/individuals for industrial purposes described above	No	Low	Low
	Sites planned for future use supporting sustainable development	No	Low	Low
	Business Parks	No	Low	Low
	Industrial access	No	Low	Low
	Barge terminal sites	No	Low	Low
	Fleeting areas	Yes†	Low, Medium - potential impacts from operation of fleeting areas	Low

	Land Use and Potential Land Actions	Land Zoned For This Use in the Vicinity of Federally Listed Species Occurrences?	Potential To Adversely Affect Federally Listed Species or Habitat - High, Medium, Low	Potential to Benefit Federally Listed Species or Habitat - High, Medium, Low
	Minor commercial landing	No	Low	Low
Zone 6 - Developed Recreation				
	TVA public land under easement, lease, or license to other agencies/individuals for recreational purposes	Yes - Ft. Loudoun Tailwater	Low - Public Park, no planned expansion to this site	Low
	TVA public land fronting land owned by other agencies/individuals for recreational purposes	No	Low	Low
	TVA public land developed for recreational purposes, such as campgrounds, day use areas, etc	No	Low	Low
	Water access	Yes - Ft. Loudoun Tailwater	Low - Public Park, no planned expansion to this site	Low
	Public recreation **Commercial Recreation**	Yes - Ft. Loudoun Tailwater No	Low - Public Park, no planned expansion to this site Low	Low Low
	Greenways	No	Low	Low
Zone 7 - Shoreline Access				
	Private water use facilities	No	Low	Low
	Shoreline access corridors	No	Low	Low
	Shoreline stabilization	No	Low	Low

	Land Use and Potential Land Actions	Land Zoned For This Use in the Vicinity of Federally Listed Species Occurrences?	Potential To Adversely Affect Federally Listed Species or Habitat - High, Medium, Low	Potential to Benefit Federally Listed Species or Habitat - High, Medium, Low
	Shoreline vegetation management	No	Low	Low
	Conservation easements	No	Low	Low
	Other activities, e.g., fill, excavation, grading, etc.	No	Low	Low

Terrestrial Resources

Because the actions resulting from this land plan directly affect land use, the potential for direct effects on terrestrial resources is greater than to aquatic resources. The fact that only one listed terrestrial species (gray bat) is known to be present on or adjacent to lands being planned minimizes that potential. TVA policy regarding protection of natural resources would further reduce that potential. Under the Preferred Alternative, approximately 47% of the shoreline being planned would be assigned to Zone 3 - Sensitive Resource Management or Zone 4 - Natural Resources Conservation. Any future proposals for Industrial, Residential, or Developed Recreational developments on TVA lands would be reviewed to consider potential adverse effects on terrestrial resources and ensure that any adverse effects are minimized or eliminated.

Plants

Because no federally listed plants or designated critical habitat segments are present in areas that could be affected by land use on Watts Bar Reservoir lands, no direct, indirect, or cumulative impacts to federally listed plants or their habitats would occur as a result of TVA Lands Planning.

Mammals

Direct Effects - The one cave on Watts Bar Reservoir known to support gray bats is located on TVA land that has been designated as Zone - 3 - Sensitive Resource Management. This site has been determined to be used only on a transitional basis during the spring and fall migration. This area is afforded further protection by being designated as part of the Marble Bluff Habitat Protection Area by TVA. No commercial, residential, or industrial development would be allowed in the vicinity of this cave. Because gray bats forage over water, land management activities would have no direct impacts to gray bats.

Indirect Effects - Shoreline development and associated clearing of riparian areas on TVA lands along the Watts Bar shoreline could indirectly affect gray bats by having negative effects on reservoir water quality and reservoir aquatic insect populations that

serve as a food base for gray bats. All future land use actions would be subject to environmental review under Section 26a of the TVA Act, and all appropriate Best Management Practices (BMPs) would be employed to minimize potential effects on reservoir water quality. In addition, the only cave known to be used by gray bats on Watts Bar Reservoir is in close proximity to the Paint Rock Wildlife Refuge. Restrictions on development in the refuge would also protect reservoir water quality and aquatic insect populations and therefore protect gray bats using this transitional cave.

Cumulative Effects - Under either alternative, shoreline development could occur in many non-TVA lands along Watts Bar Reservoir. This development has the same potential to affect gray bats as would development on TVA lands. Development on non-TVA lands is expected to be primarily residential. As with future actions on TVA lands many of these development actions would be subject to review under Section 26a of the TVA Act. TVA would require the same BMPs for residential development permitted under 26a as would be required on TVA lands. Even if these developments are not subject to 26a review, there would still be subject to other State and Federal permitting requirements (e.g. ARAP, 404, etc.) Potential impacts to gray bats and essential habitat (including the food base) would be minimized as a result of the permitting process.

Aquatic Resources

Current habitat conditions in Watts Bar Reservoir and its tailwaters are driven more by the presence of the reservoir and its operation and the presence and operation of upstream reservoirs (Ft. Loudoun, Melton Hill, and Norris) than by surrounding land use (TVA 2005). However, certain types of land use can have definite, local adverse effects on water quality and habitat conditions. This is especially true when considering industrial and residential development.

Potential effects of Land Use Designations on surface quality and aquatic habitats

Direct and Indirect Effects

Zone 1 - Non-TVA Lands

Shoreland located above summer pool elevation that TVA does not own in fee or land never purchased by TVA but is subject to TVA's 26a approvals for structures. This includes flowage easement land which is privately or publicly owned land where TVA has purchased the right to flood and/or limit structures, and privately owned reservoir land which is land lying below the 500-year flood elevation that was never purchased by TVA .

Overall land use patterns can contribute to cumulative effects on listed species. The vast majority of non-TVA lands on Watts Bar are likely to be developed as residential properties. However, these lands are not under the control of TVA and are not considered directly as a part of this Biological Assessment.

Zone 2 - Project Operations **-** These lands are owned and controlled by TVA. For the most part, these lands consist of dam and electric power plant reservations. Only minor future activities would occur on these parcels currently designated as Zone 2 - Project Operations within the 10 year planning window. Management of the Lower Watts Bar Unit is addressed in an existing Environmental Assessment (TVA 2000). The proposed completion of the Watts Bar Unit 2 reactor was the subject of consultation with the FWS (TVA 2007). TVA determined that activities associated with completion of WBN Unit 2

are not likely to adversely affect listed species in this reach of the Tennessee River. FWS has concurred with these findings. Snail darter, fanshell, rough pigtoe, and pink mucket occur downstream of Watts Bar Dam adjacent to the Watts Bar Nuclear site. No significant future activities are planned for these parcels. No direct or indirect impacts to listed species would result from planned activities on existing TVA Project Operations lands at or downstream of Watts Bar Dam.

Former Clinch River Breeder Reactor site - (CRM 14.5 - 19.0) - In addition to the lands currently designated as Zone 2, the Clinch River Breeder site would be designated as Zone 2 in this Land Plan. TVA would retain this site for future use. No specific plans are proposed for this tract within the planning cycle for the Land Plan (10 years), but it is most likely that the land would be developed for TVA's industrial use. Some impacts to water quality, aquatic habitat, and listed species could occur depending upon the type of TVA project operations development that takes place. Any future development of this site would be subject to a further review under ESA and NEPA statutes.

The potential for impacts to listed aquatic species in the Clinch River from industrial development for TVA projects at this site would come primarily from development on a barge terminal adjacent to the site or from installation and use of a water intake (or intakes) and/or wastewater outfall(s) servicing the industrial site. All appropriate BMPs and stormwater controls would be used during any construction on this site. The area that would be developed at the Breeder Site is surrounded by a conservation buffer between the site and the Clinch River (Figure 2). Only limited development would occur within this buffer, and would consist of corridors across the buffer for access to water use facilities or for placement of water withdrawal or outfall structures. Future TVA development at this site could include any combination of water use facilities, or may not require access to the river or water use.

Water Intakes and water use

There is potential for the construction and operation of water withdrawal structures in this section of the Clinch River as a result of TVA's future use of the former Breeder Site for project operations. Impacts from construction of water withdrawal structures would be similar to those described for construction of a barge facility. All of the conditions outlined above would be employed during construction of water withdrawal structures. The 'footprint' of this construction would be much smaller and the potential for impacts would be correspondingly reduced.

Operational aspects of any proposed water intake (including consumptive use) would be analyzed for potential effects on federally listed species, and any avoidance or mitigation measures needed to protect listed species would be developed in consultation with the FWS.

Water Outfalls

Construction effects for stormwater or wastewater outfalls would be similar to those described for construction of a barge terminal or water intake. As with the construction of a water intake, the 'footprint' of the construction work would be relatively small, and the potential for impacts would be reduced when compared to construction of a barge terminal.

However, wastewater and stormwater discharges can contain constituents that have the potential to affect water quality and have an adverse effect on listed species. Any outfall

constructed on would be subject to NPDES permitting requirements and all other applicable State and Federal regulations. Compliance with conditions imposed during this permitting process and during the ESA consultation process for the proposed projects would ensure that no effects or only insignificant effects on listed species would occur as a result of discharges to the Clinch River from the Breeder Site. Any project specific avoidance or mitigation measures needed to protect listed species from potential effects arising from wastewater or stormwater discharges from this site would be developed in consultation with the FWS.

If TVA were to develop a industrial facilities at this site or at any other site in Zone 2, the following measures would be employed to minimize the potential for effects on federally listed species:

1. TVA would consult with USFWSFWS in order to determine if the proposed action could affect listed mussels present in the area
2. Pre-construction mussel surveys would be conducted in all areas of the Clinch River (Watts Bar Reservoir) that would be affected by construction and use of the terminalassociated infrastructure (e.g. barge terminal, water intakes or water outfalls)
3. Any listed mussels found during these surveys would be dealt with according to terms and conditions imposed as a result the consultation process. These could consist of minimization or avoidance measures implemented during construction and operation, or relocation of the mussels encountered if effects are unavoidable

With implementation of these conditions and appropriate BMPs, only relatively minor impacts to federally listed mussels in the Clinch River are expected to occur.

Zone 3 - Sensitive Resource Management and Zone 4 - Natural Resource Conservation - Because no development would be allowed on lands designated in these categories, these designations would serve to protect shoreline habitats and water quality in Watts Bar Reservoir. Under the Preferred Alternative, approximately 47% of the TVA lands would be protected by these designations on Watts Bar Reservoir. Maintenance of these lands under Zone 3 or Zone 4 would directly benefit water quality and indirectly benefit listed aquatic species present in these areas.

Zone 5 - Industrial - Approximately 376 acres (2%) of the land considered in the Land Plan would be designated for industrial development. One large parcel is of interest when considering potential effects on federally listed aquatic species. Approximately 280 acres in the Lowe Branch Embayment would be designated for industrial development. This area is located upstream of Watts Bar Dam. No listed species are present in the area, but snail darter, fanshell, rough pigtoe, and pink mucket occur downstream of Watts Bar Dam. Development of these parcels would be subject to all applicable State and Federal permitting requirements, including ESA consultation.

Potential effects on instream habitat and water quality resulting from industrial development on these parcels would be similar to those discussed concerning the Breeder Site under Zone 2 - Project Operations. Because no listed species are present on or adjacent to these parcels, no direct effects on federally listed species would occur as a result of industrial development on these sites. All future actions on these sites

would be subject to further review under the NEPA and ESA statutes, and any potential effects to listed species identified and addressed. Any industrial wastewater discharges from this site would be subject to appropriate State and Federal permit requirements. Development of this site for industrial purposes is not likely to adversely affect any federally listed aquatic organisms or their habitats.

The remainder of lands designated as Industrial are small <10 acres and identified as areas suitable for placement of a barge terminal to serve back-lying industrial development. No listed species are present on or adjacent to these sites.

Zone 6 - Developed Recreation - Approximately 1560 acres (10%) are designated for developed recreation. Pink mucket and orangefoot pimpleback mussels are potentially present adjacent to Parcel 99 in the Ft. Loudoun tailwater/ Upper Watts Bar Reservoir. Parcel 136 on the Clinch River is located in the Caney Creek embayment. Caney Creek joins the Clinch River within the area known to be occupied by pink mucket and sheepnose mussels. This embayment is impacted by siltation and does not contain suitable habitat for these mussels. Parcel 99 is currently used for public recreation, and no future changes in use are expected. Because no changes in current use would occur (Parcel 99), or no listed species or habitat suitable for these species is present (Parcel 136), no impacts to listed aquatic species or their habitats in the project area would occur as a result of land uses on these parcels.

Zone 7 - Shoreline Access - Approximately 2302 acres (14%) of TVA land are designated for shoreline access. There are no known occurrences of federally listed species in the vicinity of the vast majority of these shoreline access areas. Approximately 20 acres of shoreline access areas are available along the Clinch River. These areas are located in embayments of Watts Bar Reservoir. The Watts Bar Dam and Ft. Loudoun Dam tailwaters where snail darters and listed mussels occur do not contain any parcels designated for shoreline access. Potential impacts to pink mucket in the Clinch River are expected to be minor and insignificant. No impacts to species in the Watts Bar or Ft. Loudon tailwaters are expected.

VI. Effects from Interdependent and Interrelated Actions
No interdependent or interrelated actions were identified during this analysis.

VII. Effects Determinations

Virginia spirea (Spirea virginiana) - Threatened - No Effect
While this species is present in the Emory River (a tributary to Watts Bar Reservoir), no populations exists in areas that would be affected by land use activities addressed in the Watts Bar Land Management Plan.

Cumberland rosemary (Conradina verticillata) - Threatened - No Effect
While this species is present in the Emory River (a tributary to Watts Bar Reservoir), no populations exists in areas that would be affected by land use activities addressed in the Watts Bar Land Management Plan.

Fanshell (Cyprogenia stegaria) - Endangered - No Effect
This species is currently present in the mainstem of the Tennessee River downstream of Watts Bar Dam. All reasonably foreseeable actions on TVA Zone 2 - Project Operations

lands in the vicinity of these occurrences have been addressed in other consultations with FWS. No changes to land use on these parcels would occur as a result of this plan, and no future actions that could affect this species would result.

Rough pigtoe (Pleurobema plenum) - No Effect
This species is currently present in the mainstem of the Tennessee River downstream of Watts Bar Dam. All reasonably foreseeable actions on TVA Zone 2 - Project Operations lands in the vicinity of these occurrences have been addressed in other consultations with FWS. No changes to land use on these parcels would occur as a result of this plan, and no future actions that could affect this species would result within the planning horizon of this document (10 years).

Pink mucket (Lampsilis abrupta) - Endangered - May Effect, Not Likely to Adversely Affect
As described for the fanshell and rough pigtoe above, this species is currently present in the mainstem of the Tennessee River downstream of Watts Bar Dam. All reasonably foreseeable actions on TVA Zone 2 - Project Operations lands in the vicinity of these occurrences have been addressed in other consultations with FWS. No changes to land use on these parcels would occur as a result of this plan, and no future actions that could affect this species would result within the planning horizon of this document (10 years). This species also occurs in the vicinity of Zone 6 - Developed Recreation parcels in Watts Bar Reservoir downstream of Ft. Loudoun Dam and in the Clinch River (Caney Creek). Actions resulting from land use designation in these areas would have no effect on the pink mucket.

Development on the Breeder Site (Zone 2) adjacent to the Clinch River has the potential to affect this species. Future development on this site is not likely to adversely affect the pink mucket given the conditions stated.

Shiny Pigtoe (Fusconaia cor) - Endangered - No Effect
This species has historically been collected in the project area, but all populations are believed to be extirpated from the project area.

Orangefoot pimpleback (Plethobasus cooperianus) - Endangered - No Effect
This species also occurs in the vicinity of Zone 6 - Developed Recreation parcels in Watts Bar Reservoir downstream of Ft. Loudoun Dam. Actions resulting from land use designation in these areas would have no effect on the pink mucket.

Snail darter (Percina tanasi) - Threatened - No Effect
This species is currently present in the mainstem of the Tennessee River downstream of Watts Bar Dam and downstream of Ft. Loudoun Dam. No changes to land use on these areas would occur as a result of this plan, and no future actions that could affect this species would result.

Spotfin chub (Erimonax monachus) - Threatened - No Effect
While this species is present in the Emory River (a tributary to Watts Bar Reservoir), no populations exists in areas that would be affected by land use activities addressed in the Watts Bar Land Management Plan.

Gray bat (Myotis grisescens) - Endangered - No Effect

The one cave on Watts Bar Reservoir known to support gray bats is located on TVA land that has been designated as Zone - 3 - Sensitive Resource Management. This site has been determined to be used only on a transitional basis during the spring and fall migration. No effects to gray bats are expected to result from this action.

Designated Critical Habitat for the spotfin chub - Emory and Obed rivers - No Adverse Modification would occur
None of the parcels that were considered in the Land Plan are located adjacent to or upstream of this critical habitat area. No effects on critical habitat for the spotfin chub in the Emory or Obed River would result.

VIII. Conclusions
Because this Land Plan is a programmatic document it considers the assignment of broad use zones or activities to parcels of TVA controlled land. It does not consider any specific potential future actions that might occur on planned lands as a result of the assignment of these use zones. These future actions, should they occur, will be considered in appropriate future environmental review and FWS would be consulted as appropriate. However, a range of potential effects can be identified for these use zones and potential future impacts to endangered species are addressed in the BA. Federally listed species are only found in three areas that could be affected by land actions addressed in the Land Plan; the Clinch River downstream of Melton Hill Dam, downstream of Ft. Loudoun Dam, and downstream of Watts Bar Dam.

Under the Preferred Alternative 3,781 acres of land would be allocated to sensitive resource management-type uses; 3,854 acres would be allocated to natural resource conservation-type uses. This results in an increase of 806 acres in these allocations when compared to the existing (1988) plan (No Action Alternative). Less land would be allocated for industrial use (Zone 5) at the Lowe Branch site than under the No Action Alternative and the majority of the Former Breeder Site would be retained as Zone 2 - Project Operations or placed in a conservation buffer (Zone 4), resulting in a net reduction of 360 acres available for industrial-type uses. Three hundred and seventy-six (376) acres could be allocated to non-TVA industrial development uses; and 1,560 acres could be allocated to developed recreational use (a 443 acre reduction).

Zone 1 - Non-TVA Shoreland parcels are not under the direct control of TVA and are not addressed as part of the Land Plan. Lands designated as Zone 3 - Sensitive Resource Management and Zone 4 - Natural Resource Conservation parcels are designated to protect sensitive state- or federally listed species, important cultural resources and other natural resources. Placement of parcels into these categories would benefit listed species. Few or none of the federally listed species known in the project area are found within or in areas that could be affected by land use on Zone 6 - Developed Recreation or Zone 7 - Shoreline Access parcels. Therefore, land use on Zone 6 and Zone 7 parcels has little or no potential to adversely affect federally listed species.

The highest potential for impacts to listed species occurs on lands designated as Zone 2 - Project Operations or Zone 5 - Industrial. The majority of these parcels are either located in areas where no listed species are found (most Zone 5 parcels), or have no future actions that would occur within the planning cycle (10 years) of the Land Plan.

The one exception to this is the Breeder Site on the Clinch River. Because TVA is retaining this parcel as Zone 2 - Project Operations, it has much more control over potential future activities on the Breeder Site. Any future action potentially affecting a threatened or endangered species would be the subject of consultation with FWS, and project specific avoidance or mitigation measures would be developed as a part of that consultation.

The overall increase in lands designated for resource protection (Zones 3 and 4), and the reduction in land available for industrial uses (Zones 2 and 6) would likely provide a net benefit to federally listed species in the project area when compared to the current land plan.

TVA has determined that there would be no effect on the two plants present in the project area; Virginia spirea and Cumberland rosemary, four of the five mussels; fanshell, rough pigtoe, shiny pigtoe, and orangefoot pimpleback, the two fish; snail darter and spotfin chub, and the one mammal; gray bat. TVA has determined that this project is not likely to adversely affect the pink mucket. This project would not result in adverse modification of designated critical habitat for the spotfin chub in the Obed or Emory Rivers.

References

Tennessee Valley Authority. 1949. *The Watts Bar Project.* Technical Report No. 9. Washington, D.C.: Government Printing Office.

_____. 1988. *Watts Bar Reservoir Land Management Plan.*

_____. 1998. *Shoreline Management Initiative: An Assessment of Residential Shoreline Development Impacts in the Tennessee Valley Final Environmental Impact Statement.* Norris: TVA Land Management.

_____. 1999b. *Agricultural Lands Licensing for 1999 Through 2003 Crop Years for Fontana, Fort Loudoun, Melton Hill, Tellico, and Watts Bar Reservoirs Environmental Assessment.*

_____. 2000. *Resource Management Plan and Final Environmental Assessment: Lower Watts Bar Management Unit, Watts Bar Reservoir.* Norris: TVA Resource Stewardship.

_____. 2001a. *Modernization of Turbines at Watts Bar Hydro Plant, Rhea County, Tennessee, Environmental Assessment.*

_____. 2001b *Proposed Issuance of Regulations Under Section 26a of the TVA Act for Nonnavigable Houseboats, Storage Tanks, Marina Sewage Pump-Out Stations, Wastewater Outfalls and Septic Systems, and Development Within*

_____. 2004. *Reservoir Operations Study Final Environmental Impact Statement.* Technical Documentation, Knoxville, Tennessee.

_____. 2005a. *Watts Bar Reservoir Land Management Plan and Draft Environmental Impact Statement.*

_____. 2005b. *Routine Operations and Maintenance of TVA's Water Control Structures in the Tennessee River Watershed. Biological Assessment Submitted to FWS, Cookeville, TN.*

_____. 2007. *Completion of Watts Bar Nuclear Plant Unit 2, Rhea County, Tennessee, Supplemental Environmental Impact Statement and Record of Decision*

U.S. Department of Energy. 1995. *Record of Decision for the Lower Watts Bar Reservoir.* Prepared in Accordance With Requirements Under the Comprehensive Environmental Response, Compensation, and Liability Act.

_____. 2000. *Sale of Boeing Land Environmental Assessment.*

Appendix A. Species Accounts

Conradina verticillata Jennison
Cumberland Rosemary

Cumberland rosemary (*Conradina verticillata*), was listed as threatened in 1991 because of the small number of populations as well as the known threats to the species survival (FWS 1991). This small evergreen shrub of the mint family grows on seasonally inundated banks, gravel and boulder bars, and on over sandstone bedrock along swift Cumberland Plateau streams in Tennessee and Kentucky (Kral 1983, FWS 1996).

Cumberland rosemary's distribution is comprised of 91 extant occurrences, which are concentrated among three distinct population centers: (1) Big South Fork River and its tributaries in Morgan, Scott, and Fentress Counties, TN and McCreary County, KY; (2) Obed River in Morgan and Cumberland Counties, TN; and (3) Caney Fork River in Cumberland and White Counties, TN. One colony in McCreary County, KY is considered extirpated (FWS 1996). Critical habitat has not been designated for this plant. In general, this species appears to be stable (FWS 2003).

The species reproduces almost entirely by clonal spread and stem longevity (FWS 1996). When stems become disconnected during winter floods, fragments of the plant wash downstream and colonize new places. Sexual reproduction rarely occurs: it has been estimated that as few as 10 percent of seeds are fully developed and fertile (FWS 1996). Of these, germination is very low. Furthermore, even when seedlings are produced, summer drought and winter floods may play a significant role in preventing their long-term survival.

The only known cause of extirpation is inundation as a result of reservoir construction for recreational or hydroelectric purposes (FWS 1996). Although intolerant of prolonged inundation, the species is dependent upon yearly flooding that may reduce or eliminate competing vegetation along and in stream corridors. Additional threats include destruction of plants and habitat by campers, horseback riders, ATVs, and white-water rafters (FWS 1996). The mining of coal and exploration of gas and oil in the area may also adversely affect the species because those activities contribute to water pollution through sediment and fragment deposition and the leaching of chemicals from those particles (FWS 1996).

Cumberland Rosemary References:

Kral, R. 1983. A report on some rare, threatened or endangered forest-related vascular plants of the South. USDA Forest Service Technical Publication R8-TP2. 2 volumes, 1,305 pages.

U.S. Fish and Wildlife Service. 1991. Endangered and threatened wildlife and plants; *Conradina verticillata* determined to be threatened. *Federal Register*, 56(230): 60937-60941.

U.S. Fish and Wildlife Service. 1996. Cumberland rosemary recovery plan. U.S. Fish and Wildlife Service, Atlanta, Georgia, 42 pages.

U.S. Fish & Wildlife Service. 2003. Summary report to congress on the recovery program for threatened and endangered species, 1998 and 2000. U.S. Fish and Wildlife Service, Washington, DC, 35 pages.

Spiraea virginiana Britton
Virginia Spiraea

Virginia spiraea (*Spiraea virginiana*), listed as threatened in 1990, is a rare shrub that inhabits frequently disturbed, high gradient sections of second and third order streams (FWS 1990). It occurs "within the southern Blue Ridge and Appalachian (Cumberland) Plateaus physiographic provinces in the headwaters, or just over the divide, of streams that flow to the Ohio drainage basin" (FWS 1992). Historically, the species was known to occur in 39 populations in nine states ranging from southwestern Pennsylvania and south-central Ohio southwest along the Appalachian highlands to northwestern Georgia, with outlier sites in northwestern Alabama and central Kentucky (FWS 1992). Critical habitat has not been designated for this species.

Virginia spiraea is no longer known to occur in Alabama or Pennsylvania and several populations in the other states have been extirpated. The only documented cause of extirpation of *Spiraea virginiana* has been human activity (FWS 1992). These actions include the impoundment of streams, road construction activities, and development. The species' present distribution includes 31 populations in seven states. Most of these populations are protected and are stable (FWS 2003).

Populations of Virginia spiraea face several natural threats, in addition to human activities. The species exhibits poor capabilities for sexual reproduction, which complicates colonization of new sites by seed. As a consequence of mostly reproducing vegetatively, genetic diversity is low throughout its range and as few as 20 genotypes are known. Genetic fixation of the clonal material may have adverse effects on the breeding potential of the species in the future (FWS 1992). Invasive species such as Chinese privet (*Ligustrum sinense*), Japanese knotweed (*Polygonum cuspidatum*), Japanese meadowsweet (*Spiraea japonica*), and Multiflora rose (*Rosa multiflora*) could also be detrimental to populations of Virginia spiraea.

Virginia Spiraea References:

U.S. Fish and Wildlife Service. 1990. Endangered and threatened wildlife and plants; threatened status determined for *Spiraea virginiana* (Virginia spiraea). *Federal Register*, 55(116):24242-24246.

U.S. Fish and Wildlife Service. 1992. Virginia spiraea (*Spiraea virginiana* Britton) Recovery Plan. Newton Corner, Massachusetts, 47 pages.

U.S. Fish & Wildlife Service. 2003. Summary report to congress on the recovery program for threatened and endangered species, 1998 and 2000. U.S. Fish and Wildlife Service, Washington, DC, 35 pages.

Cyprogenia stegaria (Rafinesque)
Fanshell

The **Fanshell** (*Cyprogenia stegaria*) was listed as an endangered species in 1990 (FWS 1990). Originally, the fanshell occurred in the Ohio, Wabash, Cumberland, and Tennessee rivers and their larger tributaries; however, reproducing populations now occur only in the Clinch River, Tennessee and Virginia, and the Green and Licking rivers, in Kentucky (FWS 1991). Results from incidental collections indicate that non-reproducing populations or individuals persist in some suitable habitats within the former range, including Tygart's Creek in Kentucky, Cumberland and Tennessee rivers in Tennessee, Muskingum River in Ohio, Wabash River in Illinois and Indiana, East Fork White and Tippecanoe rivers in Indiana, and Kanawha River in West Virginia. The increasing infrequency of this species in survey results supports the conclusion that this species is declining in at least many parts of its present range (FWS 2003). Identified causes for the decline of the fanshell include the construction and operation of reservoirs and other impacts on water and substrate quality. No critical habitat has been designated for this species (FWS 1991).

Typical fanshell habitat is gravel or cobble substrate in medium to large rivers (FWS 1991). Potential fish hosts include tangerine darter (*Percina aurantiaca*), blotchside logperch (*Percina burtoni*), and greenside darter (*Etheostoma blennioides*) (Jones and Neves 2002).

Within the last 30 years, the fanshell has been found in scattered locations along the length of the Tennessee River and in the Clinch River. During this time period, this species has been encountered in all mainstem tailwaters (downstream from Kentucky, Pickwick, Wilson, Guntersville, and Watts Bar dams). Most of these occurrences are based on sightings of single individuals; however, several members of this species have been observed in the Pickwick Dam tailwater. In this evaluation, the fanshell is considered to occur in large and medium rivers.

Fanshell References:

Jones, J. W. and Neves, R. J. 2002. Life History and propagation of the endangered fanshell pearlymussel, *Cyprogenia stegaria* Rafinesque (Bivalvia: Unionidae). *Journal of the North American Benthological Society*, 21(1):76-88.

U.S. Fish and Wildlife Service. 1990. Endangered and threatened wildlife and plants; Designation of the freshwater mussel, the fanshell, as an endangered species. *Federal Register*, 55(120):25591-25595.

U.S. Fish and Wildlife Service. 1991. Fanshell (*Cyprogenia stegaria* (=*C. irrorata*)) Recovery Plan. U. S. Fish and Wildlife Service, Atlanta, Georgia, 37 pages.

U.S. Fish & Wildlife Service. 2003. Summary report to congress on the recovery program for threatened and endangered species, 1998 and 2000. U.S. Fish and Wildlife Service, Washington, DC, 35 pages.

Pleurobema plenum (Lea)

Rough Pigtoe

The **rough pigtoe** (*Pleurobema plenum*) was added to the list of endangered species in 1976 (FWS 1976). The original distribution of this species probably included the Ohio, Cumberland, and Tennessee rivers and their larger tributaries; however, records attributed to this species also have been reported from as far west as Kansas and Arkansas (Parmalee and Bogan 1998). Since the early 1970s, the rough pigtoe has been found alive in the Barren and Green rivers in Kentucky, and in the Clinch, Cumberland, and Tennessee rivers in Tennessee (FWS 1984). Critical habitat has not been identified for this species. The increasing scarcity of encounters with this species (at least in the Tennessee River system) supports the conclusion that it is declining (FWS 2003). The reasons for the decline of this species are not totally understood but, due to the longevity of most mussel species, they are especially vulnerable to stream perturbations such as impoundments, siltation, and pollution (FWS 1984).

The rough pigtoe typically is found in firmly packed sand and gravel. The fish host for this species has not been identified (Parmalee and Bogan 1998).

In recent years, the rough pigtoe has been encountered in the mainstem Tennessee River downstream from Pickwick, Wilson, Guntersville, and Watts Bar dams; and in Pickwick and Wheeler Reservoirs. Both of the reservoir records came from the upstream ends, very close to the identified extent of the adjacent flowing water areas. This species is considered to occur, typically, in large river habitats.

Rough Pigtoe References:

Parmalee, P. W. and A. E. Bogan. 1998. *The Freshwater Mussels of Tennessee*. University of Tennessee Press, Knoxville, Tennessee, 328 pages.

U.S. Fish and Wildlife Service. 1976. Endangered status for 159 taxa of animals. *Federal Register*, 41(115):24062-24067.

U.S. Fish and Wildlife Service. 1984. Recovery plan for the rough pigtoe pearly mussel (*Pleurobema plenum*). U.S. Fish and Wildlife Service, Atlanta, Georgia, 51 pages.

U.S. Fish & Wildlife Service. 2003. Summary report to congress on the recovery program for threatened and endangered species, 1998 and 2000. U.S. Fish and Wildlife Service, Washington, DC, 35 pages.

Lampsilis abrupta (Say)
Pink Mucket Pearlymussel

The **pink mucket** (*Lampsilis abrupta* = *L. orbiculata*) was added to the list of endangered species in 1976 (FWS 1976). This species once occurred in a variety of cobble, gravel, and other substrate types in medium to large rivers in the Ohio, Cumberland, Tennessee, and middle Mississippi River systems (Parmalee and Bogan 1998). In recent years, pink muckets have been found at locations scattered across the former range where suitable habitat still exists for a variety of riverine mussel species.

These locations extend from the Kanawha River, West Virginia; west to the Gasconade River, Missouri; south to the Black River, Arkansas; and east to the Tennessee and Cumberland River basins (FWS 1985). The most upstream site in the Tennessee River watershed where this species has been found recently is the Clinch River, in Claiborne County, Tennessee. As of 2000, the U.S. Fish and Wildlife Service considered this species to be declining (FWS 2003); however, continuing routine encounters of low numbers of this species suggest that most populations are relatively stable. The causes of the decline for this species are not totally understood but may be related to impoundments, siltation, and pollution (FWS 1985). Critical habitat has not been designated for this species.

Fish hosts for the pink mucket have been suggested to be the sauger, *Stizostedion* (= *Sander*] *canadense*, and freshwater drum, *Aplodinotus grunniens* (Fuller 1974). Those fishes, however, may be the hosts just for the closely-related Higgins' Eye, *Lampsilis higginsi* (Parmalee and Bogan 1998).

Within the last 30 years, the pink mucket has been encountered in nearly all tailwaters of the mainstem Tennessee River dams and in parts of Bear Creek and the Clinch, French Broad, and Holston rivers (FWS 1985, TVA Heritage database and contributing sources). The pink mucket is known from 8 mainstem tailwaters (downstream from Kentucky, Pickwick, Wilson, Guntersville, Nickajack, Chickamauga, Watts Bar, and Fort Loudoun dams), 4 tributary tailwaters (downstream from Bear Creek, Norris, Cherokee, and Douglas dams), and 2 mainstem reservoirs (Kentucky and Wheeler). Although always uncommon or rare, this species is encountered most often in the flowing mainstem areas downstream from Pickwick and Guntersville dams. Its continued presence in pooled mainstem reservoirs and in tributary dam tailwaters is often limited to sightings of single, often old, individuals. The pink mucket is considered to typically occur in large river habitats.

Pink Mucket References

Fuller, S. L. H. 1974. Clams and Mussels (Mollusca: Bivalvia). Chapter 8 (pages 215 – 273) *in* Hart, C. W. Jr., and Fuller, S. L. H. *Pollution Ecology of Freshwater Invertebrates*. Academic Press, New York and London,

Parmalee, P. W. and A. E. Bogan. 1998. *The Freshwater Mussels of Tennessee*. University of Tennessee Press, Knoxville, Tennessee, 328 pages.

U.S. Fish and Wildlife Service. 1976. Endangered status for 159 taxa of animals. *Federal Register*, 41(115):24062-24067.

U.S. Fish and Wildlife Service. 1985. Recovery Plan for the Pink Mucket Pearly Mussel, *Lampsilis orbiculata* (Hildreth, 1828). U.S. Fish and Wildlife Service, Atlanta, Georgia, 47 pages.

U.S. Fish & Wildlife Service. 2003. Summary report to congress on the recovery program for threatened and endangered species, 1998 and 2000. U.S. Fish and Wildlife Service, Washington, DC, 35 pages.

***Fusconaia cor* (= *Fusconaia edgariana*)** (Conrad)
Shiny Pigtoe Pearlymussel

The **shiny pigtoe pearlymussel** (*Fusconaia cor*) was added (as *F. edgariana*) to the list of endangered species in 1976 (FWS 1976). The historic distribution of this species was limited to the Tennessee River and its tributaries upstream from Muscle Shoals (FWS 1983, Parmalee and Bogan 1998). Since the early 1970s, the shiny pigtoe has been found alive in the Clinch, Elk, North Fork Holston, Paint Rock, and Powell rivers (FWS 1983, Ahlstedt 1995-1996). Most populations of this species (with the possible exception of the population in the Clinch River) appear to be declining (FWS 2003). The identified reasons for the decline of this species include impoundment, siltation, and pollution (FWS 1983, Neves 1991). No critical habitat has been designated for this species. In 2001, the U.S. Fish and Wildlife Service included the shiny pigtoe in a proposal to establish nonessential experimental populations of several native mollusk species in riverine habitat just downstream from Wilson Dam (FWS 2001); however, this species has not yet been reintroduced into that reach of the Tennessee River.

The shiny pigtoe typically is found in riffle and shoal areas of clear streams with a moderate to fast current (Parmalee and Bogan 1998). Potential fish hosts include the whitetail shiner (*Notropis galacturus* [=*Cyprinella galactura*]) and common shiner (*Notropis cornutus*) (Neves 1991).

The shiny pigtoe persists in the lower Elk River upstream to Fayetteville, and the Elk River between Fayetteville and Tims Ford Dam. The most upstream record of this species found in 1980 (at Elk River Mile 118) was approximately 15 river miles downstream from Tims Ford Dam (Ahlstedt 1986). The shiny pigtoe is considered to occur in small rivers and large creek habitats.

Shiny Pigtoe References:

Ahlstedt, S. A. 1986. Cumberlandian Mollusk Conservation Program Activity 1: Mussel Distribution Surveys. Tennessee Valley Authority, Norris, Tennessee, 125 pages.

Ahlstedt, S. A. 1995-1996. Status survey for federally listed endangered freshwater mussel species in the Paint Rock River system, Northeastern Alabama, U.S.A. *Walkerana*, 8(19):63-80.

Neves, R. J. 1991. Mollusks. pages 251-320 *in* Terwilliger, Karen, editor. *Virginia's Endangered Species*. McDonald & Woodward Publishing Co., Blacksburg, Virginia, 672 pages.

Parmalee, P. W. and A. E. Bogan. 1998. *The Freshwater Mussels of Tennessee*. University of Tennessee Press, Knoxville, Tennessee, 328 pages.

U.S. Fish and Wildlife Service. 1976. Endangered status for 159 taxa of animals. *Federal Register*, 41(115):24062-24067.

U.S. Fish and Wildlife Service. 1983. Recovery Plan, Shiny Pigtoe Pearly Mussel, *Fusconaia edgariana*. U.S. Fish and Wildlife Service, Atlanta, Georgia, 67 pages.

U.S. Fish and Wildlife Service. 2001. Endangered and threatened wildlife and plants; Establishment of nonessential experimental population status for 16 freshwater mussels and 1 freshwater snail (Anthony's riversnail) in the free-flowing reach of the Tennessee River below the Wilson Dam, Colbert and Lauderdale Counties, AL. *Federal Register*, 66(115):32250-32264.

U.S. Fish & Wildlife Service. 2003. Summary report to congress on the recovery program for threatened and endangered species, 1998 and 2000. U.S. Fish and Wildlife Service, Washington, DC, 35 pages.

Plethobasus cooperianus (Lea)
Orangefoot Pimpleback

The **orangefoot pimpleback** (*Plethobasus cooperianus*) was listed as an endangered species in 1976 (FWS 1976). The historic distribution of this species included parts of the Ohio, Cumberland, Kanawha, Tennessee, and Wabash rivers (FWS 1984). Since the early 1970s, the orangefoot pimpleback has been found in the lower Ohio River (Miller et al. 1986), in the middle reach of the Cumberland River (Parmalee et al. 1980) and in the tailwaters of Kentucky, Pickwick, Wilson, Guntersville, and Ft. Loudoun dams on the Tennessee River (FWS 1984, Parmalee and Bogan 1998, TVA 1999). Critical habitat has not been identified for this species. The increasing rarity of this species during surveys supports the conclusion that it is continuing to decline (FWS 2003). The reasons for its decline are not totally understood but, due to its longevity and sedentary nature, the orangefoot pimpleback would be especially vulnerable to stream perturbations such as impoundment, siltation, and pollution (FWS 1984).

The orange-foot pimpleback is a large-river, shoal species, typically found in sand and coarse gravel. No fish host for this species has been identified (Parmalee and Bogan 1998).

In recent years, the orange-foot pimpleback has been found downstream from the following mainstem reservoirs: Kentucky, Pickwick, Wilson, Guntersville, Watts Bar, and Ft. Loudoun. The records from most of these tailwaters are based on sightings of just a few individuals; however, this species has been encountered fairly often in the river downstream from Pickwick Dam (UFWS 1984, Jenkinson 1987, TVA unpublished data).

Orangefoot Pimpleback References:

Jenkinson, J. J. 1987. Freshwater mussel survey of areas potentially affected by a proposed channel widening project, Tennessee River Miles 203 - 206. Tennessee Valley Authority, Knoxville, Tennessee, 20 pages.

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Percina tanasi Etnier
Snail Darter

The **snail darter** (*Percina tanasi*), was listed as an endangered species in 1975 (FWS 1975) and subsequently reclassified as a threatened species, and critical habitat rescinded in 1984 (USFW 1984). Historically, snail darters probably occurred in the main channel of the Tennessee River and many of its tributaries from northeastern Alabama upstream to at least Knoxville, Tennessee. For a few years following its discovery, the only known natural snail darter population occurred in the lower fifteen miles of the Little Tennessee River and the adjacent part of the adjacent Tennessee River (Hickman and Fitz 1978, FWS 1984). This population disappeared after Tellico Dam was closed in 1979. Several hundred snail darters were moved from the Little Tennessee River into the lower Hiwassee River (Polk County, Tennessee) in 1975 and into the lower Holston River (Knox County, Tennessee) in 1978 (Hickman and Fitz 1978, FWS 1984, TVA Heritage database). In the early 1980s, snail darters were found in small numbers in four other Tennessee River tributaries and a section of the mainstem Tennessee River. Presently, the species is relatively abundant in the lower French Broad, Holston, and Little Rivers near Knoxville, and in the Hiwassee River. The species is less abundant in Sewee Creek, South Chickamauga Creek, Sequatchie River, and Paint Rock River. (TVA Heritage database records). As of 2000, the U.S. Fish and Wildlife Service considered the status of this species to be uncertain (FWS 2003). Recent survey information indicates that, overall, the snail darter appears to be increasing in distribution and population size.

Adult snail darters occur and reproduce in stream reaches with extensive areas of clean-swept, sand-gravel shoals (Starnes 1977, Hickman and Fitz 1978). After hatching, larvae apparently drift downstream into deeper areas for a time before returning to upstream shoals as adults. Some snail darters apparently are able to tolerate reservoir conditions and can disperse in enough numbers to established new populations in adjacent streams.

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Cyprinella* (=*Hybopsis* and *Erimonax*) *monacha (Cope)
Spotfin Chub

The **spotfin chub** (*Erimonax* = *Cyprinella, monachus*), was listed as threatened in 1977 (FWS 1977a). Historically, the spotfin chub probably occurred throughout most of the Tennessee River system from southwestern Virginia, western North Carolina, and northern Georgia, downstream at least as far as the Duck River system. Presently, the species is only known from five widely disjunct populations in four tributary streams: the North Fork Holston River in Virginia and Tennessee, the Little Tennessee River in North Carolina (and reintroduced in Tennessee), the Emory River system in Tennessee, and the Buffalo River system in Tennessee (Jenkins and Burkhead 1984). The spotfin chub has been encountered in the Holston River downstream from the confluence of the North Fork Holston and Middle Fork Holston Rivers; however, the infrequency of sightings of spotfin chubs in that river reach suggests that a persistent, reproducing population does not exist in the mainstem Holston River (Charlie Saylor, TVA, personal communication). The recent discovery of a single individual in a tributary to Watts Bar Reservoir on the Clinch River indicates that an additional, as yet unknown, population could exist somewhere in the lower part of the Clinch River system (Mike Ryon, Oak Ridge National Laboratory, personal communication with Peggy Shute in 2002). As of 2000, the U.S. Fish and Wildlife Service considered the status of this species to be uncertain (FWS

2003); however, recent field work suggests the species is probably increasing (Pat Rakes, Conservation Fisheries, Inc., personal communication with Peggy Shute in 2002). Designated critical habitat for this species includes parts of the Little Tennessee River upstream of Fontana Reservoir, parts of the Emory River and its tributaries upstream from Watts Bar Reservoir, and parts of the North Fork Holston River in Tennessee and Virginia (FWS 1977b). A reach of the Tellico River (in Monroe County, Tennessee) has been designated as Nonessential Experimental Population (FWS 2002), and an attempt at establishing a reintroduced population of spotfin chubs into this reach has begun (Pat Rakes, Conservation Fisheries, Inc., personal communication with Peggy Shute 2002). Also, a reach of Shoal Creek (direct tributary to the Tennessee River, Wilson Reservoir, and Lauderdale County, AL) has been designated as a Nonessential Experimental Population (FWS 2005).

Spotfin chubs are found in medium to large, clear streams with considerable current over bedrock and boulders. Young are found over gravel substrates (FWS 1983, Jenkins & Burkhead 1984). Recent collection records (TVA Heritage database) indicate that seasonal (fall) migration into very small tributaries may occur. Spotfin chub populations in the Little Tennessee River system (upstream of Fontana Reservoir) and in the Emory system are apparently stable (TVA Heritage database). Those in the North Fork Holston and Buffalo systems have apparently expanded their ranges, as indicated by recent observations (TVA Heritage database). Spotfin chubs have been reintroduced in Abrams Creek, Great Smoky Mountains National Park (Shute et al. 2005).

Spotfin Chub References:

Jenkins, R. E., and N. M. Burkhead. 1984. Description, biology and distribution of the spotfin chub, *Hybopsis monacha*, a threatened cyprinid fish of the Tennessee River drainage. *Bulletin of the Alabama Museum of Natural History*, 8:1-30.

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Myotis grisescens (Howell)
Gray Bat

The **gray bat** (*Myotis grisescens*) was listed as an endangered species in 1976 (FWS 1976). Although gray bats occur throughout much of the Midwest and southern United States, their populations are found mainly in Alabama, northern Arkansas, Kentucky, Missouri, and Tennessee (FWS 1982). Gray bats are known from suitable caves throughout the Tennessee River Valley. Populations of gray bats have increased throughout portions of their range and the status of this species is considered to be improving (FWS 2003). Critical habitat has not been designated for this species.

Gray bats are year-round residents of limestone caves or cave-like habitats. Most individuals migrate seasonally between hibernating and maternity caves. They generally enter hibernation by early November, and emerge in March and April (FWS 1982). Fewer than five percent of available caves offer suitable habitat for this species. Gray bats form large colonies than can contain up to several hundred thousand individuals. They are therefore particularly vulnerable to habitat disturbances; human intrusions into caves used by maternity colonies or used as hibernacula are thought to be primarily responsible for their decline. Pesticide poisoning, reduction of insect prey, and flooding of caves due to either natural causes or impoundment have also threatened the species (FWS 1982). In an effort to protect and recover gray bat populations, the U.S. Fish and Wildlife Services has delegated TVA the tasks of protecting Nickajack, Hambrick's, Featherfoot, Norris Dam, and Key Caves, as these caves harbor significant numbers of gray bats. TVA has installed barriers at these cave entrances to prevent human disturbance, and surveys these sites annually to gather long-term data to help monitor and protect this endangered species.

Gray bats feed along reservoirs, rivers, and associated riparian habitats. They consume large numbers of flying insects over aquatic habitats (Henry 1998). During a 4-year study to determine feeding preferences of gray bats on Guntersville Reservoir, gray bats were recorded foraging over and adjacent to aquatic weed beds more than any other habitat type investigated (Henry 1998).

Gray Bat References:

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