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FINAL ENVIRONMENTAL IMPACT STATEMENT

NORTHEASTERN TRIBUTARY RESERVOIRS LAND MANAGEMENT PLAN

Beaver Creek, Clear Creek, Boone, Fort Patrick Henry, South Holston, Watauga, and Wilbur Reservoirs

Carter, Johnson, Sullivan, and Washington Counties, Tennessee, and Washington County, Virginia

VOLUME I

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MARCH 2010

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Final Environmental Impact Statement **March 2010**

Proposed project: Northeastern Tributary Reservoirs Land Management Plan
Beaver Creek, Clear Creek, Boone, Fort Patrick Henry, South Holston, Watauga, and Wilbur reservoirs
Carter, Johnson, Sullivan, and Washington counties, Tennessee; Washington County, Virginia

Lead agency: Tennessee Valley Authority

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Abstract: The Tennessee Valley Authority (TVA) proposes to develop a Northeastern Tributary Reservoirs (NTRs) Land Management Plan to guide land use decisions on TVA reservoir lands located along seven tributary reservoirs in the northeast Valley region (approximately 5,000 acres): Beaver Creek, Clear Creek, Boone, Fort Patrick Henry, South Holston, Watauga, and Wilbur reservoirs. The goal of the reservoir land planning effort is to provide a clear vision of how TVA will manage its public lands and identify lands for specific uses. This process relies heavily on public input regarding land uses and on how these lands should be managed for future uses.

This land plan considers three alternatives and incorporates TVA's 2006 Land Policy. The alternatives include a No Action Alternative (Alternative A) to continue use of the 1965 Forecast System designations on Fort Patrick Henry, South Holston, Watauga, and Wilbur reservoirs and use of the 1999 Boone Reservoir Land Management Plan. Under the No Action Alternative, Beaver Creek and Clear Creek reservoirs, which were never subject to the Forecast System or more recent land planning procedures, would remain unplanned. The other alternatives considered are a Proposed Land Use Alternative (Alternative B) and a Modified Proposed Land Use Alternative (Alternative C). TVA's preferred alternative is Alternative C.

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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 proposes to develop a reservoir land management plan (RLMP) for seven northeastern tributary reservoirs (NTRs) located in northeast Tennessee and southwest Virginia. The Northeastern Tributary Reservoirs Land Management Plan (NTRLMP) would include all public lands under TVA stewardship around Beaver Creek, Clear Creek, Boone, Fort Patrick Henry, South Holston, Watauga, and Wilbur reservoirs, which total about 4,933 acres.

The NTRLMP would be designed to guide land use approvals, private water use facility permitting, and resource management decisions. The TVA Holston-Cherokee-Douglas Watershed Team would use the NTRLMP along with TVA policies and guidelines to manage resources and to respond to requests for the use of TVA public land on these reservoirs. Under proposed NTRLMP alternatives, land would be allocated into broad categories or “zones” including Project Operations, Sensitive Resource Management, Natural Resource Conservation, Industrial, Developed Recreation, and Shoreline Access. Land use allocations would be determined with consideration of the social, economic, and environmental conditions around the reservoirs.

The NTRLMP consists of six volumes. Volume I is the environmental impact statement, which addresses the environmental impacts of implementing the NTRLMP. The seven reservoirs are described in five RLMPs, which are found in Volumes II-VI. The RLMPs contain detailed descriptions of the environment around each reservoir, as well as descriptions of each parcel of land addressed in the plans.

ALTERNATIVES INCLUDING THE PROPOSED ACTION

TVA is considering three alternatives for managing public land under its control around the seven NTRs. Under the No Action Alternative, TVA would continue to use the previous land use plans, if any, for the NTRs, some of which use an older method of land use planning. Under the two action alternatives, TVA would apply a system of allocation zones that was used in more recent TVA land plans and is consistent with current TVA policies. Alternatives were developed using information from multidisciplinary TVA technical and advisory teams, as well as comments from the public obtained during the scoping process described in Volume I, Chapter 2.

Under all of the alternatives, the following conditions would apply:

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

- Parcels allocated to Industrial (Zone 5) and Shoreline Access (Zone 7) uses remain the same.

Alternative A - No Action Alternative. Under the No Action Alternative, TVA would not prepare the NTRLMP and would continue current land plans or systems if they exist. For Fort Patrick Henry, South Holston, Watauga, and Wilbur reservoirs, TVA would continue using the Forecast System developed for those reservoirs in 1965, which allocated parcels to 13 land use categories. For Boone Reservoir, TVA would continue to use the RLMP developed in 1999. Beaver Creek and Clear Creek reservoirs would remain unplanned.

Approximately 254 acres around the NTRs are uncommitted parcels (i.e., parcels having no easement, lease, or other land use agreement) that would not be planned but would be managed in accordance with the TVA Land Policy, the Shoreline Management Policy, and other administrative considerations. About 42 percent of NTR lands would remain allocated to the equivalent of Project Operations and about 36 percent to the equivalent of Natural Resource Conservation or Sensitive Resource Management (Table S-1). The only parcels actually allocated to Sensitive Resource Management would be on Boone Reservoir.

Table S-1. Total Number of Acres Proposed in Each Allocation Zone Under Alternatives A, B, and C[1]

Zone	Alternative					
	A		B		C	
	Acres	%	Acres	%	Acres	%
2 (Project Operations)	2,077	42.1	1,550	31.4	1,550	31.4
3 (Sensitive Resource Management)	335	6.8	284	5.8	278	5.6
4 (Natural Resource Conservation)	1,409	28.5	2,073	42.0	2,044	41.4
5 (Industrial)	125	2.5	125	2.5	125	2.5
6 (Developed Recreation)	939	19.0	854	17.3	888	18.0
7 (Shoreline Access)	48	1.0	48	1.0	48	1.0
Total	**4,933**	**100**	**4,933**	**100**	**4,933**	**100**

Alternative B - Proposed Land Use Alternative. Under Alternative B, TVA would prepare an RLMP addressing the seven NTRs. To develop proposed parcel allocations, TVA reviewed existing and newly collected field data on the lands being planned. The physical capability of each parcel for supporting potential suitable uses was assessed. TVA also reviewed deeds of selected tracts previously sold to private entities to identify existing shoreline access rights. The planning team honored all existing commitments (i.e., existing leases, licenses, and easements).

Under Alternative B, the 4,679 acres previously committed to a specific use would be allocated to land use zones consistent with that specific land use. The remaining uncommitted 254 acres (34 parcels) are proposed to be allocated to Zone 4 (Natural Resource Conservation) or Zone 6 (Developed Recreation). Overall, about 48 percent of

[1]Areas in the table and associated text are rounded to the nearest acre, which may result in slight discrepancies in calculated totals.

NTR land would be allocated to Natural Resource Conservation (Zone 4) or Sensitive Resource Management (Zone 3). About 31 percent of NTR land would be allocated to Project Operations (Zone 2), and the remainder would be allocated to Developed Recreation (Zone 6), Shoreline Access (Zone 7), or Industrial (Zone 5) uses.

Alternative C - Modified Proposed Land Use Alternative. Under Alternative C, TVA would prepare an RLMP for the seven NTRs. To develop proposed parcel allocations, TVA implemented the planning process described above under Alternative B and incorporated public comments and other information obtained during the scoping process. Under Alternative C, the 4,679 acres of committed lands would be allocated to land use zones consistent with the existing land use. The remaining uncommitted 254 acres (34 parcels) are proposed to be allocated to Zones 3, 4, or 6. Alternative C, as compared to Alternative B, represents changes in land use zones for 19 parcels. Because the total acreage of those 19 parcels is relatively small (238 acres), the percentage of land allocated to Zones 3, 4, and 6 is nearly the same under both action alternatives. While adoption of Alternative C would result in a slightly smaller proportion of NTR lands allocated to natural resource conservation (Zone 4) and sensitive resource management (Zone 3), a greater number of parcels would be designated to protect existing sensitive resources. Under Alternative C, parcels on Fort Patrick Henry, South Holston, and Watauga reservoirs that contain plant species that are state-listed as threatened or endangered, rare plant communities, cultural resources, and high-quality wetlands would be allocated to Zone 3, which is most protective of sensitive resources. Those parcels would be allocated to Zone 4 under Alternative B. Additionally, six parcels on South Holston and Watauga reservoirs would be allocated to Zone 6 under Alternative C rather than Zone 4 under Alternative B, which would provide additional opportunities for recreation.

AFFECTED ENVIRONMENT

The seven NTRs are located in the northeast corner of Tennessee and southwest corner of Virginia. Boone, Fort Patrick Henry, and South Holston dams are located along the South Fork Holston River. Watauga and Wilbur dams are located along the Watauga River. Boone Dam is located approximately 1.4 miles downstream of the confluence of the two river systems, such that one arm of Boone Reservoir extends up the South Fork Holston River, and the other arm extends up the Watauga River. Clear Creek and Beaver Creek dams comprise the Bristol Flood Control Project, in Washington County, Virginia. These creeks are within the Beaver Creek watershed and drain into the South Fork Holston arm of Boone Reservoir. TVA originally acquired about 10,953 acres of land on the seven NTRs (Table 1-1). About 55 percent (6,020 acres) of this land has been sold for private use or transferred to other federal and state agencies for public use. TVA presently manages a total of approximately 4,933 acres of land on these reservoirs, which are the subject of this NTRLMP. The 451 miles of shoreline on Boone, Fort Patrick Henry, South Holston, Watauga, and Wilbur reservoirs are managed by TVA either as flowage easement (208 miles) or shoreline access land (244 miles).

Existing land uses around the NTRs include TVA project operations, recreation, residential, and undeveloped areas. Thirty-nine high-quality developed recreation facilities are provided on TVA-managed land, including a public campground, day use areas, visitor/observation buildings, a swimming beach, and developed river access sites. TVA-managed lands around the NTRs also offer abundant opportunity for dispersed recreation.

The amount of developed residential shoreline ranges from greater than 60 percent of the shoreline on Boone Reservoir to less than 1 percent on Wilbur Reservoir. No residential

development surrounds Beaver Creek and Clear Creek reservoirs, which are developed for public recreation. In total, around Boone, Fort Patrick Henry, South Holston, and Watauga reservoirs, 46 percent of the combined shoreline (about 217 shoreline miles) is available for residential development. Development has already occurred on about 43 percent of the shoreline available for residential development (about 94 shoreline miles) on those reservoirs.

Development around the four major reservoirs over the last 15 years has been steady, as many farms have been turned into residential developments, primarily single-family homes. In recent years, multifamily developments have become more prevalent. Under the TVA Land Policy, TVA can no longer consider new residential land use requests on TVA-managed land. Therefore, the amount of shoreline available for residential use will not change as a result of the land planning process. The character of the NTRs remains primarily rural and natural. No parcels are allocated to industrial development adjacent to the reservoir; the single Industrial parcel is about 1 mile from South Holston Reservoir.

Many of the TVA-managed parcels on the NTRs have existing land use agreements that commit a parcel to a specific use. The majority of such agreements are for utilities, highways, and other public infrastructure, which affect narrow linear tracts with small acreages. A total of approximately 916 acres is designated for public or commercial recreation or fronts national forest land. A large proportion of the public recreation agreements are for campgrounds, day use areas, and city parks that are operated by local, county, and state government agencies. Commercial recreation agreements include docks, marinas, and campgrounds on several of the reservoirs.

Deciduous forests and woodlands cover approximately 35 percent of the landscape in the South Fork Holston River and Watauga River watersheds. About 15 percent of the land cover is evergreen forests and woodlands. Wetlands are few, comprising less than 0.3 percent of land cover in both watersheds. Wetlands on and near the NTRs are primarily forested wetlands located in floodplains and small emergent/scrub-shrub wetlands associated with shorelines and coves. Field surveys conducted on selected parcels around the NTRs indicated the presence of moderate and high-quality wetlands on Fort Patrick Henry, South Holston, and Watauga reservoirs.

Two rare plant communities (Carolina Hemlock [Eastern Hemlock]/Great Laurel Forest and Northern White Cedar Limestone Seepage Woodland) occur on six parcels along Watauga Reservoir. No plant species that are federally listed threatened or endangered, or critical habitat designated for plants, have been recorded within 5 miles of the NTRs. Two federally listed species are known from the surrounding counties, but neither individuals of those species nor habitat suitable for those species were observed during field surveys. Thirty plant species listed by the State of Tennessee are known to occur within 5 miles of the NTRs, including three state-listed species identified on Watauga and Fort Patrick Henry parcels during field surveys.

The variety of land forms, soils, climate, and geology across the Ridge and Valley and Southern Blue Ridge ecoregions support an extremely diverse assemblage of terrestrial animals. The reservoirs provide abundant open water habitats and associated riparian (shoreline) zones that are used by a variety of wildlife including shorebirds, wading birds, waterfowl, amphibians, reptiles, and mammals. Although six federally listed terrestrial animal species are known from the NTRs area, there are no known occurrences of those species on NTRs parcels. The gray bat, a species federally listed as endangered,

potentially forages over all seven of the NTRs, but no roost habitat (caves) suitable for the gray bat is known on NTRs parcels. Twenty terrestrial animal species listed by the states of Tennessee, Virginia, or North Carolina occur within 3 miles of the NTRs. The only state-listed species identified during field surveys was the southern bog lemming, a species deemed in need of management in Tennessee, which was observed along the South Holston Reservoir.

Two federally listed mussels and two mussels that are candidates for federal listing occur within the NTRs watersheds. There are historic records of another federally listed mussel and a federally listed fish. In addition to the federally listed species, 20 state-listed aquatic species, including fish, mussels, and a snail, have been recorded within the watersheds forming the NTRs. Ten of those state-listed species occur near uncommitted parcels on the NTRs.

Although the entirety of TVA-managed land surrounding the NTRs has not been completely surveyed, many archaeological sites have been identified on each of the NTRs. Some of the identified archaeological sites are located below the normal summer pool elevation. Certain sites are eligible or potentially eligible for listing on the National Register of Historic Places. Similarly, while a complete survey for historic structures has not been conducted throughout all NTRs parcels, important historic structures over 50 years old occur on or near TVA-managed land in the area. Results of field surveys indicated no historic structures are located on uncommitted NTRs parcels.

No natural areas managed by the TVA Natural Areas Program are located on any of the seven NTRs. One Nationwide Rivers Inventory stream and ten natural areas either managed by other entities or recognized as ecologically significant sites are on or within Boone, South Holston, Wilbur, and Watauga reservoirs. Several natural areas, including U.S. Forest Service (USFS) lands (Cherokee National Forest), city and state parks, and the Appalachian Trail, are adjacent to five of the NTRs. TVA-managed parcels adjacent to these natural areas are considered committed, and land use designations are consistent with the management objectives of the back-lying public lands.

In terms of visual resources, the NTRs include islands, floodplains, secluded coves, and wetlands that are framed by high wooded ridges. Most shorelines upstream of the dams appear natural. Among the scenic resources of each of the reservoirs, the bodies of water are the most distinct and outstanding aesthetic features. Islands, secluded coves, and steep, wooded ridges are other important features.

Water quality in the NTRs is typical of impoundments, which convert typical riverine environments into lakelike conditions with respect to water temperature, dissolved oxygen (DO), nutrient dynamics, algal productivity, and aquatic life. The average retention time in the reservoirs ranges from less than one day on Beaver Creek reservoir (a detention basin with no permanent pool) to an average of 325 days on Watauga Reservoir. Reservoir ecological health ratings for Boone, Fort Patrick Henry, and South Holston typically are “poor,” primarily due to low DO concentrations, elevated chlorophyll concentrations, and a bottom-dwelling community comprised mostly of organisms indicative of poor water quality conditions. Watauga Reservoir usually scores “good” or at the high end of the “fair” range of ratings, likely due to less development around the reservoir and the natural geological characteristics of the area. Reservoir ecological health measurements are not collected in smaller reservoirs such as Beaver Creek, Clear Creek, and Wilbur reservoirs.

The reservoir tailwaters below Fort Patrick Henry and South Holston dams and Boone, South Holston, and Watauga reservoirs are designated by the respective states as impaired waters. Reasons for the impaired designation in these tailwaters include flow alteration, low DO concentrations, and/or thermal modification, with the source being the upstream impoundments. In the reservoirs, water quality impairment is due to accumulated polychlorinated biphenyls and chlordane or mercury in fish tissue. Fish consumption advisories have been issued for Boone, South Holston, and Watauga reservoirs. There are no state advisories against swimming in any of the NTRs.

Aquatic monitoring in Beaver Creek and Clear Creek reservoirs indicates ecological conditions are typically fair, but have ranged from poor to good. Results of TVA's Reservoir Vital Signs Monitoring Program in the larger reservoirs indicate fair ecological conditions on Boone, fair to poor conditions on Fort Patrick Henry, and fair to good conditions on South Holston and Watauga reservoirs. Sport fishing indexes typically indicate poor to moderate ratings on Boone, Fort Patrick Henry, South Holston, and Watauga reservoirs. Sport fishing indexes are not calculated for smaller reservoirs such as Beaver Creek, Clear Creek, and Wilbur reservoirs.

All of the counties containing the NTRs are currently in attainment of each of the National Ambient Air Quality Standards. Under ozone standards expected to be updated in March 2010, some of the NTRs counties are likely to be designated nonattainment for ozone. There are four Class I areas within 100 kilometers (62 miles) of the NTRs, including the Great Smoky Mountains National Park, Shining Rock Wilderness, Joyce Kilmer/Slickrock Wilderness, and Linville Gorge, which is closest to the NTRs (approximately 30 miles southeast of Watauga Reservoir).

The 2000 census population of the five counties containing the NTRs is estimated to be about 421,000. In every county, the population grew more slowly than in the nation and the respective state between 1980 and 2008. The independent city of Bristol, Virginia, lost population during that period. Projections and current trends suggest the population of this area will grow more slowly than the nation. Overall, the rural population share in the area is about the same as the Tennessee and Virginia averages, which are somewhat higher than the national average. The population is predominantly non-Hispanic white, with a low average minority population compared to the state and national averages.

The NTRs are located in a relatively low-income area. Overall, poverty levels are slightly higher than the State of Tennessee average and well above the Virginia and national averages. The majority of employment in the area is primarily in farming and manufacturing. In 2008, the unemployment rate in the area was slightly lower than the national and Tennessee rates, although notably higher than the Virginia rate.

ENVIRONMENTAL CONSEQUENCES

Under any of the alternatives, potential impacts to sensitive resources such as federally listed species, cultural resources, and wetlands would be identified during project-specific evaluations.

None of the three alternatives involve changes in existing land use commitments (e.g., easements, leases). Because only 5 percent of NTR lands are uncommitted, changes in land use would be minor, and none of the alternatives would significantly affect land use. Under any alternative, most categories of land uses would remain available in approximately the same proportions as currently established. In terms of land use, the

primary difference between the No Action Alternative and Action Alternatives B and C is the reduction of lands allocated to Zone 2 (Project Operations) and the increase in lands allocated to Zone 4 (Natural Resource Conservation). These changes reflect application of a land use zone that is more consistent with current uses. The primary impact of the No Action Alternative is the absence of a comprehensive plan to guide consideration of land use requests. Under Alternative A, NTRs parcels would not be allocated to a current land use zone; therefore, complete alignment with current TVA policies would not occur. Over the long term, absence of comprehensive reservoir-wide land management plans may result in land uses that do not fully optimize the goals of multiple use and stewardship to which TVA strives.

Among all three alternatives, the variation in the amount of land available for developed and dispersed recreation opportunities is small. Although the No Action Alternative (Alternative A) includes the greatest amount of land designated for developed recreation, the action alternatives provide more land for dispersed recreation. Adoption of Alternative A would result in minor negative effects to dispersed recreation relative to Alternatives B or C. Selection of Alternative B or C would not affect developed recreation facilities, but would result in minor effects due to lost opportunity for future development of recreational facilities.

Under any of the alternatives, potential future ground disturbance and development has potential for impacts to floodplain values, wetlands, water quality, and prime farmland. Alternative A involves the greatest potential for future ground disturbance and development. Because both action alternatives involve allocation of substantially more land to conservation than Alternative A, there is lower potential for ground disturbance under the action alternatives. However, regardless of the alternative selected, any development proposed in the 100-year floodplain would be subject to the requirements of Executive Order (EO) 11988 (Floodplain Management), and impacts to floodplain values would be minor. Adverse effects to wetlands from ground disturbance would be mitigated under EO 11990 (Protection of Wetlands) and would be minor. Likewise, proposed actions involving the transfer of land for development would require project-specific evaluation of impacts to prime farmland. Under any of the alternatives, adverse impacts to prime farmland would be minor.

Because the potential for ground disturbance is greatest under Alternative A, the potential for adverse impacts to archaeological sites and historic structures is greatest under that alternative. Because the amount of land allocated to Natural Resource Conservation would be greatest under Alternative B, the potential for impacts to archaeological sites and historic structures is slightly lower under this alternative than under Alternative C. Under all three alternatives, parcels containing known cultural resources would be allocated to Zone 3, which is most protective of sensitive resources. Prior to implementing any future projects on NTR lands, TVA will comply with established procedures for identifying, evaluating, and avoiding or mitigating impacts to archaeological resources and historic structures. Specific procedures for addressing potential impacts to these cultural resources in Tennessee are described in the programmatic agreement (PA) between the Tennessee State Historic Preservation Officer, TVA, and the Advisory Council on Historic Preservation. In Virginia, until a similar PA is executed, procedures required by Section 106 of the *National Historic Preservation Act* and associated implementing regulations will be applied.

Under all three alternatives, TVA identifies lands for Natural Resource Conservation and will implement measures to identify impacts to the environment when specific projects are

proposed. Given the substantial amount of deciduous and evergreen forest around the NTRs, none of the three alternatives would result in significant impacts to common terrestrial vegetation or common terrestrial wildlife. Under both action alternatives, the amount of NTR lands allocated to Zones 3 and 4 is greater than under the No Action Alternative, which would promote conservation of terrestrial plants and wildlife. Over the long term, allocation of lands to Zones 3 and 4, which limits ground disturbance, vegetation removal, and other development, is likely to benefit terrestrial wildlife communities in the South Fork Holston River and Watauga River watersheds. None of the alternatives would result in significant adverse impacts to the two rare plant communities near Watauga Reservoir. Parcels on Watauga Reservoir that contain rare plant communities would be allocated to Zone 3 under Alternative C, which would afford more protection than the allocation to Zone 4 under Alternative A or B. Therefore, selection of Alternative C would be more protective of rare plant communities. Similarly, all parcels containing state-listed threatened or endangered plants would be allocated to Zone 3 under Alternative C, whereas a portion of those parcels would be allocated to Zone 4 or 2 under Alternatives A and B. Therefore, the potential for impacts to state-listed threatened or endangered plants known on Watauga and Fort Patrick Henry parcels is greatest under Alternative A and lowest under Alternative C. No significant adverse impacts to state-listed threatened or endangered plants are expected to result from any of the alternatives.

No terrestrial plants federally listed as threatened or endangered, terrestrial wildlife, or aquatic animal species have been identified on or near uncommitted NTRs parcels where future activities would be likely to occur. None of the three alternatives result in adverse impacts to the southern bog lemming, the only state-listed threatened or endangered species known to occur on NTRs parcels. In addition, project-specific environmental reviews on any parcel would be conducted, and mitigation would be implemented when warranted. Effects to listed species would be insignificant under any of the alternatives.

The major source of potential adverse impacts to water quality and aquatic life, including listed species, is ground disturbance and associated erosion, clearing of shoreline vegetation, and runoff. Based upon land use allocations, adoption of the No Action Alternative would result in the greatest potential for future development and associated ground disturbance. Conversely, under both action alternatives, a greater amount of NTR land is allocated to Sensitive Resource Management and Natural Resource Conservation uses, which have relatively low potential for ground disturbance. Consequently, the potential for impacts to water quality and aquatic life is greatest under Alternative A. The extent of impacts would depend on the specifics of future development. New facilities with permitted discharges would be required to meet permit limits specifically designed to protect water quality. Further, any proposed land use would be required to protect water quality through either restricted development or the commitment to use best management practices. Therefore, impacts to water quality, aquatic life, and listed aquatic species under any of the alternatives are expected to be minor.

Existing natural areas and ecologically significant sites were considered during the parcel allocation process. Except for a single parcel that would be allocated to Zone 4 (Natural Resource Conservation) under Alternatives A and B, but to Zone 6 (Developed Recreation) under Alternative C, no changes to the size, location, or character of natural areas would result under any alternative. The proposed allocation of that single parcel to Zone 6 under Alternative C would be consistent with U.S. Forest Service management of the adjacent back-lying land and would not adversely affect the natural area. Therefore, no adverse direct or indirect impacts to natural areas are expected under any of the alternatives. Under

all three alternatives, preservation of natural areas on TVA-managed lands would beneficially contribute to the cumulative regional efforts to conserve natural habitats for the long term.

Adoption of Alternative A would likely result in some long-term negative impacts to visual resources and scenic integrity, which include gradual losses of visual resources, scenic attractiveness, and undeveloped areas, as well as negative changes in the aesthetic sense of place. Implementation of Alternative B or C would protect scenic areas and would preserve natural areas as development expands on non-TVA lands around the reservoirs. Under both action alternatives, impacts to visual resources would be minor.

The greatest potential for effects to air quality is associated with the Industrial land use zone. The number of acres allocated to industrial use is the same under all three alternatives. Certain activities that may occur on parcels allocated to Project Operations also have potential to affect air quality. Because the No Action Alternative includes the greatest amount of land forecast or planned for Project Operations, the potential for effects to air quality are greatest under Alternative A. However, under any of the alternatives, an appropriate level of environmental review would be required to document the extent of expected air quality impacts from projects proposed in the future. Future projects would be subject to federal, state, and local air quality regulations. Therefore, adoption of any of the three alternatives would not result in significant impacts to air quality.

Based on the small proportion of TVA public land available for development relative to the entire shoreline of the NTRs, there would be an insignificant increase in the potential for noise impacts under all three alternatives, with the lowest potential for noise expected under Alternative B.

Because land use allocations would be very similar under all three alternatives, none of the alternatives would be likely to have any noticeable effect on the local economy or on economic development opportunities in the area. Zone 5 (Industrial) would be allocated the same (one 125-acre tract) in all cases. As stated above, variation among alternatives was small because commitments that exist on 95 percent of NTR parcels were honored during the allocation process. Additionally, no demand for industrial lands on TVA-owned property around the NTRs was identified during the allocation process or public involvement in this EIS. Opportunities for economic development exist on parcels allocated to developed recreation uses. Zone 6 (Developed Recreation) allocations would be very similar, ranging from 939 acres under Alternative A to 854 acres under Alternative B. Under each alternative, there are currently undeveloped parcels allocated to Zone 6, which provides an opportunity for future development. Additionally, the Watershed Team will evaluate on a project-specific basis other opportunities to support economic development near NTR parcels, such as road and utility easements. No disproportionate impacts to disadvantaged populations are expected to occur under any of the alternatives.

Implementing any of the three alternatives would have few, if any, unavoidable adverse environmental effects. The potential to negatively affect long-term productivity of the land, as well as potential irretrievable commitments of resources, would be greater under the No Action Alternative than under either of the action alternatives. Each of the three alternatives involves use of minor amounts of energy to maintain Project Operations and Developed Recreation lands. Although the total amount of energy consumed by any proposed activities would be small and unlikely to influence regional energy demand, the potential to

consume energy is slightly greater under Alternative A compared to the two action alternatives. TVA would implement energy conservation efforts under all three alternatives.

SUMMARY OF IMPACTS

Under the No Action Alternative, the total number of acres of NTR land designated to Industrial, Developed Recreation, and Project Operations uses is greater than under either of the action alternatives. Under the No Action Alternative, the smallest number of acres is allocated to Sensitive Resource Management; only one of the seven reservoirs has parcels allocated to Sensitive Resource Management.

In comparison, under the action alternatives, fewer total acres are allocated to developed uses (Project Operations, Industrial, and Developed Recreation) and a greater number of acres are allocated to Natural Resource Conservation and Sensitive Resource Management. Generally, implementation of the No Action Alternative has greater potential for environmental impacts than either of the action alternatives. Because it contains slightly more land allocated to Developed Recreation, implementation of Alternative C has slightly greater potential for impacts to some resources than Alternative B. Although there are minor differences between the two action alternatives in acreage allocated to each zone, Alternatives B and C are distinguished by allocations of specific parcels. Compared to Alternative B, implementation of Alternative C would provide a greater number of developed recreation opportunities, including support of U.S. Forest Service recreation objectives. Because it contains slightly more land allocated to Zone 6 (Developed Recreation), Alternative C would have slightly greater potential for ground disturbance and overall impacts than Alternative B. However, under Alternative C, all 25 of the parcels that contain sensitive resources would be allocated to Zone 3 (Sensitive Resource Management), which is the most protective of sensitive resources. Under Alternative B, 14 of those parcels would be allocated to Zone 3, and 11 would be allocated to Zone 4.

No significant direct, indirect, or cumulative effects are expected to occur to any resource under any of the alternatives.

PREFERRED ALTERNATIVE

The preferred alternative is Alternative C, the Modified Proposed Land Use Alternative, which provides suitable opportunities for developed recreation, conservation of natural resources, and management of sensitive resources. Under Alternative C, all parcels with identified sensitive resources would be allocated to the most protective land use zone; only some of those parcels would be zoned for sensitive resource management under Alternative A or B. Compared to Alternative B, implementation of Alternative C would provide more of the recreational opportunities in which the public expressed interest during scoping.

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ACRONYMS, ABBREVIATIONS, AND SYMBOLS

§	Section
APE	Area of Potential Effects
ARPA	*Archaeological Resources Protection Act*
BCTF	Beaver Creek Task Force
BMPs	Best Management Practices
CFR	Code of Federal Regulations
CNF	Cherokee National Forest
CWA	*Clean Water Act*
DEIS	Draft Environmental Impact Statement
DO	Dissolved Oxygen
DOI	Department of the Interior
EA	Environmental Assessment
EO(s)	Executive Order(s)
EIS	Environmental Impact Statement
EPT	Ephemeroptera, Plecoptera, Trichoptera (Aquatic Ecology Index)
ESA	*Endangered Species Act*
FEA	Final Environmental Assessment
FEIS	Final Environmental Impact Statement
FONSI	Finding of No Significant Impact
FPPA	*Farmland Protection Policy Act*
IBI	Index of Biotic Integrity
MGD	Millions of Gallons per Day
MOA	Memorandum of Agreement
MSC	Maximum Shoreline Contour
msl	Mean Sea Level
NAAQS	National Ambient Air Quality Standards
NAGPRA	*Native American Graves Protection and Repatriation Act*
NEPA	*National Environmental Policy Act*
NHPA	*National Historic Preservation Act*
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRHP	National Register of Historic Places
NRI	Nationwide Rivers Inventory
NTR(s)	Northeastern Tributary Reservoir(s)
NTRLMP	Northeastern Tributary Reservoirs Land Management Plan
PA	Programmatic Agreement
PCB(s)	Polychlorinated Biphenyl(s)
ppm	Parts per Million
PSD	Prevention of Significant Deterioration
RFAI	Reservoir Fish Assemblage Index
RLMP(s)	Reservoir Land Management Plan(s)
RM	River Mile
RVSMP	Reservoir Vital Signs Monitoring Program
SBRE	Southern Blue Ridge Ecosystem
SFI	Sport Fishing Index
SHPO	State Historic Preservation Officer
SMI	Shoreline Management Initiative
SMP	Shoreline Management Policy
TDEC	Tennessee Department of Environment and Conservation
TMDL	Total Maximum Daily Load
TN-EPPC	Tennessee Exotic Plant Pest Council
TWRA	Tennessee Wildlife Resources Agency

TVA	Tennessee Valley Authority
TVARAM	TVA Rapid Assessment Method
USA	United States of America
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
VDCR	Virginia Department of Conservation and Recreation
VDGIF	Virginia Department of Game and Inland Fisheries
WRRWA	Watauga River Regional Water Authority

CHAPTER 1

1.0 PURPOSE OF AND NEED FOR ACTION

1.1. Background

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 affordable power, 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 of America (USA) 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 public lands are the sites for its power generating system and 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 owned or formerly owned by TVA. TVA's public lands often have been the catalyst for public and private economic development.

TVA originally acquired approximately 1.3 million acres of land in the Tennessee River Valley. The construction and operation of the reservoir system inundated approximately 470,000 acres with water. TVA has transferred to other federal and state agencies for public uses or sold for private (primarily residential) development approximately 508,000 acres. TVA currently owns approximately 293,000 acres that are managed pursuant to the *TVA Act.*

As stewards of this important resource, TVA's policy is to manage 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 region. 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.

1.2. Purpose and Need

TVA proposes to implement a Northeastern Tributary Reservoirs Land Management Plan (NTRLMP) for TVA-managed public lands surrounding seven northeastern tributary reservoirs (NTRs) along the South Fork Holston and Watauga rivers in northeast Tennessee and southwest Virginia (Figure 1-1). All lands under TVA stewardship around Beaver Creek, Clear Creek, Boone, Fort Patrick Henry, South Holston, Watauga, and Wilbur reservoirs, a total of 4,933 acres, are under consideration in this planning process.

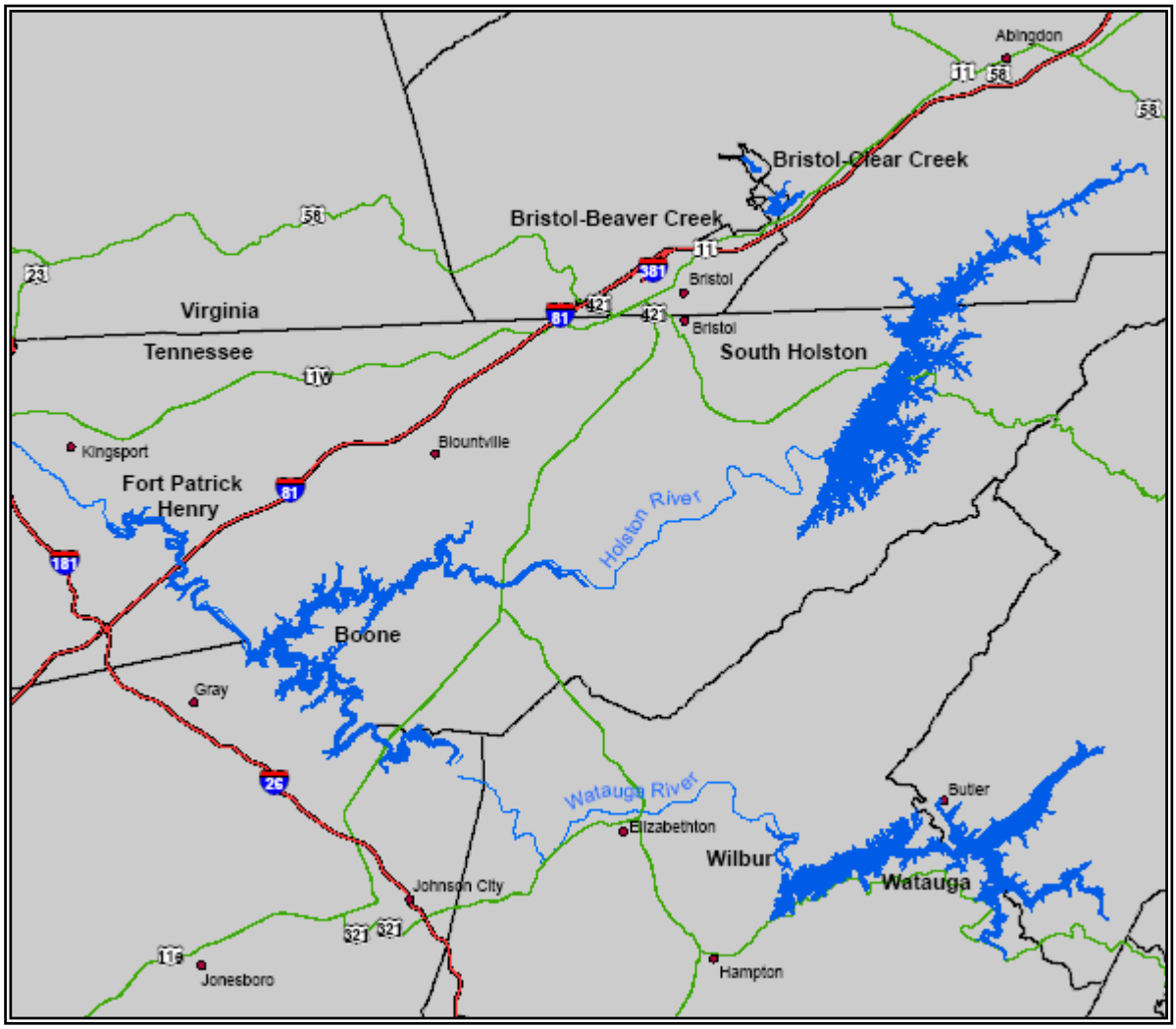

Figure 1-1. Northeastern Tributary Reservoirs (Beaver Creek, Clear Creek, Boone, Fort Patrick Henry, South Holston, Watauga, and Wilbur) Locator Map

Land acquisition and disposal information for the seven NTRs is shown in Table 1-1. The acreages listed in Table 1-1 were calculated from geo-referenced mapping data and aerial photography of the reservoir land parcels and do not completely align with acreage totals in recorded deeds. The acreages also do not account for land acquired and retained below the full summer pool elevations of the reservoirs. These acreages also do not include other lands located off-reservoir and acquired by TVA for operation of the power system (e.g., transmission line rights-of-way, substations).

Table 1-1. Northeastern Tributary Reservoirs Land Acquisition and Disposal Data

Reservoir	Location (County, State)	Total Land Originally Acquired Above Pool Elevation (Acres)	Transferred Lands (Acres)	Sold Lands (Acres)	Total Lands Disposed (Acres)	Percent Lands Disposed	TVA-Retained (Acres)
Beaver Creek	Washington, Va.	375	0	85	85	23%	290
Clear Creek	Washington, Va.	443	11	418	429	97%	14
Boone	Washington, Tenn. Sullivan, Tenn.	897	16	1	17	2%	880
Fort Patrick Henry	Sullivan, Tenn.	950	349	318	667	70%	283
South Holston	Sullivan, Tenn. Washington, Va.	3,115	808	36	844	27%	2,271
Watauga	Carter, Tenn. Johnson, Tenn.	5,003	3,864	2	3,866	77%	1,137
Wilbur	Carter, Tenn.	170	112	0	112	66%	58
Total		**10,953**	**5,160**	**860**	**6,020**	**55%**	**4,933**

TVA develops reservoir land management plans (RLMPs) to facilitate the management of reservoir lands in its custody. In general, TVA manages public land to protect and enhance natural resources, generate prosperity, and improve the quality of life in the Tennessee Valley region. The purpose of an RLMP is to 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. The RLMP also supports compliance with federal regulations and executive orders, and helps 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 reservoirs. RLMPs are submitted to the TVA Board of Directors for approval and provide a plan for long-term land stewardship and accomplishment of TVA's responsibilities under the *TVA Act*. Additional information about land planning goals is found in Chapter 4 of individual RLMPs (Volumes II-VI).

The proposed NTRLMP is designed to guide land use approvals, private water use facility permitting, and resource management decisions on the seven NTRs. The Holston-Cherokee-Douglas Watershed Team would use the proposed NTRLMP along with TVA policies and guidelines to manage resources and respond to requests for the use of TVA public land. In the land planning process, TVA would allocate public lands and land rights to one of seven land use zones (Table 1-2). In the late 1990s, TVA established this zoning system to implement TVA policies of planning lands for multiple uses and responding to stakeholder requests. In the NTRLMP, land use allocations will be determined with consideration of the social, economic, and environmental conditions around the reservoir.

In November 2006, the TVA Board of Directors approved the TVA Land Policy (Appendix A) to govern the retention, disposal, and planning of interests in real property. This policy provides for the continued development of RLMPs for reservoir properties with substantial public input and with approval of the TVA Board of Directors. An updated RLMP is needed to make land planning on the seven reservoirs consistent with the TVA Land Policy.

Finally, an updated RLMP is needed to incorporate TVA's goals for managing natural resources on public lands. TVA is currently developing a new natural resources management strategy to promote implementation of sustainable practices to balance protection of cultural and ecological resources while providing dispersed recreation opportunities. 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 quality, affordable public outdoor recreation opportunities.
- Manage resources in a cost-effective manner.

Table 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 shoreland 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 Section 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 Section 26a approvals for structures.
2	**Project Operations**	All TVA reservoir land currently used for TVA operations and public works projects, including: • ***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 dispersed recreation, maintenance facilities, watershed team offices, research areas, and visitor centers. • ***Navigation safety harbors/landings***—Areas used for tying off commercial barge tows and recreational boats during adverse weather conditions or equipment malfunctions. • ***Navigation dayboards and beacons***—Areas with structures placed on the shoreline to facilitate navigation. • ***Public works projects***—Includes public utility infrastructure, such as substations and rights-of-way for sewer lines, water lines, transmission lines, and major highway projects. • ***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 in or eligible for listing in 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***

Zone		Definition
		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 U.S. Fish and Wildlife Service, 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 a river and the adjacent land along the banks. River Corridors often consist of a linear green space of TVA land serving as a buffer to tributary rivers entering a reservoir. These areas will be included in Zone 3 when identified sensitive resources are present. • ***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

Zone		Definition
		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 terminals, mooring cells, etc., or (2) 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. • ***Land planned for any of the above uses in the future.*** 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 that 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 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 that 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 a parking lot and boat ramp. 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. Land managed for concentrated, active recreational activities that require capital improvement and maintenance, including:

Zone		Definition
		• ***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 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 centers, 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 the use of the property. • ***Greenways***—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.
7	**Shoreline Access**	TVA-owned land where Section 26a applications and other land use approvals for residential shoreline alterations are considered. Requests for residential shoreline alterations are considered on parcels identified in this zone where such use was previously considered and where the proposed use would not conflict with the interests of the general public. Types of development/management that may be permitted on this land are: • ***Residential water use facilities***, e.g., docks, piers, launching ramps/driveways, marine railways, boathouses, enclosed storage space, and nonpotable water

Zone		Definition
		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.***

1.3. Structure of the Northeastern Tributary Reservoirs Land Management Plan

The NTRLMP consists of six volumes. Volume I is the environmental impact statement (EIS), which has been developed in accordance with the *National Environmental Policy Act* (NEPA), 42 United States Code Section (§) 4321 *et seq.*, to address the potential environmental impacts of implementing the NTRLMP. The EIS includes the project purpose and need, description of alternative actions, overview of the affected environment, analyses of environmental consequences, and other elements associated with the NEPA process. Five individual RLMPs are found in Volumes II-VI of this document. Beaver Creek and Clear Creek reservoirs are addressed in a single RLMP due to the similarities of the two reservoirs. Likewise, Wilbur and Watauga reservoirs are addressed in a single RLMP. Boone, Fort Patrick Henry, and South Holston reservoirs are each described in individual RLMPs. The RLMPs contain detailed descriptions of the environment around each reservoir and descriptions of each parcel of land addressed in the plans, as well as their proposed use.

1.4. The Decision

The TVA Board of Directors will decide which of the NTRLMP alternatives to adopt for the planning and management of TVA-controlled public land around the NTRs.

1.5. Other Pertinent Environmental Reviews or Documentation

Boone Reservoir Land Management Plan Final Environmental Assessment (TVA 1999)

TVA developed this land management plan and environmental assessment (EA) for Boone Reservoir in 1999. The plan updated the 1965 land use forecast and allocated shoreline access into five zones: Project Operations, Sensitive Resource Management, Natural Resource Conservation, Recreation, and Residential Access. The EA identified no significant impacts from implementation of the proposed Land Management Plan, and TVA issued a finding of no significant impact (FONSI) in April 1999.

Boone Management Unit Resource Management Plan and Final Environmental Assessment, Boone Reservoir, Sullivan and Washington Counties, Tennessee (TVA 2002)

TVA prepared a resource-management plan and final EA (FEA) for 566 acres of public land known as the Boone Unit and issued a FONSI in August 2002. This land is on Boone Reservoir in Sullivan and Washington counties, Tennessee, about 10 miles southeast of Kingsport, 9 miles north of Johnson City, and 16 miles southwest of Bristol. The unit is made up of land along both banks of the South Fork Holston River (River Mile [RM] 18.6 to RM 35), the Watauga River (mouth to RM 15.2), and the left-descending bank of Beaver Creek (mouth to RM 1.8).

The Boone Management Unit Plan is intended to guide TVA's resource management activities for a period of 25 years, or until amended or supplemented through subsequent planning. The plan seeks to: (1) provide sustainable public use benefits through effective management of natural resources; (2) protect sensitive resources in accordance with existing regulations and principles of good stewardship; and (3) contribute to improved water quality in this portion of the Beaver Creek, South Fork Holston River, and Watauga River watersheds.

Clear Creek Golf Course and Housing Development Final Environmental Assessment (TVA 1994)

In 1994, TVA issued an FEA and FONSI for the sale of 418 acres of TVA property to the City of Bristol, Virginia, for the construction of a municipal golf course. The Clear Creek Flood Control Project was the result of a joint effort by Bristol and TVA to provide comprehensive flood control in the Beaver Creek Valley. When the project was completed, TVA granted the city a permanent easement over 418 acres for public recreational development. Prior to the sale of the property, the land was not substantially developed and was used as a city park.

Bristol Flood Reduction Final Environmental Assessment (U.S. Army Corps of Engineers [USACE] 2004)

The USACE, Nashville District, prepared an EA evaluating various alternative ways to address flood damage reduction along Beaver Creek for the cities of Bristol, Tennessee, and Bristol, Virginia, in which existing conditions and the potential environmental consequences of taking no action as well as five action alternatives were considered. The USACE concluded that selection of its preferred alternative, which included widening selected channels, removal of a building, bridge improvements, and modification to the Beaver Creek Dam, would not significantly impact the environment. TVA was a cooperating agency for the EA. In March 2006, TVA adopted the USACE EA and signed a FONSI (TVA 2006a). Subsequently, TVA and USACE developed a draft Memorandum of Agreement (MOA) for construction, operation, and maintenance of the proposed outlet structure on Beaver Creek Dam. However, due to lack of funding, USACE has not pursued construction of the modified outlet, and the MOA was not signed.

Sugar Hollow Business Complex Easement Final Environmental Assessment (TVA 2007)

In 2007, TVA issued an FEA and FONSI for the Sugar Hollow Business Complex Easement. The City of Bristol, Virginia, was developing a new business park complex on 83.7 acres of land it bought from TVA for industrial use in the mid-1990s. In order to provide road access to the complex, Bristol requested a general-purpose easement over land owned by TVA. The access road will be located on TVA's Beaver Creek Dam Reservation, a portion of which is already under permanent recreational easement to Bristol for Sugar Hollow Park. Construction of the access road and business park currently is underway.

Proposed Land Conveyance of 126.6 Acres Near South Holston Dam, Tennessee Final Environmental Assessment (TVA 1995)

At the request of the Bristol Tennessee Electric System, TVA prepared this FEA to assess impacts of future disposal of this tract to a private entity for industrial or recreational development, should one be identified. TVA issued a FONSI in October 1995. The City of Bristol, Tennessee, and the Bristol-Kingsport/Sullivan County Industrial Commissions have

expressed interest in developing the tract in the past, but neither group has been able to secure an industrial developer. Therefore, conveyance of the tract has not yet occurred.

Reservoir Operations Study Final Programmatic Environmental Impact Statement (TVA 2004)

This study evaluated alternative ways to operate the TVA reservoir system to produce greater overall public value. Specific changes in the operation of the reservoirs included in the NTRLMP were implemented in 2004 because of this study, including:

- TVA will use weekly average-flow requirements to limit the drawdown of South Holston and Watauga reservoirs June 1 through Labor Day to increase recreation opportunities.

- Based on results of the flood risk analysis, TVA raised winter flood guides and winter operating ranges on Boone, South Holston, and Watauga reservoirs.

- TVA formally schedules water releases to increase tailwater recreation opportunities below South Holston, Watauga, and Wilbur reservoirs. With variation in the amounts of flow and days of release, water releases are provided from South Holston from April 1 through October 31 and from Watauga for recreational flows below Wilbur between Memorial Day and October 31.

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

In 1998, TVA completed an EIS analyzing possible alternatives for managing residential shoreline development throughout the Tennessee River Valley. The selected alternative determined TVA's current SMP, which incorporates a strategy of managing public shoreline through an integrated approach that conserves, protects, and enhances shoreline resources and public use opportunities, while providing for reasonable and compatible use of the shoreline by adjacent residents. The SMP defines the standards for vegetation management, docks, shoreline stabilization, and other residential shoreline alterations. Across the TVA reservoir system, 38 percent of the total shoreline is available for residential development, and a third of that available shoreline had been developed by the mid-1990s. The SMI EIS is available on TVA's Web site and information on the SMP may be found on TVA's Web site at http://www.tva.gov/river/landandshore/pdfs/shorelnk.pdf.

The NTRLMP EIS tiers from the final SMI EIS concerning the categorization and management of TVA-owned shoreline access land along the NTRs. TVA-owned shoreline access land comprises 9 miles (2 percent) of the total 451 miles of shoreline on the NTRs. A detailed description of individual reservoirs can be found in Section 3.2, Table 3-2. In accordance with TVA's SMP, TVA has traditionally categorized the residential shoreline for previous land plans based on resource data collected from field surveys. To implement the categorization, 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 SMI was composed of three categories: Shoreline Protection, Residential Mitigation, and Managed Residential.

As new data were collected on the spatial location and significance of endangered species, wetlands, cultural resources, or navigation restrictions, adjustments to category boundaries have been necessary. Through experience with the shoreline categorization process set up

in 1999 by the SMI EIS, 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 are updated continually to allow ease of use of the latest information in permitting decisions. Furthermore, 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 may change as updated resource surveys are conducted. Based on these considerations, TVA is not providing a complete categorization of residential shoreline in the NTRLMP.

TVA has categorized shoreline in areas undergoing high development pressure as indicated by the volume of Section 26a and land use 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.

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 2001)

In 2001, TVA completed an EA and FONSI 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 the NTRs. 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 Section 26a regulations may be obtained from TVA watershed teams or by viewing the regulations at http://www.tva.gov/river/26apermits/index.htm.

Environmental Impact Statement and Revised Land and Resource Management Plan - Cherokee National Forest (U.S. Forest Service [USFS] 2004)

This plan and final EIS, prepared by the USFS, describe the existing environment and management of national forest lands adjacent to Boone, Fort Patrick Henry, South Holston, Watauga, and Wilbur reservoirs. This report may be accessed at http://www.fs.fed.us/r8/cherokee/planning/final_forest_plan/plan.pdf

1.6. The Scoping Process

Scoping, which is integral to the process for implementing NEPA, is a procedure that solicits public input to the NEPA process to ensure that: (1) issues are identified early and properly studied; (2) issues of little significance do not consume substantial time and effort; (3) the NEPA document is thorough and balanced; and (4) delays caused by an inadequate review are avoided. TVA's NEPA procedures require that the scoping process commence soon after a decision has been reached to prepare a NEPA review in order to provide an early and open process for determining the scope and for identifying the significant issues related to a proposed action.

TVA determined that the development of an EIS would allow for a better understanding of the impacts of the proposed land use implementation. Accordingly, on May 5, 2008, TVA published in the *Federal Register* a notice of intent (NOI) to prepare an EIS and initiated scoping for the proposal. In addition, several newspaper articles and television news reports were published during the comment period by the local news media. During the 30-day public comment period, a toll-free phone line was established for people to make verbal comments. Information about the proposed RLMPs, including maps and an interactive comment form, was available on the TVA Web site. Copies of the NOI were sent to federal, state, and regional agencies. Between May 5 and June 5, 2008, TVA sought comments from citizens, various state and federal officials, elected officials, resource conservation groups, and other organizations. Comments were also collected during a public scoping meeting held on May 20, 2008, at Sullivan Central High School in Blountville, Tennessee, where attendees were given the opportunity to have a court reporter record their oral comments and to submit written comments. A total of 42 participants attended the public scoping meeting. The scoping document (see Appendix B) describes efforts to involve the public and other agencies during the scoping period.

1.6.1. Scoping Response

During the scoping period, a total of 24 comments were received at the public scoping meeting, via the TVA Web site, through e-mail, or by letter. Comments were received from individuals, local groups (Northeast Tennessee Mountain Bike Association), and a local commercial facility (Clear Creek Golf Club).

The comments received during the public scoping period are summarized in the *Summary of Public Participation Report* section attached to the scoping document issued in August 2008 (Appendix B). The results of the public scoping provided suggestions on land use allocations for certain parcels and a characterization of respondents' use of the seven NTRs. From the comments provided, three predominant themes or general issues were identified: Natural Resources, Recreation Resources, and Reservoir Levels. Several individuals expressed their interest in additional recreational opportunities on the NTRs. The USFS expressed interest in increased access to some of the NTRs.

1.6.2. Land Use Proposals

Two land use proposals were considered when determining proposed zone allocations for subject parcels:

1. The Watauga River Regional Water Authority (WRRWA) is a regional water utility created to provide water services for the residents of Carter County, Tennessee. The WRRWA proposes to construct a water intake structure on Wilbur Reservoir. Preliminary conceptual plans involve about 2 acres of land. The structure would

include a pump building and associated water lines that would be placed within the existing road rights-of-way to a treatment plant located on private property.

2. The Virginia Department of Transportation is planning to widen Beaver Creek Reservoir Route 11 (Lee Highway) and relocate the highway entrance at Sugar Hollow Recreation Area to align with an existing signalized intersection. The minor changes to TVA-managed land (no more than approximately 1 acre) would remain consistent with the recreational use of the subject parcel on Beaver Creek Reservoir.

1.6.3. Issue and Resource Identification

This EIS is a programmatic document that addresses the proposed implementation of an NTRLMP, which would allocate TVA-managed lands to land use zones. This EIS also evaluates potential impacts associated with the various types of uses permitted under each zone. The proposed NTRLMP does not include specific projects, such as developing campgrounds or industrial sites, and effects of such projects are not evaluated in this programmatic review. Whenever such individual projects are proposed in the future, TVA will determine the need for permits, coordination with other agencies (e.g., State Historic Preservation Officer [SHPO], U.S. Fish and Wildlife Service [USFWS]), and the appropriate level of NEPA review and documentation. Additionally, this programmatic review does not address the operation of existing facilities, such as dams, electrical substations, or visitor centers. Similarly, this EIS does not address the management of water levels in the reservoirs, which was evaluated in the *Reservoir Operations Study Final Programmatic Environmental Impact Statement* (TVA 2004).

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 the NTRLMP. Existing conditions of these resources are described in Chapter 3, and the effects of each alternative on these resources are evaluated in Chapter 4:

Land Use and Prime Farmland - Existing land use patterns along the shoreline and back-lying land have been determined on most NTRs parcels by TVA land acquisition, disposals, and land use agreements. About 95 percent of the parcels are committed to existing land uses with little to no potential for change of those land uses. Proposed allocations of the remaining uncommitted parcels were evaluated using the goals of the individual RLMPs and TVA policies and regulations. TVA will comply with the 1981 *Farmland Protection Policy Act* (FPPA).

Recreation - Existing developed (public or commercial) recreation facilities available to meet public needs were identified, as were those lands that are important for dispersed recreation (e.g., hunting, bank fishing, bird watching, hiking, etc.). The effects of each alternative on recreation opportunities in the vicinity of the NTRs were evaluated.

Terrestrial Ecology - Terrestrial plant and animal communities found adjacent to the seven NTRs were characterized using existing databases and field visits. 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 Executive Orders (EOs) 13186 and 13112 on migratory birds and invasive species.

Endangered and Threatened Species - TVA identified plants and animals that are state-listed or federally listed as threatened and endangered and are known or are likely to exist in the vicinity of the seven NTRs, as well as habitat suitable for these species. TVA will comply with the *Endangered Species Act* (ESA), the *Bald and Golden Eagle Protection Act*, and similar state laws.

Wetlands - Wetlands on TVA land along the NTRs shorelines were identified. TVA will comply with EO 11990 on wetlands and the *Clean Water Act* (CWA).

Floodplains - Floodplains on TVA land along the NTRs shorelines were identified. TVA will comply with EO 11988 on floodplains.

Cultural and Historic Resources - Prehistoric or historic districts, known sites, buildings, structures, or objects on or near the seven reservoirs lands were identified. TVA will comply with Section 106 of the *National Historic Preservation Act* (NHPA).

Managed Areas and Ecologically Significant Sites - TVA identified special and unique natural areas on or in the vicinity of the seven reservoirs. The potential effect of implementing each alternative on these areas was evaluated.

Aesthetics and Visual Resources - The aesthetic settings of the reservoirs were characterized, and scenic and distinctive areas frequently seen by reservoir users and adjacent reservoir residents were identified. The potential effect of implementing each alternative on the natural beauty of the shoreline was evaluated.

Water Quality - TVA described water quality conditions within the seven NTRs, based upon the Reservoir Ecological Heath Monitoring Program or similar indices, as well as state classifications and advisories. The effect of implementing each alternative on water quality in the NTRs was evaluated.

Aquatic Ecology - TVA characterized the aquatic plants and animals found in the waters of the NTRs and their tributaries. TVA identified habitat for rare species, important aquatic habitat, or locally uncommon aquatic community types. The effect of implementing each alternative on aquatic ecology was evaluated.

Air Quality - Compliance with National Ambient Air Quality Standards (NAAQS), which establish safe concentration limits of various air pollutants, was discussed.

Noise - The potential for nuisance noises to be generated under each alternative was examined.

Socioeconomics - The current population, labor force, employment statistics, income, and property values of the NTRs region were identified. A subset of these issues is environmental justice, the potential for disproportionate impacts to minority and low-income communities. The effect of implementing each alternative on socioeconomics was evaluated.

1.7. Public Review Process

The notice of availability of the draft EIS was published in the *Federal Register* on October 9, 2009. Copies of the draft EIS were mailed to government agencies as well as individuals who requested copies. TVA notified interested federally recognized Indian tribes, elected

officials, and other stakeholders that the draft EIS was available for review and comment. Printed copies of the draft EIS were made available to the public at local libraries and at the Holston-Cherokee-Douglas Watershed Team Offices in Morristown and Gray, Tennessee. Electronic versions of the document were posted on the TVA Web site, where comments could be provided electronically. TVA also accepted comments by regular mail, e-mail, telephone, and facsimile. On October 27, 2009, TVA held an open house from 4 p.m. to 8 p.m. at the Johnson City Power Board Office in Johnson City, Tennessee, to answer questions and collect comments from the public. Forty people attended the public open house. TVA accepted comments on the NTRLMP draft EIS until November 23, 2009.

Thirty-seven written and oral comments were received from 20 commenters (some commenters submitted more than one comment), including one organization, nine citizens, and ten interested agencies. The U.S. Department of the Interior (DOI) submitted comments on behalf of the USFWS's Ecological Services offices in Tennessee and Virginia. Letters from agencies and some organizations are provided in Appendix C. TVA reviewed and prepared responses to all of these comments (Appendix D). In some instances, the EIS was changed because of the information or issues presented. All original comments and letters are part of the official record and are available upon request.

1.7.1. Public Comments

Several individuals expressed appreciation for the public outreach and support for Alternatives B and/or C. Other public comments addressed recreation opportunities, land use, and water access rights. One citizen suggested a new land use zone be developed to include resources of historic or community value. Two comments expressed concern about shoreline erosion and trash.

Two members of the Boone's Creek Historical Trust expressed interest in developing the parcel containing the William Bean Historical Monument near Boone Reservoir to improve public access to and appreciation of the site.

1.7.2. Agency Comments

The Virginia Department of Conservation and Recreation (VDCR) and the Virginia Department of Game and Inland Fisheries (VDGIF) provided data from the Virginia Natural Heritage database on records of federally listed and state-listed aquatic species in the South Fork Holston and Middle Fork Holston rivers and Beaver Creek. The VDCR provided the location of a cave near South Holston Reservoir and encouraged TVA to coordinate with the agency to minimize impacts to karst features. The VDGIF also provided information about designated trout streams near South Holston and Beaver Creek reservoirs and a state stream conservation area in the South Holston Reservoir. Both agencies recommended emphasizing recreation opportunities on South Holston and Beaver Creek reservoirs. The VDCR recommended that TVA implement erosion and sediment controls and storm water management practices. Both agencies recommended that TVA coordinate with the USFWS and VDGIF to ensure future compliance with regulations protecting rare species.

The DOI recommended that TVA contact the DOI during future site-specific reviews to evaluate the potential for future proposed projects to impact federally listed species. In the opinion of DOI, reaching a determination of "likely to adversely affect" federally listed species would be unlikely. DOI stated that the requirements of Section 7 of the ESA of 1973, as they apply to NTRLMP, have been fulfilled. The DOI expressed support for Alternative C.

The Tennessee Department of Environment and Conservation (TDEC) Division of Water Supply, Ground Water Management Section, provided information about privately owned dams, public and private water supplies, underground injection control sites, and other groundwater resources. They recommended that TVA coordinate with that agency if future projects are located near karst, sinkholes, or other connections to groundwater.

The USACE, Norfolk District, Western Virginia Regulatory Section, indicated that coordination with that office and permits under the *Clean Water Act* or *Rivers and Harbors Act* may be necessary depending upon the nature of any projects proposed on NTR lands in the future. The USACE Nashville District commented that TVA should include modifications to Beaver Creek Dam that were evaluated in a 2004 USACE EA, which TVA adopted.

The U.S. Environmental Protection Agency (USEPA), Region 4, provided detailed comments related to the Beaver Creek watershed in Knox County, Tennessee, which is not within the scope of the NTRLMP EIS. The agency also encouraged TVA to coordinate with state and federal programs for monitoring and improving water quality in the Beaver Creek watershed. The USEPA indicated the final EIS should evaluate potential direct, indirect, and cumulative impacts. The USEPA expressed a preference for Alternative B, and rated the draft EIS EC-2, expressing concern that the preferred alternative would have impacts on the environment that could and should be avoided.

TDEC expressed support for Alternative C. The Tennessee Department of Transportation had no comment, and the Virginia Department of Transportation indicated TVA should coordinate with that agency should any future proposed projects involve changes to, or use of, existing state-owned rights-of-way.

The Tennessee Wildlife Resources Agency recommended a new alternative that would blend Alternatives B and C and would honor existing land use commitments, increase boating access for hunters and fishermen, protect rare plants, and increase acres allocated to Natural Resource Conservation.

1.8. Necessary Federal Permits, Licenses, and Consultations

No federal permits are required to develop an RLMP. Site-specific information on reservoir resources has been characterized in this EIS, 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 are proposed, additional environmental reviews for these actions would be undertaken as necessary to address potential project-specific impacts.

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CHAPTER 2

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1. Development of Alternatives

TVA proposes to develop individual RLMPs to guide land use approvals, private water use facility permitting, and resource management decisions on seven NTRs. TVA developed two action alternatives: Alternative B – Proposed Land Use Plan Alternative and Alternative C – Modified Proposed Land Use Plan Alternative. Alternative B is based on the management of resources as described in the scoping document (Appendix B). Alternative C is a result of the public comments and other opportunities identified during scoping (Summary of Public Participation, Appendix B). Under each of the action alternatives, RLMPs would be developed to 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. Land use commitments include transfers, leases, licenses, contracts, power lines, outstanding land rights, and TVA-developed recreation areas. Adoption of either action alternative would lead to increased natural resource conservation and sensitive resource protection opportunities on public lands. However, the two action alternatives vary in the amount of land allocated to Sensitive Resource Management, Natural Resource Conservation, and Developed Recreation. The action alternatives also differ in the allocation of individual parcels on which TVA identified opportunities for sensitive resources management and developed recreation.

This EIS also includes analysis of environmental effects anticipated under the No Action Alternative (Alternative A). Under Alternative A, TVA would continue to use the Forecast System to manage 3,749 acres on Fort Patrick Henry, South Holston, Watauga, and Wilbur reservoirs. The 1999 Boone Reservoir Land Management Plan would be used to manage 880 acres on Boone Reservoir. The remaining 304 acres of land around Clear Creek and Beaver Creek reservoirs, which were not planned under the Forecast System and do not have a previous RLMP, would be subject to management in accordance with existing commitments and land use agreements as well as the TVA SMP and Land Policy.

Regardless of the alternative selected, the following conditions would apply:

- Any proposed development or activity on TVA-managed public land would be subject to TVA approval pending the completion of a site-specific environmental review to evaluate the potential environmental effects of the proposal. TVA would impose any necessary mitigative measures as conditions of approval for the use of public lands to prevent adverse environmental effects or to reduce potential effects.

- Future activities and use of TVA-managed public land will be guided by the TVA Land Policy.

- TVA land use allocations are not intended to supersede deeded land rights or land ownership.

2.2. Property Administration

In the proposed NTRLMP, each tract of TVA-managed land around the seven NTRs is categorized based upon a suitable use that is consistent with TVA policy and guidelines and applicable laws and regulations. As administrators of TVA public land, the TVA

Holston-Cherokee-Douglas Watershed Team will use the NTRLMP, 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 the NTRs should be made to the TVA Environmental Information Center at 1-800-882-5263.

Pursuant to the TVA Land Policy (Appendix A), TVA would consider changing a land use designation outside of the normal planning process (preparation of RLMPs) only for the purpose of water access for industrial or commercial recreation operations on privately owned back-lying land, or to implement TVA's SMP.

Additionally, there are a small number of TVA parcels in the Tennessee Valley that have deeded access rights for shoreline access that are currently utilized for uses such as commercial recreation. Should the private back-lying land become residential, a request for a change of allocation of the TVA shoreline parcel to Zone 7 (Shoreline Access) would be subject, with appropriate environmental review, to action by the TVA Board or to Board-approved policy. On the NTRs, there is one non-Zone 7 parcel (South Holston Parcel 8) over which the private back-lying property owners currently have deeded access rights.

Consistent with the TVA Land Policy, those parcels or portions of parcels that have become fragmented from the reservoir may be declared surplus and sold at public auction under certain circumstances. Parcel 9 on Fort Patrick Henry Reservoir, which is approximately 0.3 acre in size, is fragmented from the reservoir.

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 as long as such projects are compatible with the use of the allocated zone. For example, proposed construction of a water intake structure on Wilbur Reservoir Parcel 5 (Volume VI) would be compatible with the Zone 4 allocation of this parcel. Proposed public works/utility projects would be subject to a project-specific environmental review. 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 policies and the allocated use, and otherwise acceptable to TVA, will be reviewed in accordance with NEPA and must conform to the requirements of other applicable environmental regulations and other legal authorities.

2.3. Alternative A – No Action Alternative

Four of the seven reservoirs involved in this land planning effort—Fort Patrick Henry, South Holston, Watauga, and Wilbur reservoirs—previously were planned in 1965 utilizing the Forecast System. Boone Reservoir was planned in 1999 (TVA 1999). Beaver Creek and Clear Creek reservoirs have never been forecast or planned.

Before 1979, when TVA began the comprehensive planning of its reservoir lands in a public forum, the Forecast System was used to guide land use decisions on most TVA reservoir lands. The Forecast System was an in-house process that documented actual and prospective uses for all TVA public land around a reservoir using a somewhat variable set of Forecast System Designations (Appendix E). Using the Forecast System, TVA allocated land into 13 categories. Of these 13 categories, the following six were used to classify TVA land surrounding the Fort Patrick Henry, South Holston, Watauga, and Wilbur reservoirs: Dam Reservation, Public Recreation, Agriculture Research, Industry, Reservoir Operations,

and Commercial Recreation. Under the Forecast System, many parcels on Fort Patrick Henry, South Holston, Watauga, and Wilbur reservoirs were designated as "unplanned" rather than identified as one of the categories above (Appendix F).

The Boone RLMP, prepared in 1999, updated Forecast System designations previously used on Boone Reservoir. The 1999 RLMP planned the following uses for Boone Reservoir parcels: TVA Project Operations, Sensitive Resource Management, Natural Resource Conservation, Recreation, and Residential Access. Land use zones used in the 1999 RLMP have definitions similar to the zones proposed for the NTRLMP.

TVA presently manages 3,749 acres on the NTRs utilizing the Forecast System, 880 acres utilizing the Boone Reservoir Land Management Plan (TVA 1999), and 304 acres that have no previous land use plan. The 4,933 acres managed under these three systems are the subject of the NTRLMP.

Under Alternative A – the No Action Alternative, TVA would continue to use the Forecast System designations established by TVA in 1965 to manage Fort Patrick Henry, South Holston, Wilbur, and Watauga reservoirs. There are approximately 225 acres of uncommitted lands surrounding these four reservoirs that would be managed under the Forecast System, TVA's SMP, and the TVA Land Policy. There are 3,524 acres of committed lands around those four reservoirs that would continue to be managed according to existing land use agreements. Under Alternative A, TVA also would continue to manage approximately 29 acres of uncommitted lands in accordance with the 1999 Boone RLMP, TVA's SMP, and the TVA Land Policy. The remaining 851 acres of committed lands on Boone Reservoir would be managed according to existing land use agreements. Beaver Creek and Clear Creek Reservoirs would remain unplanned. The 304 acres surrounding these two reservoirs are committed lands that would be managed according to existing land use agreements. Under this alternative, the lands surrounding the seven NTRs would not be allocated according to the current seven-category land use zones (Table 1-2); therefore, complete alignment with existing policies would not occur. Proposed land use requests received from external applicants or internal TVA organizations would be evaluated for consistency with any existing land use agreement, TVA policies, and/or previous forecast (Fort Patrick Henry, South Holston, Watauga, Wilbur) or plan (Boone) for the relevant reservoir, which may not incorporate current data on land conditions, adjacent uses, etc. If the request is not consistent with the previously planned or forecast land use, formal TVA Board of Directors approval, following appropriate review, would be required to change the land use.

To facilitate the comparison of alternatives, the Forecast System designations for Fort Patrick Henry, South Holston, Wilbur and Watauga reservoirs have been converted to the equivalent designation of one of the seven proposed land use zones (Table 2-1). For example, a parcel with a Forecast System designation of Dam Reservation would be converted to Zone 2 (Project Operations). In situations where a Forecast System designation could be converted to more than one zone allocation, existing land use determined which zone allocation was selected. In some cases, a parcel with multiple land uses was split in order to allocate the varying uses to the compatible zone. Additionally, some adjacent parcels with similar land uses were combined and allocated to the

Table 2-1. Alternative A – Area[2] by Equivalent Current Land Use Designations by Reservoir

Equivalent Allocation Designation (Zone)	Land Area in Acres by Reservoir							
	Beaver Creek	Clear Creek	Boone	Fort Patrick Henry	South Holston	Watauga	Wilbur	Total
Project Operations (2)	40	14	246	166	902	661	48	2,077
Sensitive Resource Management (3)	0	0	335	0	0	0	0	335
Natural Resource Conservation (4)	0	0	224	3	798	380	4	1,409
Industrial (5)	0	0	0	0	125	0	0	125
Recreation (6)	250	0	75	85	431	93	6	939
Shoreline Access (7)	0	0	<1	29	15	3	0	48
Total	**290**	**14**	**880**	**283**	**2,271**	**1,137**	**58**	**4,933**

Note: Zone 1 – Non-TVA Shoreland is not represented because the parcels are private land (on which TVA owns flowage rights) and will not change as a result of the land planning process.

compatible zone. When parcels were designated unplanned under the Forecast System (e.g., see parcels 2, 5, 6, and 7 in Appendix F, Table F-11), the nature of the existing land use agreement was used to determine the compatible zone. For 12 parcels (totaling 37 acres) that were unplanned under the Forecast System and are also uncommitted, (i.e., no land use agreement exists), the equivalent zones were based upon existing land conditions and use of the parcel and adjacent land.

The planning zones identified within the 1999 Boone Reservoir Land Management Plan have also been converted to the equivalent land use zone designations. The committed lands surrounding Beaver Creek and Clear Creek reservoirs have been converted to equivalent land use zone designations based on the nature of the existing land use agreements. The conversions are identified for individual parcels on each reservoir in Appendix F, and the converted designations are used in many of the discussions below.

2.4. Action Alternatives

2.4.1. The Planning Process

As part of the process of developing alternatives for the NTRLMP, TVA reviewed existing and newly collected field data both on the condition of and the resources on the lands being planned. Field surveys were conducted on uncommitted parcels. No surveys for sensitive resources were conducted on committed land where data exist from previous surveys or no changes in land use are proposed. Each parcel of land was reviewed to determine its physical capability for supporting potential suitable uses. TVA also reviewed deeds of selected tracts previously sold to private entities to identify existing shoreline access rights. The planning team honored all existing commitments (i.e., existing leases, licenses, and easements). Based on this information, the TVA planning team “preallocated” land parcels to one of the seven allocation zones used in recent TVA reservoir land plans (Table 1-2). About 46 percent of the shoreline on the NTRs are lands that TVA does not own in fee, typically flowage easement lands, which are allocated to Zone 1 (Non-TVA Shoreland). Non-TVA shoreland is not included in this planning process.

[2] Areas in the table and associated text are rounded to the nearest acre, which may result in slight discrepancies in calculated totals.

Committed Land. For planning purposes, land is considered committed if it:

- Is under lease, license, easement, or contract.
- Is a developed TVA project critical to the operation of the integrated reservoir system such as a dam reservation or power lines.
- Has known sensitive resources present.
- Has a unit plan.
- Fronts land transferred or sold for public recreational use.
- Is a TVA-developed recreation area.

Agricultural licenses are not considered to be committed uses because they are an interim use of TVA public land.

Land currently committed to a specific use would be allocated to a land use zone compatible with the current use unless there is an overriding need to change the use. Possible reasons to change allocations would be ongoing adverse impacts resulting from the actions of a license or easement holder. If sensitive resources are identified on a committed parcel (with an existing lease, license, easement, etc.), that parcel would remain allocated to a zone appropriate for that committed use unless an ongoing adverse impact were found. However, TVA approval would be required prior to future activities that could impact the identified sensitive resources.

No changes to any committed land uses are proposed under either of the action alternatives. Approximately 4,679 acres (95 percent) of the TVA public land surrounding the NTRs were considered committed during the preallocation process (Table 2-2). The committed or uncommitted status of each parcel can be found in the conversion tables (Appendix F).

Table 2-2. Committed and Uncommitted Parcels on the Northeastern Tributary Reservoirs

	Committed		Uncommitted	
Reservoir	**Parcels**	**Acres**	**Parcels**	**Acres**
Beaver Creek	3	290	0	0
Clear Creek	1	14	0	0
Boone	36	851	8	29
Fort Patrick Henry	30	165	7	118
South Holston	70	2,212	10	59
Watauga	52	1,095	8	42
Wilbur	5	52	1	6
Total	**197**	**4,679**	**34**	**254**

The two action alternatives do not change the amount of land allocated for Shoreline Access (Zone 7). One Fort Patrick Henry parcel and two South Holston parcels, totaling 19 acres, were originally forecast as Reservoir Operations, but are allocated to Zone 7 under Alternatives B and C. In accordance with TVA's Section 26a regulations (18 Code of Federal Regulations [CFR] § 1304.201(a)), these parcels were placed in Zone 7 due to

existing access rights by policy because the residential areas had water access facilities prior to 1992 (see description of Reservoir Operations [Mainland] forecast in Appendix E). Once an RLMP has been adopted for a reservoir, TVA will no longer approve any private water use facilities or shoreline modifications on land previously forecast for Reservoir Operations. Additionally, all undeveloped land previously forecast for Reservoir Operations will remain in an unaltered and unencumbered condition to be considered for the most appropriate public uses during the reservoir land planning process.

TVA has transferred thousands of acres of land around the NTRs to other federal and state agencies, primarily to the USFS. TVA typically retained the fee interest in the land below the maximum shoreline contour (MSC) elevation of the specific reservoir. However, the agreements transferring lands to public agencies allowed those agencies to manage TVA-retained land below the transfer contour in a manner consistent with the agencies' objectives on the back-lying public land. The width of this marginal strip of TVA-retained land located between summer operating pool and the transfer tracts varies from reservoir to reservoir. While the width of this strip may vary, the total acreage for a reservoir may be substantial due to the total length of the shoreline. Although TVA has not calculated exact acreages of the marginal strip on some of the reservoirs, planning objectives are not impacted because these lands are committed to the back-lying land use via the transfer agreement covenants and provisions. These marginal strips are included in the RLMP and the committed use is either Zone 4 (Natural Resource Conservation) or Zone 6 (Developed Recreation). Selection of the appropriate zone primarily is dependent on the level of recreation use of the marginal strip in association with the back-lying land (i.e., developed or dispersed recreation).

Uncommitted Land. The balance of TVA land on the NTRs (254 acres or 5 percent) is not committed to a specific use through an easement, lease, or license. To develop the NTRLMP, technical specialists collected field data on many uncommitted parcels to identify sensitive resources. Representatives from various TVA organizations, including power generation, resource stewardship, recreation, and industrial development, met to allocate the parcels of TVA public land into the planning zones. Using maps that identified the known and potential locations of sensitive resources (e.g., cultural resources, wetlands, threatened and endangered species, and areas of high scenic quality), the capability and suitability of each parcel for potential uses were considered. The proposed allocations reflect the consensus of the planning team members.

2.4.2. Alternative B – Proposed Land Use Alternative

Under Alternative B, TVA would create and implement individual land plans for the seven NTRs to guide future land use decisions. The lands managed by TVA would be placed into one of the seven land use zones that best fits the existing land use, as determined in the preallocation process described above. The land areas for each of the proposed zone allocations are summarized by reservoir in Table 2-3, and the zone allocation for each individual parcel is identified in Appendix F.

Under Alternative B, new allocations for the 3,749 acres (183 parcels) that were previously forecast around Fort Patrick Henry, South Holston, Watauga, and Wilbur reservoirs would reflect the existing land uses. A majority of these forecasted lands, 3,524 acres (157 parcels), are committed due to land use agreements or deeded rights. Allocations for the 880 acres (44 parcels) around Boone Reservoir that were previously planned would reflect either the 1999 Boone Reservoir Land Management Plan allocation or the current land use agreement. A majority of the Boone Reservoir lands, 851 acres (36 parcels), are

committed under land use agreements or deeded rights. New allocations for the 304 acres (4 parcels) that have no forecast around Beaver Creek and Clear Creek reservoirs would reflect the existing land use agreements because all of these lands are committed.

Table 2-3. Alternative B – Area by Allocation Zone by Reservoir[3]

Allocation Designation	Land Area in Acres by Reservoir							
	Beaver Creek	Clear Creek	Boone	Fort Patrick Henry	South Holston	Watauga	Wilbur	Total
Zone 2	40	14	210	75	644	518	48	**1,550**
Zone 3	0	0	149	19	98	19	0	**284**
Zone 4	0	0	446	119	955	543	10	**2,073**
Zone 5	0	0	0	0	125	0	0	**125**
Zone 6	250	0	75	41	434	54	0	**854**
Zone 7	0	0	<1	29	15	3	0	**48**
Total	**290**	**14**	**880**	**283**	**2,271**	**1,137**	**58**	**4,933**

The uncommitted 254 acres (34 parcels) are proposed to be allocated to Zone 4 (Natural Resource Conservation) or Zone 6 (Developed Recreation).

2.4.3. Alternative C – Modified Proposed Land Use Alternative

To develop Alternative C, preallocations developed under Alternative B were modified based upon information obtained during the scoping process described in Section 1.6 and the scoping document (Appendix B). New information collected during the scoping process included comments from the public and regulatory agencies and data collected during field surveys. The same planning process described in Section 2.4.1 above was implemented, including maintaining all existing land use commitments (i.e., existing leases, licenses, and easements). Similar to Alternative B, the uncommitted 254 acres (34 parcels) are proposed to be allocated to Zone 3 (Sensitive Resource Management), Zone 4 (Natural Resource Conservation), or Zone 6 (Developed Recreation).

Under this Alternative, TVA would create and implement individual land plans for the seven NTRs. Parcels managed by TVA would be placed into land use zones that best represent the existing land use, resources observed during field surveys, public comments, and other opportunities identified during scoping. As a result of the scoping process, Alternative C, as compared to Alternative B, represents changes in land use zones for 19 parcels of TVA-managed land. Specifically, based upon observation of sensitive resources, 11 additional parcels would be placed into Sensitive Resource Management (Zone 3). Conversely, following field verification that sensitive resources do not exist on South Holston Parcel 1, that 98-acre parcel would be allocated to Natural Resource Conservation (Zone 4). Based upon evaluation of recreation needs and site suitability, six of the remaining seven parcels would be allocated to Developed Recreation (Zone 6) and one would be allocated to Natural Resource Conservation (Zone 4). Because the total acreage of those 19 parcels is relatively small (238 acres), the percentage of land allocated to each of Zones 3, 4, and 6 is nearly the same under Alternative C as under Alternative B. The land areas for each of the proposed zone allocations are summarized by reservoir in Table 2-4, and the zone allocation for each individual parcel is identified in Appendix F.

[3] Areas in the table and associated text are rounded to the nearest acre, which may result in slight discrepancies in calculated totals.

Table 2-4. Alternative C – Area by Allocation Zone by Reservoir[4]

Allocation Designation	Land Area in Acres by Reservoir							
	Beaver Creek	Clear Creek	Boone	Fort Patrick Henry	South Holston	Watauga	Wilbur	Total
Zone 2	40	14	210	76	644	518	48	**1,550**
Zone 3	0	0	149	21	5	102	0	**278**
Zone 4	0	0	446	116	1,045	427	10	**2,044**
Zone 5	0	0	0	0	125	0	0	**125**
Zone 6	250	0	75	41	436	86	0	**888**
Zone 7	0	0	<1	29	15	4	0	**48**
Total	**290**	**14**	**880**	**283**	**2,271**	**1,137**	**58**	**4,933**

2.5. Comparison of Alternatives

In this section, the potential environmental impacts anticipated under the three alternatives are compared based upon the information and analyses provided in Chapter 3 (Affected Environment) and Chapter 4 (Environmental Consequences).

Section 101 of 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 three alternatives are consistent with this policy. 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.

The parcels that would be allocated differently under the three alternatives are identified in Table 2-5. Only five of the seven reservoirs are represented in the table because there are no changes in the proposed parcel allocations for the committed parcels surrounding Beaver Creek and Clear Creek reservoirs.

Table 2-5. Allocation Differences Among Alternatives A, B, and C

Parcel Number	Acres	Zone by Alternative			Description
		A*	B	C	
Boone Reservoir					
16	<0.1	2	2	2	New parcel created for new road right-of-way
19	<0.1	2	2	2	New parcel created for new road right-of-way
26	151.4	3	4	4	Contains no sensitive resources; good wildlife habitat
27	70.1	3	4	4	Contains no sensitive resources; good wildlife habitat
28	35.5	2	3	3	Contains sensitive resources

[4] Areas in the table and associated text are rounded to the nearest acre, which may result in slight discrepancies in calculated totals.

Parcel Number	Acres	Zone by Alternative			Description
		A*	B	C	
Fort Patrick Henry Reservoir					
1	17.6	2	3	3	Contains sensitive resources
7a	2.4	2	2	2	New parcel created for new road right-of-way
10	66.8	2	4	4	Contains diverse wildlife habitat and riparian buffer important to water quality
10a	2.7	2	4	3	Created from Parcel 10 to protect sensitive resources
13	1.3	6	4	4	Provides good quality riparian buffer for river corridor and shoreline management; no developed recreation facilities exist
17	3.5	2	4	4	Provides good quality riparian buffer for river corridor and shoreline management; no developed recreation facilities exist
21	42.2	6	4	4	Provides good quality riparian buffer for river corridor and shoreline management; no developed recreation facilities exist
27	1.0	4	3	3	Contains sensitive resources
28a	0.3	2	2	2	New parcel created for new road right-of-way
South Holston Reservoir					
1	97.9	2	3	4	Contains no sensitive resources; good wildlife habitat
2	139.5	2	4	4	Contains good wildlife habitat
9	0.8	2	4	4	Contains three small, forested islands
12	4.1	2	4	4	Consists of marginal strip fronting private property and small islands; good riparian buffer
19	23.5	4	6	6	Fronts privately owned campground; suitable for recreational uses
21	15.7	6	4	4	Consists of Baumgardner Islands
23	1.4	6	4	6	Consists of marginal strip containing an informal boat launching ramp
25	7.0	2	4	4	Provides diverse wildlife habitat; and is a Virginia Bird and Wildlife Viewing Area
25a	5.3	2	4	3	Created from Parcel 25 to protect sensitive resources
32	7.4	6	6	4	Contains small undeveloped parking area and riparian buffer important to sensitive aquatic species nearby
35	1.7	6	4	6	Contains good wildlife habitat, riparian buffer, and primitive camping; good potential for campground
36	6.0	6	4	6	Has potential for campground
37	4.3	6	4	4	Provides excellent wildlife habitat
43	3.0	2	4	4	Consists of riparian buffer fronting Cherokee National Forest (CNF)
46	13.1	4	6	6	Managed as part of Little Jacobs Creek Recreation Area of the CNF
51	4.3	6	4	4	No developed recreation facilities present; manage for natural resources

Parcel Number	Acres	Zone by Alternative			Description
		A*	B	C	
Watauga Reservoir					
2	5.8	4	4	3	Contains sensitive resources
3	2.3	4	4	3	Contains sensitive resources
4	31.5	4	4	3	Contains sensitive resources
5	14.1	4	4	3	Contains sensitive resources
6	24.7	4	4	3	Contains sensitive resources
8	21.3	2	4	4	Consists of islands, peninsula, and cove with diverse wildlife habitat
11	10.3	6	4	4	Provides riparian buffer and quality wildlife habitat
16	8.1	6	4	4	Provides riparian buffer and quality wildlife habitat
17a	3.0	4	4	6	Requested by USFS for use as boat ramp
21	18.7	4	3	3	Contains sensitive resources
22	17.3	6	4	4	Contains good quality wildlife habitat and riparian buffer; no developed recreation facilities exist
23	118.3	2	4	4	Contains good quality, diverse wildlife habitat and riparian buffer; sensitive aquatic resources occur nearby
25	3.3	2	4	3	Contains sensitive resources
26	0.7	4	4	3	Contains sensitive resources
31	0.2	4	4	3	Contains sensitive resources
32	0.5	4	4	3	Contains sensitive resources
41	3.5	6	4	4	Contains vegetated riparian buffer beneficial to wildlife and water quality; no developed recreational facilities exist
50	9.1	4	4	6	Consists of vegetated strip bordered by USFS land; currently managed by USFS for primitive camping and used for swimming
59	20.1	4	4	6	Currently managed by the USFS for dispersed recreation
Wilbur					
1	5.9	6	4	4	No developed recreation facilities; excellent wildlife habitat

*Land use zone equivalent to the allocation in the Forecast System, Boone Reservoir Land Management Plan, or current use.

Comparison of alternatives is based upon the number of acres allocated to each zone as well as the allocation of individual parcels. Because resources, including sensitive resources, are present on some NTRs parcels, it is important to consider both measures. While a slightly smaller proportion of NTR lands would be allocated to resource conservation and protection under Alternative C, a greater number of parcels would be designated to protect specific sensitive resources.

Compared to the No Action Alternative, the two action alternatives (B and C) allocate about 12 percent more of the NTR lands to Natural Resource Conservation (Zone 4) and Sensitive Resource Management (Zone 3) (Table 2-6). Furthermore, a greater number of parcels on which sensitive resources were identified would be allocated to Zone 3 under

both of the action alternatives. In turn, compared to the No Action Alternative, the amount of land allocated to Project Operations (Zone 2) under the action alternatives would decrease by about 11 percent. The amount of land allocated to Developed Recreation (Zone 6) would decrease by 1 to 2 percent under the action alternatives compared to the No Action Alternative. As stated in Section The parcels designated for Industrial (Zone 5) and Shoreline Access (Zone 7) are the same under all three alternatives. Therefore, under the assumption that potential future development is more likely on Zones 2 and 6 than Zones 3 and 4, there is greater potential for future land development under No Action Alternative than under the action alternatives.

Table 2-6. Allocation by Zone Under Alternatives A, B, and C

Zone	Alternative					
	A		B		C	
	Acres	%	Acres	%	Acres	%
2	2,077	42.1	1,550	31.4	1,550	31.4
3	335	6.8	284	5.8	278	5.6
4	1,409	28.5	2,073	42.0	2,044	41.4
5	125	2.5	125	2.5	125	2.5
6	939	19.0	854	17.3	888	18.0
7	48	1.0	48	1.0	48	1.0
Total	**4,933**	**100**	**4,933**	**100**	**4,933**	**100**

Compared to Alternative B, Alternative C includes slightly more land in Zone 6 and slightly less in Zones 3 and 4. As stated above, the differences between Alternatives B and C affect only 19 parcels totaling 238 acres. Therefore, under the assumption that development would be more likely to occur in Zone 6 than in Zones 3 and 4, Alternative B would result in slightly fewer opportunities for development than Alternative C.

However, although there are minor differences between the two action alternatives in acreage allocated to each zone, Alternatives B and C are distinguished by different allocations of specific parcels. Under Alternative C, 11 parcels on Fort Patrick Henry, South Holston, and Watauga reservoirs are allocated to Zone 3 to protect sensitive resources. In comparison, those parcels are allocated to Zone 4 under Alternative B. Eight other parcels are zoned differently under Alternative C as compared to Alternative B, primarily to better reflect existing conditions and suitable uses of the parcels (Table 2-5).

2.6. Summary of Impacts

Under the No Action Alternative, the total number of acres of NTR land designated to Industrial, Developed Recreation, and Project Operations uses is greater than under either of the action alternatives. Under the No Action Alternative, Sensitive Resource Management is designated for the smallest number of acres, and occurs on only one of the seven reservoirs. Compared to Alternative A, the action alternatives allocate fewer acres to developed uses (Project Operations, Developed Recreation) and greater acres to Natural Resource Conservation. Generally, implementation of the No Action Alternative would present a greater potential for environmental impacts than either of the action alternatives.

Between the action alternatives, Alternative B provides fewer opportunities for developed recreation than Alternative C. Because it contains slightly more land allocated to Developed Recreation, adoption of Alternative C would pose a slightly greater potential for ground disturbance and overall impacts than Alternative B, which generally has the lowest potential for impacts. However, under Alternative C, all 25 of the parcels that contain sensitive resources would be allocated to Zone 3 (Sensitive Resource Management), which is the most protective of sensitive resources. Under Alternative B, 14 of those parcels would be allocated to Zone 3, and 10 would be allocated to Zone 4. Under Alternative C, parcels on Fort Patrick Henry, South Holston, and Watauga reservoirs that contain state-listed plants, rare plant communities, cultural resources, and high-quality wetlands would be allocated to Zone 3, as compared to their allocation to Zone 4 under Alternative B.

Impacts to each resource under each of the three alternatives are summarized in Table 2-7 below. Mitigation measures designed to avoid or minimize impacts are included in Section 4.20.

Table 2-7. Summary of the Environmental Impacts of the Three Alternatives

Resource	Potential Impacts	Alternative		
		A – No Action	B – Proposed	C – Modified
Land Use	Changes to land uses	Minor direct adverse effects. Minor indirect effects due to absence of comprehensive land plans.	No adverse direct or indirect effects. Minor beneficial effects of long-term, comprehensive land plans.	
Recreation	Availability of developed (Zone 6) and dispersed recreational opportunities	Greatest Zone 6 land – beneficial effect on developed recreation. Least Zone 4 land – minor negative impact to dispersed recreation.	Greatest reduction of Zone 6 land, resulting in minor indirect impacts. Minor beneficial effects from increase in dispersed recreation opportunities.	Moderate reduction of Zone 6 land, resulting in minor indirect impacts. Minor beneficial effects from increase in dispersed recreation opportunities.
Prime Farmland	Conversion of prime farmland; a farmland rating required before development	Greatest number of acres potentially affected; adverse impacts minor.	Lowest number of acres potentially affected; adverse impacts minor.	Lower number of acres affected than Alternative A; adverse impacts minor.
Terrestrial Ecology	Loss and fragmentation of terrestrial vegetation and wildlife habitat from clearing and ground-disturbing activities; indirect effects associated with dispersed recreation and spread of invasive plants	Greatest area potentially affected; minor potential impacts to common plant species. Minor potential direct and indirect impacts to rare plant community on Watauga Reservoir. Insignificant impacts to terrestrial wildlife.	Smallest area potentially affected; minor potential impacts to common plant species. Minor potential direct and indirect impacts to rare plant community on Watauga Reservoir. Insignificant impacts to terrestrial wildlife.	Area potentially affected smaller than Alternative A; minor potential impacts to common plant species. Lowest potential for impacts to rare plant community on Watauga Reservoir; potential impacts minor. Insignificant impacts to terrestrial wildlife.

Resource	Potential Impacts	Alternative		
		A – No Action	B – Proposed	C – Modified
Threatened and Endangered Plants and Terrestrial and Aquatic Animals	Direct impacts associated with clearing and ground disturbance; indirect impacts from habitat fragmentation, human visitation, spread of invasive species	No federally listed species affected. No significant direct or indirect impacts to known state-listed species.	No federally listed species affected. No significant impacts to known state-listed species.	No federally listed species affected. Most protective of state-listed plants. No significant impacts to known state-listed species.
Wetlands	Adverse effects to or destruction of wetlands from land clearing and ground disturbance	No direct impacts assuming protection under EO 11990; minor indirect impacts associated with dispersed recreation.	No adverse impacts assuming protection under EO 11990. Emphasis on preservation of natural habitat including wetlands; minor indirect impacts associated with dispersed recreation.	No adverse impacts assuming protection under EO 11990. Greatest emphasis on preservation of natural habitat including wetlands; minor indirect impacts associated with dispersed recreation.
Floodplains	Adverse impacts to floodplain values	Minor	Lowest due to increase in conservation lands.	
Cultural Resources	Damage to archaeological and historic properties	Greatest potential for impacts; effects avoided or mitigated through site-specific analysis and compliance with the programmatic agreement (PA) and Section 106 of the NHPA.	Lowest potential for impacts to archaeological resources, effects avoided or mitigated through site-specific analysis and compliance with the PA and Section 106 of the NHPA.	Lesser potential for impacts to archaeological resources, effects avoided or mitigated through site-specific analysis and compliance with the PA and Section 106 of the NHPA.
Managed Areas and Sensitive Ecological Sites	Incompatible land use on adjacent areas; impacts on sensitive resources	No direct or indirect adverse effects.		
Visual Resources	Effects on scenic quality; gradual degradation of visual resources	Decline in visual resources on uncommitted lands over the long term.	Lowest potential for effects to visual resources; long-term beneficial effect of largest percentage of acres in Zones 3 and 4.	Potential for effects to visual resources lower than Alternative A, slightly greater than Alternative B; long-term beneficial effect of large percentage of acres in Zones 3 and 4.

Resource	Potential Impacts	Alternative		
		A – No Action	B – Proposed	C – Modified
Water Quality	Impacts from runoff of pollutants and soil erosion	Greater potential for adverse effects project-specific review and use of best management practices (BMPs) when appropriate; minor negative effects.	Lowest potential for ground disturbance; project-specific review and use of BMPs when appropriate; minor negative effects.	Potential for ground disturbance lower than Alternative A; project-specific review and use of BMPs when appropriate; minor negative effects.
Aquatic Ecology	Alteration of aquatic habitat primarily from shoreline modification	Greater potential for adverse effects; site-specific review and use of BMPs when appropriate; minor negative effects.	Lowest potential for ground disturbance; site-specific review and use of BMPs when appropriate; adverse effects negligible.	Potential for ground disturbance lower than Alternative A; site-specific review and use of BMPs when appropriate; adverse effects negligible.
Air Quality	Emissions from construction and development activities	Very low potential for impacts; project-specific review needed; adverse effects minor.		
Noise	Noise generated by facilities associated with Industrial, Project Operations, or Developed Recreation	Greatest potential for noise generation; no significant impacts.	Lowest potential for noise generation; no significant impacts.	Potential to generate noise smaller than Alternative A, but slightly greater than Alternative B; no significant impacts.
Socioeconomic Impacts and Environmental Justice	Effects to the local economy and populations	No noticeable effect on local economy. No disproportionate impacts to disadvantaged populations.		

2.7. The Preferred Alternative

The preferred alternative is Alternative C, the Modified Proposed Land Use Alternative, which provides suitable opportunities for developed recreation, conservation of natural resources, and management of sensitive resources. Under Alternative C, all parcels with identified sensitive resources would be allocated to the most protective land use zone; only some of those parcels would be zoned for sensitive resource management under Alternatives A and B. Compared to Alternative B, Alternative C would provide more of the recreational opportunities in which the public expressed interest during scoping.

CHAPTER 3

3.0 AFFECTED ENVIRONMENT

The existing conditions of various environmental resources that could be affected by implementation of the proposed NTRLMP are described in this chapter.

3.1. The Northeastern Tributary Reservoirs

The NTRLMP addresses seven TVA tributary reservoir projects in the northeast corner of Tennessee and southwest corner of Virginia (Figure 1-1). Several characteristics of the NTRs are listed in Table 3-1.

Table 3-1. Characteristics of Seven Northeastern Tributary Reservoirs

Reservoir	Dam Location*	Length of Reservoir (miles)	Flood Storage (acre-feet)	Shoreline (miles)	Summer Pool Elevation (feet above msl**)	Annual Pool Variation (feet)
Beaver Creek	BCM 22.5	1.2	5,020	1.2	-	Detention only
Clear Creek	CCM 2.8	-	2,511	2.2	-	-
Boone	SFH RM 18.6	32.7	75,829	131.1	1,382	18
Fort Patrick Henry	SFH RM 8.2	10.4	0	27.1	1,263	5 (daily)
South Holston	SFH RM 49.8	23.7	252,757	181.1	1,729	21
Watauga	W RM 36.7	16.3	152,829	108.1	1,959	7
Wilbur	W RM 34.0	1.8	0	3.8	Run of the River◆	15

- = Not applicable
* Measured in river miles (RM) from the mouth of the respective river (SFH = South Fork Holston; W = Watauga) or creek; BCM = Beaver Creek Mile; CCM = Clear Creek Mile
** mean sea level = msl
◆ Elevation depends upon operation of Watauga Dam

Beaver Creek, Boone, Clear Creek, Fort Patrick Henry, and South Holston reservoirs, and a small portion of Wilbur Reservoir, are located in the Ridge and Valley ecoregion of Tennessee and Virginia. This region occurs between the Blue Ridge Mountains on the east and the Cumberland Plateau on the west. It is a relatively low-lying area made of roughly parallel ridges and valleys that were formed through extreme folding and faulting events in past geologic time (Griffith et al. 1998).

Within the Ridge and Valley ecoregion, Fort Patrick Henry, Boone, Beaver Creek, Clear Creek, the portion of South Holston Reservoir in Virginia, and Parcel 1 on Wilbur are located within the Southern Limestone/Dolomite Valleys and Rolling Hills subregion. This is a heterogeneous region composed predominantly of limestone and cherty dolomite. Landforms are mostly undulating valleys and rounded ridges and hills, with many caves and springs. Soils vary in their productivity, and land cover includes oak-hickory and oak-pine

forests, pasture, and intensive agriculture, as well as urban and industrial land uses. The portion of South Holston Reservoir located in Tennessee is located within the Southern Shale Valleys subregion, which consists of lowlands, rolling valleys and slopes and hilly areas dominated by shale materials. Small farms and rural residences occur throughout where land is used for grazing or farming tobacco, corn, or hay (Griffith et al. 1998).

Watauga and most of Wilbur reservoirs are located within the Southern Sedimentary Ridges subregion of the Southern Blue Ridge ecoregion (SBRE). The SBRE is one of the richest centers of biodiversity in the eastern United States and one of the most floristically diverse. This ecoregion includes the Appalachian oak forest, northern hardwoods, and at the highest elevations in Tennessee and North Carolina, the southeastern spruce-fir forest. Shrub, grass, and heath balds; hemlock; cove hardwoods; and oak-pine communities are also significant (Griffith et al. 1998). The Southern Sedimentary Ridges subregion includes some of the westernmost foothills of the Blue Ridge Mountains. The slopes are steep and elevations are generally from 1,000 to 4,500 feet above msl. The soils are underlain by Cambrian-age sedimentary rocks and support mostly a mixed oak and oak-pine forest (Griffith et al. 1998).

The seven NTRs are located along two major river systems: the South Fork Holston River, extending from southwest Virginia into northeast Tennessee and the Watauga River extending from North Carolina into northeast Tennessee. Boone, Fort Patrick Henry, and South Holston dams are located along the South Fork Holston River. Watauga and Wilbur dams are located along the Watauga River. Boone Dam is located approximately 1.4 miles downstream of the confluence of the two river systems, such that one arm of Boone Reservoir extends up the South Fork Holston River, and the other arm extends up the Watauga River. Clear Creek and Beaver Creek dams comprise the Bristol Flood Control Project, located in Washington County, in southwest Virginia. These creeks are within the Beaver Creek watershed and drain into South Fork Holston arm of Boone Reservoir.

3.1.1. Beaver Creek and Clear Creek Reservoirs

Beaver Creek and Clear Creek reservoirs are located in Washington County, Virginia. Clear Creek is a tributary of Beaver Creek. Both creeks are within the South Fork Holston River watershed (06010102). Both dams were built in 1965 to provide flood protection and recreation for the Bristol, Tennessee-Virginia, area. The Beaver Creek Dam is a 1,588-foot-long flood detention dam with no permanent reservoir pool. The detention basin of Beaver Creek has a flood-storage capacity of 5,020 acre-feet. The Clear Creek Dam is 670 feet long. Clear Creek Reservoir has a flood-storage capacity of 2,511 acre-feet and reaches 0.6 mile upstream from the dam. A detailed description of Beaver Creek and Clear Creek reservoirs and surrounding lands is provided in Volume II.

3.1.2. Boone Reservoir

Boone Reservoir is located in Sullivan and Washington counties, Tennessee. The reservoir is two-pronged, with one arm formed along the South Fork Holston River and one arm formed along the Watauga River. The reservoir is within the South Fork Holston River watershed (06010102). The Boone Dam stretches 1,532 feet across the South Fork Holston River, just downstream of the confluence with the Watauga River. The construction of Boone Dam occurred between 1950 and 1952, and the reservoir was named for frontiersman Daniel Boone, who played a major role in the history of the area. Three hydroelectric generating units are present at Boone Dam, with a power generating capacity of 81,000 kilowatts. Boone Reservoir is operated for a number of purposes, including power production, flood control, recreation, and management of water supply, water quality

and aquatic habitat. Management of reservoir lands are currently guided by the Boone Reservoir Land Management Plan (TVA 1999) and the Resource Management Plan for the Boone Management Unit (TVA 2002). Boone Reservoir has a flood-storage capacity of 75,829 acre-feet. A detailed description of Boone Reservoir and surrounding lands is provided in Volume III.

3.1.3. Fort Patrick Henry Reservoir

Fort Patrick Henry Reservoir is located in Sullivan County, Tennessee, and Fort Patrick Henry Dam stretches 737 feet across the South Fork Holston River in the South Fork Holston River watershed (06010102). The construction of Fort Patrick Henry Dam occurred between 1951 and 1953, and the reservoir was named after the colonial fort, also known as Long Island Station. The Fort Patrick Henry Dam has two generating units and a generating capacity of 59,400 kilowatts of electricity. Fort Patrick Henry Dam was built primarily for hydropower, but the dam is also used to regulate the flow of water downstream, to ensure a reliable supply of water for local industry and for cooling water at TVA's John Sevier Fossil Plant, and to provide recreational opportunities. A detailed description of Fort Patrick Henry Reservoir and surrounding lands is provided in Volume IV.

3.1.4. South Holston Reservoir

South Holston Reservoir is located in Sullivan County, Tennessee, and Washington County, Virginia, and South Holston Dam stretches 1,600 feet across the South Fork Holston River in the South Fork Holston River watershed (06010102). The construction of the earth-and-rock fill dam began in 1942. However, the construction was halted soon after, in favor of other wartime construction efforts. Construction resumed in 1947, and the dam was completed in 1950. South Holston Dam has one hydroelectric unit and a power generating capacity of 38,500 kilowatts. With a flood-storage capacity of 252,757 acre-feet, South Holston Reservoir is operated for many purposes, including flood control, power production, recreation, and management of aquatic habitat. Water levels in the reservoir vary about 21 feet during normal years to provide for flood storage and augmentation of the flow of water during the drier seasons of the year. A detailed description of South Holston Reservoir and surrounding lands is provided in Volume V.

3.1.5. Watauga and Wilbur Reservoirs

Watauga and Wilbur reservoirs are located in Carter and Johnson counties, Tennessee, on the Watauga River in the Watauga watershed (06010103). Watauga Dam is a 900-foot earth-and-rock fill structure. Construction of the dam began in 1942, but was halted later that same year due to other wartime construction efforts. Construction resumed in 1946, and the dam was completed in 1948. Watauga Dam has two hydroelectric generating units with a capacity of 57,600 kilowatts of electricity. Watauga Reservoir has a flood-storage capacity of 152,829 acre-feet and is operated for many uses, including flood control, power generation, recreation, and management of water quality and aquatic habitat. Watauga is the highest reservoir (over 1,900 feet above msl) in the Tennessee River system.

Wilbur Dam stretches 375 feet across the Watauga River and is located almost 3 miles downstream from Watauga Dam. The construction of Wilbur Dam occurred between 1909 and 1912. Wilbur Dam has four hydroelectric generating units. Upon completion of construction, two hydroelectric generating units were installed in 1912. Another hydroelectric generating unit was added in 1926. TVA acquired Wilbur Dam in 1945 and installed a fourth hydroelectric generating unit. Detailed descriptions of Watauga and Wilbur reservoirs and surrounding lands are provided in Volume VI.

3.2. Land Use

Existing land use patterns along the shoreline and back-lying land have been influenced by whether TVA acquired the land and whether TVA has subsequently sold, transferred, or retained the land. TVA originally acquired about 10,953 acres of land on the seven NTRs (Table 1-1). About 55 percent (6,020 acres) of this land has been sold for private use or transferred to other federal and state agencies for public use. TVA presently manages a total of approximately 4,933 acres of land on these reservoirs, which are the subject of this NTRLMP.

As described in Section 2.4.1, TVA typically retained the land below the MSC fronting the transferred or sold lands. A large proportion of the back-lying acreage disposed of was transferred to the USFS and is now national forest system land along the shorelines of the NTRs. Transfer agreements to other public agencies allow for management of these retained lands by those agencies, consistent with their management of the adjacent back-lying land (see TVA-Owned and Jointly Managed Shoreline in Table 3-2 below). In contrast, in cases where TVA sold back-lying land to private persons or entities, the sale deeds typically allow for rights of ingress and egress across the TVA-retained marginal strip, and therefore, the back-lying landowners typically have the right to apply to TVA for permission to construct private water use facilities.

Table 3-2. Northeastern Tributary Reservoirs Shoreline Ownership Data

Reservoir	Flowage Easement Shoreline		TVA-Owned Shoreline Access		TVA-Owned and Jointly Managed Shoreline		TVA-Owned and Managed Shoreline		Total Shoreline Miles
	Miles	% of Total Miles	Miles	% of Total Miles	Miles	% of Total Miles	Miles	% of Total Miles	Miles
Boone	108	82	0.5	<1	19	14	4	3	131
Fort Patrick Henry	9	32	5	19	9	32	4	15	27
South Holston	43	24	3	<1	133	73	4	2	181
Watauga	48	44	0.5	<1	55	51	4	4	108
Wilbur	0	0	0	0	1	37	2	61	4
Total	**208**	**46**	**9**	**2**	**217**	**48**	**18**	**4**	**451**

Most of the residential development along the reservoirs is on land TVA sold with shoreline access rights across the TVA-owned marginal strip of land below the MSC (Zone 7 – Shoreline Access) or on private land on which TVA purchased the right to flood to a certain elevation (Zone 1 – Flowage Easement Shoreline). The SMI EIS shoreline ownership data for five of the seven NTRs is presented in Table 3-2. The 451 miles of shoreline along the five reservoirs is managed by TVA, either as flowage easement or shoreline access land. Clear Creek and Beaver Creek are omitted from the table because they are part of the Bristol Flood Control Project, which was not included in the scope of the SMI EIS.

To clarify shoreline development trends on the NTRs, TVA used aerial photography and Geographic Information System mapping to estimate the amount of shoreline available for residential development. The amount of developed residential shoreline ranges from greater than 60 percent of the shoreline on Boone Reservoir to less than 1 percent on

Wilbur Reservoir (Table 3-3). No residential development surrounds Beaver Creek and Clear Creek reservoirs, which are developed for public recreation (Table 3-3). A negligible amount of shoreline available for residential development exists on Wilbur Reservoir. In total, around Boone, Fort Patrick Henry, South Holston, and Watauga reservoirs, 46 percent of the combined shoreline (about 217 shoreline miles) is available for residential development. Development has already occurred on about 43 percent of the shoreline available for residential development (about 94 shoreline miles).

Table 3-3. Percent of Shoreline Available for Residential Development and Percent of Available Shoreline Developed

Reservoir	Percent of Total Shoreline Available for Residential Development*	Percent of Available Shoreline Already Developed
Beaver Creek	-	-
Clear Creek	-	-
Boone	83	66
Fort Patrick Henry	52	43
South Holston	25	14
Watauga	45	20
Wilbur	<1	<1
Total	**46**	**43**

- = Not applicable
* Sum of flowage easement and shoreline access

Development around the four major reservoirs over the last 15 years has been steady, as many farms have been turned into residential developments, primarily single-family homes. In recent years, multifamily developments have become more prevalent. Under the TVA Land Policy, TVA can no longer consider new residential land use requests on TVA-managed land. Therefore, the amount of shoreline available for residential use will not change as a result of the land planning process.

Many of the TVA-managed parcels on the NTRs have existing land use agreements that commit a parcel to a specific use. The majority of the land use agreements are for uses such as utilities, highways, and other public infrastructure. Most of these public infrastructure uses affect narrow linear tracts with small acreages. A total of approximately 916 acres is designated for public or commercial recreation or fronts national forest land (Table 3-4). A large proportion of the public recreation agreements are for campgrounds, day use areas, and city parks that are operated by local, county, and state government agencies. Commercial recreation agreements include docks, marinas, and campgrounds on several of the reservoirs, which are described in more detail in Section 3.3.

Table 3-4. Northeastern Tributary Reservoirs Land Use Agreements by Category (2008)

Land Use Agreement Categories	Number of Agreements	Acres (approximate)
Recreation		
Public Recreation	13	719.5
Commercial Recreation	9	29.5
Land Fronting National Forest System Lands	2	167.5
Project Operations		
Highways/Roads	11	18.3
Railroad	1	<1.0
Municipal Uses (office buildings, parking lots, industrial parks, etc.)	0	0.0
Utilities		
Wastewater/water treatment	2	24.4
Sewer Lines	3	1.3
Electric Lines	31	40.5
Telephone Lines	11	8.0
Water Lines	2	3.5
Gas Lines	1	1.0
Fiber Optic Lines	5	3.6
Other		
Sufferance Agreements	2	<1.0
Private - Homes/Driveways	1	<1.0
Total	**94**	**1,017**

3.3. Recreation

The northeastern Tennessee Valley region provides numerous opportunities for outdoor recreation within a one-day drive of nearly one-third of the nation's population. Four Tennessee state parks, two Virginia state parks, one national park, three national forests, 10 TVA reservoirs, and countless smaller parks and nature centers make up the recreation fabric of the NTRs region. Recreational opportunities provide a variety of individual, social, and cultural benefits.

TVA-managed lands in the NTRs region include 4,933 acres along TVA reservoirs, some of which provide a high-quality and diverse array of recreation opportunities. Recreation facilities on TVA-managed lands include campgrounds, marinas, swimming beaches, picnicking facilities, fishing piers, boat ramps, visitor buildings, and other day use facilities.

The inventory of recreation areas on NTRs includes public and private recreation areas. Public facilities are owned and/or operated by TVA or other government entities, whereas private facilities are commercial areas operated for profit and occur on private land, on TVA land with land right agreements, or on combinations of private and public lands under agreement. Modern recreation facilities and amenities on shoreline properties adjacent to the NTRs include: 13 campgrounds, 8 marinas, 31 developed boat launches/ramps, and many day use facilities such as picnic areas, swimming beaches, ball fields, fishing piers,

and a golf course. Detailed descriptions of recreation areas are provided in individual RLMPs (Volumes II-VI).

Thirty-nine high-quality developed recreation facilities are provided on TVA-managed land on the NTRs (Table 3-5). These facilities primarily occur on parcels allocated as Zone 6 (Developed Recreation) or Zone 2 (Project Operations, i.e., Dam Reservation). TVA-managed developed recreation facilities include a public campground, day use areas, visitor/observation buildings, a swimming beach, and developed river access sites. In general, regulations on TVA developed recreation facilities prohibit hunting, possession and use of firearms, use and consumption of alcohol, and camping outside designated campsites. Recreational use of motorized vehicles is restricted to roadways and is otherwise prohibited on TVA lands and in the reservoir drawdown zones. Fishing is permissible in accordance with applicable state regulations.

Table 3-5. Developed and Dispersed Recreation Sites Located on the Northeastern Tributary Reservoirs

Reservoir	No. Developed Recreation Sites	No. Dispersed Recreation Areas	No. Dispersed Recreation Sites
Beaver Creek and Clear Creek	2	0	0
Boone	11	7	59
Fort Patrick Henry	4	2	7
South Holston	11	6	27
Watauga and Wilbur	11	2	2
Total	**39**	**17**	**95**

TVA-managed lands around the NTRs also offer abundant opportunity for dispersed recreation, which consists of passive, informal opportunities that are predominantly nature based or water based. Dispersed recreation typically occurs on parcels allocated as Zone 2, 3, or 4 (Project Operations, Sensitive Resource Management, and Natural Resource Conservation, respectively), and on undeveloped Zone 6 (Developed Recreation) parcels. Generally, dispersed recreation amenities include: rustic trails for fishing access/walking/hiking/horseback riding, primitive campsites, primitive swimming and launching sites, and hunting and fishing areas.

As of 2008, 17 areas identified and assessed on the NTRs contained a total of 95 dispersed recreation sites (Table 3-5). A site is defined as an area of impact where a recreation activity occurs; an area is the sum of the sites near one another on a TVA parcel. Regulations designed to protect resources and users of dispersed recreation lands prohibit motorized-vehicle use except where permissible for fishing access and launching boats from primitive sites during winter drawdown season. Hunting and fishing are permissible, unless otherwise posted, consistent with statewide regulations. Likewise, possession and use of firearms and other weapons is permitted subject to all applicable state regulations. Camping stays are limited to a maximum of 14 days within any 30-day period. After 14 days, campers must move at least one river mile before reestablishing a campsite. Consumption of alcohol is governed by local ordinances, unless otherwise posted.

Some improvements may be made to dispersed recreation areas when necessary to provide access for the user (e.g., parking lot), improve health and safety of the user (e.g.,

installation of seasonal portable toilets), or mitigate damage to natural resources (e.g., hardening of recreation sites to reduce severity of impacts).

3.4. Prime Farmland

The FPPA requires that all federal agencies evaluate impacts to farmland prior to converting such land permanently to nonagricultural land use. Prime farmland is defined by the U.S. Department of Agriculture (USDA) as land that has the best combination of chemical and soil physical characteristics for meeting the nation's short- and long-range needs for food and fiber. Prime farmland can consist of cultivated land, pastureland, or forestland, but it is not urban, built-up land or covered by water.

The Commonwealth of Virginia has designated farmland of statewide importance that is exceptional for the production of food, feed, fiber, forage, and oil seed crops. Generally, state agencies identify farmlands of statewide importance as those areas that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some may produce as high a yield as prime farmlands if conditions are favorable. In some states, additional farmlands of statewide importance may include tracts of land that have been designated for agriculture by state law. Consideration for protection under the FPPA extends to farmland of statewide importance.

To evaluate effects to prime farmland and farmland of state importance, TVA identifies soil classifications using the USDA, Natural Resources Conservation Service Web Soil Survey (http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx).

About 430 acres of prime farmland and 167 acres of farmland of statewide importance occur around the seven NTRs (Table 3-6). No land of either designation occurs around Wilbur Reservoir. Farmland of statewide importance occurs in Washington County, Virginia, near Beaver Creek, Clear Creek, and South Holston reservoirs. Detailed descriptions of the parcels containing prime farmland are provided in the individual RLMPs (Volumes II-VI) and in Appendix G.

Table 3-6. Approximate Number of Acres and Parcels Having Prime Farmland or Farmland of Statewide Importance Around the Northeastern Tributary Reservoirs

Reservoir	Prime Farmland		Farmland of Statewide Importance	
	Acres	No. Parcels*	Acres	No. Parcels*
Beaver Creek	18	1	120	3
Clear Creek	0	0	3	1
Boone	58	5	0	0
Fort Patrick Henry	50	8	0	0
South Holston	292	10	44	11
Watauga	12	1	0	0
Wilbur	0	0	0	0
Total	**430**	**25**	**167**	**15**

*Some parcels may contain both prime farmland and farmland of statewide importance.

The geographic extent of the NTRs reaches Carter, Johnson, Sullivan, and Washington counties in Tennessee, and Washington County, Virginia. The proportion of total county area in farms ranges from 18 percent in Carter County to 57 percent in Washington County, Tennessee (Table 3-7). Prime farmland is found in each of the five counties, comprising between 3 and 17 percent of the total area in a county (Table 3-7).

Agriculture census data show that during the 20 years between 1987 and 2007, the number of farms in the five counties has decreased between about 10 and 73 percent (Table 3-7). However, during the same period, the number of acres of land in farms increased in Carter County, and decreased between 1.9 and 43 percent in the other four counties. In 2007, the average size of farms ranged from 64 acres in Sullivan County to 111 acres in Washington County, Virginia. Between 1987 and 2007, the average size of farms increased in all counties except Sullivan County.

Table 3-7. Acreage of Prime Farmland and Farming Trends in the Counties Adjacent to Northeastern Tributary Reservoirs

County	Percent of Total Area in Farms	Acres Prime Farmland	Percent Prime Farmland	Percent Change From 1987 to 2007*		
				Number of Farms	Land in Farms (Acres)	Average Size of Farms (Acres)
Carter, Tenn.	18	10,337	5	-32.9	4.5	27.6
Johnson, Tenn.	23	5,331	3	-73.1	-43.4	17.6
Sullivan, Tenn.	31	14,461	5	-11.9	-18.8	-6.3
Washington, Tenn.	57	36,382	17	-15.7	-4.5	9.7
Washington, Va.	54	13,319	4	-10.1	-1.9	7.2

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

3.5. Terrestrial Ecology

3.5.1. Plant Communities

Vegetation classes commonly found around the reservoirs include evergreen forest, evergreen woodlands, evergreen-deciduous forest, deciduous forest, deciduous woodlands, shrublands, and herbaceous vegetation. Descriptions of vegetation classes are adapted from Grossman et al. (1998) and are found in the glossary of this EIS (Section 7.2).

Throughout the South Fork Holston River and Watauga River watersheds, deciduous forests and woodlands are the most common and the most diverse vegetation classes found in the watersheds surrounding the NTRs. Deciduous forests and woodlands cover approximately 35 percent of the landscape and are composed of diverse communities ranging from mesic (moist) cove hardwood forest to xeric (dry) upland oak forests. Evergreen-deciduous forests occupy approximately 20 percent of the land cover and primarily consist of moist mixed-hardwood forests and dry pine and pine-oak forests. Less than 15 percent of the land cover is evergreen forests and evergreen woodlands. In addition, small areas (less than 1 percent) of floodplain hardwood forests, along with scrub-shrub wetland communities, occur along the backs of coves along the reservoirs. Herbaceous vegetation in the form of row crops, grass fields, and agricultural areas, along with cleared areas within transmission line rights-of-way and along roadsides, are abundant

around Boone, Fort Patrick Henry, and South Holston reservoirs, where approximately 30 percent of the land use is herbaceous vegetation. Only about 12 percent of the land use surrounding Wilbur and Watauga reservoirs is herbaceous vegetation. Land use/land cover information was obtained from TDEC (2000; 2006a; 2006b).

During April and May 2007, field surveys were conducted on selected uncommitted parcels to assess terrestrial plant communities. Two rare plant communities were identified during field surveys. While not federally or state-listed as threatened or endangered, these plant communities are considered to be imperiled and their occurrence is tracked by NatureServe. Along the north shore of Watauga Reservoir on Parcels 2, 3, 4, 5, and 6 is Carolina Hemlock (Eastern Hemlock)/Great Laurel Forest, which is ranked G1 (globally critically imperiled) under the NatureServe ranking system. Carolina hemlock communities, in general, have a restricted range, occurring only in the Southern Blue Ridge and upper Piedmont ecosystems and are probably native to North Carolina and Tennessee. Occurrences are typically small and restricted to rocky bluff habitats. All occurrences are threatened by fire suppression and the hemlock woolly adelgid (*Adelges tsugae*), an exotic pest (NatureServe 2008). During field surveys, hemlock wooly adelgid was observed on both hemlock species.

A small, isolated area of northern white cedar limestone seepage woodland is found near Parcel 24 on Watauga Reservoir. This plant community type is ranked G2/G3 (G2 = imperiled globally; G3 = globally rare or uncommon). It typically is found on cliffs, associated with seepage over limestone or dolomite. Stands are dominated by northern white cedar and may contain several rare plant species such as showy lady's slipper, starry Solomon's plume, and shining ladies tresses (NatureServe 2008).

Invasive nonnative species of plants occur on most of the planned TVA parcels around the NTRs. EO 13112 defines an invasive species as one that is not native to that ecosystem and whose introduction does or is likely to cause economic or environmental harm or harm to human health. Invasive nonnative plants affect native terrestrial plant communities by competing for space and resources, which ultimately could degrade botanical diversity and wildlife habitat. Invasive species are typically robust plants that are not subject to natural controls of native insects and diseases. Consequently, invasive species may spread across the landscape beyond the control and reclamation measures applied by landowners and managers on individual land holdings (Miller 2003).

The Federal Noxious Weed List of 2006 (USDA 2007) lists invasive, nonnative plant species that are controlled by federal law. No listed plants are reported from the lands around the NTRs. However, 15 species listed by the Tennessee Exotic Plant Pest Council (TN-EPPC) in 2001 as a severe threat to native ecosystems (Rank 1) were observed on NTR lands. Species included autumn olive, bush honeysuckle, Chinese lespedeza, Chinese privet, English ivy, garlic mustard, Japanese honeysuckle, Japanese stiltgrass, Johnson grass, kudzu, mimosa, multiflora rose, oriental bittersweet, princess tree, and tree of heaven. Other nonnative species such as crown vetch, tall fescue, shrubby bushclover, Queen Anne's lace, periwinkle, and small carpet grass were also encountered. All of these species have the potential to adversely impact the native plant communities because of their potential to spread rapidly and displace native vegetation. All of the TN-EPPC Rank 1 (severe threat) species are considered high priority when TVA plans management of invasive plants (James 2002).

3.5.2. Wildlife Communities

The variety of land forms, soils, climate, and geology across the Ridge and Valley ecoregion and SBRE support an extremely diverse assemblage of animals. The Ridge and Valley ecoregion contains long stretches of ridges with adjacent valleys that run in a southwestern-to-northeastern direction. In this ecoregion, deciduous and mixed evergreen-deciduous forests are interspersed with agriculture and urban dominated areas. Wildlife ranges from forest-dependent species to those that tolerate highly modified habitats. The SBRE contains the largest area of contiguous, mature forest habitat in the eastern U.S. (Franzreb and Phillips 1995). Forests in the SBRE provide globally significant habitat for many species, especially amphibians and land snails (Ricketts et al. 1996). The array of microclimates and diversity of habitats are associated with high levels of species richness and species with limited geographic ranges. The high elevations found in the SBRE also provide habitat for relict populations of animals typically found at more northern latitudes.

Several forest types are found on TVA public lands along the NTRs. Deciduous forests provide a diversity of habitat for wildlife. Oak-hickory forest is the most abundant forest type in the eastern U.S. (Flather et al. 1999) and is prevalent on NTR lands. The numerous bird species that nest in deciduous forests include wild turkey, whip-poor-will, ruby-throated hummingbird, red-eyed vireo, blue-headed vireo, wood thrush, gray catbird, black-throated green warbler, black-and-white warbler, ovenbird, hooded warbler, and scarlet tanager. Riparian corridors along streams within deciduous forests provide nesting habitat for Acadian flycatcher, northern parula, and Louisiana waterthrush. Many additional bird species migrate through or winter in the area. Common mammal species of deciduous forests include black bear, white-tailed deer, red bat, eastern chipmunk, eastern gray and southern flying squirrels, white-footed mouse, southern red-backed and woodland voles, short-tailed shrew, gray fox, least weasel, and bobcat.

Seepages, streams, and temporary ponds in deciduous forests provide habitat for numerous amphibians including American and Fowler's toads; green, northern cricket, and other frogs; spotted and other mole salamanders; red and mud salamanders; and northern dusky and other salamanders in the genus *Desmognathus*. Reptiles commonly found in deciduous forests, especially near water, include eastern fence lizard, ground skink, five-lined skink, eastern box turtle, eastern worm snake, black racer, and ring-necked snake.

Evergreen and evergreen-deciduous forests provide nesting habitat for woodland birds including pine and yellow-throated warblers, great crested flycatcher, and chuck-will's-widow. Birds that winter in this forest type include red-breasted nuthatch, red crossbill, and pine siskin. Other animals that inhabit evergreen and evergreen-deciduous forests but are not restricted to them include white-tailed deer, wild turkey, black bear, eastern mole, eastern kingsnake, smooth earth snake, eastern fence lizard, and six-lined racerunner. Additionally, streams, wetlands, and other seasonally wet areas in this forest type provide habitat for a variety of salamanders, frogs, and toads.

Nonforested habitat in this area includes agricultural fields, transmission line rights-of-way, and pasture. These early successional habitats provide habitat for a variety of bird species including eastern bluebird, eastern meadowlark, American crow, American kestrel, and red-tailed hawk. Amphibians and reptiles that use these habitats include spring peeper, chorus frog, and common garter snake.

Bird and mammal diversity greatly increases at edge habitats, especially those between forested areas bordered by early successional habitats. Birds commonly found at these

edge habitats include wild turkey, great crested flycatcher, white-eyed vireo, Carolina wren, blue-gray gnatcatcher, brown thrasher, blue-winged warbler, prairie warbler, common yellowthroat, yellow-breasted chat, indigo bunting, eastern towhee, field and song sparrow, and orchard oriole. Mammals expected at edges include eastern cottontail, woodchuck, eastern harvest mouse, red fox, coyote, long-tailed weasel, and striped skunk.

The reservoirs provide abundant open water habitats and associated riparian (shoreline) zones that are used by a variety of wildlife. Common species include great blue heron, green heron, belted kingfisher, common yellowthroat, and northern parula. No heron colonies occur on or within 3 miles of the NTRs. Shallow embayments, especially those with emergent vegetation, provide habitat for waterfowl. Common waterfowl include wood ducks, Canada geese, and mallards. Other waterfowl present include American black duck, gadwall, green-winged teal, ring-necked duck, lesser scaup, common goldeneye, bufflehead, hooded merganser, and common merganser.

Shorebird use of the NTRs is limited as most reservoirs have steep, rocky banks and limited embayments or exposed mud flats that would provide suitable foraging areas. Most of the mud flats available on the NTRs are small and are comprised of rocky soils, providing poor-quality habitat for most shorebird species. However, notable exceptions are mudflats located at Austin Springs on Boone Reservoir, Roan Creek on Watauga Reservoir, and mudflats on South Holston Reservoir. Species such as least sandpiper, which forage along the margins of reservoirs, and killdeer, which are not restricted to foraging on mudflats, are commonly observed on the NTRs. Other species observed on better mudflats include pectoral and spotted sandpipers, and uncommon species including ruddy turnstone, dowitchers, wimbrel, black-necked stilt, American avocet, and sanderling.

Common amphibians found in the riparian zones include green frog, American bullfrog, northern cricket frogs, eastern narrowmouth toad, and eastern red-spotted newt. Reptiles include northern water snake, common snapping turtle, and painted turtles. Common mammals include mink, muskrat, raccoon, and American beaver.

Caves also provide unique habitat for certain insect and wildlife species. Seventy-five caves occur within 3 miles of the NTRs. All caves except one are greater than 200 feet away from any northeastern tributary reservoir parcels. Actions greater than 200 feet away from a cave do not normally adversely affect cave habitat. One cave exists within Parcel 6 on Boone Reservoir, which is committed as a sensitive resources management parcel. Because caves are extremely fragile and biologically significant, TVA maintains an undisturbed 200-foot-wide buffer zone around this cave.

3.6. Endangered and Threatened Species

This section describes federally listed and state-listed plants, terrestrial animals, and aquatic animals observed on or near the NTRs. In addition to field surveys, species observations were documented from the TVA Natural Heritage database. The database was searched for record occurrences within 5 miles of the NTRs for plants, within 10 miles for aquatic species, and within 3 miles for terrestrial species (ranges are based upon standard TVA practices developed to best evaluate each resource, which have been approved by the USFWS). Records considered “extirpated” or no longer occurring at the documented location were not included in this evaluation.

3.6.1. Plants

Field surveys and reviews of the TVA Heritage database show that no federally listed plant species have been recorded within 5 miles of the NTRs. No designated critical habitat for federally listed plants is present in or around the NTRs. Two federally listed species are known from the surrounding counties. In Carter County, near Wilbur and Watauga reservoirs, the federally listed as endangered spreading avens (*Geum radiatum*) occurs on Roan Mountain. This species is restricted to high-elevation rocky summits of the Southern Appalachians, and neither plants nor suitable habitat for this species were observed during rare plant surveys conducted in the NTRs study area during 2007. A single population of the federally listed as threatened small whorled pogonia (*Isotria medeoloides*) occurs in Washington County, Tennessee. However, no populations of this species were found during surveys for rare plants conducted during April and May 2007.

Thirty plant species listed by the State of Tennessee are known to occur within 5 miles of the NTRs. Lists of state-listed plants potentially present around each reservoir are provided in the individual RLMPs (Volumes II-VI). There were no records of listed plants occurring within 5 miles of Beaver Creek, Clear Creek, or South Holston reservoirs in Virginia.

Three state-listed plant species were identified on NTRs parcels during field surveys conducted in 2007. Previously undocumented populations of the endangered branching whitlow-wort (*Draba ramossima*) were found on Fort Patrick Henry (Parcel 10a) and Watauga (Parcels 5 and 6). A previously undocumented population of Virginia heartleaf (*Hexastylis virginica*), a species of special concern, was identified on Watauga Parcel 50. Carolina hemlock (*Tsuga caroliniana*), a threatened species, was observed on Watauga Parcels 2 and 5 and is known to occur on Watauga Parcels 3, 4, and 6.

3.6.2. Terrestrial Animals

Field surveys and reviews of the TVA Heritage database indicated the endangered gray bat (*Myotis grisescens*) and Virginia big-eared bat (*Corynorhinus townsendii virginianus*) are the only federally listed animal species recorded within 3 miles of the NTRs (see individual RLMPs for species lists). The gray bat roosts in caves year-round and typically forages over open water habitats including streams, rivers, and reservoirs. A substantial colony of gray bats inhabits a cave in Sullivan County, approximately 0.5 mile east of Boone Reservoir, and in the same county with Fort Patrick Henry and South Holston reservoirs. No other caves providing potentially suitable habitat for gray bats were observed during field surveys conducted for the NTRLMP. Gray bats likely forage over all the NTRs, but in lower numbers than those observed on TVA's main stem reservoirs. There is potential foraging and roosting habitat for the Virginia big-eared bat within 3 miles of Watauga Reservoir, but the nearest record of the species is a single observation greater than 2.5 miles from that reservoir.

In addition, four federally listed species are known from surrounding counties, but have not been identified within 3 miles of the NTRs. The Carolina northern flying squirrel (*Glaucomys sabrinus coloratus*) and the spruce-fir moss spider (*Microhexura montivaga*), both endangered, typically occur at elevations greater than 5,000 feet within spruce-fir forests and in mixed conifer-northern hardwood forests. The spruce-fir moss spider is restricted to five mountain tops. The distributions of these two species do not occur, and no suitable habitat exits, within 3 miles of any of the NTRs. A single Indiana bat (*Myotis sodalis*), an endangered species, was captured near Jefferson National Forest, greater than 15 miles from South Holston Reservoir. Although many caves occur in the NTRs region, none is known to be occupied by Indiana bats or to be suitable for occupation by the

species. The threatened bog turtle (*Glyptemys muhlenbergii*) has been recorded from Johnson County, near Watauga and Wilbur reservoirs. While no bog turtles have been recorded within 3 miles, habitat suitable for this species exists within 3 miles of the NTRs.

Twenty animal species listed by the states of Tennessee, Virginia, or North Carolina occur within 3 miles of the NTRs. With a single exception, no state-listed species were identified on parcels surveyed for the NTRLMP. A southern bog lemming (*Synaptomys cooperi*), a species deemed in need of management, was captured on South Holston Reservoir Parcel 2. Habitat suitable for the southern bog lemming species exists within 3 miles of NTRs parcels. The individual RLMPs provide additional detail regarding listed species and suitable habitat found near each of the NTRs.

3.6.3. Aquatic Animals

A review of the TVA Natural Heritage database indicated that the shiny pigtoe pearlymussel (*Fusconia cor*) and tan riffleshell (*Epioblasma florentina walkeri*), both federally listed as endangered, have been recorded within the watersheds that comprise the NTRs study area. The fluted kidneyshell (*Ptychobranchus subtentum*) and slabside pearlymussel (*Lexingtonia delabelloides*), both candidates for federal listing, also have been reported. Historic records of the little-wing pearlymussel (*Pegias fabula*), a federally listed as endangered species, are known from the Middle Fork Holston River upstream of South Holston Reservoir. No TVA-managed parcels are located near those records. The spotfin chub (*Cyprinella monacha*), federally listed as threatened, has been recorded downstream of the Fort Patrick Henry and South Holston dams. However, due to discharges of cold and deep water from the dams, the tailwater habitat is likely no longer suitable for this species.

In addition to federally listed species, 20 state-listed aquatic species, including fish, mussels, and a snail, have been recorded within the watersheds forming the NTRs. Detailed descriptions of listed aquatic species in each reservoir are provided in the RLMPs (Volumes II-VI).

3.7. Wetlands

Wetlands are defined by TVA Environmental Review Procedures (TVA 1983) as: “[T]hose areas inundated by surface or ground water 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 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 ecologically important because of their beneficial effect on water quality, their moderation of flow regimes by retaining and gradually releasing water, their value as wildlife habitat, and as areas of botanical diversity. Wetlands exist within and adjacent to TVA reservoirs and are influenced by surface water and groundwater connections to the water levels in these reservoirs.

Land use/land cover data generated by the USEPA in 1999 indicated wetlands comprise less than 0.3 percent of land cover in the South Fork Holston River watershed (TDEC 2006a; 2006b). Wetlands constitute less than 0.1 percent of land cover in the Watauga River watershed (TDEC 2000).

Data prepared for the TVA *Reservoir Operations Study* (TVA 2004) provide general estimates of the type and extent of wetland acreage associated with TVA reservoirs. National Wetland Inventory data indicate wetlands on and near the NTRs are primarily

forested wetlands located in the floodplains of rivers and streams (Table 3-8). Small areas of emergent/scrub-shrub wetlands (typically less than 0.10 acre) are associated with reservoir shorelines and coves. Isolated wetlands such as bogs, seeps, and fens are relatively rare. Aquatic bed wetlands and mudflats are seasonal habitats; aquatic bed wetlands are associated with the summer growth of aquatic vegetation and are relatively uncommon on the NTRs. The large amount of aquatic bed and mudflat habitat shown for Watauga Reservoir is a function of the time of year when aerial photography was processed. Mudflat habitats are more common as these habitats are associated with reservoir drawdowns. Wetlands tend to be smaller and do not occur as frequently on tributary reservoirs because of the relatively steep drawdown zones, the rolling to steep topography of adjacent lands, shoreline disturbance caused by wave action, and the lower predictability and shorter duration of summer pool levels.

Table 3-8. Summary of Wetlands on TVA Northeastern Tributary Reservoirs by Area and Type[5]

Reservoir	Wetland Type				
	Combined Aquatic Beds and Mud Flats (Acres)	Emergent (Acres)	Forested (Acres)	Scrub-Shrub (Acres)	All Types (Acres)
Beaver Creek	0	2	<1	3	6
Clear Creek	0	4	5	3	12
Boone	2	7	28	11	48
Fort Patrick Henry	0	1	40	1	42
South Holston	9	32	7	4	52
Watauga	752	2	13	16	783
Wilbur	21	7	0	0	28
Total	**784**	**55**	**93**	**38**	**971**

Source: TVA 2004

Field surveys conducted on selected parcels around the NTRs indicated the presence of moderate and high-quality wetlands on Fort Patrick Henry, South Holston, and Watauga reservoirs. The TVA Rapid Assessment Method (TVARAM), which is a version of the Ohio Rapid Assessment Method designed specifically for the TVA region, was used to assess wetland conditions and identify wetlands with potential ecological significance (Mack 2001). Using TVARAM, wetlands may be classified into three categories. Category 1 wetlands are described as “limited quality waters.” They are considered to be a resource that has been degraded, has limited potential for restoration, or is of such low functionality that lower standards for avoidance, minimization, and mitigation can be applied. Category 2 includes wetlands of moderate quality and also wetlands that are degraded but exhibit reasonable potential for restoration. Category 3 generally includes wetlands of very high quality and wetlands of concern regionally and/or statewide, such as wetlands that provide habitat for species listed as threatened or endangered. Detailed descriptions of wetlands found around each reservoir are provided in the RLMPs (Volumes II-VI).

Large-scale analysis of land cover data over time and by ecoregion provides information on the status and trends of wetland resources. These data indicate an overall loss of forested wetland habitat in both the Southern Blue Ridge and Ridge and Valley ecoregions

[5] Areas are rounded to the nearest whole acre, which may lead to slight discrepancies in calculated totals.

(Loveland and Acevedo 2006). This loss is associated primarily with urbanization and agriculture. Emergent and scrub-shrub wetland acreage has remained relatively stable in the last 20 years, with some gain in open water/pond habitats (Dahl 2006).

3.8. 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 . . ." (43 *Federal Register* 6030 [10 February 1978]). The 100-year and 500-year flood elevations for portions of the South Fork Holston and Watauga rivers are provided in Appendix G. Descriptions of these floodplains are provided in the RLMPs (Volumes II-VI).

3.9. Cultural Resources

The Appalachian Highland region has been inhabited for at least 12,000 years. The areas around the major waterways of the region were the focus of prehistoric habitation, resource acquisition, and ceremonial activity for all of this time. Intensification of prehistoric occupation of the Appalachian Highlands is indicated by the frequency of archaeological sites attributable to the succeeding series of temporal/cultural traditions beginning with the Paleo-Indian Stage (ca. 12000-8000 B.C.) and continuing through the Archaic (8000-1200 B.C.), the Woodland (1200 B.C.-1000 A.D.), and the Mississippian (1000-1500 A.D.) stages. Following European contact, drastic cultural changes occurred, which for explanatory purposes have been divided into the Protohistoric-Contact Stage (1500-1750 A.D.) and the subsequent Historic era, which includes the Cherokee (1700 A.D.-present) and European- and African-American (1750 A.D.-present) occupations. The sustained presence of Native American groups in the Appalachian Highlands and their continuation of traditional religious and cultural practices are of great importance to communities of the region.

TVA is mandated under the NHPA, the *Archaeological Resources Protection Act* (ARPA) of 1979, the *Native American Graves Protection and Repatriation Act* (NAGPRA), as well as other legislation, to protect historic properties located on TVA land or affected by TVA undertakings. A historic property is defined in 36 CFR § 800.16(l)(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 maintained by the Secretary of the Interior." In response to this mandate, TVA conducts inventories of its land to identify historic properties.

Prior to an undertaking, TVA must comply with Section 106 of the NHPA in order to identify, evaluate, and assess effects on historic properties and to determine the appropriate course of action. TVA may conduct the phased identification and evaluation procedure set forth in the regulations of the Advisory Council on Historic Preservation at 36 CFR § 800.4(b)(2). An undertaking is defined under 36 CFR § 800.16(y) as

> *"a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency, including those carried out by or on behalf of a Federal agency; those carried out with Federal financial assistance; and those requiring a Federal permit, license or approval."*

The area of potential effects (APE), as defined in 36 CFR § 800.16(d), is "the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist." For the NTRLMP, TVA has identified the APE for archaeological sites and historic structures in Tennessee as the TVA-retained land of 880 acres on Boone, 283 acres on Fort Patrick Henry, 2,099 acres on South Holston in Tennessee, 1,137 acres on Watauga, and 58 acres on Wilbur Reservoir. In Virginia, the APE is defined as the 290 acres on Beaver Creek, 14 acres on Clear Creek, and 185 acres on South Holston in Virginia.

A programmatic agreement (PA) was executed in October 2005 between TVA, the Advisory Council on Historic Resources, and the Tennessee SHPO regarding the implementation of TVA RLMPs for identification, evaluation, and treatment of historic properties that are eligible for inclusion in the National Register of Historic Places (NRHP) (Appendix G). This PA applies to all NTR land considered within the three alternatives. In 2008, TVA consulted with the Tennessee SHPO about the proposed NTRLMP (Appendix G). TVA proposed to fulfill its Section 106 responsibilities for the proposed NTRLMP by implementing the PA. The Tennessee SHPO concurred with this recommendation. TVA currently is coordinating with the Virginia SHPO to develop a similar PA addressing the identification, evaluation, and treatment for all cultural resources adversely affected by future proposed uses of TVA lands in Virginia planned in RLMPs. Until the Virginia PA is executed, TVA will incorporate the identification, evaluation, and treatment procedures to effectively mitigate adverse effects to historic properties pursuant to Section 106 of the NHPA.

3.9.1. Archaeological Resources

To support the characterization of TVA-managed lands around the NTRs, TVA conducted surveys for archaeological sites along portions of Watauga and South Holston reservoirs. Additionally, TVA evaluated results of previous surveys conducted along the NTRs. The TVA-managed land surrounding the reservoirs has not been systematically and completely surveyed for cultural resources. However, many archaeological sites have been identified on each of the NTRs. Some of the identified archaeological sites are located below the normal summer pool elevation. Certain sites are eligible or potentially eligible for listing in the NRHP. Descriptions of known archaeological resources are provided in the RLMPs (Volumes II-VI).

3.9.2. Historic Structures

Pursuant to Section 106 of the NHPA, TVA protects important historic structures located on TVA lands or affected by its undertakings. Such properties and other structures over 50 years old (including farm houses, communities, resorts, fortifications, churches, and cemeteries) occur on or near TVA land throughout the NTRs area.

Initially, European settlement in the early 19th century developed into an agricultural economy with farmsteads and small towns. Transportation networks evolved along the Tennessee River and its tributaries. 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 Valley. 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 the NTRs resulted in further significant changes to the region. The acquisition of land for the reservoirs resulted in the removal of

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

A complete survey for historic structures has not been conducted for all of the NTRs. However, to the extent practicable, structures over 50 years old were identified utilizing planimetric map data. Additionally, a preliminary field survey of uncommitted parcels indicated no historic structures are located on uncommitted parcels. However, the presence of historic structures on all NTR lands cannot be ruled out until a site visit has been conducted as part of a project-specific environmental review.

3.10. Managed Areas and Ecologically Significant Sites

This section addresses natural areas that are on, immediately adjacent to, or within 3 miles of each of the seven NTRs. Natural areas include managed areas, ecologically significant sites, and Nationwide Rivers Inventory (NRI) streams. Managed areas include lands held in public ownership that are managed by an entity (e.g., TVA, USFS, State of Tennessee, Sullivan County) to protect and maintain certain ecological and/or recreational features. A management plan or similar document defines what types of activities are compatible with the intended use of the managed area. Ecologically significant sites are either tracts of privately owned land that are recognized by resource biologists as having significant environmental resources, or tracts on TVA lands that are ecologically significant but not specifically managed by TVA's Natural Areas Program. NRI streams are free-flowing segments of rivers recognized by the National Park Service (NPS) as possessing remarkable natural or cultural values that may potentially qualify them as part of the National Wild and Scenic Rivers System.

3.10.1. Natural Areas on TVA Northeastern Tributary Reservoirs Lands

A review of the TVA Natural Heritage database indicated that no natural areas managed by the TVA Natural Areas Program are on any of the seven NTRs. One NRI stream and 10 natural areas either managed by other entities or recognized as ecologically significant are on or within Boone, South Holston, Wilbur, and Watauga reservoirs (Table 3-9). Descriptions of these natural areas are found in parcel descriptions in the accompanying RLMPs (Volumes II-VI). No natural areas are on Beaver Creek, Clear Creek, and Fort Patrick Henry reservoirs. No waterbodies designated as part of the National Wild and Scenic Rivers System are located within the South Fork Holston River or Watauga River watersheds.

Table 3-9. Natural Areas on TVA Northeastern Tributary Reservoirs Lands

Reservoir	Natural Area	Steward*	Location
Boone	Austin Springs Ecologically Significant Site	TVA	Parcel 34
	Overmountain Victory National Historic Trail	National Park Service (NPS) in partnership with states and other groups	South Fork Holston River, approximate RM 34.8; nearest Parcel 20
South Holston	Osceola Island Ecologically Significant Site	TVA (also used as a TVA-managed recreation area)	Island portion of Parcel 3
	Sullivan County Park	TVA permanent recreation easement to Sullivan County, Tenn.	Parcel 14
	Washington County Park	TVA permanent recreation easement to Washington County, Va.	Parcels 24 and 38
Watauga	Wilbur Cliffs Ecologically Significant Site	USFS	Parcel 1
	Appalachian National Scenic Trail	Appalachian Trail Conservancy	Parcels 1 and 59
	Watauga River (NRI stream)	NPS	Parcel 25
	Watauga River Potential National Natural Landmark	NPS	Parcel 25
	Watauga Lake Rare Plant Ecologically Significant Site	TVA	TVA right-of-way on USFS land adjacent to Watauga Reservoir
Wilbur	Wilbur Cliffs Ecologically Significant Site	USFS	Parcels 3, 4, 5, 6
	Wilbur Lake State Wildlife Observation Area	TVA and Tennessee Wildlife Resources Agency (TWRA)	Reservoir surrounded by Parcels 2, 3, 4, 5, 6

* Ecologically significant sites are not actively managed; "steward" indicates the entity responsible for general management of the land.

3.10.2. Natural Areas Adjacent to TVA Northeastern Tributary Reservoirs Lands

A review of the TVA Natural Heritage database indicated that several natural areas are adjacent to five of the NTRs, including USFS lands (Cherokee National Forest [CNF]), city and state parks, and the Appalachian Trail (Table 3-10). No natural areas are adjacent to Beaver Creek and Clear Creek reservoirs. Zone allocations of TVA land parcels are consistent with the management objectives of these back-lying public lands (see Chapter 2). The adjacent natural areas are listed below in Table 3-10 by reservoir along with the managing agency of the public land.

Table 3-10. Natural Areas Adjacent to TVA Northeastern Tributary Reservoirs Lands

Reservoir	Natural Area	Steward
Boone	Winged Deer Park	City of Johnson City, Tennessee; TWRA
Fort Patrick Henry	Warriors Path State Park	TDEC
South Holston	Cherokee National Forest (CNF)	USFS
	North Cherokee Wildlife Management Area	TWRA
	Jefferson National Forest	USFS
Watauga	CNF	USFS
	Pond Mountain Wilderness Area (CNF)	USFS
	Watauga Scenic Area (CNF)	USFS
	Big Laurel Branch Wilderness Area (CNF)	USFS
	Griffith Branch Cove (CNF)	USFS
	Wilbur Lake State Wildlife Observation Area	TVA; TWRA
	Wilbur Cliffs	USFS
Wilbur	Appalachian Trail	Appalachian Trail Conservancy
	CNF	USFS
	Big Laurel Branch Wilderness Area (CNF)	USFS
	Wilbur Cliffs	USFS

3.10.3. Other Natural Areas Within 3 Miles of TVA Northeastern Tributary Reservoirs Lands

Other natural areas within 3 miles of but not on or adjacent to TVA NTR lands (as indicated by a review of the TVA Natural Heritage database) are listed in Table 3-11. No additional natural areas are near Clear Creek and Fort Patrick Henry reservoirs.

Table 3-11. Natural Areas Within 3 Miles of TVA Northeastern Tributary Reservoirs Lands

Reservoir	Natural Area	Steward*	Distance to Nearest Point of Reservoir
Beaver Creek	Hickey Gap Road Ecologically Significant Site	Virginia Natural Heritage Program	2.3 miles east
Boone	Morrell Cave State Designated Natural Area	TDEC	0.5 mile southeast
	CNF	USFS	0.7 mile east
	Watauga River Bluffs The Nature Conservancy Preserve / Designated State Natural Area	The Nature Conservancy – Tenn./TDEC	1.6 miles south
South Holston	Overmountain Victory State Scenic Trail	NPS and states, other groups	0.8 mile northwest
	Middle Fork Holston River Megasite Ecologically Significant Site	Virginia Natural Heritage Program	1.5 miles north
	Holston River, South Fork (NRI stream)	NPS	1.0 mile above reservoir

Reservoir	Natural Area	Steward*	Distance to Nearest Point of Reservoir
Watauga	North Cherokee Wildlife Management Area (CNF)	TWRA	3.0 miles south
	Walnut Mountain (CNF) Ecologically Significant Site	USFS	2.8 miles south
	Doe River (NRI stream)	NPS	3.0 miles southwest
	Doe River Gorge Scenic Area (CNF)	USFS	3.0 miles southwest
	Pisgah National Forest	USFS	0.9 mile southeast
	Doe Branch Ditch Ecologically Significant Site	TDOT	0.8 mile northwest
Wilbur	Hunter Bog Registered State Natural Area	TDEC	3.0 miles northwest

*Ecologically significant sites are not actively managed; "steward" indicates the entity responsible for general management of the land.

3.11. Visual Resources

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 of the reservoir 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. The four broad visual characteristics listed below 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. Viewing distance is the measure of how far an area can be seen by observers and the degree of visible detail. It is ranked in one of three classifications from foreground to background. Figure 3-1 illustrates the viewing distance parameters.

    - 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 mile and 4 miles from the observer where objects may be distinguishable, but their details are weak and tend to merge into larger patterns.

- o Background is the landscape seen beyond 4 miles where object details and colors are not normally discernible unless they are especially large, standing alone, or provide strong contrast.

- 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.

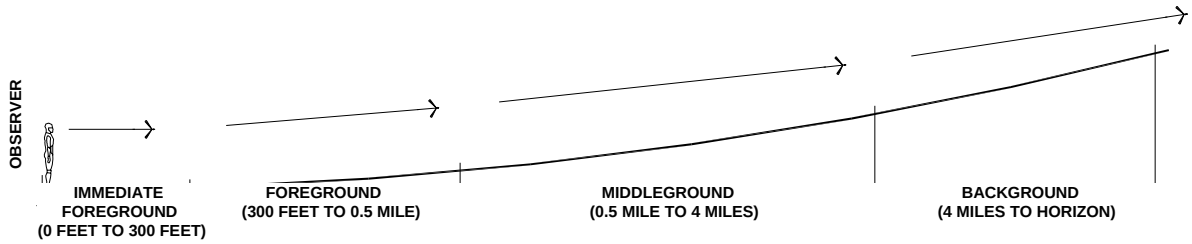

Figure 3-1. Viewing Distance

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.

The NTRs include islands, floodplains, secluded coves, and wetlands that are framed by high wooded ridges. Because the scenic features of the landscape are not limited by land boundaries, the attractive landscape character extends across public and private land alike. The natural elements together with the communities and other cultural development provide a scenic, rural countryside.

Land uses adjacent to the reservoirs include residential development, public parks, and sporadic industrial features. The reservoirs offer abundant water-recreation opportunities along with a variety of scenery. Most creek embayments are broadly open at the mouth, and some wind over a mile to their headwaters.

Among the scenic resources of each of the reservoirs, the water body itself is the most distinct and outstanding aesthetic feature. The horizontal surface provides visual balance and contrast to the islands and wooded hillsides. The reservoirs weave around ridges and bends, changing views periodically seen from the water. The reservoirs also link the other landscape features together. Views across the water are satisfying and peaceful to most observers.

Islands are another significant feature. The islands provide scenic accents and visual reference points throughout the reservoirs and serve as visual buffers for less desirable views. They also provide a pleasing foreground frame for the distant shoreline or background.

Other important scenic features include the secluded coves and steep, wooded ridges that occur around the reservoirs. The isolated coves with wooded shoreline provide relatively private locations for dispersed recreation activities. Significant elevation changes along

some stretches of shoreline provide a dramatic contrast to the surrounding reservoir and gently sloping countryside, particularly when they are viewed from background distances.

Most shorelines upstream of the dams appear natural. Slopes and ridgelines seen from the reservoirs are generally heavily vegetated with mature hardwood and evergreen trees and provide positive visual contrast to the reservoirs. There is usually little development in the foreground distances.

3.12. Water Quality

3.12.1. General Water Quality Characteristics

Water quality in the NTRs and their tailwaters is influenced by numerous factors including the size, geology, and land use conditions in upstream drainage areas, point and nonpoint discharges of pollutants, adjacent land use activities, and the operation of the reservoirs. The NTRs are located in two distinct ecoregions with different geological characteristics and land use patterns that affect water quality in the reservoirs.

Most of the South Fork Holston River watershed and a portion of the Watauga River watershed, downstream of Watauga and Wilbur dams, lie within the Ridge and Valley ecoregion, which is characterized by numerous ridges and valleys underlain by sedimentary rocks. The dissolution of the limestone and dolomite that underlie much of the valleys results in naturally high concentrations of dissolved minerals in the streams. The area has a relatively large population with substantial industrial development surrounding the Tri-Cities metropolitan area of Johnson City-Kingsport-Bristol in Tennessee and Virginia.

The Watauga River watershed upstream of Watauga and Wilbur dams and a portion of the South Fork Holston River watershed east of South Holston Reservoir lie within the SBRE. The SBRE is mostly forested because of the mountainous terrain and a large proportion of land within the national forest. The geology is primarily metamorphic and igneous rocks with minor areas of sedimentary geology. Because much of the province is underlain by rocks that are relatively insoluble and surface water drainage is rapid, streams draining this area generally contain relatively low concentrations of nutrients and dissolved minerals. The Watauga/Wilbur watershed contains the town of Mountain City, Tennessee, and the western portion of Boone, North Carolina. Parts of the basin are being developed for second homes and recreational areas. Although many of the headwater streams of the South Fork Holston River lie within the SBRE and the national forest, the geology and land use within the Ridge and Valley ecoregion are the predominant influences on overall water quality within the South Fork Holston River basin.

Impoundments convert typical riverine environments into lakelike conditions, thereby effecting change to many aspects of the aquatic environment such as water temperature, dissolved oxygen (DO), nutrient dynamics, algal productivity, and aquatic life in the reservoirs themselves and the rivers downstream. The length of time water is retained in a reservoir (i.e., residence time) is one of the primary mechanisms influencing these changes. Table 3-12 provides the average annual residence time and other physical characteristics of the NTRs.

The long residence time in South Holston and Watauga reservoirs (262 and 325 days, respectively), and to some extent Boone Reservoir (30 days), results in thermal stratification (i.e., the separation or layering of colder and warmer waters, with the colder, more dense water settling on the bottom) during summer in these reservoirs. Once stratification is established, oxygen in the deeper, colder waters is not replenished from the

air or from contact with the oxygen-rich surface water, and the natural process of decaying organic material results in low DO concentrations in the lower strata of the water column. The extent of oxygen depletion is related to the length of time a reservoir remains stratified and the amount of organic material present. The oxygen demand is increased by high nutrient loads (i.e., pollution) that carry in organic matter and/or result in increased algal growth. Residence time and the availability of nutrients and light play an important role in the growth of algae in the reservoirs.

Table 3-12. Physical and Operational Characteristics of Northeastern Tributary Reservoirs

Reservoir	Watershed	Hydrologic Unit Code	Drainage Area (square miles)	Mean Annual Flow (cubic feet per second)	Full Pool		Mean Depth* (feet)	Residence Time* (days)
					Area (acres)	Volume (1,000 acre-feet)		
Beaver Creek	South Fork Holston River	06010102	13.7	-	170**	5**	-	-
Clear Creek	South Fork Holston River	06010102	5.8	-	46	2.5	-	-
Boone	South Fork Holston River	06010102	1,840	2,441	4,310	189	44	30
Fort Patrick Henry	South Fork Holston River	06010102	1,903	2549	872	27	31	5
South Holston	South Fork Holston River	06010102	703	954	7,581	658	87	262
Watauga	Watauga River	06010203	468	688	6,430	569	89	325
Wilbur	Watauga River	06010203	471◆	730	72	0.7	10	0

- = Not applicable

* Mean depth and residence time are based on average, rather than full pool area and volume.

** Beaver Creek is a detention only reservoir with no permanent pool; at the emergency spillway crest, the temporary reservoir would cover 170 acres.

◆ Total drainage area of Wilbur Reservoir includes Watauga drainage area.

Boone, Fort Patrick Henry, South Holston, and Watauga are hydroelectric dams that withdraw water from the deeper, less oxygenated waters of the reservoir. The water released from these dams can create low-oxygen conditions downstream. To address tailwater oxygen concentrations and minimum-flow requirements, TVA established the Reservoir Releases Improvement Program in 1991. TVA has improved water quality below many of its dams by implementing minimum flows via turbine pulses and using a wide range of methods (e.g., turbine venting, oxygen injection, and aerating weirs) to improve DO concentrations. Minimum flows are maintained downstream of Boone and Fort Patrick Henry dams by venting the turbines (i.e., installing equipment that mixes air with water flowing over the turbines) in the Boone Dam. Turbine venting is also used to aerate water below Watauga and Wilbur dams. Minimum flow below the South Holston Dam is maintained by an aerating labyrinth weir and by periodically pulsing the turbines.

Wilbur Reservoir is a small hydroelectric project located on the Watauga River immediately downstream of TVA's Watauga Dam. There is very little useful storage behind Wilbur Dam, and it is generally operated in tandem with Watauga, except for maintaining pulsed and/or continuous minimum flows. The immediate watershed of Wilbur Reservoir (area between Watauga Dam and Wilbur Dam) is only about 3 square miles. Water quality in the reservoir is influenced primarily by the cold water releases from Watauga Dam.

Clear Creek and Beaver Creek dams are earthen dams with no facilities for power generation. They are essentially self-regulating by means of overflow structures. Beaver Creek is a detention reservoir with no permanent pool, meaning Beaver Creek is a free-flowing stream most of the time. At the emergency spillway crest (for large floods), the Beaver Creek Reservoir would temporarily cover 170 acres. Clear Creek Dam encompasses 46 acres at full pool and is surrounded by a public golf course.

3.12.2. Water Quality Monitoring

Water quality in TVA reservoirs is evaluated by several programs designed to monitor the chemical and biological conditions of the aquatic environment.

State-designated impaired waters. The states of Tennessee, Virginia, and North Carolina conduct water quality testing in accordance with requirements of the CWA. State assessment results are compiled biennially and reported to the public. The principal vehicles for this water quality assessment reporting are the states' 305(b) Reports and 303(d) Lists (North Carolina Department of Environment and Natural Resources 2007; TDEC 2008; Virginia Department of Environmental Quality 2008). These reports present how well waters support designated uses as well as likely causes and potential sources of impairment.

Many segments of the South Fork Holston and Watauga River systems are listed by the states as water-quality impaired under Section 303(d) of the CWA. Impaired waters have one or more properties that violate state water quality standards. They are considered impaired by pollution and not fully meeting designated uses, such as recreation (e.g., swimming and fishing), propagation of aquatic life, or water supply.

The state-designated impaired TVA reservoirs and tailwaters within the scope of this EIS include the reservoir tailwaters below Fort Patrick Henry and South Holston dams and the Boone, South Holston, and Watauga reservoirs (Appendix G, Tables G-2 through G-6). Reasons for the impaired designation in tailwaters include flow alteration, low DO concentrations, and/or thermal modification, with the source being the upstream impoundment. In the reservoirs, the reason for impairment is accumulated polychlorinated biphenyls (PCBs) and chlordane or mercury in fish tissue. Fish consumption advisories issued for Boone, South Holston, and Watauga reservoirs are discussed below. The principal sources of problems in reservoirs are the historical discharge of pollutants that have accumulated in sediment and fish flesh, plus atmospheric deposition of mercury.

State-designated impaired waters also include streams flowing into several of the reservoirs. The Tennessee, Virginia, and North Carolina water quality assessment reports list about 520 stream miles as impaired or partially impaired within the watersheds of the NTRs. The most common reasons for a stream to be impaired are the presence of elevated levels of bacteria, followed by loss of biological integrity and habitat loss. The most common sources of stream impairment are nonpoint source pollution from agriculture and urban runoff.

Fish consumption advisories. TVA maintains a program to examine contaminants in fish fillets from TVA reservoirs and their major tributary streams. TVA coordinates fish tissue studies in the Tennessee Valley with state agencies that are responsible for protecting public health and issuing a fish consumption advisory if warranted. TVA assists the states by collecting fish from TVA reservoirs and checking the tissue for metals, pesticides, PCBs, and other chemicals that could affect human health. Typically, channel catfish and largemouth bass are monitored.

The State of Tennessee has issued a precautionary advisory for the consumption of catfish and carp from Boone Reservoir because of PCB and chlordane contamination. A precautionary advisory also has been issued by the State of Tennessee for the consumption of largemouth bass from South Holston Reservoir and largemouth and channel catfish from Watauga Reservoir because of elevated mercury concentrations. A precautionary advisory means that pregnant women, nursing mothers, and children should not eat the fish species named. All others should limit consumption of the named species to one meal per month. The Commonwealth of Virginia has issued an advisory to not consume carp or largemouth and smallmouth bass from Beaver Creek (Beaver Creek Dam downstream to the Virginia/Tennessee state line) because of PCB contamination. Virginia also advises that people not consume more than two meals per month of carp or northeastern hogsucker from Wolf Creek (Route 670 near Abingdon downstream to Route 75 near Green Spring).

Swimming advisories. The states evaluate water quality by performing and evaluating bacteriological (*Escherichia coli*) monitoring. When test results warrant, the states issue water contact advisories. Currently, there are no state advisories against swimming in the NTRs.

Reservoir ecological health. Since 1990, TVA has implemented the Reservoir Ecological Health Monitoring Program to determine reservoir health as compared to other reservoirs in the TVA system, to provide data for comparing future water quality conditions, and as a screening program to target needs for more detailed studies (TVA 2006b). As a part of this program, TVA developed a reservoir ecological health scoring system to aid in data evaluation and communication of monitoring results to the public. The ecological health scoring system is based upon the following five indicators, which are typically measured in the reservoir forebay area (a short distance upstream of the dam) and one or more areas farther upstream:

1. DO is necessary in respiration of most aquatic organisms. Ideally, a reservoir has enough DO throughout the water column available to fish, insects, and zooplankton (microscopic aquatic animals) for respiration. Concentrations of DO in a reservoir both control and are controlled by many physical, chemical, and biological processes (e.g., photosynthesis, respiration, oxidation-reduction reactions, bacterial decomposition, temperature) that determine the assimilative capacity of a reservoir. Assimilative capacity is a water body's ability to receive wastewaters or other materials requiring oxygen for decomposition without deleterious effects and without damage to aquatic life. If concentrations are low enough and/or low levels are sustained long enough, it can adversely affect the health and diversity of aquatic organisms. DO levels are expressed in terms of milligrams/liter.

2. Chlorophyll, a surrogate measure for the amount of algae (phytoplankton) in the water, is important because it provides insights into the level of primary productivity (basic level of the food web) within a water body and can provide a measure of

nutrient enrichment. Although some level of phytoplankton production is essential to maintain a healthy aquatic community, as concentrations increase, uses can be affected differently. For example, fisheries such as largemouth bass in southeastern reservoirs can be enhanced as phytoplankton concentrations increase to relatively high levels. However, elevated phytoplankton concentrations are a concern because adverse ecological and use impacts could occur, such as reduced water clarity, more frequent algal blooms, higher oxygen demands and lower DO concentrations, increased periods of anoxic conditions and resultant anoxic byproducts (i.e., ammonia, sulfide, and dissolved manganese), more frequent water treatment problems, and higher water treatment cost.

3. Sediment quality is a measure of the amount of PCBs, pesticides, and metals in sediment on the bottom of the reservoir. Sediments at the bottoms of reservoirs serve as a repository for a variety of materials, especially chemicals that have a low solubility in water. If contaminated, bottom sediments can have adverse impacts on bottom fauna and can often be long-term sources of toxic substances to the aquatic environment. They may impact wildlife and humans through the consumption of contaminated food or water or through direct contact. These impacts may occur even though the water above the sediments meets water quality criteria. Thus, examination of reservoir sediments is useful to determine if toxic chemicals are present and if chemical composition is changing through time.

4. Benthic macroinvertebrates (large bottom-dwelling invertebrates such as worms, snails, mussels, and crayfish) 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. Data analyses that are indicative of water quality include richness of taxa (i.e., diversity of various groups of animals and plants), relative abundance of organisms tolerant or intolerant of poor water quality, and proportions of samples with no organisms present.

5. Fish are included because they are important to the aquatic food chain and because they have a long life cycle that allows them to reflect water quality conditions over time. Fish are also important to the public for aesthetic, recreational, and commercial reasons. Ratings are based primarily on fish community structure and function using a metric known as the Reservoir Fish Assemblage Index (RFAI). Also considered in the rating is the percentage of the sample represented by omnivores (organisms that eat plants and animals) and insectivores (insect eaters), overall number of fish collected, and the occurrence of fish with anomalies such as diseases, lesions, parasites, deformities, etc.

Each indicator is evaluated separately and assigned a rating of “good,” “fair,” or “poor.” Individual ratings are combined into a single, composite score for each reservoir, termed the Reservoir Ecological Health Rating.

Reservoir Ecological Health Ratings reported between 1994 and 2007 are summarized in Table 3-13 and provided in detail in Appendix G, Tables G-7 and G-8.

Table 3-13. Typical Ratings for Dissolved Oxygen, Chlorophyll, and Sediment in the Northeastern Tributary Reservoirs Monitored as Part of the Reservoir Ecological Health Monitoring Program, 1991-2007

Indicator	Boone			Fort Patrick Henry	South Holston		Watauga	
	Forebay	Transition Zone*	Transition Zone**	Forebay	Forebay	Transition zone	Forebay	Transition Zone
Dissolved Oxygen	G/F/P	P	G	G	P	P	G/F	F/P
Chlorophyll	G/F/P	P	P	P	G	G→ G/F/P	G	G
Sediment	F	F	P→F	G/F	G/F	G/F	G/F	F

* South Fork Holston River
**Watauga River
Rating codes: *G = Good; F = Fair; P = Poor; more than one rating code (e.g., G/F) for an indicator means that ratings have fluctuated generally between the rating categories shown; an arrow (→) between rating codes signifies that the indicator has exhibited a trend toward either improved or lower ratings.*

Boone, Fort Patrick Henry, South Holston, and Watauga reservoirs are monitored under TVA's Reservoir Ecological Health Monitoring Program. Wilbur, Clear Creek, and Beaver Creek reservoirs are not included in this monitoring program due to the small size and operational characteristics of these reservoirs as described in Section 3.12.1 above.

Boone, Fort Patrick Henry, and South Holston often receive "poor" ecological health scores, primarily caused by low DO concentrations, elevated chlorophyll concentrations, and a benthic macroinvertebrate (e.g., mollusks) community comprised mostly of organisms indicative of poor water quality conditions. Watauga Reservoir usually scores "good" or at the high end of the "fair" range. DO concentrations in Watauga are not as severely depressed, and chlorophyll concentrations are lower than those found on other reservoirs. Two factors contribute to better water quality conditions in Watauga: (1) relatively less development in the surrounding area and (2) the nutrient-poor soils characteristic of the SBRE (as opposed to the nutrient rich soils surrounding the other reservoirs in the Ridge and Valley ecoregion). Detailed results of ecological health monitoring for each reservoir are provided in the individual RLMPs (Volumes II-VI).

3.12.3. Water Supply

The quality of source water can have a direct impact on water treatment cost and how the water ultimately is used. Quality of source water may also determine the maximum amount of pollution from both point and nonpoint sources that a water body can assimilate without violating state water quality standards. Numerous municipal water suppliers and industries utilize surface water from the NTRs and their supporting watersheds as their primary source of raw water. In 2005, the average daily surface water demand among these users was 31.5 millions of gallons per day (MGD) (Table 3-14).

Wastewater permits are issued by the states under the National Pollutant Discharge Elimination System (NPDES) program. Based on these permits, the 2005 average daily wastewater discharge for all seven NTRs was about 30 MGD (Table 3-14).

Table 3-14. Average Daily Municipal and Industrial Water Intake From and Wastewater Discharge to Northeastern Tributary Reservoirs in 2005

Reservoir*	Municipal Water Intake (MGD)	Industrial Water Intake (MGD)	NPDES-permitted Wastewater Discharge (MGD)
Beaver Creek	0	0	0
Clear Creek	0	0	0
Boone	19.3	0.1	21.7
Fort Patrick Henry	0	0	1.3
South Holston	8.9	0	5.4
Watauga	3.1	0.1	1.6
Wilbur	0	0	0

Source: TVA's 2005 Water Use database
*Includes intake from watersheds supporting each reservoir

3.13. Aquatic Ecology

Aquatic life in the NTRs is influenced by some of the same physical and chemical factors associated with water quality, such as adjacent land uses and reservoir operations, discussed in Section 3.12 above. The Tennessee River and all major tributaries, including the rivers and streams in the NTRs area, have been affected by impoundments and point and nonpoint sources of pollution. As a result, the larger river fish faunas have extremely fragmented distributions and several known species have disappeared (Etnier and Starnes 1993).

In reservoirs, aquatic habitat in the littoral (i.e., near shore) zone is greatly influenced by back-lying land use and topography. In areas characterized by residential development, habitat includes man-made features such as riprap banks, seawalls, and docks. Undeveloped shoreline typically is wooded; therefore, trees and brush provide woody cover in those areas. Shoreline topography varies from moderately deep with stretches of bluff along the main channels to typically shallow in embayments and coves. Due to the lack of natural underwater structure (e.g., submerged trees), rock is an important component of underwater habitat. Rock habitat includes, but is not limited to, bedrock outcrops, a mixture of rubble and cobble, or gravel along main channel shorelines. Cove substrate is typically soil and gravel with scattered cobble. Structure provides protection from predators, shade to cool the water temperature in the shallow littoral zone, spawning habitat, and places for food organisms to live and grow. Algae and other organisms (including bacteria, zooplankton, and aquatic insects), which are important fish foods, use physical and biological structure as growth substrates.

Impoundment favors growth of aquatic species that are tolerant of lakelike conditions, and disfavors groups of aquatic species adapted to river conditions. Deep tributary reservoirs often undergo thermal stratification (layering) during summer, when the colder, less oxygenated water settles on the bottom. Therefore, water discharged into the Boone, Fort Patrick Henry, South Holston, and Watauga/Wilbur tailwaters can be very cold and have low DO content, impairing water quality and resulting in less diverse aquatic communities. Recent projects (e.g., turbine venting, oxygen injection, and installation of weir dams) designed to aerate dam discharges in the tailwaters of Boone, Fort Patrick Henry, South

Holston, Wilbur, and Watauga reservoirs have increased DO levels to mimic more natural riverlike conditions.

On the other hand, releases of very cold water from the lower depths of Fort Patrick Henry, South Holston, and Wilbur dams support well-established, year-round trout fisheries in the tailwaters. These downstream areas generally have habitats and food bases that can support large carrying capacities and allow trout to grow larger than they normally do elsewhere. These tailwaters are typically stocked by TWRA with fingerlings in the early spring and adult fish (catchables) throughout the summer. Adults supplement the catch during peak angling season, and by fall, fingerlings have begun to enter these fisheries. Recruitment of natural reproduction (mostly by brown trout) contributes substantially to the fishery in the South Holston tailwater and, to a lesser extent, in the Wilbur tailwater (Watauga River), which supports a 16-mile fishery for rainbow and brown trout before it enters Boone Reservoir (Habera et al. 2003a; 2003b). Brook trout fingerlings were added to the Wilbur tailwater stocking program in 2001. Watauga tailwater receives just over 200,000 trout annually, most of which are rainbow trout.

Aquatic ecological conditions in streams and reservoirs are monitored under a number of TVA programs. Conditions in Beaver Creek and Clear Creek reservoirs are evaluated using results of Index of Biotic Integrity (IBI) (Karr 1981) and benthic macroinvertebrate sampling conducted below the respective dams. Data from monitored streams are compared to benchmarks from relatively unimpacted streams as a measure of ecological impact. Analysis of benthic macroinvertebrates (Ephemeroptera, Plecoptera, Trichoptera [EPT] score) also provides a measure of water quality and ultimately, the health of the stream. Between 1995 and 2007, IBI scores for Beaver and Clear creeks indicate fair to very poor conditions, and EPT scores indicate primarily fair conditions, ranging from poor to good. The Beaver Creek and Clear Creek RLMP (Volume II) provides additional details about the results of these monitoring programs.

Aquatic ecological conditions in the larger reservoirs have been monitored using the Reservoir Vital Signs Monitoring Program (RVSMP), which focuses on (1) physical and chemical characteristics of waters; (2) physical and chemical characteristics of sediments; (3) benthic macroinvertebrate community sampling; and (4) fish assemblage sampling. The RVSMP includes evaluation of fish community structure and function using an analysis tool known as the RFAI (McDonough and Hickman 1999). Also considered in the rating is the percentage of the sample represented by omnivores and insectivores, overall number or fish collected, and the occurrence of fish with anomalies such as diseases, lesions, parasites, and deformities. The RVSMP also includes evaluation of benthic macroinvertebrate communities based upon seven parameters that indicate species diversity, abundance of selected species that are indicative of good (or poor) water quality, total abundance of selected species, and proportion of samples with no organisms present.

Biennial RFAI and benthic macroinvertebrate scores recorded between 1999 and 2007 indicate fish assemblage scores are typically fair on Boone, fair to poor on Fort Patrick Henry, and fair to good on South Holston and Watauga reservoirs. Benthic scores are typically poor on Boone and South Holston reservoirs and fair to poor on Fort Patrick Henry and Watauga reservoirs.

Additionally, the Sport Fishing Index (SFI; Hickman 2000) is designed to measure sport fishing quality for various species in Tennessee and Cumberland Valley reservoirs. The SFI is based on the results of fish population sampling by TVA and state resource agencies and, when available, results of angler success as measured by state resource agencies

(i.e., bass tournament results and creel surveys). The SFI score ranges from a high of 60 (excellent) to a low of 20 (very poor). On Boone and South Holston reservoirs, SFI scores measured for five species ranged between 25 and 36 and were typically similar to or greater than the Valleywide average. On Watauga Reservoir, SFI scores measured for five species ranged between 24 and 48 and were typically similar to or greater than the Valleywide average. On Fort Patrick Henry Reservoir, SFI scores measured for three species ranged from 28 to 35 and were similar to the Valleywide average. Detailed results of RFAI, benthic macroinvertebrate sampling, and the SFI monitoring are provided in the individual RLMPs.

3.14. Air Quality

NAAQS have been established to protect the public health and welfare with respect to six pollutants: particulate matter, sulfur dioxide, carbon monoxide, ozone, nitrogen dioxide, and lead. An area where any air quality standard is violated may be designated as a nonattainment area for that pollutant, and emissions of that pollutant from new or expanding sources are carefully controlled. On March 12, 2008, the USEPA significantly strengthened its NAAQS for ground-level ozone. USEPA is revising the 8-hour primary ozone standard designed to protect public health to a level of 0.075 parts per million (ppm). The previous standard set in 1997 was 0.084 ppm. In addition to tightening the primary standard, USEPA is also strengthening the secondary 8-hour standard for ozone to the level of 0.075 ppm. The secondary standard is designed specifically to protect sensitive plants from damage caused by ozone exposure throughout the growing season. States were to have made recommendations to USEPA no later than March 2009 for areas to be designated attainment, nonattainment, and unclassifiable. USEPA will issue final designations no later than March 2010 unless there is insufficient information to make these designation decisions, in which case USEPA will issue designations by March 2011. Under these tightened ozone standards, some of the counties in which the NTRs are located are likely to be designated nonattainment for ozone. USEPA tightened the primary fine particulate standard in December 2006 and designated additional nonattainment areas in December 2008, though none of the counties covered by the NTRLMP were designated as nonattainment for fine particulate matter. All of the counties containing the NTRs are currently in attainment of each of the NAAQS standards.

Prevention of significant deterioration (PSD) regulations are used to limit air pollutant emissions from new or expanding sources. Under these regulations, some national parks and wilderness areas are designated PSD Class I air quality areas and are specially protected. There are four Class I areas within 62 miles of the NTRs, including Linville Gorge Wilderness, the Great Smoky Mountains National Park, Shining Rock Wilderness, and Joyce Kilmer/Slickrock Wilderness. The closest Class I area, Linville Gorge, is located approximately 30 miles southeast of Watauga Reservoir.

3.15. Noise

Along the NTRs, sources of noise include industrial development, power generation facilities, substations, developed recreation sites, and traffic. Noise-related effects of lands planning in the NTRs were evaluated qualitatively based upon the number of acres allocated to each zone and based upon the assumption that the potential to generate noise is greatest with industrial land uses, is moderate with developed recreation uses, and is least with conservation land uses.

3.16. Socioeconomics

3.16.1. Population and Economy

Human population in the counties where the NTRs are located is estimated to be about 421,000, as of 2008 (Table 3-15). In every county in the area, population grew more slowly than in the nation and the state between 1980 and 2008, while the independent city of Bristol, Virginia, lost population. Projections and current trends suggest that the population of this area will reach about 450,000 by the year 2020. Washington County, Tennessee, is projected to grow slightly faster than the nation, although more slowly than the state. Otherwise, the area is projected to grow more slowly than the nation.

Overall, the rural population share in the area is about the same as the Tennessee average, which is somewhat higher than the national average as well as the Virginia average. However, two counties—Johnson, Tennessee, and Washington, Virginia—are considerably more rural than the area as a whole.

Table 3-15. Population Around the Northeastern Tributary Reservoirs

Area	1980	2000	Estimate 2008	Projection 2020	Percent Increase, 1980-2008	Projected Percent Increase, 2008-2020	Percent Rural, 2000
Carter Co., Tenn.	50,205	56,742	59,492	63,657	18.5	7.0	40.3
Johnson Co., Tenn.	13,745	17,499	18,112	19,655	31.8	8.5	83.2
Sullivan Co., Tenn.	143,968	153,048	153,900	161,390	6.9	4.9	26.6
Washington Co., Tenn.	88,755	107,198	118,639	133,790	33.7	12.8	32.6
Washington Co., Va.	46,487	51,103	53,038	54,138	14.1	2.1	69.7
Bristol City, Va.	19,042	17,367	17,424	17,078	-8.5	-2.0	0.9
Total	**362,202**	**402,957**	**420,605**	**449,708**	**16.1**	**6.9**	**36.9**
Tennessee	4,591,023	5,689,283	6,214,888	7,195,375	35.4	15.8	36.4
Virginia	5,346,797	7,078,515	7,769,089	8,917,396	45.3	14.8	27.0
U.S. (000)	226,545.8	281,421.9	304,059.7	341,387.0	34.2	12.3	21.0

Sources: Historical data and U.S. projection from U.S. Census Bureau, http://www.census.gov.

Projections for Tennessee: 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,* http://cber.bus.utk.edu/.

Projections for Virginia: Virginia Employment Commission, http://www.vawc.virginia.gov/gsipub/.

Total employment in 2007 was almost 246,000 in the area counties (Table 3-16). Both farming and manufacturing account for a larger share of jobs than in the state and the nation. Farm employment accounted for 3.1 percent of all jobs in the area, slightly higher than the Tennessee share of 2.5 percent and almost twice the national share of 1.6 percent. Johnson County is more dependent on farming, which accounts for 11.3 percent of all jobs in the county. Manufacturing is especially important in Sullivan County and in Washington County/Bristol City, Virginia.

Table 3-16. Employment in the Counties Around the Northeastern Tributary Reservoirs in 2007

Area	Total Employ-ment	Percent of Total Employment				
		Farm	Manufac-turing	Retail Trade	Govern-ment	Other
Carter Co., Tenn.	21,338	3.3	6.7	14.1	12.0	63.9
Johnson Co., Tenn.	6,931	11.3	10.0	11.2	16.1	51.4
Sullivan Co., Tenn.	94,307	1.6	14.7	12.1	8.5	63.2
Washington Co., Tenn.	80,051	2.9	9.2	11.8	16.0	60.1
Washington Co. + Bristol City, Va.	43,140	5.2	14.3	13.0	12.5	54.9
Total	**245,767**	**3.1**	**12.0**	**12.3**	**12.2**	**60.4**
Tennessee	3,746,010	2.5	10.5	11.2	12.0	63.8
Virginia	4,936,137	1.1	5.9	10.6	17.5	64.9
U.S. (000)	180,943.8	1.6	8.0	10.7	13.4	66.3

Source: U.S. Bureau of Economic Analysis, Regional Economic Accounts, http://www.bea.gov/regional/reis/.

The unemployment rate in the area in 2008 was 5.6 percent, slightly lower than the national and Tennessee rates, although notably higher than the Virginia rate (Table 3-17). The highest rate, 8.4 percent, was in Johnson County, followed by Carter County at 6.4 percent. The rates in the rest of the area were below the national and Tennessee levels, although higher than the Virginia rate.

Table 3-17. Unemployment and Income in the Counties Surrounding the Northeastern Tributary Reservoirs in 2007

Area	Unemployment Rate (2008)	Per Capita Personal Income (2007)	
		($)	Percent of U.S.
Carter Co., Tenn.	6.4	23,987	62
Johnson Co., Tenn.	8.4	20,785	54
Sullivan Co., Tenn.	5.2	32,141	83
Washington Co., Tenn.	5.5	30,516	79
Washington Co. + Bristol City, Va.	5.2	29,907	77
Total	**5.6**	**29,664**	**77**
Tennessee	6.4	33,395	86
Virginia	4.0	41,727	108
U.S. (000)	5.8	38,615	100

Source: U.S. Bureau of Economic Analysis, Regional Economic Accounts, http://www.bea.gov/regional/reis/.

The NTRs are located in a relatively low-income area (Table 3-17). All of the counties in the area have per capita personal income levels below the state and national averages. Johnson County is the poorest county, with per capita income only 54 percent of the national average. Carter County, the second-lowest, is 62 percent of the national average. The remaining counties have average income between 77 and 83 percent of the national average, which is still below, but much closer to, the Tennessee average.

3.16.2. Environmental Justice

The population of the area is predominantly non-Hispanic white, with a minority population average of 5.9 percent (Table 3-18). The minority population share ranges from 3.9 percent in Washington County, Virginia, to 8.4 percent in Washington County, Tennessee and 9.4 percent in the independent city of Bristol, Virginia. These shares are very low in comparison to the state and national averages.

Table 3-18. Minority Population in the Counties Around the Northeastern Tributary Reservoirs, 2008

Area	Total Population	Nonwhite Population	White Hispanic Population	Total Minority Population	Percent Minority Population
Carter Co., Tenn.	59,492	2,053	737	2,790	4.7
Johnson Co., Tenn.	18,112	732	176	908	5.0
Sullivan Co., Tenn.	153,900	5,939	1,515	7,454	4.8
Washington Co., Tenn.	118,639	7,407	2,564	9,971	8.4
Washington Co., Va.	53,038	1,532	532	2,064	3.9
Bristol City, Va.	17,424	1,422	223	1,645	9.4
Total	**420,605**	**19,085**	**5,747**	**24,832**	**5.9**
Tennessee	6,214,888	1,219,860	204,512	1,424,372	22.9
Virginia	7,769,089	2,095,176	472,488	2,567,664	33.0
U.S.	304,059,724	61,420,482	43,147,784	104,568,266	34.4

Source: U.S. Census Bureau, http://www.census.gov/popest/race.html

Overall, poverty levels are slightly higher than the State of Tennessee average and well above the Virginia and national averages (Table 3-19). The average share of persons below poverty level in the area in 2007 was 16.7 percent, somewhat higher than the 15.8 percent average for Tennessee. The national average is lower at 13.0 percent and the Virginia average much lower at 9.9 percent. Johnson County has the highest poverty level, at 21.9 percent, followed by Carter County at 20.1 percent. The remaining levels range from 14.8 percent in Washington County, Virginia, to 18.3 percent in the independent city of Bristol, Virginia.

Table 3-19. Persons Below Poverty Level in the Counties Around the Northeastern Tributary Reservoirs, 2007

Area	Persons Below Poverty Level (Number)	Persons Below Poverty Level (Percent)
Carter Co., Tenn.	11,244	20.1
Johnson Co., Tenn.	3,568	21.9
Sullivan Co., Tenn.	22,627	15.0
Washington Co., Tenn.	19,469	17.3
Washington Co., Va.	7,589	14.8
Bristol City, Va.	3,098	18.3
Total	**67,595**	**16.7**
Tennessee	945,263	15.8
Virginia	739,135	9.9
U.S.	38,052,247	13.0

Source: U.S. Census Bureau, http://www.census.gov/hhes/www/poverty/poverty.html

CHAPTER 4

4.0 ENVIRONMENTAL CONSEQUENCES

This chapter addresses the potential direct, indirect, and cumulative effects of adopting and implementing Alternatives A, B, and C. A direct impact is an effect caused by the action and occurring at the same time and place. An indirect impact is an effect caused by the action but removed in time or distance. A cumulative impact results from the incremental or collective effect of the action when combined with other past, present, and reasonably foreseeable future actions. Cumulative effects were examined within the South Fork Holston River and Watauga River watersheds, in the context of gradually increasing population and land development in that area.

4.1. Introduction

Analysis of environmental consequences was based upon the assumption that any activity allowed under a particular land use zone would occur at the greatest allowable intensity on the entire extent of the parcel. For example, on a 10-acre parcel allocated to Zone 5 (Industrial), we assumed the entire 10 acres would be cleared of vegetation and developed to support an industrial facility. Activities on Zones 7, 2, and 6 may include development, construction, and landscaping but some areas of a parcel may be left in a relatively natural state. Therefore, the analysis was based upon the assumption that the potential for altering the existing conditions of a parcel are greatest under Zone 5; moderate under Zones 7, 2, and 6; slight under Zone 4; and least under Zone 3. Actual projects, when planned and proposed in detail in the future, will be evaluated to determine site-specific environmental impacts. Potential impacts to sensitive resources would be identified and avoided or minimized as appropriate consistent with applicable regulations.

4.2. Land Use

Under all three alternatives, allocations of parcels having existing land use agreements (i.e., committed parcels) were not changed. Because only 5 percent of NTR lands are uncommitted, land uses change very little among alternatives. In many instances, the primary change has been the application of a new zone definition (Table 1-2 and Appendix E). Effects to land use are based upon changes in the amount of land allocated to each zone.

Most categories of land uses under the action alternatives would remain available in approximately the same proportions as are currently established under the No Action Alternative. Under all three alternatives, a single 125-acre parcel near South Holston Reservoir is allocated to Zone 5 (Industrial). The same 15 parcels on Boone, Fort Patrick Henry, South Holston, and Watauga reservoirs are allocated to Zone 7 (Shoreline Access) under all three alternatives. The overall percentage of lands, across all seven reservoirs, allocated to Zone 3 (Sensitive Resource Management) and Zone 6 (Developed Recreation) changes very little among alternatives.

In terms of land use, the primary differences between the No Action Alternative and the action alternatives (B and C) are the reduction of lands allocated to Zone 2 (Project Operations) and the increase in lands allocated to Zone 4 (Natural Resource Conservation) (Table 2-6).

Regionally, the trend of increasing residential development in areas of the reservoirs currently available for development is related to broad socioeconomic trends and would be unaffected by the land plan alternatives. Additionally, TVA's Land Policy prohibits allocation of additional lands or land rights for residential use or the disposal of reservoir lands for residential use. All three alternatives are consistent with this policy.

Land cover in the Watauga River and South Fork Holston River watersheds is predominantly deciduous, evergreen, and mixed forest (Table 4-1). Less than 5 percent of the land in these watersheds is urban, commercial, or residential. Relative to the region within these two watersheds, the consequences of allocating NTR lands as planned under each of the three alternatives would result in only minor cumulative effects to land use in the region.

Table 4-1. Land Cover/Use in the Watauga River and South Fork Holston River Watersheds

Land Cover/Use	Percent of Total Area
Deciduous Forest	55
Evergreen Forest	6
Mixed Forest	7
Pasture/Grasses	22
Cropland	2
Open Water	3
Urban/Residential/Commercial	5

Source: TDEC 2000; 2006a

Alternative A

Using equivalent land use zones, 90 percent of NTR lands are allocated to Zones 2, 4, and 6 (Table 2-6). Changes to current land use would be minor. Land designated for Industrial (125 acres) and uncommitted parcels designated for Developed Recreation (111 acres) or Project Operations (85 acres) are currently undeveloped but could be developed in the future. Because these parcels are already designated for these uses, direct impacts to land use would be minor.

The primary impact of Alternative A is the absence of a comprehensive plan to guide consideration of land use requests. Under this alternative, the lands surrounding the seven NTRs would not be allocated to a land use zone; therefore, complete alignment with current TVA policies would not occur. Requested land uses that are consistent with the forecast designation or Boone Reservoir Land Management Plan (TVA 1999) would either be approved or denied based on a review of potential environmental impacts, TVA's Land Policy, and other administrative considerations. Among the six NTRs without a previous RLMP, a total of 154 parcels were unplanned under the Forecast System, and 12 of those parcels (totaling 37 acres) are also uncommitted. Land use requests submitted for those parcels would be evaluated individually based upon TVA policies. Over the long term, absence of comprehensive reservoir-wide land plans may result in land uses that do not fully optimize the goals of multiple use and stewardship to which TVA strives. However, because only about 5 percent of the land around the NTRs is uncommitted, any impacts to land use under the No Action Alternative would be negligible.

Action Alternatives B and C

Implementation of Alternative B, as compared to equivalent zoning under Alternative A, would result in changes of zone allocations on 36 parcels (Table 2-5). Under Alternative B, 90 percent of NTR lands would be allocated to Zones 4, 2, and 6 (Table 2-6). The number of acres allocated to Zone 4 (Natural Resource Conservation) would increase on Boone, Fort Patrick Henry, South Holston, and Watauga reservoirs, resulting in an additional 662 acres allocated to Zone 4 under Alternative B. An additional 171 acres on three reservoirs would be allocated to Zone 3 (Sensitive Resource Management) to protect sensitive resources. Field surveys indicated no sensitive resources exist on two Boone parcels allocated to Sensitive Resource Management under the No Action Alternative. Those parcels, totaling about 221 acres, would be allocated to Zone 4 under both action alternatives, resulting in a net decrease of about 51 acres allocated to Zone 3 under the action alternatives. The area allocated to Zone 2 (Project Operations) would decrease by a total of 527 acres across all seven reservoirs. Although the number of acres allocated to Zone 6 would slightly increase on South Holston Reservoir, there would be a net decrease of 85 acres on the NTRs due to decreases in Zone 6 lands on Fort Patrick Henry, Watauga, and Wilbur reservoirs.

Selection of Alternative C, as compared to equivalent zoning under Alternative A, would result in changes in land use zones for 47 parcels (Table 2-5). Ninety percent of NTR lands would be allocated to Zones 4, 2, and 6 (Table 2-6). Under Alternative C, an additional 635 acres would be allocated to Zone 4 (Natural Resource Conservation). The area allocated to Zones 2 and 3 would have a net decrease of 527 acres and 57 acres, respectively. Although the number of acres allocated to Zone 6 would slightly increase on South Holston Reservoir, there would be a net decrease of 51 acres across all seven reservoirs.

Under Alternatives B and C, as compared to Alternative A, land use allocations would not change for Beaver Creek or Clear Creek reservoirs. On Wilbur Reservoir, the only difference among alternatives is allocating Parcel 1 (6 acres) to Zone 4 under Alternatives B and C, as compared to Zone 6 under Alternative A. The effect of changes in the amount of Zone 2 lands is discussed in detail below. Changes in the amount land allocated to Zones 3, 4, and 6 are discussed in detail in sections addressing sensitive resources and recreation.

In comparison to Alternative A, the amount of land allocated to Zone 2 under Alternatives B and C would be reduced on Boone, Fort Patrick Henry, South Holston, and Watauga reservoirs (Tables 4-2 and 4-3). Reduction of the amount of land in Zone 2 would not adversely affect TVA's ongoing project operations or public works. Currently, of the parcels forecast/planned for Project Operations that would be allocated to other uses under Alternatives B and C, none contains operations or public works facilities. The parcels identified with the equivalent land use Zone 2 were broadly categorized under the Forecast System, and are more appropriately classified as natural resources management areas. For example, the majority of parcels changed from equivalent Zone 2 to other uses were forecast for Reservoir Operations, which applied to islands used for dispersed recreation and natural resources management, and to narrow shoreline bands managed for flood control (Appendix E). The actual land use on those parcels is more consistent with the definition of Zone 4 or 3 rather than Zone 2 (Table 1-2).

Differences in land use between Alternatives B and C are slight (Table 4-4). The amount of land allocated to Zone 2 does not change between the two action alternatives. Allocations for Beaver Creek, Clear Creek, Boone, and Wilbur are identical between the two action

Table 4-2. Acres Allocated to Land Use Zones Under Alternative B Compared to Equivalent Allocations Under Alternative A

Zone	Beaver Creek	Clear Creek	Boone	Fort Patrick Henry	South Holston	Watauga	Wilbur	Total
2	--	--	-36	-91	-258	-143	--	-527
3	--	--	-186	19	98	19	--	-51
4	--	--	222	115	156	163	6	662
5	--	--	--	--	--	--	--	0
6	--	--	--	-43	3	-39	-6	-85
7	--	--	--	--	--	--	--	0

-- = No change

Table 4-3. Acres Allocated to Land Use Zones Under Alternative C Compared to Equivalent Allocations Under Alternative A

Zone	Beaver Creek	Clear Creek	Boone	Fort Patrick Henry	South Holston	Watauga	Wilbur	Total
2	--	--	-36	-91	-258	-143	--	-527
3	--	--	-186	21	5	102	--	-57
4	--	--	222	113	247	48	6	635
5	--	--	--	--	--	--	--	0
6	--	--	--	-43	5	-7	-6	-51
7	--	--	--	--	--	--	--	0

-- = No change

Table 4-4. Acres Allocated to Land Use Zones Under Alternative C Compared to Alternative B

Zone	Beaver Creek	Clear Creek	Boone	Fort Patrick Henry	South Holston	Watauga	Wilbur	Total
2	--	--	--	--	--	--	--	0
3	--	--	--	3	-93	83	--	-6
4	--	--	--	-3	91	-116	--	-27
5	--	--	--	--	--	--	--	0
6	--	--	--	--	2	32	--	34
7	--	--	--	--	--	--	--	0

-- = No change

alternatives. Allocations on Fort Patrick Henry Reservoir are nearly identical except for a single 3-acre parcel that is allocated to Zone 3 under Alternative C, but to Zone 4 under Alternative B. The primary differences between Alternatives B and C are the number of acres allocated to Zones 3, 4, and 6 on South Holston and Watauga reservoirs. Under Alternative C, as compared to Alternative B, there are about 34 more acres allocated to Zone 6, about 27 fewer acres allocated to Zone 4, and about 6 fewer acres allocated to Zone 3.

Under Alternatives B and C, changes in land use allocations would not result in substantive direct or indirect impacts to land use. The presence of comprehensive long-term land use

plans would beneficially affect land use by providing clear guidance designed to optimize multiple uses and land stewardship throughout the NTRs.

4.3. Recreation

Developed recreation occurs on committed parcels allocated to Zone 6 (or the equivalent under Alternative A). These parcels typically have an existing land use agreement for a park, campground, marina, or other recreation purposes. Dispersed recreation opportunities occur primarily on parcels allocated as Zones 2, 3, and 4, and on uncommitted (undeveloped) Zone 6 lands. Under all three alternatives, the net percentage of NTR lands available for developed recreation uses (Zone 6 allocations) would be nearly the same (from 17 to 19 percent). Similarly, the percentage of Zones 2, 3, and 4 lands offering dispersed recreation opportunities would remain relatively constant, at 78 to 79 percent of the land, among all three alternatives. The alternatives differ in the allocation of individual parcels to developed recreation. As discussed below, Alternatives B and C differ in the allocations of certain parcels based upon suitability for recreational activities and requests for future recreational uses.

The zone allocations (or the equivalent under Alternative A) on Beaver Creek and Clear Creek reservoirs are the same under all three alternatives. Existing recreational opportunities on those reservoirs are preserved under all three alternatives. Therefore, there would be no adverse consequences to recreational opportunities under any of the alternatives. On Boone Reservoir, 11 parcels totaling 75 acres are allocated to Zone 6 under all three alternatives. Therefore, opportunities for developed recreation on Boone Reservoir would not be adversely affected under any alternative. Furthermore, on Boone Reservoir, differences among the alternatives are based upon changes in allocations among Zones 2, 3, and 4 (Table 2-5), which does not affect the availability of dispersed recreation opportunities. Based upon these conclusions, Beaver Creek, Clear Creek, and Boone reservoirs were dismissed from the more detailed discussion of potential impacts to recreation under each alternative found below.

Among all three alternatives, the variation in the amount of land available for developed and dispersed recreation opportunities is small. No developed facilities currently used would be affected under any alternative. In the context of the South Fork Holston River and Watauga River watersheds, federal land available to the public for developed and dispersed recreation is abundant. TVA-managed recreational facilities provide river and reservoir access that is unique but abundant in the region. Given the abundant and diverse opportunities, none of the three alternatives involve impacts that would result in significant cumulative effects to developed or dispersed recreation in the region.

Alternative A

Under Alternative A, 939 acres (19 percent) of TVA shoreland on NTRs are forecast for developed recreation. Unless otherwise posted, 1,744 acres (35 percent) of parcels allocated to Sensitive Resource Management and Natural Resource Conservation would support dispersed recreation, and the remaining 2,125 acres allocated to Project Operations and Shoreline Access could be available for dispersed recreation unless occupied by development or otherwise posted.

Alternative A includes the greatest number of acres of land designated for developed recreation. Some lands categorized for developed recreation have been improved with facilities, while other parcels are not currently developed but have potential for future development. Implementation of this alternative would beneficially affect developed

recreation by providing a diversity of existing sites as well as future opportunities for new facilities.

Alternative A includes the least amount of land available for dispersed recreation. Continuation of the Forecast System would negatively affect dispersed recreation. However, because there are substantial amounts of Zone 4 and undeveloped Zone 2 lands under this alternative, the impacts would be minor.

Alternative B

Under the action alternatives, lands managed by TVA that provide recreation opportunities associated with developed public and/or commercial facilities would be placed into Zone 6 (Developed Recreation), or Zone 2 (Project Operations) when the facilities occur on TVA dam reservations. Lands managed by TVA that provide dispersed recreation opportunities would be placed into Zone 2, 3, or 4, depending upon other compatible uses occurring on the parcel. Dispersed recreation could occur on any TVA parcels that are not otherwise posted or developed.

Implementation of Alternative B, as compared to equivalent zoning under Alternative A, would result in a net reduction of land allocated to Zone 6 by 85 acres. The reduction is less than 2 percent of the total TVA-managed land on the NTRs. About 854 acres (17 percent) of NTR lands would be allocated to Zone 6. Parcels 19 and 46 on South Holston Reservoir, totaling 37 acres and forecast as Natural Resource Conservation, would be allocated to Zone 6, which would allow opportunities for developed recreation that are consistent with adjacent USFS lands. Conversely, 13 parcels, totaling 122 acres, forecast for Developed Recreation on Fort Patrick Henry, South Holston, Watauga, and Wilbur reservoirs would be allocated to other zones (Table 2-5). None of these 13 parcels allocated to a zone other than Developed Recreation currently have developed recreational facilities. Although no Zone 6 lands would remain on Wilbur Reservoir, about 54 acres of Zone 6 lands would be available on the nearby Watauga Reservoir. Adoption of Alternative B would impact recreation by changing the amount and location of lands available for future development of recreational facilities. Under Alternative B, the acreage of Zone 6 land on South Holston Reservoir would slightly increase, but would be reduced on Fort Patrick Henry, Watauga, and Wilbur reservoirs. However, because the number of acres removed from Zone 6 is small, impacts would be minor.

Furthermore, each of the parcels previously forecast for Developed Recreation is allocated to zones that allow for dispersed recreation. The 2,357 acres (48 percent of NTR properties) allocated to Zones 3 and 4 would support opportunities for dispersed recreation, and an additional 1,598 acres allocated to Zones 2 and 7 could be available for dispersed recreation unless occupied by development or otherwise posted. On this basis, selection of Alternative B would beneficially affect recreation. Again, because the number of acres is small, effects throughout the NTRs region are minor.

Alternative C

Selection of Alternative C, compared to Alternative A, would reduce the total acreage allocated to Zone 6 by 51 acres, or 1 percent of the total TVA-managed land on the NTRs. Approximately 888 acres (18 percent) of NTR lands would remain allocated to Zone 6. Five parcels on Watauga and South Holston reservoirs, totaling about 69 acres and currently forecast as Natural Resource Conservation (Zone 4), would be allocated to Zone 6, which would increase opportunities for developed recreation on those reservoirs. Conversely, 11 parcels totaling 120 acres of land forecast for Developed Recreation on Fort Patrick Henry,

South Holston, Watauga, and Wilbur reservoirs would be allocated to other zones (Table 2-5). None of these 11 parcels previously forecast for Zone 6 currently has developed recreational facilities. While no land on Wilbur Reservoir would be allocated to Zone 6, 86 acres of Zone 6 lands would be available on the nearby Watauga Reservoir. Adoption of Alternative C would indirectly impact recreation by changing the amount and location of lands available for future development of recreational facilities. Under Alternative C, the acreage of Zone 6 land on South Holston Reservoir would slightly increase, but would be reduced on Fort Patrick Henry, Watauga, and Wilbur reservoirs. However, because the number of acres removed from Zone 6 is small, impacts would be minor.

Compared to Alternative B, Alternative C would result in different allocations for four South Holston Reservoir parcels, resulting in the net increase of about 2 acres allocated to Zone 6. Similarly, three additional Watauga Reservoir parcels, totaling about 32 acres, would be allocated to Zone 6 under Alternative C. Opportunities for developed recreation would be greater on South Holston and Watauga reservoirs under Alternative C as compared to B.

Under Alternative C, as with Alternative B, each of the parcels previously forecast for developed recreation is allocated to zones that likely allow for dispersed recreation. About 2,322 acres (47 percent) of NTRs properties would be allocated to Zones 3 and 4 and would support dispersed recreation uses, and another 1,598 acres allocated to Zones 2 and 7 could be available for dispersed recreation unless occupied by development or otherwise posted. On this basis, selection of Alternative C would beneficially affect recreation. However, opportunities for dispersed recreation may be slightly reduced under Alternative C as compared to Alternative B. Again, because the number of acres is small, effects throughout the NTRs region are minor.

4.4. 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 recreational development, which preclude the property being used for agricultural purposes. Generally, prime farmland on properties located in Zone 3 (Sensitive Resource Management) and Zone 4 (Natural Resource Conservation) are not subject to adverse impacts because those properties would be retained in a relatively “natural” state and not be converted to other land uses, preserving any prime farmland. However, prime farmland on parcels allocated to Zone 2, 5, 6, or 7 is subject to potential adverse effects because land in these zones could be devoted to nonagricultural uses, such as industrial development, developed recreation, and water access.

Under any of the alternatives, proposed actions involving the transfer of land for development that contains any acreage of soil with prime farmland 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 a possible 260) are given greater consideration of protection so that agricultural use can be preserved.

About 431 acres of prime farmland occur on 24 of the 231 parcels addressed in the NTRLMP (Table 4-5 and Appendix G, Table G-1). About 167 acres of farmland of statewide importance occur on 12 parcels located in Virginia. The potential for direct and

indirect impacts to prime farmland and farmland of statewide importance under each of the alternatives is discussed below.

Table 4-5. Approximate Number of Acres of Prime Farmland and Land of Statewide Importance Allocated to Each Zone Under Alternatives A, B, and C

Zone	Alternative A		Alternative B		Alternative C	
	Prime Farmland	Land of Statewide Importance	Prime Farmland	Land of Statewide Importance	Prime Farmland	Land of Statewide Importance
2	356	11	201	4	201	4
3	18	0	75	0	34	0
4	12	0	109	16	154	11
5	7	0	7	0	7	0
6	30	155	30	147	27	153
7	8	1	8	1	8	1

The total acreage of prime farmland associated with parcels addressed in the NTRLMP is small (about 0.5 percent) relative to more than 79,830 acres of prime farmland occurring in the five counties adjacent to the NTRs. The majority of NTRLMP parcels, including parcels containing prime farmland, are already committed to land uses other than agriculture. Regionally, the number of farms and the acres of land in farms are declining in nearly all of the five counties, although the average size of farms is increasing except in Sullivan County, Tennessee (Table 3-7). However, because any future negative impacts on NTR lands would occur on a relatively small proportion of existing prime farmland in the region and project-specific reviews would identify and minimize adverse impacts, implementation of any of the three alternatives would not result in substantial cumulative effects to prime farmland.

Alternative A

Under Alternative A, approximately 401 acres of prime farmland and 167 acres of farmland of statewide importance occur on parcels allocated to Zones 2, 5, 6, and 7, where disturbance of soils is likely. Approximately 60 percent of prime farmland around the seven reservoirs occurs on Project Operations lands associated with dam reservations and tailwaters. Nearly 53 percent of prime farmland is located on South Holston Parcels 2, 3, and 73, which comprise the tailwater shoreline and dam reservation, and are forecast for Project Operations. Prime farmland also occurs on parcels developed for use as community parks, informal boat ramps, and a water treatment plant. In many instances, soil-disturbing impacts to parcels committed to Project Operations or those developed uses have already occurred; therefore, allocation to these zones would not represent a future impact to prime farmland. Conversely, about 4 percent of prime farmland occurs on parcels fronting subdivisions, riparian strips, and an undeveloped industrial parcel on which future impacts could occur. Approximately 30 acres of prime farmland occur on parcels allocated to Zones 3 and 4, where impacts to prime farmland are unlikely.

About 86 percent of the farmland of statewide importance occurs on parcels currently allocated to Zone 6. About 119 acres (71 percent) occur on Sugar Hollow Park (Beaver Creek Parcels 1 and 3), which is already developed and landscaped. Similarly, another 24

acres of farmland of statewide importance is located on South Holston Parcels 24 and 33, which are Zone 6 parcels committed to the Washington County Park and the Area 6 Ramp, respectively. The remainder of farmland of statewide importance occurs on parcels used for Project Operations, access areas, formal and informal boat ramps, and a fire department building (Appendix G, Table G-1). None of the farmland of statewide importance occurs on parcels allocated to Zone 3 or 4.

Adoption of Alternative A would have the greatest potential to adversely affect prime farmland and farmland of statewide importance because the greatest proportion of parcels would be allocated to Zones 2, 5, 6, and 7. As future requests for land uses on these parcels are submitted to TVA, project-specific environmental reviews are expected to identify and reduce negative impacts to prime farmland and farmland of statewide importance. Minor adverse impacts are expected as parcels are converted to uses incompatible with agriculture. However, because the proportion of prime farmland and farmland of statewide importance is small, changes in land use would not result in significant impacts.

Alternative B

Under Alternative B, 246 acres of prime farmland and 152 acres of farmland of statewide importance would occur on parcels allocated to Zones 2, 5, 6 and 7 where impacts are likely. Approximately 184 acres of prime farmland and about 16 acres of farmland of statewide importance would be allocated to Zones 3 and 4. Compared to the No Action Alternative, 155 fewer acres of prime farmland and 15 fewer acres of farmland of statewide importance would be subject to potential future development uses incompatible with agriculture.

As described under Alternative A above, future requests for land uses would be subject to project-specific environmental reviews. Minor adverse impacts to prime farmland are expected. However, for the reasons stated above, changes in land use under Alternative B would not result in significant impacts.

Alternative C

Under Alternative C, 243 acres of prime farmland and 158 acres of farmland of statewide importance would occur on parcels allocated to Zones 2, 5, 6, and 7 where impacts are likely. Approximately 188 acres of prime farmland and 11 acres of farmland of statewide importance would be allocated to Zones 3 and 4.

Compared to the No Action Alternative, about 158 fewer acres of prime farmland and about 9 fewer acres of farmland of statewide importance would be subject to potential future development uses incompatible with agriculture.

Compared to Alternative B, about 3 fewer acres of prime farmland would be subject to potential future development uses incompatible with agriculture. However, about 6 more acres of farmland of statewide importance could be developed under Alternative C as compared to Alternative B.

As described under Alternative A above, future requests for land uses would be subject to project-specific environmental reviews. Minor adverse impacts to prime farmland are expected. However, for the reasons stated above, changes in land use under Alternative C would not result in significant impacts.

4.5. Terrestrial Ecology

This section addresses anticipated effects to terrestrial plant and wildlife communities. Potential effects to threatened and endangered plants and animals are addressed in Section 4.6 below.

Analysis of the effects to terrestrial plant and wildlife communities is based upon the potential for proposed activities to result in clearing vegetation or ground disturbance (e.g., grading), which would be the primary sources of direct impacts to plant and wildlife communities. Indirect effects to plant and wildlife communities include fragmentation and isolation of suitable habitat and spread of invasive, nonnative species that compete with native species. Greater potential for site development correlates with a greater potential for adverse impacts to terrestrial plants and wildlife. As such, Zones 3 and 4 are the most protective of terrestrial habitat. Zone 5 has the greatest potential to involve ground disturbance that may affect terrestrial communities. The potential impacts to plants and wildlife on Zones 2, 6, and 7 are dependent upon the existing condition of the parcel and on the proposed future uses. Future actions on lands allocated to these zones may involve substantive development (e.g., new roads, campgrounds, marinas, etc.), or they may be left relatively natural. Furthermore, many wildlife species may become accustomed to facilities developed on these lands, such that long-term effects to common species of wildlife are minor. For the purposes of this programmatic analysis, we assume the potential for impacts to plants and wildlife on Zones 2, 6, and 7 would be moderate.

Under any of the alternatives, site-specific environmental reviews would be conducted when development projects are proposed in the future. Such reviews would evaluate the potential for project-specific effects to plant and wildlife communities. Additionally, to minimize the potential for introduction of invasive plant species on TVA-owned properties, any proposed development project would implement the following requirements:

- Landscaping activities would not include the use of invasive plants listed as Rank 1 (Severe Threat), Rank 2 (Significant Threat), or Rank 3 (Lesser Threat) on the TN-EPPC list of Invasive Exotic Pest Plants in Tennessee (Appendix G, Tables G-9 through G-11).

- Revegetation and erosion-control work would utilize seed mixes comprised of native species or noninvasive, nonnative species (Appendix G, Table G-12).

4.5.1. Plant Communities

In the South Fork Holston River and Watauga River watersheds, as the human population and associated commercial and residential development continues to increase, a related trend of increasing removal and fragmentation of natural vegetation is expected. Loss of native vegetation communities may lead to diminished biodiversity and alteration of habitat suitability. Common deciduous and evergreen forests and woodlands are extensive in the NTRs region. Under all three alternatives, the proposed NTRLMP identifies lands for natural resources conservation and implements measures to minimize impacts when projects are planned. Therefore, none of the three alternatives would result in significant cumulative impacts to common terrestrial vegetation.

Rare plant communities are limited in distribution in the region. The Carolina Hemlock (Eastern Hemlock)/Great Laurel Forest is a globally critically imperiled terrestrial plant community. Within the SBRE, this plant community is a key component supporting other

floral species and fauna because the hemlock provides shade, food, and shelter for those species. The Carolina Hemlock (Eastern Hemlock)/Great Laurel Forest is susceptible to infestation of the hemlock wooly adelgid, an exotic insect pest. Regionally, cumulative effects of increasing population and development and the spread of the wooly adelgid are expected to result in the continued decline of this rare community. The USFS is implementing biological and chemical measures to control wooly adelgid in the federal lands adjacent to Watauga Reservoir. Because TVA-managed parcels containing the Carolina Hemlock (Eastern Hemlock)/Great Laurel Forest would be managed to conserve natural resources, activities proposed under each of the three alternatives would not result in adverse cumulative effects to that plant community. Similarly, continued allocation of Watauga Reservoir Parcel 24 to Project Operations (Zone 2) under all three alternatives is expected to maintain intact the Northern White Cedar Limestone Seepage Woodland habitat and would not result in adverse cumulative effects to that plant community.

Alternative A

Under Alternative A, 1,409 acres on four of the seven reservoirs (Fort Patrick Henry, South Holston, Watauga, and Wilbur) would be forecast or planned for Natural Resource Conservation (equivalent to Zone 4). An additional 335 acres on Boone Reservoir would be planned for Sensitive Resource Management (equivalent to Zone 3). The potential for impacts to plant communities in these two zones is minor. Approximately 3,064 acres on the NTRs would be designated Project Operations, Developed Recreation, or Shoreline Access, where moderate effects to plant communities may occur. The greatest potential for impacts to plant communities would be limited to 125 acres near South Holston Reservoir. Given the substantial amount of common vegetation types around those reservoirs, selection of Alternative A would not result in major direct or indirect effects to common terrestrial plant communities.

No uncommon terrestrial plant communities are known from the lands surrounding Beaver Creek, Clear Creek, Boone, South Holston, Fort Patrick Henry, or Wilbur reservoirs. Project-specific surveys would be conducted prior to clearing vegetation to evaluate the presence of, and potential impacts to uncommon or rare plant communities. Therefore, activities around those six reservoirs are not expected to affect rare terrestrial plant communities.

The Carolina Hemlock (Eastern Hemlock)/Great Laurel Forest occurs along the north shore of Watauga Reservoir (Parcels 2, 3, 4, 5, and 6), on parcels forecast for Natural Resource Conservation. Currently, Parcels 2, 3, 4, and 6 are under a permanent easement for the use and benefit of the USFS. No easement has been granted for Parcel 5. These parcels are remote and are surrounded by USFS lands. The public can access these parcels from the reservoir or the Appalachian Trail, which runs through Parcel 3. Activities conducted on Natural Resource Conservation parcels include forest management and dispersed recreation. There is some potential for clearing, the removal of hazard trees, and other timber management that would directly affect the Carolina Hemlock (Eastern Hemlock)/Great Laurel Forest on these parcels. However, because such activities likely would be conducted to promote forest health, no substantial adverse affects are expected. Additionally, there is potential for indirect impacts to this community from dispersed recreation activities (e.g., cutting firewood). However, given the remoteness and steep slopes of the parcels, the potential for frequent and intense visitation is low. Therefore, no significant indirect impacts to this rare plant community are anticipated.

The northern white cedar limestone seepage woodland, a globally rare community, occurs in Parcel 24 on Watauga Reservoir, which is a utility easement corridor, surrounded on both sides by land allocated to Natural Resource Conservation. Maintenance of the easement sustains the conditions that allow this community to thrive. Therefore, no adverse direct or indirect effects to this plant community are expected from the continued management of this easement.

Alternative B

Under Alternative B, 2,357 acres on five of seven NTRs (Boone, Fort Patrick Henry, South Holston, Watauga, and Wilbur) would be allocated to Zones 3 and 4, in which impacts to terrestrial vegetation are expected to be minor. Approximately 2,452 acres would be allocated to Zones 2, 6, and 7, where the potential for direct and indirect impacts is greater. The extent of NTR lands allocated to Zone 5 (Industrial) under Alternative B is the same as under Alternative A. Because the amount of land eligible for potential development is smaller, the potential to promote the spread of invasive exotic plants is lower under Alternative B than under Alternative A. Furthermore, requirements to use noninvasive species for planting or seeding would reduce the potential for spreading invasive species of plants. Allocations proposed under Alternative B would be more protective compared to the existing condition, and would result in minor direct or indirect impacts to common terrestrial plant communities.

No uncommon terrestrial plant communities are known from the lands surrounding Beaver Creek, Clear Creek, Boone, South Holston, Fort Patrick Henry, or Wilbur reservoirs. Project-specific surveys would be conducted prior to clearing vegetation to evaluate the presence of, and potential impacts to, listed plant species. Therefore, activities around those six reservoirs are not expected to affect rare terrestrial plant communities.

Under this alternative, Watauga Reservoir Parcels 2, 3, 4, 5, and 6, on which Carolina Hemlock (Eastern Hemlock)/ Great Laurel Forest (globally critically imperiled terrestrial community) occurs, would remain allocated as Zone 4 (Natural Resource Conservation). Similarly, the globally rare northern white cedar limestone seepage woodland community on Watauga Parcel 24 would remain allocated to Zone 2 (Project Operations) and managed as a utility corridor. For the same reasons described above under Alternative A, no significant direct or indirect adverse impacts are expected to occur to either rare plant community under Alternative B.

Alternative C

Under Alternative C, 2,322 acres on five of seven NTRs (Boone, Fort Patrick Henry, South Holston, Watauga, and Wilbur) would be allocated to Zones 3 and 4, in which impacts to terrestrial vegetation are expected to be minor. Approximately 2,486 acres would be allocated to Zones 2, 6, and 7, where the potential for impacts is greater. The extent of NTR lands allocated to Zone 5 (Industrial) under Alternative C is the same as under Alternative A. Because the amount of land eligible for potential development is smaller, the potential to promote the spread of invasive exotic plants is lower than under Alternative A. Furthermore, requirements to use noninvasive species for planting or seeding would reduce the potential for spreading invasive species of plants. Allocations proposed under Alternative C would be more protective compared to the existing condition and would not result in major direct or indirect impacts to common terrestrial plant communities.

No uncommon terrestrial plant communities are known from the lands surrounding Beaver Creek, Clear Creek, Boone, South Holston, Fort Patrick Henry, or Wilbur reservoirs.

Project-specific surveys would be conducted prior to clearing vegetation to evaluate the presence of, and potential impacts to uncommon or rare plant species. Therefore, future activities around those six reservoirs are not expected to affect rare terrestrial plant communities.

Under Alternative C, Watauga Reservoir Parcels 2, 3, 4, 5, and 6, would be allocated to Zone 3 (Sensitive Resource Management) as compared to their Zone 4 (Natural Resource Conservation) allocation under Alternative B. Those parcels contain the globally critically imperiled terrestrial community, Carolina Hemlock (Eastern Hemlock)/Great Laurel Forest, Because no forest management activities would occur on Zone 3 parcels, the potential for direct impacts to this plant community is lower under Alternative C than under Alternative A or B. Therefore, although Alternative C would result in slightly fewer acres allocated to Zone 3 as compared to Alternative B, parcels containing known sensitive species would be somewhat more protected under Alternative C. Because dispersed recreation could occur on Zone 3 parcels, there is potential for indirect impacts. However, as described above under Alternative A, the likelihood of substantial recreational activities is low, and no major indirect impacts to this community are anticipated under Alternative C.

In addition, no adverse direct or indirect impacts to the globally rare northern white cedar limestone seepage woodland community are anticipated because allocation changes are not proposed for Parcel 24 on Watauga Reservoir.

4.5.2. Wildlife Communities

Alternative A

Under Alternative A, 1,409 acres on four of the seven reservoirs (Fort Patrick Henry, South Holston, Watauga, and Wilbur) would be forecast or planned for Natural Resource Conservation (equivalent to Zone 4). An additional 335 acres on Boone Reservoir are planned for Sensitive Resource Management (Zone 3). Approximately 3,064 acres on the NTRs would be designated Project Operations, Developed Recreation, or Shoreline Access, where moderate effects to terrestrial wildlife may occur. Industrial use would be limited to 125 acres near South Holston Reservoir.

Under this Alternative, Beaver Creek and Clear Creek reservoirs would remain unplanned, and current land uses would continue. No effects to existing terrestrial wildlife habitat on TVA-managed land around Beaver Creek and Clear Creek reservoirs are anticipated.

Boone Reservoir would continue to be managed as it is under the 1999 RLMP (TVA 1999) and the Boone Management Unit Resource Management Plan (TVA 2002). Sensitive areas, including a cave, on Parcel 6, are currently allocated to Sensitive Resource Management. Due to the protected status of the parcel, no impacts to sensitive terrestrial animal resources are anticipated. No other impacts to terrestrial wildlife habitat on Boone Reservoir are anticipated under Alternative A.

On Fort Patrick Henry, South Holston, Watauga, and Wilbur reservoirs, TVA shoreland would remain under current allocations under the Forecast System established for those reservoirs in 1965. The mature forest and intact shorelines around South Holston and Watauga reservoirs provide good quality habitat for wildlife. Formal and informal recreation occurring on several parcels (South Holston Parcels 25, 34, 35, 36, and 37, and Watauga Parcel 50) is resulting in removal of vegetation and soil compaction, which degrades habitat suitability for wildlife. Further degradation of wildlife habitat would occur with the current land use designations under Alternative A.

Under Alternative A, the existing uses of TVA parcels would likely remain unchanged. Despite impacts from formal and informal recreation observed on certain TVA-managed parcels, given the amount of quality habitat observed on TVA and adjacent lands, direct, indirect, and cumulative impacts of actions under Alternative A to terrestrial animal resources would be minor.

Alternative B

Under Alternative B, 2,357 acres on five of seven reservoirs (Boone, Fort Patrick Henry, South Holston, Watauga, and Wilbur) would be allocated to Zones 3 and 4. Zone 3 allocations would comprise 6 percent of NTR lands and would occur on Boone, Fort Patrick Henry, South Holston, and Watauga reservoirs. Approximately 2,452 acres on the NTRs would be allocated to Zones 2, 6, and 7. Industrial use would be limited to the same 125-acre parcel discussed under Alternative A.

Allocation changes (compared to Alternative A) proposed under this alternative include:

- Two Boone Reservoir parcels (26 and 27), totaling 221.5 acres and designated for Sensitive Resource Management under Alternative A, would be allocated to Zone 4. In the 1999 Boone RLMP, those parcels were allocated to Zone 3 based upon presence of habitat potentially suitable for sensitive species. Because current data indicate no sensitive species are present, these parcels would not meet criteria warranting management for sensitive resources. The allocation to Zone 4 would promote conservation of natural resources, including existing habitat. These parcels are within the Boone Management Unit, for which the Boone Management Unit Resource Management Plan (TVA 2002) would continue to be implemented.

- Two South Holston parcels (19 and 46), totaling 36.6 acres and forecast for Natural Resource Conservation, would be allocated to Zone 6, which would allow for dispersed recreation as well as the potential for developed recreation.

- Five parcels, totaling 170.7 acres, would be allocated to Zone 3, rather than Zone 2 or 4 under Alternative A, to protect sensitive resources identified on those parcels.

- Twenty-two parcels, totaling 465.7 acres, would be allocated to Zone 4, rather than Zone 2 or 6 under Alternative A. There is decreased potential for negative impacts to terrestrial wildlife communities on land allocated to Zone 4 as compared to Zones 2 and 6.

- Parcel 50 on Watauga Reservoir, and Parcels 25, 35, 36, and 37 on South Holston Reservoir would remain or would change to Zone 4. While this allocation is likely to limit development, it does not limit dispersed recreation. Therefore, the ongoing degradation of vegetation and soil quality is expected to continue. Degradation of terrestrial wildlife habitat is expected to continue on these parcels under Alternative B. However, given the substantial amount of similar habitat around those reservoirs, these impacts would not significantly affect terrestrial wildlife communities.

Implementation of Alternative B would result in a net gain, compared to the existing condition, in the number of acres allocated to Zones 3 and 4. The proposed allocations under Alternative B increase the total acreage allocated to Zones 3 and 4 on five of the seven reservoirs as compared to Alternative A. Changes in allocation of specific parcels

would not result in significant adverse impacts. Therefore, adoption of Alternative B is not expected to result in negative direct, indirect, or cumulative impacts to terrestrial wildlife communities. Over the long term, allocation of lands to Zones 3 and 4, which limits ground disturbance, vegetation removal, and other development, is likely to benefit terrestrial wildlife communities in the South Fork Holston River and Watauga River watersheds.

Alternative C

Under Alternative C, approximately the same number of acres of NTR land would be allocated to Sensitive Resource Management (Zone 3) and Natural Resource Conservation (Zone 4), as was proposed in Alternative B. About 34 more acres would be allocated to Zone 6 under Alternative C than under Alternative B. Allocations to the other zones would be the same as under Alternative B.

Allocation changes (relative to Alternative A) proposed under Alternative C include:

- Two Boone Reservoir parcels (26 and 27), totaling 221.5 acres and designated for Sensitive Resource Management under Alternative A, would be allocated to Zone 4 because no sensitive resources warranting protection were identified on those parcels (see additional discussion of these parcels above).

- Fifteen parcels, totaling 164.4 acres, would be allocated to Zone 3 rather than Zone 2 or 4 under Alternative A to protect sensitive resources identified on those parcels.

- Eight parcels (322.6 acres) forecast or planned for Zone 2 under Alternative A would be allocated to Zone 4.

- Five parcels (South Holston 19 and 46 and Watauga 17a, 50, and 59), totaling 69 acres and forecast for Natural Resource Conservation under Alternative A, would be allocated to Zone 6. Additionally, Parcels 34, 35, and 36 on South Holston Reservoir would remain allocated to Zone 6, which would allow for dispersed recreation as well as the potential for developed recreation. The ongoing degradation of vegetation and soil quality is expected to continue, and future development of recreational facilities has the potential to permanently remove or alter habitat. However, given the substantial amount of similar habitat around those reservoirs, these impacts would not significantly affect terrestrial wildlife communities.

Implementation of Alternative C would result in a net gain, compared to the existing condition, in the number of acres allocated to Zones 3 and 4. The proposed allocation under Alternative C would increase the total acreage allocated to Zones 3 and 4 on five of the seven reservoirs as compared to Alternative A.

On the other hand, Alternative C would result in about 6 fewer acres allocated to Zone 3 and about 27 fewer acres allocated to Zone 4 than under Alternative B. Variation in the net amount of Zone 3 land is based upon results of field surveys that indicated presence, or absence (in the case of South Holston Parcel 1), of sensitive resources. Variation in the net amount of Zone 4 land is based upon targeting recreational opportunities to parcels most suitable for that use. Changes in allocation of specific parcels would not result in significant adverse impacts. Therefore, Alternative C is not expected to result in negative direct, indirect, or cumulative impacts to terrestrial wildlife communities. Over the long term, allocation of lands to Zones 3 and 4 is likely to beneficially affect terrestrial wildlife

communities in the South Fork Holston River and Watauga River watersheds in a cumulative context.

4.6. Endangered and Threatened Species

Analysis of potential effects to endangered and threatened species was based upon the potential for proposed land use allocations to result in development of currently undeveloped parcels. Greater potential for site development correlates with greater potential for adverse impacts to listed species. However, under any of the alternatives, site-specific environmental reviews would be conducted on projects proposed in the future. Those site-specific reviews would assess the presence of, and potential project-related impacts to, listed species of plants and animals.

4.6.1. Plants

No plants or habitat suitable for plants that are federally listed were identified on or within 5 miles of the parcels addressed in the NTRLMP. Therefore, federally listed plants would not be affected under any of the alternatives. The following discussion addresses potential impacts to state-listed plant species. The potential environmental effects of future projects would be evaluated and impacts to state-listed plants would be avoided or minimized to the extent possible. Therefore, the scope and extent of potential impacts resulting from the NTRLMP is minimal, and adoption of any of the three alternatives would not result in significant cumulative effects to state-listed species.

Alternative A

Under Alternative A, 3,189 acres would be allocated to Project Operations, Industrial, Developed Recreation, and Shoreline Access land uses, on which the potential for impacts to state-listed plants is greatest. About 1,744 acres would be managed for Natural Resource Conservation or Sensitive Resource Management, on which the potential to impact listed plants is lowest.

Ongoing operations and management would continue on the nine parcels containing known populations of state-listed plants. Under Alternative A, Fort Patrick Henry Parcel 10a would continue to be part of Parcel 10, and it would be allocated to Project Operations. Parcels 2, 3, 4, 5, 6, and 50 on Watauga Reservoir would be forecast for Natural Resource Management and, except for Parcel 5, would continue to be included in the USFS easement. State-listed plants on these parcels could be subject to direct impacts associated with project operations and forest management. However, project-specific surveys would be conducted prior to clearing vegetation to evaluate the presence of, and potential impacts to, listed plants. Therefore, no major direct impacts would occur on these parcels or where state-listed plants occur throughout the NTRs.

There is potential for indirect impacts associated with dispersed recreation and spread of invasive plant species. On the Watauga parcels, given the remoteness and steep slopes of the parcels, the potential for frequent and intense visitation is low, and therefore, no substantive indirect impacts to state-listed plants are anticipated. The state-listed branching whitlow-wort found on Fort Patrick Henry Parcel 10a also is located on a steep bluff where foot traffic is unlikely, and the occurrence of exotic invasive plants is minor. No major indirect impacts to this species are expected under Alternative A.

Alternative B
Under Alternative B, 28 parcels on five of seven NTRs that were forecast or planned to Zone 2 or 6 under Alternative A would be allocated to Zone 3 or 4. This would result in a lower potential for impacts to state-listed plants that may be present on those parcels. The potential for impacts to state-listed plants would be low on the 2,357 acres allocated to Zones 3 and 4 and greater on the remaining 2,576 acres allocated to other zones. However, project-specific surveys would be conducted prior to clearing vegetation to evaluate the presence of, and potential impacts to, listed plants. Therefore, no substantive impacts are anticipated under Alternative B.

Under Alternative B, Fort Patrick Henry Parcel 10a would be created and allocated to Zone 4, which would be more protective of the state-listed as endangered plant present on that parcel. Similarly, state-listed plants identified on Watauga Reservoir parcels would remain allocated as Zone 4. The potential for site development is diminished on these parcels, and no direct impacts to state-listed plants would occur. Direct impacts associated with forest management and indirect impacts associated with dispersed recreation and invasive species may still occur on Zone 4 parcels, but impacts would be minor for the reasons described above under Alternative A.

Alternative C
Under Alternative C, 26 parcels on five of seven reservoirs that were forecast or planned to Zones 2 and 6 would be allocated to Zone 3 or 4. This would result in a decreased potential for impacts to state-listed species that may be present on those parcels. The potential for impacts to state-listed plants would be low on the 2,322 acres allocated to Zones 3 and 4 and greater on the remaining 2,611 acres allocated to other zones. However, project-specific surveys would be conducted prior to clearing vegetation to evaluate the presence of, and potential impacts to, listed plants. Therefore, no major impacts are anticipated under Alternative C.

Compared to Alternatives A and B, land use allocations proposed under Alternative C are the most protective of known populations of state-listed plants around Fort Patrick Henry and Watauga reservoirs. Six of the seven parcels would be allocated to Zone 3 (Sensitive Resource Management) (Table 2-5). Parcel 50 on Watauga Reservoir would be allocated to Zone 6 (Developed Recreation), consistent with the current management by USFS as a primitive camping area. Future plans for developed recreation facilities on this parcel would include protection of sensitive plant resources occurring within this parcel. There is potential for indirect impacts to state-listed plants from dispersed recreation and invasive species. However, as described above under Alternative A, any indirect impacts would be minor.

4.6.2. Terrestrial Animals

Under all three alternatives, land planning on the NTRs has no potential to affect any federally listed or state-listed terrestrial species, except for the southern bog lemming, which has been observed on South Holston Reservoir Parcel 2. As stated in Section 3.6.2 above, no other state-listed or federally listed species have been observed on NTRs parcels. NTRs parcels do not contain habitat suitable for most federally listed or state-listed species recorded within 3 miles of the NTRs.

Alternative A
Under Alternative A, South Holston Reservoir Parcel 2 is designated TVA Project Operations. The parcel is a portion of the tailwater below the South Holston Dam, and

includes several easements for utilities and a highway. Activities currently occurring on this parcel do not adversely affect the southern bog lemming. If additional development were proposed in the future, a site-specific assessment would be conducted to evaluate impacts to listed species. Therefore, no adverse direct, indirect, or cumulative impacts to this species are anticipated under Alternative A.

Alternatives B and C

Under Alternatives B and C, South Holston Reservoir Parcel 2 would be allocated to Zone 4 (Natural Resource Conservation). This would change the management focus of this parcel to enhance the natural resources on the land and provide for human use and appreciation. Future development is less likely, but still possible. Because the variety of habitat this species prefers is common throughout the region, these new management focuses are not expected to impact the southern bog lemming.

4.6.3. Aquatic Animals

The primary source of potential impacts to listed aquatic species is ground disturbance and construction in riparian areas, which could directly affect aquatic species by introducing structures, riprap, or other materials into the water. Such activities may also indirectly affect aquatic species by degrading water quality through inputs of pollutants, sediment, or excess nutrients. Soil disturbance is associated with potential for runoff and sedimentation, which may impact water quality and listed aquatic species. Therefore, activities in Zones 2, 5, 6, and 7 have the greatest potential to affect aquatic species, with Zone 5 activities having the greatest likelihood of adverse effects due to clearing and grading, development of impervious surfaces, and the potential for point source discharges to the reservoir. Actions in Zones 3 and 4 have the lowest potential to affect aquatic species.

Prior to specific actions taken on any parcels in the future, TVA would conduct additional site-specific environmental reviews and require appropriate site design and management practices using TVA's Section 26a General and Standard Conditions, including best management practices (BMPs), to minimize negative environmental impacts and help ensure that the proposals best serve the needs and interest of the public. Further, any actual development of TVA and non-TVA lands must comply with state and federal environmental regulations and applicants must often obtain permits specifically designed to prevent adverse impacts and violation of applicable water quality criteria. Potential impacts to water quality, discussed in Section 4.12 below, are directly related to the consequences to aquatic species.

Analysis of the effects to aquatic species under the three alternatives focused on species located near uncommitted (plannable) parcels. The potential environmental consequences of ongoing projects and activities associated with committed land uses have been reviewed previously; therefore, we assume that no adverse effects to aquatic species would occur from ongoing activities on committed parcels. To examine potential effects to aquatic species, TVA aquatic biologists evaluated records for each species' location within each of the reservoir watersheds, determined the species' location relative to the NTRs parcels, and considered barriers to passage such as dams and, for certain species, impounded habitat. While 26 federally listed and state-listed aquatic species are known from one or more of the seven reservoirs or associated tributaries or tailwaters (see individual RLMPs), not all of those species are located near plannable parcels. None of the parcel allocations in the NTRLMP have potential to affect federally listed aquatic species. TVA identified 10 state-listed species potentially affected by NTR lands planning (Table 4-6). Based on these criteria and as shown in the table, Boone, South Holston, and Watauga were the only NTRs

with proposed parcel allocations potentially associated with records of state-listed species. Therefore, planning of the 4,288 acres of TVA-managed land surrounding those three reservoirs was reviewed in detail to evaluate potential effects to listed aquatic species. Results of the detailed analysis are described below.

Table 4-6. State-Listed Aquatic Animals That Occur Near Plannable Parcels

Common Name	Scientific Name	State Status (Rank)	Reservoir
Longhead darter	*Percina macrocephela*	THR (S2)	Boone
Tennessee dace	*Phoxinus tennesseensis*	NMGT (S3)	Boone
Black sculpin	*Cottus baileyi*	TRKD (S2)	South Holston
Fatlips minnow	*Phenacobius crassilabrum*	SPCO (S2)	South Holston
River redhorse	*Moxostoma carinatum*	SPCO (S2S3)	South Holston
Sharphead darter	*Etheostoma acuticeps*	END (S1)	South Holston
Greenfin darter	*Etheostoma chlorobranchium*	THR (S1)	South Holston
Banded sculpin	*Cottus carolinae*	THR (S1)	Watauga
Tangerine darter	*Percina aurantiaca*	NMGT (S3)	Watauga
Tennessee dace	*Phoxinus tennesseensis*	NMGT (S3)	Watauga

Note: No federally listed aquatic species occur near plannable parcels.

State Status abbreviations: END = Endangered; NMGT = In need of management; SPCO = Species of concern; THR = Threatened; TRKD = Tracked

State Rank abbreviations: S1 = Critically imperiled, often with 5 or fewer occurrences; S2 = Imperiled, often with <20 occurrences; S3 = Rare or uncommon, often with <80 occurrences; S#S# = Occurrence numbers are uncertain

Alternative A

Under Alternative A, a total of 1,744 acres would be managed either for Sensitive Resource Management or Natural Resource Conservation. Boone Reservoir is the only reservoir with land allocated to Sensitive Resource Management. These two land use designations afford the most protection to aquatic life.

Under Alternative A, a total of 2,425 acres on the three reservoirs are currently allocated to Project Operations, Shoreline Access, and Developed Recreation. A single 125-acre parcel near South Holston Reservoir is allocated to Industrial use. Activities associated with these four land use designations have potential to indirectly affect aquatic life. However, as described above, the extent of impacts associated with these designations would depend upon the specifics of future development. Projects proposed in the future would be individually evaluated and subject to federal, state, and TVA regulations and permits. Therefore, no major direct, indirect, or cumulative impacts to listed aquatic species are anticipated.

Alternative B

Under Alternative B, TVA would allocate about half of the TVA-managed land around Boone, South Holston, and Watauga reservoirs (approximately 2,209 acres) to Zones 3 and 4. All three reservoirs would have some parcels allocated to Zones 3 and 4. Approximately 1,954 acres would be allocated to Zones 2, 6, and 7. Just as under Alternative A, the only land allocated to Zone 5 (Industrial) is the 125-acre parcel near South Holston Reservoir.

On Boone Reservoir, the longhead darter and Tennessee dace records are associated with parcels allocated to Zone 3. However, the Tennessee dace could potentially be found on any Boone Reservoir parcel with small streams. Listed aquatic species records identified on South Holston Reservoir are associated with parcels allocated to Zone 4. Listed aquatic

species identified on Watauga Reservoir are associated with uncommitted parcels allocated either to Zone 3 or 4. As on Boone, the Tennessee dace could be found on any TVA parcels on Watauga Reservoir with small streams.

Under Alternative B, on all three reservoirs containing state-listed aquatic species, the acreage allocated to Zones 3 and 4 would increase, and acreage allocated to Zones 2, 6, and 7 would decrease. Future developments on parcels around these reservoirs have the potential to adversely impact state-listed aquatic species. However, because over half the shoreland is allocated to zones on which development is unlikely and future development projects would be required to minimize impacts to water quality, selection of Alternative B would not result in adverse direct, indirect, or cumulative impacts to state-listed aquatic species. Over the long term, allocation of lands to Zones 3 and 4, which limits ground disturbance, vegetation removal, and other development, is likely to benefit aquatic species in the South Fork Holston River and Watauga River watersheds.

Alternative C

Under Alternative C, TVA would allocate greater than 51 percent of the TVA-managed land around Boone, South Holston, and Watauga reservoirs (approximately 2,175 acres) to Zones 3 and 4. All three reservoirs would have some parcels allocated to Zones 3 and 4. Approximately 1,987 acres would be allocated to Zones 2, 6, and 7. Just as under Alternatives A and B, the only land allocated to Zone 5 (Industrial) is the 125-acre parcel near South Holston Reservoir.

Compared to existing conditions (Alternative A), implementation of Alternative C would result in greater acreage allocated to Zones 3 and 4 and less acreage allocated to Zones 2, 6, and 7 on all three reservoirs containing state-listed aquatic species. Compared to Alternative B, implementation of Alternative C would result in 34 fewer acres on Boone, South Holston, and Watauga allocated to Zones 3 and 4.

Future developments on parcels around these reservoirs have potential to adversely impact state-listed aquatic species. However, because over half the shoreland is allocated to zones on which development is unlikely, and future development projects would be required to minimize impacts to water quality, selection of Alternative C would not result in adverse direct, indirect, or cumulative impacts to state-listed aquatic species. Over the long term, allocation of lands to Zones 3 and 4 is likely to beneficially affect aquatic species in the South Fork Holston River and Watauga River watersheds.

4.7. Wetlands

Analysis of the effects anticipated under the three alternatives focused on wetlands located on uncommitted (plannable) parcels. The potential environmental consequences of ongoing projects and activities associated with committed land uses previously have been reviewed. Therefore, we assumed that parcels with existing committed land uses either contain no wetlands, or the ongoing land use does not adversely affect on-site wetlands. Of the 34 uncommitted parcels for the seven reservoirs, wetlands are present on nine parcels on Fort Patrick Henry, South Holston, and Watauga (Table 4-7). Four of the wetlands are Category 3 (highest quality), and five are Category 2 (moderate quality).

Table 4-7. Summary of Wetlands on Uncommitted Parcels on Northeastern Tributary Reservoirs

Reservoir	Parcel No.	Wetland Type	TVARAM Category	Zone Allocation by Alternative		
				A	B	C
Fort Patrick Henry	10a	emergent	2	2	4	3
	21	forested	2	6	4	4
	23	forested	2	4	4	4
South Holston	19	scrub-shrub	2	4	6	6
	25a	emergent/scrub-shrub/forested	3	6	4	3
Watauga	11	scrub-shrub	2	6	4	4
	26	emergent/scrub-shrub	3	4	4	3
	31	forested/scrub-shrub	3	4	4	3
	32	forested/scrub-shrub	3	4	4	3

Ground-disturbing activities and vegetation removal would be the primary source of potential impacts to wetlands. Greater ground disturbance correlates with a greater potential for adverse impacts to wetlands and wetland functions. The potential for ground-disturbing activities would be greatest in Zones 5, 6, and 7 and least in Zones 3 and 4. There is moderate potential for ground disturbance in Zone 2, as some Project Operations lands would be maintained undeveloped, and many Zone 2 parcels have already undergone development. Under any of the alternatives, wetlands present on any parcels would be subject to EO 11990. Any impacts to wetlands associated with ongoing or future project operations would be evaluated under NEPA and minimized to the extent practicable.

Alternative A

No major direct impacts to wetlands are expected to occur under Alternative A. As shown in Table 4-7, one of the nine parcels would be designated as Project Operations (Zone 2); three parcels as Developed Recreation (Zone 6), and the remainder as Natural Resource Conservation (Zone 4). The likelihood of future development is greater on parcels allocated to Zones 2 and 6 than Zones 3 and 4. However, any projects proposed for these parcels would be reviewed to assess potential effects to wetlands; impacts would be avoided or mitigated. Furthermore, these wetlands are generally very small in size. Consequently, any potential impacts associated with future project operations or developed recreation would have a negligible effect on wetlands.

There could be some minor and indirect impacts to wetlands associated with dispersed recreation and camping activities where minimal clearing of vegetation occurs on the shoreline and around tent and picnic areas. Overall, impacts associated with this alternative would be minor, as any localized trimming or clearing of wetland vegetation would have a negligible effect on wetland resources within the overall project area.

Because the total area of emergent, forested, and scrub-shrub wetlands addressed in this NTRLMP is very small (186 acres), proposed activities under Alternative A would have no measurable cumulative impacts to wetlands in the region.

Alternative B

No significant direct impacts to wetlands are expected to occur under Alternative B. Eight out of the nine parcels containing wetlands would be Zone 4 (i.e., managed to protect and enhance habitat), which would afford protection to wetlands. This alternative would afford

greater protection to wetlands on Fort Patrick Henry Parcel 21, where unauthorized mowing is occurring. Similar protection for wetlands is anticipated on South Holston Parcel 25a, where unauthorized all-terrain vehicle use is impacting the site.

Some minor and indirect impacts to wetlands could occur under this alternative. Informal recreation and camping activities could result in some minimal clearing of vegetation. Overall, impacts associated with this alternative would be minor, as any localized trimming or clearing of wetland vegetation would have a negligible effect on wetland resources within the overall project area.

Cumulative impacts to wetlands would likewise be minor under Alternative B. Informal recreation may result in very minor impacts to wetland vegetation, but these impacts are expected to be very small and localized, and wetlands would recover with no lasting effects.

Alternative C
Implementation of this Alternative is expected to have the least amount of adverse effects to wetlands. Under Alternative C, TVA would allocate five parcels containing wetlands to Zone 3 (Sensitive Resource Management) as compared to their allocation to either Zone 2 (Project Operations) or Zone 4 (Natural Resource Conservation) under Alternative A. Because Zone 3 parcels are specifically managed for protection and enhancement of sensitive resources, this allocation change would afford a slightly greater level of protection to wetlands on the parcels than is provided under Alternative A or B.

As described under Alternative B, adoption of Alternative C would reduce ongoing damage to wetlands on Fort Patrick Henry Parcel 21 and South Holston Parcel 25a. Additionally, as described above under Alternatives A and B, there could be some negligible impacts to wetlands associated with informal recreation, but these impacts are expected to be very minor. As with both previous alternatives, cumulative impacts to wetlands would be negligible.

4.8. Floodplains

Under any of the three alternatives considered, projects proposed on TVA-managed parcels would be reviewed to ensure consistency with EO 11988.

Minor potential impacts to the floodplain are expected under any of the three alternatives. The degree of impacts under each alternative is described below. However, because the maximum potential extent of floodplain impacts is small and the requirements of EO 11988 will be applied to individual projects, effects to the floodplain are expected to be minimal under all three alternatives.

Alternative A
Under Alternative A, the development and/or management of properties would proceed under the 1965 Forecast System, the 1999 Boone Reservoir Land Management Plan, and current policies, and floodplain impacts would be evaluated when future projects are planned in detail. Potential development would generally consist of water use facilities and other repetitive actions in the floodplain that would result in minor floodplain impacts.

Alternative B
Under Alternative B, the potential adverse impacts to natural and beneficial floodplain values would be less than those under Alternative A because a substantial portion of the

available land would be allocated to Zones 3 and 4, in which construction of facilities or structures within the floodplain is not anticipated.

Alternative C
The potential adverse impacts to natural and beneficial floodplain values under Alternative C would virtually be the same as those expected under Alternative B because the same percentage of acres would be allocated to Zones 3 and 4, in which construction within the floodplain is not anticipated.

4.9. Cultural Resources

Under all three alternatives, TVA would comply with the requirements of the NHPA regarding the preservation and treatment of historic properties. In Tennessee, the PA stipulates procedures for evaluating eligibility for the NRHP and mitigating adverse effects to historic properties. In Virginia, TVA would implement procedures required under Section 106 of the NHPA (see Section 3.9 above) until a similar PA is executed. In addition, archaeological resources located on federal lands (including all TVA NTR lands) are afforded protection under ARPA, NAGPRA, and other federal legislation pertinent to archaeological resources.

4.9.1. Archaeological Resources

Analysis of the potential effects anticipated under the three alternatives focused on uncommitted parcels. The majority of archaeological survey coverage on NTRs does not fall within the uncommitted (plannable) parcels addressed in this NTRLMP. Therefore, this analysis evaluates the potential for proposed activities to result in ground disturbance (e.g., clearing and grading), which would be the primary source of potential direct impacts to archaeological sites. Greater ground disturbance correlates with a greater potential for adverse impacts to archaeological resources. Indirect effects to archaeological resources include looting resulting from the presence of the public. Looting can have significant negative effects on individual sites. On the other hand, the presence of the public may also indirectly benefit archaeological resources due to increased monitoring by conservation-minded groups.

For the purpose of comparing potential direct and indirect effects to archaeological sites at a programmatic scale, the land use zones were rated based on the potential ground disturbance required for their associated activities. Zones 3 and 4 are relatively equal in their low potential for effects to archaeological sites due to the minimal ground disturbance associated with those zones. The potential to indirectly affect archaeological sites is also low on shorelands in Zones 3 and 4 because increased monitoring may counteract looting or abuse of archaeological sites.

Zones 6 and 7 are relatively equal in their moderate potential to affect archaeological sites as they typically involve more ground disturbance than activities characteristic of Zones 3 and 4. The potential for indirect effects to archaeological sites is also moderate in Zones 6 and 7 because the increased foot traffic associated with Shoreline Access and Developed Recreation may lead to looting of archaeological sites.

The greatest potential to affect archaeological sites occurs on parcels allocated to Zones 2 and 5 due to the greater amount of ground disturbance normally associated with navigation, power, and dam projects in Zone 2 and industrial facilities in Zone 5. The potential for indirect effects to archaeological sites is moderate in Zones 2 and 5 because the increased

foot traffic associated with Project Operations and Industrial use could lead to looting of archaeological sites.

Under any of the alternatives, results of archaeological testing will be reviewed prior to undertaking site-specific ground-disturbing activities on any of the NTRs. In Tennessee, TVA would use the phased identification and evaluation procedure set forth in the PA. TVA is coordinating with the Virginia SHPO to develop a similar PA that would apply to TVA lands planned in that state. Until such a PA is executed, TVA would incorporate the phased identification and evaluation procedures to effectively mitigate adverse effects to archaeological sites in Virginia pursuant to Section 106 of the NHPA. For all activities, TVA would comply with other pertinent laws and regulations, including ARPA, NAGPRA, and other federal legislation pertinent to archaeological resources.

Site-specific activities proposed in the future would be approved or denied according to the significance of any archaeological resources present. Archaeological sites within the NTRs properties will be avoided whenever possible. If avoidance is not possible, 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, as defined in the Tennessee PA, as to be developed in the Virginia PA, and/or as provided under Section 106. Although mitigation documents the site and preserves certain artifacts, under the revised NHPA regulations, excavation and removal of artifacts are considered adverse impacts to an archaeological site.

Within the South Fork Holston River and Watauga River watersheds, trends of increasing population and land development are likely to increase disturbance of archaeological resources. Under each of the three alternatives proposed for the NTRLMP, impacts to significant archaeological sites would be minimized by avoidance of the site or by mitigation through data recovery pursuant to 36 CFR Part 800. Furthermore, designation of lands to uses that minimize ground disturbance is protective of archaeological resources. Therefore, implementation of the NTRLMP would not contribute to cumulative adverse effects that may occur in the region.

Proposed parcel allocations for the committed parcels surrounding Beaver Creek and Clear Creek reservoirs are identical under all three alternatives. Therefore, no direct or indirect impacts to archaeological sites are expected at those locations under any of the three alternatives.

Alternative A

Under Alternative A, 2,202 acres on the seven reservoirs would be forecast or planned for Project Operations and Industrial uses, which have the greatest potential for ground-disturbing activities. Additionally, 987 acres would be forecast or planned for Developed Recreation and Shoreline Access uses, which have moderate potential for ground-disturbing activities. Each of those land uses has moderate potential to indirectly impact archaeological sites.

Approximately 1,744 acres on the seven NTRs would be managed for Natural Resource Conservation or Sensitive Resource Management under this alternative. These land uses have the lowest potential for ground-disturbing activities, and consequently the lowest potential to affect archaeological sites that may be present. The potential for indirect effects to archaeological sites also is low on land used for these purposes.

Because of the executed PA in Tennessee and adherence to NHPA requirements in Virginia, and because appropriate mitigation would be performed as necessary, potential effects to cultural resources would be minor. Any adverse indirect effects to archaeological sites under Alternative A are expected to be minor.

Alternative B

Under Alternative B, 1,675 acres would be allocated to Zones 2 and 5, on which there is high potential for ground disturbance. Another 902 acres would be allocated to Zones 6 and 7, where there is moderate potential for ground disturbance. As future requests for land uses on these parcels are submitted to TVA, project-specific environmental reviews are expected to avoid or mitigate negative direct impacts to archaeological sites as described in the PA (in Tennessee) or under Section 106 of the NHPA (in Virginia). Therefore, potential effects to archaeological resources would be minor. However, each of those land uses has moderate potential to indirectly affect archaeological sites.

Under Alternative B, the greatest amount of land (2,357 acres) on the seven NTRs would be allocated to Zones 3 and 4. These land uses have the lowest potential for ground-disturbing activities and consequently the lowest potential to affect any archaeological sites that may be present. The potential for indirect effects to archaeological sites also is low on land used for these purposes.

Alternative C

At the programmatic scale, the potential for impacts to archaeological resources under Alternative C would be nearly identical to the potential impacts described under Alternative B. Under Alternative C, 1,675 acres would be allocated to Zones 2 and 5, while 936 acres would be allocated to Zones 6 and 7. Using the same approach described above, adverse impacts to archaeological resources would be avoided or mitigated on a project-specific basis. Because of the executed PA in Tennessee and adherence to NHPA requirements in Virginia, and because appropriate mitigation would be performed as necessary, potential effects to cultural resources would be minor. Moderate potential for indirect adverse impacts would occur on all four of those zones.

Under Alternative C, 2,322 acres on the seven NTRs would be allocated to Zones 3 and 4. These land uses have the lowest potential for ground-disturbing activities and low potential for indirect effects to archaeological sites.

4.9.2. Historic Structures

Information on historic structures used for this study was derived mainly from planimetric map data and a windshield survey of uncommitted parcels. For any proposal on a given parcel (regardless of zone allocation), a field check of the current status of these historic structures would be accomplished to determine the significance of the resource, and the stipulations set forth in the Tennessee PA, any applicable Virginia PA, and/or under Section 106 of the NHPA would be followed. Under each alternative, review for applicability of the NHPA would take place for any proposed activity that has the potential to affect historic structures identified on or adjacent to TVA land. Nearly all of these historical structures are located on property adjacent to TVA land, not on TVA tracts. 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 adopted, proposed site-specific activities would be subjected to the requirements of the PA (in Tennessee) or Section 106 of the NHPA (in Virginia) to

determine what historic features exist on TVA public land and on adjacent tracts within the APE. TVA would determine the significance of any historic structures identified, and impacts to such structures would be avoided or mitigated in accordance with the PA and/or the NHPA.

Alternative A

Under this alternative, management of historic structures and potential effects as a result of proposed development would continue to be evaluated on a case-by-case basis. Under Alternative A, because they could change the visual character of the surrounding area, activities on Zone 6 (Developed Recreation), particularly commercial recreation activities, Zone 5 (Industrial), and Zone 7 (Shoreline Access) have the potential to impact adjacent historic structures. Thus, potential effects, especially indirect visual effects, are possible under Alternative A. However, because these potential effects would be identified, along with possible mitigation measures, and because TVA would reserve the option to refuse land use requests that would have unavoidable adverse effects, potential effects to historic structures would be minor. Selection of this alternative would not result in cumulative effects to historic structures in the region.

Alternative B

Under Alternative B, the NTRLMP would enhance conservation and protect historic structures. The plan would provide for preservation and would protect additional shoreline from development. Lands with distinctive visual character, such as heavily contrasting land forms or unique water bodies, would be placed in Zone 3 (Sensitive Resource Management) or Zone 4 (Natural Resource Conservation). About 284 acres would be allocated to Zone 3, where presence of sensitive resources, including significant scenic areas, was a principal consideration. Another 2,073 acres would be allocated to Zone 4, which includes lands with attractive but less unique scenic qualities and little visible alteration. Activities that involve minor visible changes, such as recreational hiking, picnicking, bank fishing, and some selective forest management (e.g., pine beetle salvage), could take place in both Zones 3 and 4. Some development with more visible modifications could take place in Zone 4 areas, as long as the location and appearance remained subordinate to the desired visual characteristics. A total of 2,357 acres (48 percent) of publicly held reservoir acreage on the NTRs would be allocated to Zones 3 and 4, as compared to 1,744 acres (35 percent) under Alternative A. Therefore, implementation of this alternative would provide enhanced management of historic structures.

Under Alternative B, development could occur, particularly on the 42 percent of land allocated to Zones 2, 5, 6, and 7. However, because review for applicability of the NHPA would take place on a case-by-case basis for any proposed activity, potential effects to historic structures would be identified and mitigated appropriately under the PA (in Tennessee) or under Section 106 of the NHPA (in Virginia). Therefore, no substantial direct or indirect effects to historic structures would occur. Selection of this alternative would not result in cumulative effects to historic structures in the region.

Alternative C

Under this alternative, the potential for effects to historic structures would be similar to those described under Alternative B. Approximately 278 acres would be allocated to Zone 3 and approximately 2,044 to Zone 4, a combined total of about 47 percent of all NTRs reservoir lands. Compared to the No Action Alternative, Alternative C would afford better protection of historic structures and preservation of natural areas around the reservoir. Compared to Alternative B, Alternative C would allocate about 34 fewer acres to Zones 3

and 4, and would therefore afford slightly less protection to any historic structures in the area.

Under this alternative, development could occur, particularly on 43 percent of land allocated to Zones 2, 5, 6, and 7. However, because potential effects to historic structures would be identified and mitigated appropriately under the PA (in Tennessee) or under Section 106 of the NHPA (in Virginia), these effects would not be significant. Selection of Alternative C would not result in cumulative effects to historical structures in the region.

4.10. Managed Areas and Ecologically Significant Sites

Natural areas on TVA NTR lands are on committed parcels and are allocated according to their prescribed land use to one of four zones: Zone 2 (Project Operations), Zone 3 (Sensitive Resource Management), Zone 4 (Natural Resource Conservation), or Zone 6 (Developed Recreation). Additionally, committed parcels fronting natural areas situated on back-lying public lands are zoned according to the agency's land use of the back-lying land (e.g., USFS land), and are within one of the zones listed above. Under all three alternatives, between 35 and 48 percent of acres on the TVA NTRs is allocated to Sensitive Resource Management or Natural Resource Conservation. Therefore, between one-third and one-half of the NTR lands have management objectives that support and enhance the character of natural areas on, adjacent, or near TVA NTR lands.

With a single exception, zone allocations of parcels containing natural areas are the same under all three alternatives. Parcel 59 on Watauga Reservoir, which includes a portion of the Appalachian Trail, is allocated to Zone 4 (Natural Resource Conservation) under Alternatives A and B, but is allocated to Zone 6 (Developed Recreation) under Alternative C. Parcel 59 is approximately 20 acres and includes a narrow strip fronting land transferred to the USFS and an island accessible only by water. Allocation to Zone 6 under Alternative C reflects current management by the USFS and use of the parcel for dispersed recreation (i.e., in accordance with the definition of Zone 6, which includes "TVA public land fronting land owned by other agencies for recreational purposes."). Therefore, changing the allocation of Parcel 59 from Zone 4 to Zone 6 would not result in adverse impacts to the natural area.

All other natural areas are located on parcels that remain allocated to the current use. No changes to the size, location, or character of natural areas are expected to result from selection of Alternative A, B, or C. Therefore, no adverse direct or indirect impacts to natural areas are expected under any of the alternatives.

Although trends of increasing population growth and land development are occurring within the South Fork Holston River and Watauga River watersheds, there are no reasonably foreseeable future actions that would negatively affect natural areas or ecologically significant sites on non-TVA land in that region. Under all three alternatives considered in this document, preservation of natural areas and ecologically sensitive sites on TVA-managed lands would beneficially contribute to the cumulative regional efforts to conserve natural habitats for the long term.

4.11. 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 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.

Comparative scenic values of TVA public land were assessed during the development of Alternatives B and C in order to identify areas for scenic protection and visual resource conservation. Those parcels having distinctive visual characteristics such as islands, rock bluffs, steep, wooded ridges, wetlands, and flowing shallow water areas were allocated to Sensitive Resource Management (Zone 3) under the action alternatives. Land that provides valuable protective screening also was allocated to Zone 3. 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 wildlife management areas and wetlands would be preserved under all the alternatives. Many islands around the reservoirs 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 reservoirs would benefit under the action alternatives. Major sections of the riverine upper reservoirs 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.

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

Under the No Action Alternative, there would continue to be no established provision to allocate selected lands based upon visual resource conservation concerns. A slow but noticeable decline in scenic resources, aesthetic quality, and visual landscape character would occur as development demands continue to increase. Where TVA has custody of the land, actions of TVA and others would be evaluated to determine potential visual effects prior to land use approval, thereby preventing serious visual disruptions or loss of scenic resources. Approval of some activities may also require avoidance or mitigation measures that reduce visual impacts.

However, under the Forecast System, about 254 acres of uncommitted lands (5 percent of all NTR lands) could be subject to various forms of development. Sections of highly scenic shoreline as well as those of more common, less unique visual quality would be continually at risk from approval of these uses. Frequently, lands sought for development are also those with the greatest scenic qualities and that are the most desirable for public conservation. Alteration of lands with the least capacity to absorb change could occur. Under Alternative A, the cumulative effect of additional development could reduce the overall scenic attractiveness of the NTRs, which would negatively affect the visual landscape character and aesthetic sense of place. In this event, the scenic integrity of the predominately rural reservoirs would decrease slightly.

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

Alternative B

Under Alternative B, the NTRLMP would enhance conservation and protection of scenic resources. The plan would provide for preservation of the most scenic areas, and would protect additional shoreline from development. Lands with distinctive visual character would be placed in Zone 3 or 4 (Sensitive Resource Management or Natural Resource Conservation, respectively). About 284 acres would be allocated to Zone 3, where visual qualities and scenic value were principal considerations for most parcels. Another 2,073 acres would be allocated to Zone 4, which includes lands with attractive but less unique scenic qualities and little visible alteration. Activities that involve minor visible changes, such as recreational hiking, picnicking, bank fishing, and some selective forest management (e.g., pine beetle salvage), could take place in both Zones 3 and 4. Some development with more visible modifications could take place in Zone 4 areas, as long as the location and appearance remained subordinate to the desired visual characteristics. A total of 2,357 acres (48 percent) of TVA-managed NTRs acreage would be allocated to Zones 3 and 4. Management and protection of the scenic landscape character would provide direction for any land use decisions affecting these parcels. Visual impacts would also be considered in decisions affecting the use of parcels in other zones.

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

Alternative C

Under this alternative, potential effects to visual resources would be similar to those described under Alternative B. Approximately 278 acres would be allocated to Zone 3 and approximately 2,044 to Zone 4, for a total about 47 percent of all reservoir lands in those two categories. Alternative C provides for better protection of scenic resources and preservation of natural areas around the reservoir than does Alternative A. Consequently, implementation of this alternative would provide enhanced protective management for visual resources and would help preserve the scenic landscape character of the reservoirs for long-term public enjoyment. On the other hand, about 34 fewer acres are allocated to

Zones 3 and 4 under Alternative C as compared to B, which would result in slightly less preservation of scenic resources under Alternative C.

4.12. Water Quality

Increased development and intensive land use has the potential to result in some degree of negative impact to the aquatic environment from point source pollution such as municipal or industrial discharges, or nonpoint source pollution, which comes from many sources (typically defined as sources that are not required to have an NPDES permit). Development and intensive land uses often increase the amount of impervious surface (i.e., roofs, roads, and paved areas), remove vegetation, and increase storm water runoff, thereby reducing the natural buffering/filtering effect of vegetated lands and increasing the potential for soil erosion and other nonpoint sources of pollution. The main areas of concern, in terms of potential impacts to the aquatic environment and consequently aquatic life, are:

- Increased turbidity and sedimentation.
- Increased levels of nutrients that can lead to subsequent algal blooms and higher oxygen demands.
- Increased levels of chemicals and bacteria from impervious surfaces, disturbed lands, managed lawns, and improper operation or failure of wastewater treatment systems.

Under any of the alternatives, the potential environmental consequences would be similar, but the more development and/or land disturbance allowed by an alternative, the greater the potential for adverse environmental impacts. Potential water quality impacts, such as erosion and nutrient runoff, likely would be greater from parcels designated for Project Operations, Industrial, Developed Recreation, or Shoreline Access use where more development and intensive land use could occur. However, prior to any individual actions taken on any parcels in the future, TVA would conduct additional site-specific environmental reviews on a case-by-case basis and require appropriate site design and management practices using TVA's Section 26a General and Standard Conditions/BMPs (TVA 2005) to minimize negative environmental impacts and help ensure the proposals best serve the needs and interest of the public. Further, any actual development of TVA and non-TVA lands must comply with state and federal environmental regulations, and applicants must often obtain permits specifically designed to prevent adverse impacts and violation of applicable water quality criteria.

Alternative A

Under Alternative A, only Boone Reservoir has parcels (335 acres) allocated to Sensitive Resource Management, the land use designation that is most protective of water quality. Parcels on five of the seven reservoirs (excluding Beaver Creek and Clear Creek reservoirs), totaling 28 percent of NTR lands (1,409 acres), would be dedicated to Natural Resource Conservation, which affords some protection to water quality through restriction on development and protection of riparian vegetation.

Under Alternative A, a total of 2,077 acres (42 percent) of the NTR lands are currently allocated to Zone 2 (Project Operations). Alternative A also includes a 125-acre parcel near South Holston Reservoir allocated to Industrial, which currently is undeveloped. The Industrial parcel is located approximately 1 mile from the reservoir, so future clearing,

grading, or other site development would likely have limited effects on reservoir water quality. No other TVA-managed land on the NTRs is allocated for industrial development. An additional 987 acres are allocated to Developed Recreation and Shoreline Access. Activities associated with these four land use zones have some potential to adversely impact water quality, with the Industrial classification having the greatest potential for adverse impacts. Industrial development could involve extensive clearing and grading, increase impervious surfaces, and result in possible point source pollution to the adjoining reservoir. However, the extent of impacts associated with any of these land uses would be dependent on the specifics of future development. New facilities with permitted discharges would be required to meet permit limits specifically designed to prevent degradation of applicable water quality criteria. Further, any proposed land use would be required to protect water quality through either restricted development or the commitment to use BMPs to minimize impacts. Therefore, selection of Alternative A would not cause substantial direct, indirect, or cumulative impacts to water quality.

Alternative B

Under Alternative B, a total of 2,357 acres (48 percent) would be allocated to Sensitive Resource Management (Zone 3) and Natural Resource Conservation (Zone 4). Zone 3 allocations would occur on four reservoirs, and Zone 4 allocations would occur on five of the seven reservoirs (Table 2-3). Zone 3 and Zone 4 allocations afford the most protection to water quality because of the more stringent restrictions on land use and enhanced protection of riparian vegetation.

Under Alternative B, only two parcels (totaling about 37 acres) that were designated for an undeveloped land use under Alternative A would be allocated to a potentially developed use under Alternative B (Table 2-5). South Holston Parcels 19 and 46, forecast to Zone 4 under Alternative A, would be allocated to Zone 6 (Developed Recreation). A total of 1,550 acres (31 percent) would be allocated to Zone 2 under Alternative B. The only land allocated to Industrial use would be the 125-acre parcel near South Holston Reservoir. Additionally, 902 acres are allocated to Developed Recreation and Shoreline Access. Under these four land use zones, development potentially affecting water quality could occur. However, as described above under Alternative A, proposed land uses would be required to protect water quality in accordance with TVA guidance, federal regulations, and state permits. Consequently, direct, indirect, and cumulative impacts to water quality associated with Alternative B are expected to be minor.

Alternative C

Allocations under Alternatives B and C are identical on Boone, Wilbur, Clear Creek, and Beaver Creek reservoirs. Alternative C, as compared to Alternative B, involves changes in land use allocations for 19 parcels of TVA-managed land. Under Alternative C, an additional 34 acres are allocated to Zone 6, with an equivalent reduction in allocations to Zone 3 (6 acres) and 4 (29 acres). The same parcels are allocated to Zones 2, 5, and 7 under Alternatives B and C. The minor variations in allocations to Zones 6, 4, and 3 do not represent substantial changes. Therefore, the potential for adverse impacts to water quality under Alternative C are the same as described under Alternative B above. Similarly, the requirements for project design, permitting, and monitoring to minimize impacts to water quality would be the same as described under Alternative B. Therefore, potential direct, indirect, and cumulative effects to water quality would be minor under Alternative C.

4.13. Aquatic Ecology

As with listed aquatic species, the major source of potential adverse impacts to common aquatic species in the NTRs would be land use changes and associated erosion, clearing of shoreline vegetation, and runoff. Shoreline riparian vegetation provides several benefits to aquatic life. Shoreline vegetation can provide shade to help control water temperature, especially in cove areas where the water is usually shallow with little flow. Terrestrial vegetation also provides habitat for insects that are fed upon by carnivorous and insectivorous aquatic species. Tree root wads along the shoreline provide refuge from predation. Submerged trees that have fallen into the water also provide structure in the reservoir. Riparian vegetation also serves to stabilize shoreline soil, thereby reducing the potential for erosion. Sedimentation associated with erosion can clog voids between rocks in the substrate of streams and reservoirs. These voids are important for fish spawning and habitat for aquatic insects. Clean rocky substrates are also the home of sessile freshwater mussels that can be smothered by sedimentation. Potential impacts to aquatic ecology likely would be greater from parcels designated for Project Operations, Industrial, Developed Recreation, or Shoreline Access use where more development and intensive land use could occur. However, as described in Section 4.12 above, individual actions would be subject to site-specific environmental review, as well as applicable state and TVA guidelines for minimizing impacts to aquatic habitat. In some instances, construction of docks and associated pilings and structures such as rock aggregation, while having potential short-term negative impacts during construction, can enhance shoreline habitat when constructed by providing shade and cover for some fish and aquatic invertebrates.

Land uses around Clear Creek and Beaver Creek reservoirs parcels would not change under any of the three alternatives. Therefore, the condition of aquatic communities (fish and benthic organisms) in those reservoirs would most likely remain in poor to fair condition under any of the alternatives.

No change to land use designations are proposed under Alternative A. Alternatives B and C both involve a significant portion of TVA-managed land being allocated to Sensitive Resource Management and Natural Resource Conservation. Therefore, none of the proposed allocation changes under any of the alternatives would negatively affect the trout fisheries in the TVA reservoirs and tailwaters considered in this analysis.

Alternative A

Under Alternative A, approximately 3,189 acres are designated for Project Operations, Industrial, Developed Recreation, and Shoreline Access uses with high potential for ground-disturbing activities that may affect aquatic ecology. The only land allocated to Industrial is a parcel approximately 1 mile from South Holston Reservoir. About 1,409 acres on the NTRs would be managed for Natural Resource Conservation. An additional 335 acres on Boone Reservoir is designated for Sensitive Resource Management. No Sensitive Resource Management parcels are located on the other six reservoirs. Zones 3 and 4 designations have the lowest potential to affect aquatic ecology.

Future land use requests consistent with the Forecast System designation or existing land plan can either be approved or denied based on a review of potential environmental impacts, compliance with TVA's Land Policy, and other administrative considerations. Future developments could negatively affect aquatic ecology. However, due to the required project-specific environmental review and application of TVA Section 26a General and Standard Conditions/BMPs (TVA 2005), negative impacts would be minor. Additionally, the TVA-managed land addressed in the NTRLMP constitutes a small proportion of the total

watersheds draining to the NTRs. Therefore, selection of Alternative A is not expected to result in direct, indirect, or cumulative impacts to common aquatic species or their habitats.

Alternative B

Under Alternative B, a total of 2,357 acres (48 percent) would be allocated to Sensitive Resource Management (Zone 3) and Natural Resource Conservation (Zone 4), resulting in a pronounced increase in acreage in these two allocations as compared to Alternative A. Zone 3 would occur on four of the seven reservoirs, and Zone 4 would occur on five, with the largest increases on Watauga and South Holston reservoirs. The increase in number of acres allocated to these zones, as well as the expanded distribution of those zones on more reservoirs, is expected to benefit the aquatic environment indirectly by maintaining natural shoreline vegetation.

Under Alternative B, only two parcels (totaling about 37 acres) that were designated for an undeveloped land use under Alternative A would be allocated to a potentially developed use under Alternative B (Table 2-5). South Holston Parcels 19 and 46, forecast to Zone 4 under Alternative A, would be allocated to Zone 6 (Developed Recreation) under Alternative B. A total of 2,577 acres (52 percent) would be allocated to Zones 2, 5, 6, and 7. Under these four land use zones, development potentially affecting water quality could occur. The only land allocated to Industrial use would be the 125-acre parcel near South Holston Reservoir. However, as described above under Alternative A, proposed land uses would be required to protect the aquatic environment in accordance with TVA guidance, federal regulations, and state permits. Consequently, direct, indirect, and cumulative impacts to aquatic ecology associated with Alternative B are expected to be negligible.

Alternative C

Compared to Alternative B, approximately 34 additional acres would be allocated to zones likely to impact aquatic ecology under Alternative C. As under Alternative B, the number of acres allocated to Zones 3 and 4 are substantially greater than the existing conditions. Allocations proposed under Alternative C also result in distribution of Zones 3 and 4 lands over a greater number of reservoirs than existing conditions. Therefore, because the differences between Alternatives B and C are minor, the effects to aquatic ecology under Alternative C are virtually the same as those described under Alternative B.

4.14. Air Quality

With respect to the NTRLMP, the greatest potential for effects to air quality is from the Industrial land use zone. Under all three alternatives, a single 125-acre parcel near South Holston Reservoir (Parcel 6) is currently undeveloped but has the appropriate land use designation to be developed for industrial use in the future. TVA previously concluded that conversion of the site to light industrial would not have an adverse impact on air quality in the area (TVA 1995). Development of this parcel for activity not categorized as “light industrial” (i.e., not causing obnoxious odors, noise, toxic waste, excessive airborne particulates, fire hazards, etc.) would require project-specific assessment of effects to environmental resources including air quality. Furthermore, in the event that a land use request on another NTRs parcel involves industrial development, a site-specific environmental review will include assessing and documenting the extent of expected air quality impacts. Should the requested parcel be located in or potentially affect a nonattainment area for ozone or $PM_{2.5}$ (where particulate matter has a diameter less than or equal to 2.5 micrometers), TVA shall 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.

The potential for impacts to air quality from actions on Project Operations (Zone 2) lands depends upon the type of development proposed in the future. The No Action Alternative includes the greatest amount of land forecast or planned for Project Operations (2,077 acres). Because both action alternatives include 1,550 acres of land allocated to Zone 2, the potential for impacts to air quality is lower under Alternatives B and C than under the existing condition. Under any of the alternatives, an appropriate level of environmental review would be required to document the extent of expected air quality impacts from projects proposed in the future. Future projects would be subject to federal, state, and local air quality regulations.

Activities associated with Zones 3, 4, 6, and 7 are not likely to generate emissions that affect air quality. Therefore, adoption of any of the three NTRLMP alternatives would result in no significant impacts 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, commercial recreational development. Under all three alternatives, future industrial development is limited to a single 125-acre parcel near South Holston Reservoir. The amount of land allocated to Developed Recreation (Zone 6) is greatest under Alternative A (939 acres), is less under Alternative C (888 acres), and is lowest under Alternative B (854 acres). The amount of land allocated to Project Operations is also greatest under Alternative A (2,077 acres) and less under Alternatives B and C (1,550 acres each). The potential for impacts associated with noise depends upon the types of developments proposed for Zones 2 and 6 lands.

Overall, based on the proportion of TVA public land available for development relative to the entire shoreline of the NTRs, there would be an minor increase in the potential for impacts associated with noise under all three alternatives, with the lowest potential for noise expected under Alternative B.

4.16. Socioeconomics

Potential socioeconomic impacts of the NTRLMP would be associated with direct effects of jobs created by development accommodated by the allocation of TVA-managed lands to use zones (e.g., development of industrial facilities, campgrounds, marinas, etc.). Because the proportion of land allocated to Industrial or Developed Recreation uses is small, the potential for new job creation is negligible. Additionally, there could be indirect effects associated with population growth in response to new development. Effects to socioeconomics could occur because of changes in developed and dispersed recreation opportunities, as well as changes in the overall attractiveness of the area as a place to live or visit.

The TVA Land Policy clarifies the availability of TVA-managed lands for industrial, residential, and recreational uses, which in turn determines the potential for development. However, future industrial, commercial, and residential development is likely to occur in the NTRs region on private land, regardless of the uses and availability of TVA public lands.

Regionally, the implementation of the NTRLMP is not expected to significantly contribute to cumulative human population growth or the economy via creation of jobs, residential developments, or commercial opportunities. However, TVA public lands in the NTRLMP provide public recreation opportunities and undeveloped shoreline that enhance the

attractiveness of the area, both of which may indirectly promote some population growth and certain economic sectors.

4.16.1. Population and Economy

Under all three alternatives, land use allocations would be very similar. Zone 5 (Industrial) would be allocated the same (one 125-acre tract) in all cases. As stated above, variation among alternatives was small because commitments that exist on 95 percent of NTR parcels were honored during the allocation process (Table 2-2). Additionally, no demand for industrial lands on TVA-owned property around the NTRs was identified during the allocation process or public involvement in this EIS. Opportunities for economic development exist on parcels allocated to developed recreation uses. Zone 6 (Developed Recreation) allocations would be very similar, ranging from 939 acres under Alternative A to 854 acres under Alternative B. Under each alternative, there are currently undeveloped parcels allocated to Zone 6, which provides an opportunity for future development. Additionally, the Watershed Team will evaluate on a project-specific basis other opportunities to support economic development near NTR parcels, such as road and utility easements. The location and extent of residential developments would not be changed by any of the alternatives.

Alternative A

Under this alternative, TVA would continue to use the current designations where they exist. Land use requests would be approved or denied based on their consistency with the current designations and on a review of potential environmental impacts, the TVA Land Policy, and other relevant considerations. Adoption of the No Action Alternative would not affect the local or regional population and economy.

Alternative B

Under this Alternative, as compared to Alternative A, there would be no change in the land designated for industrial use or shoreline access, but there would be a decrease of 85 acres (about 10 percent) in the land designated for Developed Recreation. Most of the differences between Alternatives A and B would designate land now considered to be for Project Operations to Natural Resource Conservation, which would more appropriately reflect current uses. As discussed in Section 4.3, the changes would have no substantive impact on the attractiveness of the area for dispersed recreation. Therefore, none of the changes would be likely to have any noticeable impact on the local economy or on economic development opportunities in the area.

Alternative C

Under Alternative C, as compared to Alternative A, there would be no change in the land designated for Industrial use or Shoreline Access, but there would be a decrease of 51 acres (about 1 percent) in the land designated for Developed Recreation. Compared to Alternative B, implementing Alternative C would result in about 34 more acres allocated for Developed Recreation, but about 35 fewer acres allocated to Zones 3 and 4. Other allocations under Alternative C would be very similar to those under Alternative B with regard to their overall potential impact. Therefore, none of the changes would be likely to have any noticeable effect on the local economy or on economic development opportunities in the area.

4.16.2. Environmental Justice

As discussed in Section 3.16.2, the minority population in the vicinity of the NTRs is small compared to the state and national levels. However, poverty levels are higher in some

counties where these reservoirs are located. The changes that would occur under Alternatives B and C are minor and would have at most only small impacts on the region's economy, recreation opportunities in the area, scenic values, and other resource areas. Therefore, no disproportionate impacts to disadvantaged populations are expected to occur under any of the alternatives.

4.17. Unavoidable Adverse Effects

Because of the requirement that project-specific environmental reviews be conducted prior to implementation, few, if any, unavoidable potential environmental effects would result under any of the three alternatives. Implementation of any of the three alternatives would result in no effects or minor effects to all of the resources examined (Table 2-7). Implementation of any of the three alternatives is not expected to result in substantive adverse cumulative effects to any resources. Continuing regional development trends, such as residential development on non-TVA lands, would likely continue to result in degradation of aquatic and terrestrial habitat regardless of the alternative selected.

4.18. Relationship Between Short-Term Uses and Long-Term Productivity

NEPA requires consideration of the "relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity" (40 CFR § 1502.16). For RLMPs, short-term uses generally are those that occur within a 10-year period, and long term refers to later decades. Productivity is the capability of the land to provide market and amenity outputs and values for future generations. The capability of the land to maintain productivity is one factor that influences the quality of life for future generations.

Generally, the land planning process results in few actions that adversely affect long-term productivity. Where practicable, TVA manages public lands for multiple uses, including recreation, natural resources, and protection of sensitive resources, for the goal of protecting these values for the public.

Commitments of the land for developed uses (e.g., industrial facilities, certain project operations facilities, some types of recreational development) have potential to decrease the productivity of land for agriculture, forestry, wildlife, certain recreational activities, and other natural resources management. Under all three alternatives, industrial and shoreline access uses are allocated to the same parcels, totaling about 4 percent of NTR lands (Table 2-6). The percentage of lands allocated to Zone 2 (Project Operations) is approximately 42 percent under Alternative A and 31 percent under Alternatives B and C. The percentage of lands allocated to Zone 6 (Developed Recreation) is also smaller under Alternatives B and C compared to Alternative A. Therefore, the extent of land allocated to zones having a potential to adversely affect long-term productivity is greatest under Alternative A. The potential to convert prime farmland or farmland of statewide importance (Virginia) to nonagricultural uses is greatest under Alternative A and lowest under Alternative C.

Conversely, allocation to Zones 3 (Sensitive Resource Management) and 4 (Natural Resource Conservation) increases the likelihood of long-term productivity of those lands. The percentage of NTR lands allocated to Zones 3 and 4 is approximately 35 percent under Alternative A and approximately 48 percent under Alternatives B and C. Therefore, long-term productivity of the land is expected to be greater under Alternatives B and C.

The scenic and recreational values of the NTRs are key factors in attracting new residents and visitors to the region. The current regional trends of increasing population and residential and commercial development are expected to continue. New jobs and income would be generated by spending activities of new residents and visitors, which may lead to enhanced long-term socioeconomic productivity. Allocation of lands to zones that enhance scenic and dispersed recreational values (i.e., Zones 3 and 4) is greatest under Alternatives B and C, while allocation to developed recreational uses is greatest under Alternative A. Therefore, adoption and implementation of any of the three alternatives is expected to promote public enjoyment of the reservoirs and, thereby, support regional trends of socioeconomic growth.

4.19. Irreversible and Irretrievable Commitments of Resources

Irreversible commitments of resources generally occur from the use of nonrenewable resources that have few or no alternative uses at the termination of the proposed action. Irretrievable commitments of resources result in the lost production or elimination of renewable resources such as timber, agricultural land, or wildlife habitat.

Construction of residences and project operations, industrial, and recreational facilities/structures would involve irreversible commitment of fuel, energy, and building material resources. Use of these resources would occur under all three alternatives as site-specific proposals are reviewed and approved, but would be greatest under Alternative A due to the greater total number of acres allocated to Zones 2, 5, 6, and 7, as compared to the total acres in those zones under Alternatives B and C.

As shoreline is converted to residential, commercial, industrial, and some types of recreational use, the land is essentially permanently changed and no longer available for agriculture, forestry, wildlife habitat, natural area, or certain dispersed recreational activities for the foreseeable future. This is an irretrievable commitment of land, which would occur under all alternatives if and when specific projects are approved and implemented. Over the long term, this type of irretrievable commitment would be greatest under Alternative A, due to the greater total number of acres allocated to Zones 2, 5, 6, and 7, as compared to the total acres in those zones under Alternatives B and C.

4.20. Energy Resources and Conservation Potential

Developing and implementing RLMPs does not involve substantive use of energy resources, but the activities allowed under land use zone definitions could use energy resources. Energy is used to fuel machines needed to maintain grassy areas on the TVA Project Operations lands such as dam reservations. Alternative A includes the greatest number of acres allocated to Zone 2 lands, and therefore would likely require the greatest amount of energy to maintain Project Operations lands.

Energy is also used by machines to maintain areas set aside for Natural Resource Conservation. Under any of the three alternatives, fuel would be required to conduct natural resource management activities such as mowing, timber management, access road maintenance, etc., should those activities be prescribed for certain parcels. The majority of lands in Zone 4 are not actively maintained. Implementation of Alternative B would result in a slightly greater requirement for this type of energy use because it involves the greatest acreage allocated to Zone 4 (Natural Resource Conservation).

Energy may be consumed by campers, boaters, and other users on Zone 6 (Developed Recreation) lands. TVA is encouraging campers who utilize developed recreation areas to reduce energy consumption and to conserve water resources. TVA has posted resource conservation tips at many campgrounds located on TVA land as part of its campground conservation program. TVA would encourage energy conservation measures to be utilized at recreation areas that may be developed in the future. These practices could potentially reduce energy usage under all alternatives. Alternative A involves the greatest number of acres allocated to Zone 6; therefore, energy use associated with developed recreation would be greatest under that alternative.

Finally, because each alternative contains the same South Holston parcel allocated to Zone 5, potential energy use associated with Industrial activities would be the same under each of the three alternatives. TVA actively promotes public education and outreach to encourage energy efficiency and green-energy offerings and promotes the integration of energy efficiency and water conservation into community planning and building construction. TVA would work with potential users of TVA lands to achieve energy savings and to implement conservation practices.

Under all three alternatives, energy use associated with land planning would be minor because nearly half the acres would likely be maintained in a natural condition. The small amount of energy used while implementing the RLMPs is not likely to have much influence on regional energy use demands.

4.21. Summary of TVA Commitments and Proposed Mitigation Measures

Mitigation measures are actions that could be taken to avoid, minimize, rectify, offset, reduce, or compensate for adverse impacts to the environment. In considering requests for use of TVA lands allocated under the NTRLMP, TVA will implement the following commitments and mitigation measures.

- TVA has executed a PA with the Tennessee SHPO for RLMPs and will seek to execute a separate PA with the Virginia SHPO for the identification, evaluation, and treatment of all cultural resources adversely affected by future proposed uses of TVA lands planned in RLMPs. All activities will be conducted in accordance with the stipulations defined in these PAs. Until the Virginia PA is executed, the TVA will incorporate the identification, evaluation, and treatment procedures established under Section 106 of the NHPA to effectively mitigate adverse effects to historic properties.

- Prior to approving any proposal to use NTR land, an appropriate level of site-specific environmental review will be conducted to determine the potential environmental effects of the proposed use.

- As necessary, based on the findings of any site-specific environmental review, TVA may require the implementation of appropriate mitigative measures, including TVA's BMPs (e.g., Section 26a General and Standard Conditions/best management practices [TVA 2005]), as a condition of approval for land use on the TVA-managed properties on the NTRs.

- In the event that a land use request involves industrial development, the site-specific environmental review will determine and document the extent of expected air quality impacts. Should the requested parcel be located in or potentially affect a

nonattainment area for ozone or $PM_{2.5}$ (where particulate matter has a diameter less than or equal to 2.5 micrometers), TVA shall 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.

- Invasive plants listed as Rank 1 (Severe Threat), Rank 2 (Significant Threat), or Rank 3 (Lesser Threat) on the TN-EPPC list of Invasive Exotic Pest Plants in Tennessee (Appendix G, Tables G-9 through G-11) will not be used in landscaping activities on NTR lands.

- Revegetation and erosion-control measures will utilize seed mixes comprised of native species or noninvasive nonnative species (Appendix G, Table G-12).

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CHAPTER 5

5.0 LIST OF PREPARERS

5.1. NEPA Project Management

Amy Burke Henry

Position:	NEPA Specialist
Education:	M.S., Zoology and Wildlife; B.S., Biology
Experience:	12 years in Biological Surveys, Natural Resources Management Planning, and Environmental Reviews
Involvement:	NEPA Compliance and Document Preparation

Heather L. Montgomery

Position:	NEPA Specialist
Education:	B.S., Environmental Biology
Experience:	7 years in Planning and Managing Land and Environmental Impacts Assessment
Involvement:	NEPA Compliance and Document Preparation

Richard L. Toennisson

Position:	Contract NEPA Specialist
Education:	M.S., Forest Products/Industrial Engineering; B.S., Forestry
Experience:	35 years in Forest Management and Products Engineering, Environmental Science, and NEPA Compliance
Involvement:	NEPA Compliance and Document Preparation

5.2. Other Contributors

Tyler F. Baker

Position:	Limnologist, Chattanooga, Tennessee
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Experience:	19 years in Aquatic Management Programs
Involvement:	Surface Water

John (Bo) T. Baxter

Position:	Senior Aquatic Biologist
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Experience:	19 years in Protected Aquatic Species Monitoring, Habitat Assessment, and Recovery; 9 years in Environmental Review
Involvement:	Aquatic Ecology/Threatened and Endangered Species

Elizabeth C. Burton

Position:	Contract Terrestrial Zoologist
Education:	M.S., Wildlife and Fisheries Science; B.A., Biology; B.A., Anthropology
Experience:	7 years in Field Biology
Involvement:	Threatened and Endangered Species; Wildlife

Patricia B. Cox

Position:	Senior Botanist
Education:	Ph.D., Botany (Plant Taxonomy and Anatomy); M.S. and B.S., Biology
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Involvement:	Terrestrial Ecology, Invasive Plant Species, and Threatened and Endangered Species

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Position:	Contract Economist
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Involvement:	Socioeconomics and Environmental Justice

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Position:	Aquatic Biologist
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Experience:	22 years in Environmental Assessment
Involvement:	Aquatic Ecology

Ella Christina Guinn

Position:	Project Control Specialist
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Experience:	14 years in Land Use Analysis; 6 years in Environmental Services
Involvement:	Technical Staff Coordinator

Heather M. Hart

Position:	Contract Natural Areas Biologist
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Experience:	7 years in Surface Water Quality, Soil and Groundwater Investigations, and Environmental Reviews
Involvement:	Natural Areas (Managed Areas, Nationwide Rivers Inventory, and Ecologically Significant Sites)

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Mark S. McNeely

Position:	Program Administrator
Education:	M.S., Education; B.S., Biological Sciences
Experience:	6 years in Environmental Education; 13 years in Resource Stewardship
Involvement:	Document Layout and Publishing Coordinator

P. Alan Mays

Position:	Environmental Scientist
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Experience:	32 years in Soil-Plant-Atmospheric Studies
Involvement:	Prime Farmland

Roger A. Milstead

Position:	Program Manager, Flood Risk
Education:	B.S., Civil Engineering; Registered Professional Engineer
Experience:	33 years in Floodplain and Environmental Evaluations
Involvement:	Floodplains

Aurora D. Moldovanyi

Position:	Recreation Specialist
Education:	M.S., Nature-Based Recreation and Park Planning; B.S., Wildlife Biology and Management
Experience:	4 years with TVA Recreation Program; 3 years with National Park Service Education Resources
Involvement:	Recreation

W. Chett Peebles

Position:	Specialist, Landscape Architect
Education:	Bachelor of Landscape Architecture; Registered Landscape Architect
Experience:	21 years in Site Planning and Visual Assessment
Involvement:	Visual Resources and Historic Properties

Kim Pilarski-Brand

Position:	Senior Wetlands Biologist
Education:	M.S., Geography, Minor Ecology
Experience:	14 years in Wetlands Assessment and Delineation
Involvement:	Wetlands

Jan K. Thomas

Position:	Contract Natural Areas Specialist
Education:	M.S., Human Ecology
Experience:	10 years in Health and Safety Research, Environmental Restoration, Technical Writing; 5 years in Natural Area Reviews
Involvement:	Natural Areas (Managed Areas, Nationwide Rivers Inventory, and Ecologically Significant Sites)

Dana Vaughn

Position:	Watershed Representative
Education:	B.A., Biology
Experience:	3 years, TVA Land and Water Stewardship
Involvement:	Project Manager, Northeastern Tributary Reservoirs Land Management Plan

Edward W. Wells III

Position:	Archaeologist
Education:	M.A., Anthropology; B.S., Anthropology
Experience:	10 years Cultural Resource Management
Involvement:	Cultural Resources

Cassandra L. Wylie

Position:	Atmospheric Analyst
Education:	M.S., Forestry and Statistics; B.S., Forestry
Experience:	21 years in Atmospheric Modeling and Effects of Air Pollution on Forests; 8 years in Noise Analysis
Involvement:	Air Quality and Noise Impacts

CHAPTER 6

6.0 LIST OF AGENCIES, ORGANIZATIONS, AND PERSONS TO WHOM COPIES WERE SENT

Federal Agencies

Appalachian National Scenic Trail
Great Smoky Mountains National Park
U.S. Army Corps of Engineers, Nashville District
U.S. Army Corps of Engineers, Nashville Regulatory Branch
U.S. Army Corps of Engineers, Abingdon, Virginia
U.S. Army Corps of Engineers, Christiansburg, Virginia
U.S. Army Corps of Engineers, Norfolk, Virginia
U.S. Department of Agriculture, Natural Resource Conservation Service
U.S. Fish and Wildlife Service, Cookeville, Tennessee
U.S. Fish and Wildlife Service, Abingdon, Virginia
U.S. Fish and Wildlife Service, Gloucester, Virginia
U.S. Forest Service, Cherokee National Forest
U.S. Forest Service, George Washington and Jefferson National Forests

State Agencies

Tennessee

Tennessee Department of Agriculture
Tennessee Department of Economic and Community Development
Tennessee Department of Environment and Conservation, Director
Tennessee Department of Environment and Conservation, Air Pollution Control Division
Tennessee Department of Environment and Conservation, Recreation Educational Svc. Division
Tennessee Department of Environment and Conservation, Water Pollution Control Division
Tennessee Department of Environment and Conservation, Natural Heritage Division
Tennessee Department of Transportation
Tennessee Division of Archaeology
Tennessee Historical Commission
Tennessee Wildlife Resources Agency, Environmental Services Division

Virginia

Virginia Department of Conservation and Recreation
Virginia Department of Game and Inland Fisheries
Virginia Department of Historic Resources
Virginia Department of Transportation
Virginia Department of Environmental Quality

Local Agencies and Private Organizations

Appalachian RC&D Council
Black Diamond Resource Conservation & Development Council
Boone Lake Association
Boone Watershed Partnership
Carter County, Mayor
City of Elizabethton, Mayor
City of Jonesborough, Mayor
City of Bristol, Tennessee, Mayor
City of Bristol, Virginia, Mayor
City of Mountain City, Mayor

City of Kingsport, Mayor
City of Johnson City, Mayor
First Tennessee Development District
Friends of South Fork Holston River
Gate City, Mayor
Holston River Soil & Water Conservation District
Holston River Watershed Alliance
Johnson County, Mayor
Johnson County Stream Watch
Mount Rogers Planning District Commission
Smoky Mountain Resource Conservation & Development Council
Sullivan County, Mayor
The Nature Conservancy, East Tennessee
The Nature Conservancy, National
Town of Abingdon, Town Manager
Upper Tennessee River Roundtable
Warrior's Path State Park
Washington County, Tennessee, Mayor
Washington County, Virginia, Mayor

Individuals Who Were Sent Notification of final EIS Availability

The following list includes individuals who expressed interest in the NTRLMP EIS by submitting comments on the scoping document or DEIS or by attending the public meeting. Post cards announcing availability of the final EIS were mailed to approximately 1,800 interested individuals.

Erich Allen
Kingsport, TN

Marshall Bagley
Blountville, TN

Ed Balaban
Bristol, TN

Dee Bardes
Piney Flats, TN

George Bottcher
Johnson City, TN

George E. Boy
Johnson City, TN

James Brooks
Johnson City, TN

Frank Brown
Bristol, TN

Sabrina Brown
Bristol, TN

Harold Bullis
Blountville, TN

Helen Bullis
Blountville, TN

Harold Bullow
Blountville, TN

Jim Burke
Gray, TN

Shawn Burke
Gray, TN

Ralph Campbell
Abingdon, VA

Greg Carr
Kingsport, TN

Jack Carrier
Kingsport, TN

Mickii Carter
Gray, TN

Sharyl Carter
Bristol, VA

Clayton Caudill
Gray, TN

Ginny Chaffinch
Butler, TN

Larry Chaffinch
Butler, TN

Bruce A. Chamberlin
Kingsport, TN

Ed & Charlene Champion
Gray, TN

Tom Cole
Kingsport, TN

Ruth Combs
Kingsport, TN

Jeff Corder
Johnson City, TN

Jim Culberft
Johnson City, TN

Val DeVault
Bristol, VA

Anthony Duncan
Abingdon, VA

Carl Durham
Bristol, TN

Rodney R. Farris
Abingdon, VA

Michael Ford
Jonesborough, TN

Verlin Ford
Kingsport, TN

Powell & Sharon Foster
Bristol, TN

Allison Hall
Bluff City, Tennessee

Bob Hardin
Elizabethton, TN

Russ Harrison
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Doug Haseltine
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Lydia Haseltine
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Edwin & Deborah Holman
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Beverley Jenkins
Spring City, Tennessee

Brandon Johnson
Gray, TN

Charles Jones
Knoxville, TN

Sam Jones
Kingsport, TN

Robert Lamberson
Limestone, TN

Anthony B. Lee
Johnson City, TN

Jerry Lukach
Johnson City, TN

Richard E. Maxey
Clemmons, NC

David McKenna
Blountville, TN

Luther Minor
Bristol, VA

Ware Mitchell
Gray, TN

Jai Moore
Meadowview, VA

Lana Moore
Blountville, TN

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Cleveland, TN

Ed Snowden
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Susan Snowden
Gray, TN

Joseph Spanovich
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Monti & Jackie Tesky
Gray, TN

Ted Tipton
Hampton, TN

Sheila & Richard Tittsworth
Kingsport, TN

Tom Wechter
Piney Flats, TN

Carolyn L. Welch
Butler, TN

Carlos Whaley
Greenville, Tennessee

Thomas R. White
Hampton, TN

Ezra H. Williams
Kingsport, TN

Joseph Williams
Kingsport, TN

James M. Wilson
Johnson City, TN

Jimmy C. Woods
Gray, TN

Patrick Wylie
Mountain City, TN

Josh (no last name given)
Johnson City, TN

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CHAPTER 7

7.0 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	TVA land licensed to a private individual for the production of agricultural crops; the land use is an interim use of TVA land.
attainment areas	Those areas of the U.S. that meet NAAQS as determined by measurements of air pollutant levels.
benthic	Refers to the bottom of a stream, river, or reservoir.
cumulative impacts	Impacts that 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 parklike 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.
deciduous	Vegetation that sheds leaves in autumn and produces new leaves in the spring.
direct impacts	Effects that are caused by the action and occur at the same time and place (40 CFR § 1508.8).
dissolved oxygen (DO)	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.
ecoregion	A relatively homogeneous area of similar geography, topography, climate, and soils that supports similar plant and animal life.
embayment	A bay or arm of the reservoir.

emergent wetland	Wetlands dominated by erect, rooted herbaceous plants, such as cattails and bulrush.
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.
evergreen	Vegetation with leaves that stay green and persist all year.
evergreen-deciduous	Vegetation consisting of a mixture of plants that are both evergreen and deciduous, often referred to as mixed deciduous.
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*.
forest	Vegetation having tree crowns overlapping, generally forming 60-100 percent cover (Grossman et al. 1998).
fragmentation	The process of breaking up a large area of relatively uniform habitat into smaller disconnected areas.
herbaceous vegetation	Dominated by forbs, generally forming at least 25 percent cover; other life-forms with less than 25 percent cover (Grossman et al 1998).
historic property	Defined in 36 CFR § 800.16(l) as “any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places.”
indirect impacts	Effects that are caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable (40 CFR § 1508.8).
macroinvertebrates	Bottom-dwelling aquatic animals without vertebrae (skeletal spine), such as mollusks and arthropods.

mainstream reservoirs	Impoundments created by dams constructed across the Tennessee River.
marginal strip	The narrow strip of land retained by TVA between the summer operating pool and back-lying tracts that are owned or controlled by private or other public entities.
maximum shoreline contour (MSC)	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.
NatureServe	An international network of biological inventories (natural heritage programs or conservation data centers) that provides information about the location and status of animals, plants, and habitat communities, and establishes a system for ranking the relative rarity of those resources (http://www.natureserve.org/explorer/).
National Ambient Air Quality Standards (NAAQS)	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, particulate matter, sulfur dioxide, nitrogen dioxide, and lead.
physiographic provinces	General divisions of land with each area having characteristic combinations of soil materials and topography.
phytoplankton	Aquatic organisms, often microscopic, capable of generating their own food via photosynthesis, e.g., algae.
polychlorinated biphenyls (PCBs)	PCBs are organic compounds historically used for many applications, especially as dielectric fluids in transformers and capacitors and coolants. PCBs are toxic and classified as persistent organic pollutants. PCB production was banned by the U.S. in 1976.

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.
riprap	Stones placed along the shoreline for bank stabilization and other purposes.
riparian zone	An area of land that has vegetation or physical characteristics reflective of permanent water influence. Typically a streamside zone or shoreline edge.
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.
shoreline	The line where the water of a TVA reservoir meets the shore when the water level is at the normal summer pool elevation.
shrublands	Vegetation consisting of shrubs generally greater than about 1.5 feet tall with individuals or clumps not touching or overlapping, generally forming less than 25 percent cover; tree cover generally less than 25 percent (Grossman et al. 1998).

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.
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.
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 ground water 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 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."
Wildlife Management Area	Land and/or water areas designated by state wildlife agencies, such as the Tennessee Wildlife Resources Agency (TWRA), 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.
woodland	Open stands of trees with crowns not usually touching, generally forming 25-60 percent cover (Grossman et al. 1998).
zooplankton	Microscopic aquatic organisms that drift in the water column. Unlike phytoplankton, zooplankton are unable to generate food through photosynthesis and must instead consume other organisms.

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Appendix A – TVA Land Policy

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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 land rights for residential use or dispose of reservoir properties for residential 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 land rights for retail use or dispose of reservoir land or land rights 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.

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Appendix B – Scoping Information

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SCOPING DOCUMENT
NORTHEASTERN TRIBUTARY RESERVOIRS
LAND MANAGEMENT PLANS
ENVIRONMENTAL IMPACT STATEMENT
August 2008

Introduction

The Tennessee Valley Authority (TVA) develops reservoir land management plans to facilitate the management of reservoir properties under its administration. 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. These plans provide for long-term land stewardship and accomplishment of TVA responsibilities under the *TVA Act* of 1933.

TVA is preparing a programmatic environmental impact statement (EIS) that assesses the potential environmental impacts of alternative ways of managing TVA property on seven northeastern tributary reservoirs: Beaver Creek, Boone, Clear Creek, Fort Patrick Henry, South Holston, Watauga, and Wilbur. The proposed land plans would involve approximately 5,000 acres of TVA-managed land. Under the Northeastern Tributary Reservoirs Land Management Plans (NTRLMP), these lands would be allocated to various categories of uses, which would then guide the types of activities to be considered on TVA land. The allocations would be based on public needs, the presence of sensitive environmental resources, and TVA goals and policies.

Background

TVA originally acquired a total of 10,952 acres in Carter, Johnson, Sullivan, and Washington Counties, Tennessee, and Washington County, Virginia for the development of these seven northeastern tributary reservoirs. About 55 percent or approximately 6,000 acres of this land has subsequently been transferred (primarily to other Federal agencies for recreational uses) or sold for economic, industrial, residential, public recreation, or natural resource conservation purposes. The approximate 5,000 acres that remain above the summer operating pool elevations are managed by TVA and are the subject of the proposed reservoir land plans.

All public lands under TVA control on the reservoirs would be allocated for uses in the land plans. Alternative land allocations would be analyzed as different alternatives in the EIS. In developing the land plans for each of the seven northeastern tributary reservoirs, the lands currently committed to a specific use by deed, contract, or agreement would likely be allocated to that current use; however, changes that support TVA goals and objectives would be considered.

Fort Patrick Henry, South Holston, Watauga, and Wilbur Reservoirs were previously planned utilizing a Forecast System developed for those reservoirs in 1965. Planned uses under the Forecast System are Dam Reservation, Public Recreation, Agriculture Research, Industry, Reservoir Operations, and Commercial Recreation. Boone Reservoir was planned in 1999. The planned uses for Boone Reservoir are TVA Project Operations, Sensitive Resource Management, Natural Resource Conservation, Recreation, and

Residential Access. TVA lands on Beaver Creek and Clear Creek have never been planned.

The new land plans for the seven reservoirs would propose options for allocating TVA public lands into one of the following categories as shown in Table 1. The remaining lands that TVA does not own in fee or land never purchased by TVA will be placed in Zone 1(Non-TVA Shoreland) and are not included in this planning process. These zones are similar to those used on other TVA reservoirs that have been planned since 1999.

Table 1. TVA Reservoir Land Planning Zones

Zone	Definition
2 – Project Operations	TVA reservoir land currently used for TVA operations and public works projects.
3 – Sensitive Resource Management	Land managed for the protection and enhancement of sensitive resources.
4 – Natural Resource Conservation	Land managed for the enhancement of natural resources for human use and appreciation.
5 – Industrial	Land managed for economic development including businesses in distribution/processing/assembly and light manufacturing. Preference will be given for industries requiring water access.
6 – Developed Recreation	Land managed for public and/or commercial recreation.
7 – Shoreline Access	TVA-owned land where Section 26a applications and other land use approvals for shoreline alterations are considered.

In November 2006, the TVA Board of Directors approved TVA's Land Policy to govern the retention, disposal, and planning of interests in real property. TVA's Land Policy provides for the continued development of reservoir land management plans for 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. However, TVA will not allocate uncommitted lands or land rights for residential use or dispose of reservoir properties for residential use when developing land plans. In addition, proposals for mixed-use development (live/work/play) will not be considered. For lands allocated as industrial, TVA will show a preference for water-based industries.

This EIS will tier from TVA's Final EIS, *Shoreline Management Initiative: An Assessment of Residential Shoreline Development Impacts in the Tennessee Valley*, which was issued in November 1998. TVA completed this EIS on alternatives for managing residential shoreline development on its reservoirs. 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, recreational 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, TVA would prepare a shoreline categorization for individual reservoirs to help identify areas where sensitive natural and cultural resources exist.

In accordance with the TVA Shoreline Management Policy (SMP), which implements SMI, TVA categorized the residential shoreline of the northeastern tributary reservoirs based on resource data collected from field surveys. In preparation for the land plans, a resource inventory was conducted in 2008 for sensitive species and their potential habitats, archaeological resources, and wetlands along the residential shoreline of the seven northeastern tributary reservoirs.

Scoping Activities

TVA has conducted an extensive public involvement effort to determine the scope of the EIS and to determine alternative parcel allocations under a range of alternatives. The major public involvement steps are listed below.

May 5, 2008	A notice of intent was published in the *Federal Register* alerting other agencies and the public of the EIS.
May 6, 2008	TVA staff mailed over 2,500 informational packages to stakeholder groups and individuals in the reservoirs area.
May 15, 2008	An announcement of the May 20, 2008, public scoping meeting was published in five local newspapers: *Bristol Herald Courier, Kingsport Times News, Johnson City Press, Elizabethton Star,* and *Knoxville News Sentinel.*
May/June 2008	TVA staff met with stakeholder groups and individuals in the reservoirs area to brief them on the planning effort.
May 20, 2008	A public scoping meeting was held at Sullivan Central High School in Blountville, Tennessee, and attended by 42 people.
June 5, 2008	The scoping comment period concluded with 24 comments on the proposal.

In addition, several newspaper articles and television news reports were published during the comment period by the local news media. During the 30-day public comment period, a toll-free phone line was established for people to make verbal comments. Information about the proposed Northeastern Tributary Reservoirs Land Management Plans, including maps and an interactive comment form, was available on the TVA web site.

Copies of the notice of intent were sent to federal, state, and regional agencies (Table 2). Written comments were received from two federal agencies, U.S. Fish and Wildlife Service (USFWS) and the U.S. Forest Service (USFS); one state agency, Virginia Department of Transportation; and one local commercial facility, Clear Creek Golf Club.

Table 2. Agencies Sent a Copy of the Notice of Intent

Agency
U.S. Fish and Wildlife Service: Cookeville, Tennessee
U.S. Fish and Wildlife Service: Abingdon, Virginia
U.S. Fish and Wildlife Service: Gloucester, Virginia
Tennessee Department of Transportation
Tennessee Department of Agriculture
Tennessee Department of Economic and Community Development
Tennessee Historical Commission
Tennessee Wildlife Resources Agency
First Tennessee Development District
Tennessee Department of Environment and Conservation (TDEC)
TDEC - Natural Heritage Division
TDEC - Division of Recreation Educational Services
TDEC - Division of Water Pollution Control
TDEC - Division of Air Pollution Control
U.S. Army Corps of Engineers: Nashville, Tennessee
U.S. Army Corps of Engineers: Norfolk, Virginia
U.S. Army Corps of Engineers: Christiansburg, Virginia
U.S. Army Corps of Engineers: Abingdon, Virginia
Appalachian National Scenic Trail
Great Smoky Mountains National Park
Tennessee Division of Archaeology
Virginia Department of Historic Resources
U. S. Forest Service - George Washington and Jefferson National Forests
U.S. Forest Service - Cherokee National Forest
Virginia Department of Environmental Enhancement Department of Environmental Quality
Virginia Department of Transportation
Mount Rogers Planning District Commission
Virginia Department of Game and Inland Fisheries
Virginia Department of Conservation and Recreation

The comments received during public scoping are summarized in the attached *Summary of Public Participation* issued in August 2008. The results of the public scoping provided recommendations on land use allocations for individual reservoirs and on the environmental issues to be addressed in the EIS, as well as a characterization of respondents' use of the seven reservoirs. Specifically, the public comments reflected a desire to create walking/biking trails on Boone and Fort Patrick Henry Reservoirs and to expand an existing marina on Watauga Reservoir.

Alternatives

TVA proposes to develop individual reservoir land management plans to guide land-use approvals, private water use facility permitting, and resource management decisions on seven northeastern tributary reservoirs. 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. These commitments include transfers, leases, licenses, contracts, power lines, outstanding land rights, and TVA-developed recreation areas.

TVA has decided to develop two action alternatives: Alternative B – Conservation and Recreation and Alternative C – Conservation and Resource Management. Alternative B is based on the management of natural resources as proposed during scoping. Alternative C is a result of the public comments and other opportunities identified during scoping and would lead to increased natural resource conservation and sensitive resource protection opportunities on public lands. The amount of land allocated for TVA Project Operations (Zone 2) and Shoreline Access (Zone 7) would likely remain the same under all the alternatives. While Alternative A – No Action Alternative would provide a baseline for the analysis of likely environmental impacts, Alternatives B and C would frame the environmental issues identified during scoping.

Alternative A - No Action Alternative - Under the No Action Alternative, TVA would continue to use the Forecast System designations established by TVA in 1965 to manage the lands surrounding Fort Patrick Henry, South Holston, Wilbur, and Watauga Reservoirs. TVA would continue to use the existing land management plan to manage Boone Reservoir. Beaver Creek and Clear Creek Reservoirs would remain unplanned. However, the committed lands surrounding the seven northeastern tributary reservoirs are not allocated to a current land use zone; therefore, complete alignment with existing TVA policies would not occur. Requested land uses that are consistent with the forecast designation or existing land plan can either be approved or denied based on a review of potential environmental impacts, TVA's Land Policy, and other administrative considerations.

Alternative B - Conservation and Recreation Alternative - This alternative would promote conservation of natural resources combined with some developed recreation. Under this alternative, TVA would create and implement individual land plans for the seven northeastern tributary reservoirs. The lands managed by TVA would be placed into one of the seven land use zones that best fits the existing land use. TVA would promote conservation of natural resources and developed recreation by allocating about 6 percent of the land surrounding the seven reservoirs to Sensitive Resource Management (Zone 3), 42 percent to Natural Resource Conservation (Zone 4), and 17 percent of the land to Developed Recreation (Zone 6). Exact acreages for each land use zone are not known at this time.

Alternative C - Conservation and Resource Management Alternative - This alternative would provide additional opportunities for the conservation of natural resources with an emphasis on the management of sensitive resources. Under this alternative, TVA would create and implement individual land plans for the seven northeastern tributary reservoirs. The lands managed by TVA would be placed into land use zones that best represent the existing land use, public comments, and other opportunities identified during scoping. As a result of the scoping process, Alternative C, as compared to Alternative B, represents changes in land use zones for 16 parcels of TVA-managed land. Specifically, ten additional parcels would be placed into Sensitive Resource Management (Zone 3). The remaining six parcels would be placed in either Natural Resource Conservation (Zone 4) or Developed Recreation (Zone 6). Because the total acreage of those 16 parcels is relatively small, the percentage of land allocated to each of Zones 3, 4, and 6 is the same under Alternative C as under Alternative B: 6 percent of the land surrounding the seven reservoirs would be allocated to Sensitive Resource Management (Zone 3), 42 percent to Natural Resource Conservation (Zone 4), and 17 percent to

Developed Recreation (Zone 6). Exact acreages for each land use zone are not known at this time.

Significant Environmental Issues to be Addressed in Detail

The majority of the public responses to the notice of intent (NOI) focused on the use of public lands for recreational purposes. Many comments were received that requested the construction of walking/biking trails on Boone and Fort Patrick Henry Reservoirs. Stakeholders requested that a walking/hiking trail be constructed on Boone Reservoir lands near the dam and follow the shoreline as much as possible. Stakeholders commenting on the walking/biking trail on Fort Patrick Henry Reservoir requested that the trail be constructed on Parcel 10 and connect with the Warriors Path State Park mountain bike trail. One commenter requested that lands be set aside for wildlife management and bow hunting. In addition, Fish Springs Marina commented about the need to expand its existing operation on Watauga Reservoir.

Additional comments were received expressing concerns about the importance of natural resource conservation and water quality. The USFWS encouraged TVA to keep all areas that are currently zoned for Sensitive Resource Management (Zone 3) and Natural Resource Conservation (Zone 4) unchanged. The USFS expressed the desire to acquire land from TVA, which is adjacent to the Cherokee National Forest or along the shorelines of Watauga and South Holston Reservoirs. Stakeholders surrounding Fort Patrick Henry Reservoir commented on the amount of trash and litter present in and along the shoreline. Lastly, the rate of shoreline erosion and shoreline stabilization techniques are a concern of stakeholders surrounding Clear Creek and South Holston Reservoirs.

Issues and Resources to be Addressed

Based on the analysis of the scoping comments as well as its internal scoping, TVA has identified the following resources and issues, which would be affected by implementing new land management plans for the northeastern tributary reservoirs. For each resource, the potential direct and indirect effects of each alternative will be described in the EIS. In addition, other activities that may affect resources of concern for land plans will be identified, and the potential effect of these activities on the northeastern tributary reservoirs resources and trends in the resources would be assessed. The major resource categories that will be considered in the EIS are listed below.

Land Use and Prime Farm Land - Existing land use patterns along the shoreline and back-lying land have been largely determined by TVA land acquisition, disposals, and land use agreements. Many of the parcels are committed to existing land uses with little to no potential for change in the 10-year planning horizon. Proposed allocations of the remaining uncommitted parcels will be evaluated using the goals of the NTRLMP and TVA policies and regulations. TVA will comply with the 1981 Farmland Protection Policy Act.

Recreation - Current recreation facilities available to meet public recreation needs will be identified, as will 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 the northeastern tributary reservoirs will be evaluated.

Terrestrial Ecology - Includes the plants and animals comprising the terrestrial ecosystems and natural community types found adjacent to the seven northeastern tributary reservoirs. 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 Executive Orders (EOs) 13186 and 13112 on migratory birds and invasive species.

Endangered and Threatened Species - State or federally listed threatened and endangered plant and animals, known or likely to exist in the vicinity of the seven northeastern tributary reservoirs, will be identified, including the occurrence and habitats on TVA lands and waters. TVA will comply with the Endangered Species Act (ESA) and similar state laws.

Wetlands - 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. TVA will comply with EO 11990 on wetlands and the Clean Water Act.

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

Cultural and Historic Resources - Archaeological sites, historic buildings, and cultural landscapes and properties on or near the seven reservoirs lands including sites listed on the National Register of Historic Places (NRHP) will be identified. TVA will comply with the *National Historic Preservation Act* (NHPA).

Managed Areas and Sensitive Ecological Sites – TVA will identify special and unique natural areas on or in the vicinity of the seven reservoirs set aside for a particular management objective or lands that are known to contain sensitive biological, cultural, or scenic resources.

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. The effect of each alternative on the natural beauty of the shoreline would be evaluated.

Water Quality - Water quality conditions affect the overall ecological conditions of the seven northeastern tributary reservoirs. Water quality is influenced by activities causing shoreline erosion as well as pollution, litter, and debris control. The effect of each alternative on water quality would be evaluated.

Aquatic Ecology - Aquatic ecology includes the plants and animals found in the waters of the northeastern tributary reservoirs and their tributaries. Issues that will be evaluated include the identification and protection of rare species' habitat, important aquatic habitat, or locally uncommon aquatic community types. The effect of each alternative on aquatic ecology would be evaluated.

Air Quality and Noise - Both resources are important for public health and welfare. Compliance with National Ambient Air Quality Standards, which establish safe concentration limits of various air pollutants, is an important issue that will be identified and discussed.

Socioeconomics - The current population, labor force, employment statistics, income, and property values of the northeastern tributary reservoirs region will be identified. A subset of these issues is environmental justice, the potential for disproportionate impacts to minority and low-income communities. The effect of each alternative on socioeconomics would be evaluated.

Issues and Resources Not to be Addressed

Based on the analysis of the scoping information, TVA has identified that the development of the land plans are unlikely to have an impact on greenhouse gases and no sequestered carbon would be released to the environment. TVA would evaluate the potential impacts from the implementation of the land plans as valid projects are identified. Lake level comments submitted during scoping have been addressed in TVA's 2004 *Reservoir Operations Study*. Comments pertaining to lake levels are not included within the scope of this EIS. Also, non-environmental issues such as appreciation of TVA processes and guidelines will not be further addressed.

Related Environmental Documents

Clear Creek Golf Course and Housing Development: Final Environmental Assessment (TVA, 1994)

In 1994, TVA issued a Final Environmental Assessment and Finding of No Significant Impact for the sale of 418 acres of TVA property to the City of Bristol, Virginia, (Bristol) for the construction of a municipal golf course. The Clear Creek Flood Control Project was the result of a joint effort by Bristol and TVA to provide comprehensive flood control in the Beaver Creek Valley. When the project was completed, TVA granted the city a permanent easement over 418 acres for public recreational development. Prior to the sale of the property, the land was not highly developed and used as a city park.

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

In 1998, TVA completed an EIS analyzing possible alternatives for managing residential shoreline development throughout the Tennessee River Valley. The alternative selected determined TVA's current Shoreline Management Policy (SMP), which incorporates a strategy of maintaining and gaining public shoreline through an integrated approach that conserves, protects, and enhances shoreline resources and public use opportunities, while providing for reasonable and compatible use of the shoreline by adjacent landowners. The SMP defines the standards for vegetation management, docks, shoreline stabilization, and other residential shoreline alterations. The NTRLP EIS will tier from the SMI EIS.

Boone Reservoir Land Management Plan: Final Environmental Assessment (TVA, 1999)

In 1999, TVA developed a reservoir land management plan to assist in the management of public lands around Boone Reservoir. The land plan updated a 1955 land use forecast. In addition, it allocated residential access shoreland into categories depending on the presence of sensitive environmental resources. TVA notified the public and environmental agencies of its land planning effort for Boone Reservoir in 1997. A draft EA was released for comment in November 1998. After considering all public comments, TVA developed a Final Environmental Assessment and Land Use Plan.

Reservoir Operations Study Final Programmatic Environmental Impact Statement (TVA, 2004)

This EIS describes TVA's operation of the reservoirs included in the NTRLMP.

Environmental Impact Statement and Revised Land and Resource Management Plan - Cherokee National Forest (U.S. Forest Service, 2004)

This plan and Final EIS describes the existing environment and management of National Forest lands adjacent to Boone, Fort Patrick Henry, South Holston, Watauga, and Wilbur Reservoirs.

Bristol Flood Reduction: Final Environmental Assessment (USACE, 2006)

The U.S. Army Corps of Engineers, Nashville District (USACE) prepared an environmental assessment (EA) evaluating various alternative ways to address flood damage reduction along Beaver Creek for the cities of Bristol, Tennessee, and Bristol, Virginia (Twin Cities). The existing conditions and potential impacts of the viable proposed alternatives were identified and impacts assessed. TVA was a cooperating agency in the EA. In March 2006, TVA signed a Finding of No Significant Impact (FONSI) adopting the USACE EA.

Sugar Hollow Business Complex Easement: Final Environmental Assessment (TVA, 2007)

In 2007, TVA issued a Final Environmental Assessment and Finding of No Significant Impact for the Sugar Hollow Business Complex Easement. The City of Bristol, Virginia (Bristol) was developing a new business park complex on land it bought from TVA for industrial use in the mid-1990s. In order to provide road access to the complex, Bristol requested a general-purpose easement over land owned by TVA. The access road would be located on TVA's Beaver Creek Dam Reservation, a portion of which is already under permanent recreational easement to Bristol for Sugar Hollow Park.

Other Environmental Review and Consultation Requirements

TVA will be the lead Federal agency in the preparation of the land plans and EIS. Other environmental and permitting agencies, including EPA, U.S. Army Corps of Engineers, USFS, U.S. Geological Survey (USGS), TDEC, Tennessee and Virginia SHPOs, TWRA, Virginia Department of Conservation and Recreation, and Virginia Department of Environmental Enhancement will be sent a copy of the Draft EIS for review.

Delegation of Work Assignments

Office of Environment and Research, Environmental Stewardship and Policy, NEPA Resources, will have primary responsibility for management of the EIS process and assembly of the Draft and Final EISs, in consultation with Land and Water Stewardship and the Office of the General Counsel. Other TVA groups, including Environmental Research & Technical Services, River Operations, and Economic Development, may contribute to the analysis.

Interdisciplinary Team (IDT)

The following TVA staff individuals are participating in preparation of the EIS. Their respective responsibilities for the individual resource area discussions are also denoted.

Tyler Baker	Surface Water and Water Quality
Michael Broder	Air Quality
Chris Cooper	Project Manager
Steve Cottrell	Terrestrial Ecology
Pat Cox	Botany and Endangered and Threatened Plants
Janice Dockery	Document Editor
Jim Eblen	Socioeconomics
Joe Feeman	Forestry and Resource Management
Jerry Fouse	Project Advisor and Recreation
Kenneth Gardner	Aquatic Ecology and Endangered and Threatened Aquatic Animals
Kelie Hammond	Navigation
Hill Henry	Terrestrial Ecology and Endangered and Threatened Terrestrial Animals
Clint Jones	Aquatic Ecology and Endangered and Threatened Aquatic Animals
Heather McGee	NEPA Project Manager
Mark McNeely	Graphics
Johnathan McNutt	Recreation
Alan Mays	Prime Farmland
Roger Milstead	Floodplains and River Operations
Jason Mitchell	Natural Areas
Aurora Moldovanyi	Recreation
Charles Nicholson	NEPA Compliance
Laurie Pearl	Land Use and Watershed Initiatives
Chett Peebles	Cultural Resources – Historic Structures and Visual Resources
Kim Pilarski-Brand	Wetlands
Peter Scheffler	Socioeconomics
Laura Smith	Communications
Rick Toennission	NEPA Project Management
Ted Wells	Cultural Resources – Archaeology

Schedule for DEIS Preparation and Review

The following is a tentative schedule for the completion of the EIS.

Task	Date
DEIS Notice of Availability (NOA)	February 2009
Public Review of DEIS	February – March 2009
Development of FEIS	April – September 2009
FEIS NOA	September 2009
Approval of NTRLMP by TVA Board of Directors	December 2009
ROD NOA	January 2010

Northeastern Tributary Reservoirs Land Management Plans

Summary of Public Participation

Tennessee Valley Authority

August 2008

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Part I:

Public Comments Identified by Issue

Abbreviations for Government Agencies and Stakeholder Groups

CCGC	Clear Creek Golf Club
NTMBA	Northeast Tennessee Mountain Bike Association
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
VDOT	Virginia Department of Transportation

General Comments (Comments that are not reservoir specific)		
Appreciation		
Watershed Team	We have always enjoyed working with the TVA over the years. As landowners, we appreciate the professionalism of your staff and the quality.	Individual
Public Meeting	I'm not sure how you can get the information about the meeting date out. I do understand turnover in mailing list does occur. Maybe after elections get new list of alderman and commissioners to update those list. Excellent material and informational discussion.	Individual
Natural Resources		
Natural Resource Protection	Due to the little information available, we do not have any detailed comments at this time. However, once more information is available in the draft EIS, we will likely provide more relative comments.	USFWS
Natural Resource Protection	Due to the increasing loss of public land for private entities around East Tennessee reservoirs, we would encourage TVA to keep all areas that are currently zoned for Sensitive Resource Management (Zone 3) and Natural Resource Conservation (Zone 4) unchanged.	USFWS

Wildlife	I'd just wanted to comment that I would like to see a juvenile and with adult hunting area set aside for safety issues, and for people to take as a father or mother to take a child and introduce them to the outdoors in a safer setting than a no holds barred hunting area. And I'd like to see as much hunting available land for hunting as possible, maybe some archery only areas which are another good safety factor, but would allow a person to bring their children in a setting to hunt and teach them how to hunt. Thank you.	Individual
Recreation		
Mountain Biking	This looks and sounds like a great opportunity to bring family and everyday weekend warriors together.	Individual
Coordination with Virginia Department of Transportation		
Intergovernmental Reviews	All lands developed in Virginia are subject to the following regulations. Each of the regulations defines the procedures required in the development of property or changes in land use.	VDOT
Intergovernmental Reviews	http://www.vdot.virginia.gov/projects/chapter527/default.asp - This document provides guidance on the details of § 15.2-2222.1 of the Code and its supporting regulations that establish the rules, procedures, deadlines for VDOT's review of local government comprehensive plans/plan amendments and traffic impact analyzes for certain rezoning applications, site plans and subdivision plats.	VDOT
Intergovernmental Reviews	http://www.virginiadot.org/projects/accessmgt/default.asp - The access management regulations and standards for principal arterials began implementation on July 1, 2008. Minor arterial collector, and local streets regulations will be implemented on October 1, 2009.	VDOT

Beaver Creek Reservoir		
Reservoir Levels		
Reservoir Levels	Will wait to hear about flow changes for Beaver Dam if happening, otherwise no problem.	Individual
Project Operations		
Road Development	However, at the Beaver Creek Reservoir Route 11 (Lee Highway) is currently being designed by VDOT to increase capacity to 4 lanes with a raised median. These improvements will have limited impacts on the existing Beaver Creek Reservoir (Sugar Hollow Recreation Area) only requiring the relocation of the existing entrance. The relocated entrance will be tied into a signalized intersection thereby improving the access for the park.	VDOT

Clear Creek Reservoir		
Project Operations		
Road Development	No existing or future transportation projects will be impacted at the Clear Creek Reservoir.	VDOT
Natural Resources		
Shoreline Erosion	What progress and timetable is there to stop erosion on Clear Creek Lake?	CCGC
Reservoir Levels		
Reservoir Levels	What progress and timetable is there to change water flow into Clear Creek Lake?	CCGC

Boone Reservoir		
Natural Resources		
Natural Resource Protection	Keep Parcel 10 on Boone Lake in Zone 4	Individual
Recreation		
Public Access	I would like to see better access to these public lands from the land side of the properties. Typically these parcels are bordered by private land and these landowners for years have had the luxury of living next to a parcel of land which is for the most part not accessible to the general public. There is plenty of room on the parcels around Boone Lake to make off street parking areas and access points that do not offend private landowners. Without such access these properties are only accessible from the water side of the property and therefore not useable by all interested parties.	Individual
Trail Construction and Management	I would like to see a walking/biking trail put at B1 near Boone Dam. The trail could follow the shoreline as much as feasible. The trail could begin near the entrance to Boone Dam Reservoir area travel up and through the picnic/swimming area, out along the shore area to the ramp/parking area down around the cove to what is now designated as available for camping out of the cove and up the shore to Gammin Drive. It should have very little environmental impact and allow public use for an area that is for the most part not accessible to the public.	Individual
Reservoir Levels		
Reservoir Levels	I don't see the need to drop the lake in the fall. Other lakes do not fluctuate more than 4 feet in a year. For flood control, rains usually come in the spring when the lake is rising. Overall, more water is needed in Boone.	Individual

Fort Patrick Henry Reservoir		
Recreation		
Boating	We both live on Patrick Henry lake, and our complaint is that the same trash floats up and down all summer long. You'll see the same log or the same tire or whatever it is. And it floats up and down all summer long, you know, it goes down one end of the lake, comes back up. And sometimes the trash is so heavy that you can't even navigate through it. And if have you that a jet type boat or a jet type ski that sucks water through your jet, you can't even take it out because it will clog it up. But in the case of a regular boat you still can't maneuver around it, it is so heavy and so dense with trash, cups, bags, logs, I mean it's just a mess.	Individual
Boating	They used to have a barge to clean the lake up and it's still down at the dam. But they don't use it anymore, to collect the trash on the lake. They used to do that when we first moved out there, and that's been a lot of years ago. And they do nothing now to get rid of the trash.	Individual
Trail Construction and Management	Parcel #10 / I-81 in the Fort Patrick Henry Reservoir Land Management Plan: This parcel is next to the Warriors Path State Park mountain bike trail system. Parcel #10 should be made available for further development of mountain bike trails in the area. Mountain bike trails provide a great activity for all ages. There has been an ever growing interest in mountain biking in the Tri-Cities area. Not only is the number of local cyclist on the rise, but we continue to get traffic from people outside the area coming to the Tri-Cities specifically to ride our trails. The more trails and more variety of trails we can build, the more people will want to come and bring their bikes and dollars to the area.	Individuals (4) and NTMBA
Trash and Litter		
Trash and Litter	I guess this is probably the way they fluctuate the lake. It fluctuates like in the morning 3 feet until afternoon. I guess it's just puts it's on the bank. And when it goes down, it drops it's on the bank and then when its comes back up, it picks it back up. It never leaves the lake all summer long. It just collects -- I know last year, there was a TVA marker that marks shallow water. It came loose, and it stayed within probably a half mile all summer long. And it floated back and forth, back and forth and never left the area. So anyway, I don't know what they can do about it.	Individual

Trash and Litter	But it's terrible. I mean it really is. You have to see it to believe it. It just gets worse and worse. And last year was really bad. I guess it was dry last year, and it was really bad last year.	Individual

South Holston Reservoir		
Project Operations		
Road Development	No existing or future transportation projects will be impacted at the South Holston Reservoir.	VDOT
Natural Resources		
Natural Resource Protection	At this time, the Forest Service does not have any specific comments as it pertains to scoping interest. However, we would like to express our desire, if the opportunity arises, to acquire land from TVA which is adjacent to the Cherokee National Forest or along the shorelines of Watauga and South Holston Reservoirs. In addition, the Forest Service would like to continue receiving notification of all documents and meetings as it pertains to this project, including the EIS when published.	USFS
Shoreline Erosion	TVA lake coves with steep banks are filling in rapidly and trees on the banks are toppling. The cause is wakes from speeding boats particularly jet skiers that circle continually. As an example, in a normal year we lose 10 horizontal feet of bank in Sharps Creek Inlet of South Holston Lake during full pool. Private docks are damaged by the wakes. The problem is that TVA refuses to recognize small coves with steep banks such as Sharps Creek must be declared no wake-zones to eliminate the problem. Yes, we all know the state must take legislative action. Please don't tell us again that it is not your responsibility, but the state's. If you were motivated, you could take the lead with the state in getting those coves with steep banks declared as no-wake zones.	Individual
Shoreline Erosion	Other solutions might involve planting with silken dogwood, but we have found that they were out from boat wakes, particularly on steep banks. Rip-rap would be an expensive, esthetically unattractive solution that would limit access to swimmers from what remains of the banks.	Individual
Shoreline Erosion	TVA kept lake levels below normal full pool the summer of 2007. There was no noticeable erosion that year. Lowering full pool elevation and letting the dirt banks re-vegetate is the only other obvious solution. However, private docks at the end of coves whose owners depend	Individual

	on full pool to use them would lose use of their docks. And it would limit total lake surface available for boaters.	

Watauga Reservoir		
Natural Resources		
Natural Resource Protection	At this time, the Forest Service does not have any specific comments as it pertains to scoping interest. However, we would like to express our desire, if the opportunity arises, to acquire land from TVA which is adjacent to the Cherokee National Forest or along the shorelines of Watauga and South Holston Reservoirs. In addition, the Forest Service would like to continue receiving notification of all documents and meetings as it pertains to this project, including the EIS when published.	USFS
Recreation		
Marina Expansion	I would like to expand my existing commercial marina operation, Fish Springs Marina, on Watauga Lake. Tile B2 of the Watauga and Wilbur Reservoir Land Management Plan, parcel 48 on the map is my current operation. I would like to extend my existing houseboat dock and covered slip operation around the corner in a westward direction partially onto what is now parcel 49, toward the mouth of Little Stone Creek cove, without entering or obstructing the mouth (use) of Little Stoney Creek cove.	Individual

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Part II:

Public Comments Identified by Reservoir and Parcel

Beaver Creek Reservoir		
Parcel	**Suggested Land Use**	**Comment**
1	Zone 2 – Project Operations	However, at the Beaver Creek Reservoir Route 11 (Lee Highway) is currently being designed by VDOT to increase capacity to 4 lanes with a raised median. These improvements will have limited impacts on the existing Beaver Creek Reservoir (Sugar Hollow Recreation Area) only requiring the relocation of the existing entrance. The relocated entrance will be tied into a signalized intersection thereby improving the access for the park.

Boone Reservoir		
Parcel	**Suggested Land Use**	**Comment**
10	Zone 4 – Natural Resource Management	Keep Parcel 10 on Boone Lake in Zone 4
1	Zone 4 – Natural Resource Management	I would like to see a walking/biking trail put at B1 near Boone Dam. The trail could follow the shoreline as much as feasible. The trail could begin near the entrance to Boone Dam Reservoir area travel up and through the picnic/swimming area, out along the shore area to the ramp/parking area down around the cove to what is now designated as available for camping out of the cove and up the shore to Gammin Drive. It should have very little environmental impact and allow public use for an area that is for the most part not accessible to the public.
3	Zone 4 – Natural Resource Management	I would like to see a walking/biking trail put at B1 near Boone Dam. The trail could follow the shoreline as much as feasible. The trail could begin near the entrance to Boone Dam Reservoir area travel up and through the picnic/swimming area, out along the shore area to the ramp/parking area down around the cove to what

		is now designated as available for camping out of the cove and up the shore to Gammin Drive. It should have very little environmental impact and allow public use for an area that is for the most part not accessible to the public

Fort Patrick Henry Reservoir		
Parcel	**Suggested Land Use**	**Comment**
10	Zone 4 – Natural Resource Management	Parcel #10 / I-81 in the Fort Patrick Henry Reservoir Land Management Plan: This parcel is next to the Warriors Path State Park mountain bike trail system. Parcel #10 should be made available for further development of mountain bike trails in the area. Mountain bike trails provide a great activity for all ages. There has been an ever growing interest in mountain biking in the Tri-Cities area. Not only is the number of local cyclist on the rise, but we continue to get traffic from people outside the area coming to the Tri-Cities specifically to ride our trails. The more trails and more variety of trails we can build, the more people will want to come and bring their bikes and dollars to the area.

Watauga Reservoir		
Parcel	**Suggested Land Use**	**Comment**
49	**Zone 6 - Recreation**	I would like to expand my existing commercial marina operation, Fish Springs Marina, on Watauga Lake. Tile B2 of the Watauga and Wilbur Reservoir Land Management Plan, parcel 48 on the map is my current operation. I would like to extend my existing houseboat dock and covered slip operation around the corner in a westward direction partially onto what is now parcel 49, toward the mouth of Little Stone Creek cove, without entering or obstructing the mouth (use) of Little Stoney Creek cove.

RECEIVED JUN 12 2008

United States Department of Agriculture | Forest Service | Cherokee National Forest | 2800 Ocoee Street N Cleveland, TN 37312-5374

File Code: 1900-1
Date: June 10, 2008

Daniel H. Ferry
Senior Mgr. Environmental Services and Programs
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, TN 37902-1499

Doc. Type:
Index Field:
Project Name:
Project No.:

Dear Mr. Ferry:

Thank you for the opportunity to comment on the preparation of an Environmental Impact Statement (EIS) for Northeastern Tributary Reservoirs Land Management Plan (NTRLMP) by Tennessee Valley Authority (TVA). At this time, the Forest Service does not have any specific comments as it pertains to scoping interest. However, we would like to express our desire, if the opportunity arises, to acquire land from TVA which is adjacent to the Cherokee National Forest or along the shorelines of Watauga and South Holston Reservoirs. In addition, the Forest Service would like to continue receiving notification of all documents and meetings as it pertains to this project, including the EIS when published.

If you have any additional questions, comments, or concerns, please contact Susan Shaw, Forest Biological and Physical Resources, Planning, Lands, & Minerals Staff Officer, at 423.476.9700.

Sincerely,

H. THOMAS SPEAKS, JR.
Forest Supervisor

Caring for the Land and Serving People

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McGee, Heather Leanne

From: Robbie_Sykes@fws.gov
Sent: Thursday, June 05, 2008 3:51 PM
To: McGee, Heather Leanne
Subject: Northern Tributaries Reservoir Management Plan

Follow Up Flag: Follow up
Flag Status: Red

Heather,

I have reviewed the information in the subject plan which was published in May 5, 2008, in the Federal Register / Vol. 73, No. 87. Due to the little information available, we do not have any detailed comments at this time. However, once more information is available in the draft EIS, we will likely provide more relative comments. Due to the increasing loss of public land for private entities around East Tennessee reservoirs, we would encourage TVA to keep all areas that are currently zoned for Sensitive Resource Management (Zone 3) and Natural Resource Conservation (Zone 4) unchanged.

We look forward to reviewing the draft EIS and providing more substantial comments at that time. Please feel free to contact our office if any assistance is needed.

Sincerely,

Robbie Sykes

1

COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION
1401 EAST BROAD STREET
RICHMOND, VIRGINIA 23219 2000

David S. Ekern, P.E.
COMMISSIONER

July 2, 2008

Mr. Daniel H. Ferry
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, TN 37902-1499

Re: Northeastern Tributary Reservoirs Land Management Plan

Dear Mr. Ferry:

The Virginia Department of Transportation has reviewed the information provided for the referenced project. Our review covers impacts to existing and proposed transportation facilities.

No existing or future transportation projects will be impacted at the South Holston Reservoir and Clear Creek Reservoir. However, at the Beaver Creek Reservoir Route 11 (Lee Highway) is currently being designed by VDOT to increase capacity to 4 lanes with a raised median. These improvements will have limited impacts on the existing Beaver Creek Reservoir (Sugar Hollow Recreation Area) only requiring the relocation of the existing entrance. The relocated entrance will be tied into a signalized intersection thereby improving the access for the Park.

All lands developed in Virginia are subject to the following regulations. Each of the regulations defines the procedures required in the development of property or changes in land use.

http://www.vdot.virginia.gov/projects/chapter527/default.asp - This document provides guidance on the details of §15.2-2222.1 of the Code and its supporting regulations that establish the rules, procedures, and deadlines for VDOT's review of local government comprehensive plans/plan amendments and traffic impact analyses for certain rezoning applications, site plans and subdivision plats.

http://www.virginiadot.org/projects/accessmgt/default.asp - The access management regulations and standards for principal arterials began implementation on July 1, 2008. Minor arterial, collector, and local streets regulations will be implemented on October 1, 2009.

Thank you for the opportunity to comment on this project.

Sincerely,

Mary T. Stanley

Mary T. Stanley
Environmental Engineer
Virginia Department of Transportation
(804) 786-0868

Appendix C – Correspondence

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STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
WATER SUPPLY
9th Floor, 401 Church Street
Nashville, Tennessee 37243-1549
Phone: (615) 532-0191; Fax: (615) 532-0503

October 20, 2009

Northeastern Tributary Reservoirs Land Management Plan
ATTN: Amy B. Henry
TVA NEPA Resources
400 West Summit Hill Drive, WT 11D
Knoxville, Tennessee 37902

RE: Request for Comments, Draft Environmental Impact Statement
Northeastern Tributary Reservoirs Land Management Plan (Sullivan, Johnson, Washington Counties), Tennessee

Ms. Henry:

The Division of Water Supply has received and reviewed the Draft Environmental Impact Statement for the Northeastern Tributary Reservoirs Land Management Plan and would like to thank TVA NEPA Resources for the opportunity to comment on this plan.

Safe Dams Program:

A file review was conducted of all registered sites in the Safe dam program. There are several privately owned dams adjacent to the proposed project area. The contact for information in the Safe Dams Program can be obtained from Mr. Lyle Bentley Manger of the Safe Dams Section in the Division of Water Supply. Mr. Bentley may be reached by e-mail lyle.bentley@tn.gov or by telephone at (615) 532-0154.

Source Water Protection Program:

A review of the community and non-community water supplies in the area shows that a significant portion of the proposed project will be in Source Water Protection Area. Any information on the Source Water/Wellhead Protection areas can be directed to Mr. Scotty D. Sorrells Manager Groundwater Management Section. Mr. Sorrells may be reached by e-mail scotty.sorrells@tn.gov or by telephone at (615) 532-9224.

Ms. Henry
Draft Environmental Impact Statement Northeastern Tributary Reservoirs Land Management Plan
October 20, 2009
Page 2

Water Well Program:

A file review was conducted of all the registered private water wells within this proposed route. Please contact Mr. Luke Ewing with the names of the topographic quads. There are private water supplies in the proposed area. Please be advised that not all the water wells that are in existence are on this database and that there may be older wells that we have no record of as well as hand dug wells whose existence we would not have recorded. All water wells that are encountered should be plugged and abandoned by a licensed well contractor. Any information related to the Water Well Program can be directed to Mr. Luke Ewing Manager Water Well Program. Mr. Ewing can be reached by e-mail luke.ewing@tn.gov or by telephone at (615) 532-0176.

Underground Injection Control:

A file review was conducted of all the registered Underground injection Control (UIC) points within the area of review. There are number of systems registered UIC sites within the proposed project area. The system should be properly plugged and abandoned before construction. Please be advised that not all old large capacity septic systems or stormwater injection points that are in existence are on this database. All UIC wells that are encountered should be plugged and abandoned according to approval from the UIC program. The plan for the proposed project locates the project in a karst area, the county you are working in is in mature karst terrain and has abundant sinkholes and other karst features. In Tennessee the modification of sinkholes is regulated under the Underground Injection Control (UIC) Program, which is housed in the Ground Water Management Section. If there is to be a modification of any sinkhole on this project it will be necessary for you to have a letter of authorization from the UIC program to proceed. You will need to contact Carolyn Sullivan of my staff to file the application and obtain the authorization. Once a final project has been determined, we will need a map(s) showing the sinkholes identified before construction that will be modified. At the completion of construction we will also need a map with all the sinkholes that have been modified showing notations with latitudes and longitudes and information as to the modification performed on the sinkhole. Note that the sinkholes which show on a 7 ½ minute quadrangle topographic map are by no means a complete representation (they typically represent about 5 - 20% of the actual sinkholes). Please be advised that the sinkhole is considered the entire closed depression whether there is an open throat or not and not just the area near an open throat. Extreme caution should be used in the filling and construction on or in a sinkhole. It may be necessary to add extra support over the expanse of a sinkhole, even after the sinkhole has been filled. A sinkhole by nature is an unstable geologic area, which has no permanent means of stabilization and is subject to times of movement and settling. This uncontrollable movement may cause some damage to any permanent structure placed on or around the karst feature. The State of Tennessee assumes no responsibility in potential consequences of building on filled depressions of any kind at any time. Any information on the UIC programs can be directed to Ms. Carolyn Sullivan UIC Program Groundwater Management Section. Ms. Sullivan may be reached by e-mail carolyn.sullivan@tn.gov or by telephone at (615) 532-0180.

Ms. Henry
Draft Environmental Impact Statement Northeastern Tributary Reservoirs Land Management Plan
October 20, 2009
Page 3

This letter represents a brief review of best available data sources and not a comprehensive field evaluation. Please verify all information contained within this letter in the field.

The issuance of this letter does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, State, or local laws or regulations.

If you have any questions, feel free to call me at (615) 532-9224 or email at scotty.sorrells@tn.gov.

Sincerely,

Scotty D. Sorrells
Manager Ground Water Management Section
Source Water Protection Coordinator
Division of Water Supply

c: Thomas A. Moss Acting Director DWS
William Hench PE Engineering Section
Lyle Bentley Chief SDP
Luke Ewing Manager WWP
Carolyn Sullivan UIC
David Greif GWMS

DEPARTMENT OF THE ARMY
NASHVILLE DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1070
NASHVILLE, TENNESSEE 37202-1070

November 13, 2009

IN REPLY REFER TO
Project Planning Branch

TVA NEPA Resources
Attention: Ms. Amy B. Henry
400 West Summit Hill Drive, WT11D
Knoxville, Tennessee 37902

Dear Ms. Henry:

Thank you for the opportunity to review and comment on the *Draft Environmental Impact Statement (EIS), Northeastern Tributary Reservoirs Land Management Plan*. Please note for future correspondence for the US Army Corps of Engineers, Nashville District, Lieutenant Colonel Anthony P. Mitchell assumed command on July 17, 2009 and is our current District Engineer.

Our only comments to your draft EIS pertain to Beaver Creek Dam, described in Chapter 3 and further discussed in Volume II of the document. In December 2004 the Corps completed an Environmental Assessment (EA) addressing flood damage reduction to the cities of Bristol, Tennessee and Bristol, Virginia. TVA adopted this EA and signed a Finding of No Significant Impact in March 2006. One alternative planned for implementation includes modifying the outlet structure of Beaver Creek Dam to increase detention times for smaller storm events and heavy rainfalls to allow floodwaters below the dam to move through the twin cities before releasing water from the upper Beaver Creek drainage area. We suggest your draft EIS recognize the modification to the structure and address any implications thereof relevant to your study.

Thank you again for allowing the Corps to comment during TVA's NEPA process. If additional information is necessary, please contact Kim Franklin at (615)736-7954.

Sincerely,

Jim Higgs
for
Patricia L. Coffey
Chief, Project Planning Branch

Henry, Amy Burke

From: Ewing, Amy (DGIF) [Amy.Ewing@dgif.virginia.gov]
Sent: Tuesday, November 17, 2009 9:23 AM
To: Henry, Amy Burke
Cc: Watson, Brian (DGIF); Pinder, Mike (DGIF); Kittrell, Bill (DGIF); Boynton, Allen (DGIF); Greene, Clark (DGIF)
Subject: ESSLog# 30183_Draft Environmental Impact Statement (DEIS)_NE Tributary Reservoirs Land Mgt. Plan

Ms. Henry,
We have reviewed the sections of the draft EIS for the Northeastern Tributary Reservoirs Land Management Plan that cover the Bristol Project (Beaver Creek and Clear Creek reservoirs) and the South Holston Reservoir in Virginia. We offer the following comments and recommendations:

Bristol Project:
According to our records, Beaver Creek has been designated a stockable trout water. We recommend that the land management plan for this reservoir consider this important fisheries resource. We recommend coordination with Bill Kittrell, VDGIF Region III Fisheries Manager regarding stocking and angling activities as well as opportunities for recreational access in and around the reservoir, if appropriate.

South Holston Reservoir:
According to our records, Middle Fork Holston River which feeds into the reservoir is designated a Threatened and Endangered Species Water due to the presence of federal Threatened state Threatened spotfin chub, state Threatened longhead darter, state Threatened slabside pearlymussel, state Threatened black sandshell and federal Endangered state Endangered rough rabbitsfoot. It appears the lands adjacent to this water as it empties into the reservoir are not owned by TVA. In the case that it is or that it may be acquired by TVA, we recommend that the riparian lands adjacent tot his water be placed into Zone 3: Sensitive Resource Management and that naturally vegetated riparian buffers of at least 300 ft be maintained on this water.

According to our records, South Fork Holston River which feeds into the reservoir is designated a Threatened and Endangered Species Water due to the presence of state Endangered sharphead darter. It appears the lands adjacent to this water as it empties into the reservoir is not owned by TVA except perhaps for the area designated as "Access Area 7" and shown as a hatched green polygon. In the case that it is or that it may be acquired by TVA, we recommend that the riparian lands adjacent tot his water be placed into Zone 3: Sensitive Resource Management and that naturally vegetated riparian buffers of at least 300 ft be maintained on this water.

Cox Mill Creek which feeds into the reservoir has been designated a wild trout water known to support rainbow trout. We recommend consideration of this important fishery during development of the land management plan. Access to this water for angling by the public and sampling by our biologists should be incorporated into that plan. We recommend coordination with Bill Kittrell, VDGIF Region III Fisheries manager at 276-783-4860 regarding this resource.

We also note that we have two boat ramps on South Holston Reservoir. One is located near the confluence of Fifteeenmile Creek and one is located near the location on the map designated as "Area 6 ramp". We recommend that the land management plan for this reservoir include consideration of these boat ramps and the need for continued access to the ramps for management and maintenance purposes. We support continuing to allow the public access to this reservoir. Bill Kittrell may be contacted for more information or guidance about recreational access.

Please contact us if we may be of further assistance.

Thank you. Amy

Amy M. Ewing
Environmental Services Biologist
Virginia Dept. of Game and Inland Fisheries
4010 West Broad Street

Richmond, VA 23230
804-367-2211
amy.ewing@dgif.virginia.gov

L. Preston Bryant, Jr.
Secretary of Natural Resources

Joseph H. Maroon
Director

COMMONWEALTH of VIRGINIA
DEPARTMENT OF CONSERVATION AND RECREATION
203 Governor Street
Richmond, Virginia 23219-2010
(804) 786-6124

November 17, 2009

Amy Henry
TVA NEPA Resources
400 West Summit Hill Drive, WT 11D
Knoxville, TN 37902

RE: TVA Northeastern Tributary Reservoirs Land Management Plan

Dear Ms. Henry:

South Holston Land Management Plan
The Department of Conservation and Recreation (DCR) Division of Planning and Recreational Resources (PRR) administers the Virginia Scenic Rivers, Virginia Byways, and state trails programs. Additionally, DCR is responsible for developing the Virginia Outdoors Plan (VOP), the state's comprehensive outdoor recreation and open space plan. The VOP recognizes the importance of scenery to Virginians who walk and drive for pleasure, and who visit natural areas, parks, and scenic areas. Walking for pleasure is the number one activity of Virginians. Access to water is the number one need for Virginians. Several of the top 10 activities that Virginia participate are water related including, swimming, boating, fishing, and sunbathing.

The management plan for the Holston River addresses the recreational and scenic needs of the lake. However, there are few boat launch opportunities along the entire lake shoreline and the existing ones need to be mapped better. Providing additional boat launches will help to address the great demand for boat access to Virginia's waters.

The lake is also within the proposed corridor for the Beaches to bluegrass statewide trail. Coordinate existing trail upgrades and the construction of new trails, so that they can be a part of that statewide trail system. Jennifer Wampler, trails coordinator, can help with this. Her contact information is Jennifer Wampler, Trails Coordinator, Jennifer.Wampler@dcr.virginia.gov , (804) 786-9240.

The DCR's Division of Natural Heritage has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

According to the information currently in our files, the South Fork-Middle Fork Holston River Stream Conservation Unit is located within Access Area 7 (Parcel Number 32). SCUs identify stream reaches

that contain aquatic natural heritage resources, including 2 miles upstream and 1 mile downstream of documented occurrences, and all tributaries within this reach. SCUs are given a biodiversity significance ranking based on the rarity, quality, and number of element occurrences they contain; on a scale of 1-5, 1 being most significant. The South Fork-Middle Fork Holston River Stream Conservation Unit has been given a biodiversity significance ranking of B2, which represents a site of very high significance. The natural heritage resources of concern associated with this SCU are:

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status	Federal Species of Concern
Alasmidonta marginata	Elktoe	G4	S1S2		SC	
Apalone spinifera	Spiny Softshell	G5	S2			
Erimonax monachus	Turquoise Shiner	G2	S1	LT	LT	
Etheostoma acuticeps	Sharphead Darter	G3	S1		LE	
Fusconaia barnesiana	Tennessee Pigtoe	G2G3	S2	SOC	SC	SOC
Lexingtonia dolabelloides	Slabside Pearlymussel	G2	S2	C	LT	
Moxostoma carinatum	River Redhorse	G4	S2S3		SC	
Phenacobius crassilabrum	Fatlips Minnow	G3G4	S2		SC	
Pleurobema oviforme	Tennessee Clubshell	G2G3	S2S3	SOC		SOC
Ptychobranchus subtentum	Fluted Kidneyshell	G2	S2	C		

In addition, the South Fork Holston River has been designated as a "Threatened and Endangered Waters" by the Virginia Department of Game and Inland Fisheries (VDGIF) and the associated species are the Little-winged pearlymussel (*Pegias fabula*, G1/S1/LE/LE), Sharphead Darter and Slabside Pearlymussel.

The large-leaf pondweed (*Potamogeton amplifolius*, G5/S1S2/NL/NL) has also been historically documented in the South Fork Holston River.

Due to the legal status of some of the natural heritage resources, DCR recommends coordination with USFWS and VDGIF to ensure compliance with the protected species legislation. To minimize adverse impacts to the aquatic ecosystem as a result of the proposed activities, DCR also recommends the implementation of and strict adherence to applicable state and local erosion and sediment control/storm water management laws and regulations.

Furthermore, the Virginia Karst Program and the Virginia Speleological Survey (VSS) have reviewed this project for documented sensitive karst features and caves. The VSS knows of one cave within the polygon, a resurgence (spring associated) cave called Thomas Cave No. 2. The location is shown on the attached map. Please coordinate with Wil Orndorff (540-394-2552, Wil.Orndorff@dcr.virginia.gov) to document and minimize adverse impacts to karst features.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

In addition, our files do not indicate the presence of any State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

New and updated information is continually added to Biotics. Please contact DCR for an update on this natural heritage information if a significant amount of time passes before it is utilized.

The Virginia Department of Game and Inland Fisheries maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters, that may contain information not documented in this letter. Their database may be accessed from or contact Shirl Dressler at (804) 367-6913.

The remaining DCR divisions have no comments regarding the scope of this project. Thank you for the opportunity to comment.

Sincerely,

Robert S. Munson
Planning Bureau Manager
DCR-DPRR

CC: Wil Orndorff, DCR-Karst
Amy Ewing, VDGIF
Tylan Dean, USFWS

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
SUITE 700, JAMES K. POLK BUILDING
NASHVILLE, TENNESSEE 37243-0349
(615) 741-2848

GERALD F. NICELY
COMMISSIONER

PHIL BREDESEN
GOVERNOR

November 17, 2009

Northeastern Tributary Reservoirs
Land Management Plan
ATTN: Amy B. Henry
400 West Summit Hill Drive, WT 11D
Knoxville, TN 37902

RE: Draft Environmental Impact Statement, Northeastern Tributary Reservoirs Land Management Plan

Dear Ms. Henry:

Thank you for the opportunity to comment on the scope of the above-referenced draft EIS.

At this time, the Tennessee Department of Transportation has no comments. If we can be of any assistance in the future, please contact Ms. Suzanne Herron, Director of our Environmental Division, at 615-741-2612.

Sincerely,

Gerald F. Nicely
Commissioner

GFN:SH

cc: Ms. Suzanne Herron, W/Attach.

TVA PUBLIC COMMENTS

Comment List

Northeastern Tributaries Land Management Plan

###################	By: Gregory Hogue	Addr1: 75 Spring Street, S.W.	Addr2: Suite 1144
City: Atlanta	State: GA Zip: 30303	Phone: 4043314524	E-mail: gregory_hogue@ios.doi.gov Cont Meth: E-mail

Comment: Amy Henry Northeastern Tributary Reservoir Land Management Plan TVA NEPA Resources 400 West Summit Hill Drive, WT 11D Knoxville, Tennessee 37902 Phone: (865) 632-4045 Re: Comments on the Draft Environmental Impact Statement (DEIS) for the Northeastern Tributary Reservoirs Land Management Plan Dear Ms. Henry: The United States Department of the Interior (Department) has reviewed the Tennessee Valley Authority□s (TVA) Draft Environmental Impact Statement (DEIS) for the Northeastern Tributary Reservoirs Land Management Plan (NTRLMP) and provide the following comments. The DEIS describes a reservoir land management plan for seven northeastern tributary reservoirs located in northeast Tennessee and southwest Virginia. The NTRLMP would plan all public lands under TVA stewardship around Beaver Creek, Clear Creek, Boone, Fort Patrick Henry, South Holston, Watauga, and Wilbur reservoirs, which total about 4,933 acres. The NTRLMP would be designed to guide land use approvals, private water use facility permitting, and resource management decisions. TVA has identified three alternatives for managing public land under its control around the seven northeastern tributary reservoirs, including the proposed action. TVA has indicated that no federally listed terrestrial plants, terrestrial wildlife, or aquatic animal species have been identified on or near uncommitted northeastern tributary reservoir parcels where future activities would be likely to occur. Two rare plant communities were identified as Carolina Hemlock (Tsuga caroliniana)/Great Laurel (Rhododendron maximum) Forest along the north shore of Watauga Reservoir. The federally listed as endangered gray bat (Myotis grisescens) and Virginia big-eared bat (Corynorhinus townsendii virginianus) are the only federally listed animals species recorded within 3 miles of the northeastern tributary reservoir parcels. The shiny pigtoe pearlymussel (Fusconia cor) and tan riffeshell (Epioblasma florentina walker), both federally listed as endangered, have been recorded within the watersheds that comprise the northeastern tributary reservoir parcels study area. The fluted kidneyshell (Pychobranchus subtentum) and slabside pearlymussel (lexingtonia delabelloides), both candidates for federal listing, also have been reported. No TVA-managed parcels are located near those records. The spotfin chub (Cyprinella monacha), federally listed as threatened, has been recorded downstream of Fort Patrick Henry and South Holston dams. However, due to discharges of cold and deep water from the dams, the tail water habitat is likely no longer suitable for this species. Under the preferred alternative, Alternative C, fewer acres (2,322 acres) versus Alternative B (2,357 acres) would be allocated to Zone 3(Sensitive Resource Management) and Zone 4 (Natural Resource Conservation). However, those parcels containing the global critically imperiled terrestrial community, Carolina Hemlock/Great Laurel Forest, under Alternative C would be allocated to Zone 3 as compared to their Zone 4 allocation under Alternative B. Therefore, although Alternative C would result in fewer acres allocated to Zone 3 as compared to Alternative B, parcels containing known sensitive species would be somewhat more protected under Alternative C. Recognizing that the difference in acreage allotted to Zone 3 is minor (35 acres) between Alternative B and C and that there would be added protection to the Carolina Hemlock/Great Laurel Forest Under Alternative C, we agree with TVA□s decision to select Alternative C, as the preferred alternative. This is also taken into account, the potential for dispersed recreation and potential associated indirect impacts from such activities. TVA has determined that no plants or habitat suitable for plants that are federally listed were identified on or within 5 miles of the parcels addressed in the NTRLMP. Additionally, TVA has determined that land planning on the NTRs has no potential to affect on any federally listed terrestrial species. TVA has also assumed that none of the parcel allocations in the NTRLMP would have the potential to affect federally listed aquatic species. We recommend that TVA consult with the Department on individual site-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 Department advises that □likely to adversely affect□ is the appropriate determination at the programmatic consultation level, also. However, after reviewing the EIS and discussing the NTRLMP with TVA staff, we believe that the likelihood of reaching a determination of □likely to adversely affect□ at the site specific consultation level in the future is unlikely. In view of this, we believe that the requirements of section 7 of the Endangered Species Act (Act) of 1973, as they apply to the NTRLMP, 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 your permit application, 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 NTRLMP, site-specific consultations will still be needed, but can tier back to this consultation. It is incumbent upon TVA and the Department to coordinate adequately in the future to minimize the likelihood of any specific actions resulting in an adverse effect to listed species. If you have questions or need further assistance, please contact Todd Shaw on (931) 528-6481 extension 215. I can be reached on (404) 331-4524 or by email at gregory_hogue@ios.doi.gov. Sincerely, Gregory Hogue Environmental Officer cc: Shane Hanlon, FWS □ Abingdon, VA Jerry Zelwitz □ FWS □ Region 4 Brenda Johnson □ USGS □ Reston, VA OEPC - WASH

Comments for Northeastern Tributaries Land Management Plan: 1

12/01/2009 **Comments Date Range: 11/23/2009 to 11/23/2009** Page 1 of 1

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

November 23, 2009

Amy B. Henry
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, Tennessee 37902

RE: Northeastern Tributary Reservoirs Land Management Plan Beaver Creek, Clear Creek, Boone, Fort Patrick Henry, South Holston, Watauga, and Wilbur reservoirs Carter, Johnson, Sullivan, and Washington counties, Tennessee; Washington County, Virginia CEQ No. 20090346

Dear Ms. Henry:

Pursuant to Section 102(2)(C) of the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act, the U.S. Environmental Protection Agency (EPA) has reviewed the subject Northeastern Tributary Reservoirs Land Management Plan Beaver Creek, Clear Creek, Boone, Fort Patrick Henry, South Holston, Watauga, and Wilbur reservoirs Carter, Johnson, Sullivan, and Washington counties, Tennessee; Washington County, Virginia prepared by the Tennessee Valley Authority (TVA). This draft plan and EIS will hereafter be referred to as the Draft Environmental Impact Statement (DEIS).

The Tennessee Valley Authority (TVA) is developing a Northeastern Tributary Reservoirs (NTRs) Land Management Plan to guide land use decisions on TVA reservoir lands located along seven tributaries in the northeast Valley region (approximately 5,000 acres): Boone, Fort Patrick Henry, South Holston, Watauga, Wilbur, Beaver Creek, and Clear Creek. The goal for the reservoir planning effort is to provide a clear vision of how TVA will manage its public lands and identify lands for specific uses. This process relies heavily on public input regarding land uses and on how these lands should be managed for future uses.

ALTERNATIVES INCLUDING THE PROPOSED ACTION

This land plan considers three alternatives and incorporates TVA's 2006 Land Policy. The alternatives include a No Action Alternative (Alternative A) to continue use of the Forecast System designations on Fort Patrick Henry, South Holston, Watauga, and Wilbur reservoirs and use of the 1999 Boone Reservoir Land Management Plan. Under the No Action Alternative, Beaver Creek and Clear Creek reservoirs, which were never subject to the Forecast System or more recent land planning procedures, would remain unplanned. The other alternatives considered are a Proposed Land Use

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Alternative (Alternative B) and a Modified Proposed Land Use Alternative (Alternative C). TVA's Preferred Alternative is Alternative C.

Under all of the alternatives:

- TVA would continue to conduct environmental reviews to address site-specific issues prior to the approval of any proposed development or activity on public land.
- Future activities and land uses will be guided by the TVA Land Policy.
- TVA land use allocations are not intended to supersede deeded landrights or land ownership.
- Parcels allocated to Industrial (Zone 5) and Shoreline Access (Zone 7) uses remain the same.

Alternative A - No Action Alternative.

Under the No Action Alternative, TVA would not prepare the NTRLMP and would continue current land plans or systems if they exist. Fort Patrick Henry, South Holston, Watauga, and Wilbur reservoirs would continue using the Forecast System developed for those reservoirs in 1965, which allocated parcels to 13 land use categories. Boone Reservoir would continue to use the RLMP developed in 1999. Beaver Creek and Clear Creek reservoirs would remain unplanned.

Alternative B - the Proposed Land Use Alternative.

Under Alternative B, TVA would prepare an RLMP addressing the seven NTRs. To develop proposed parcel allocations, TVA reviewed existing and newly collected field data on the lands being planned. The physical capability of each parcel for supporting potential suitable uses was assessed. TVA also reviewed deeds of selected tracts previously sold to private entities to identify existing shoreline access rights. The planning team honored all existing commitments (i.e., existing leases, licenses, and easements).

Alternative C (The Preferred Alternative) - the Modified Proposed Land Use Alternative.

Under Alternative C, TVA would prepare an RLMP for the seven NTRs. To develop proposed parcel allocations, TVA implemented the planning process described above under Alternative B and incorporated public comments and other information obtained during the scoping process. Under Alternative C, the 4,679 acres of committed lands would be allocated to land use zones consistent with the existing land use. The remaining uncommitted 254 acres (34 parcels) are proposed to be allocated to Zones 3, 4, or 6. Alternative C, as compared to Alternative B, represents changes in land use zones for 19 parcels. Because the total acreage of those 19 parcels is relatively small (238 acres), the percentage of land allocated to Zones 3, 4, and 6 is nearly the same under both action alternatives. Under Alternative C, parcels on Fort Patrick Henry, South

Holston, and Watauga reservoirs that contain state-listed plants, rare plant communities, cultural resources, and high-quality wetlands would be allocated to Zone 3, which is most protective of sensitive resources. Those parcels would be allocated to Zone 4 under Alternative B. Additionally, six parcels on South Holston and Watauga reservoirs would be allocated to Zone 6 under Alternative C rather than Zone 4 under Alternative B, which would provide additional, opportunities for recreation.

EPA submits the following comments regarding this DEIS for your consideration in the Final EIS (FEIS):

Recommendations

EPA Region 4 recommends that TVA coordinate its efforts and/or become an active participant with the Beaver Creek Task Force (BCTF). In 1998 EPA led a group of agencies, institutions and utilities to form a partnership to determine how to address impacts to impaired streams in this rapidly urbanizing watershed. The BCTF has undertaken a number of major projects, including a flood study, a watershed inventory, and an outreach & education program. The partnership currently includes:

Beaver Creek Watershed Association
AmeriCorps
City of Knoxville
Environmental Protection Agency, Region 4
Hallsdale-Powell Utility District
Knox County Engineering and Public Works Stormwater Management Division
Knox County Health Department
Knox County Parks and Recreation
Knox County Soil Conservation District
Knox Land and Water Conservancy
Knoxville-Knox County Metropolitan Planning Commission
Knoxville/Knox County/Knoxville Utility Board GIS
Legacy Parks Foundation
Tennessee Department of Environment and Conservation
Tennessee Department of Transportation (TDEC)
Tennessee Valley Authority
Tennessee Water Resources Research Center, University of Tennessee
USDA Natural Resources Conservation District
United States Geological Survey
Water Quality Forum
West Knox Utility District

EPA recommends that future TVA watershed activities remain in compliance with all approved FEMA flood studies that have been completed within the Beaver Creek Watershed. Our agency has been concerned with the extreme development pressures and related induced stormwater/flooding problems. EPA has supported the development of a Beaver Creek Watershed Stormwater Master Plan that includes

regulatory mechanisms to address future flooding and environmental issues. This plan considers future build-out conditions in the watershed in order to allow Knox County to enact current regulations to mitigate future damages in the watershed caused by the anticipated level and pattern of development. The "no fill line" policy, which expanded the preserved floodplain area well beyond the FEMA minimums, followed this study as a key management measure for new construction. EPA therefore recommends that TVA closely coordinate its efforts with the Knox County Stormwater program.

EPA also recommends that TVA coordinate its future efforts with EPA Region 4's TMDL Program. A number of pathogens and sediment TMDLs have been approved by EPA for the Beaver Creek Watershed, and the NPS should consider the allowable loadings and available assimilative capacity (if any) in the waterbodies with established TMDLs. EPA is also currently working with the local governments to develop a formal Ecological Trading Program, and TVA should consider joining in this endeavor. Sediment and nutrient trading plans are currently being developed using work accomplished for the TMDL studies.

EPA Region 4 also recommends that TVA coordinate its efforts with the State of Tennessee's Nonpoint Source Management Program, which has been created to measurably reduce nonpoint source pollution and thus improve water quality. The program also seeks to strengthen and expand partnerships, and increase the water resources stewardship of Tennessee's citizens. Since the program was initiated in 1989, EPA has contributed more than $37 million in grant funding through Section 319 of the Clean Water Act. The grant awards are supplemented by a 40% nonfederal match from the State. Some of these funds have been used in the Beaver Creek Watershed. EPA is currently working with the State on Beaver Creek Watershed nonpoint source-impaired waterbodies where restoration efforts have led to documented water quality improvements. Waterbodies have been separated into three categories, depending on the type of water quality improvement achieved: partially or fully restored waterbodies; those waterbodies that have made progress toward achieving water quality goals; and waterbodies with ecological restoration underway.

Finally, as Beaver Creek has historically been identified as impaired on the State's 303(d) list and a sediment TMDL has been developed by TDEC, a major sediment model for the Beaver Creek watershed was funded (completed by the University of Tennessee in 2005). This model found bank erosion to significantly contribute to stream sediment loads. The Rapid Geomorphic Assessment (RGA) developed by the USDA National Sedimentation Laboratory was recently used (2009) to quantify channel stability and bank erosion potential. The Study Team has measured variables as "force" surrogates (stream power, bankfull discharge), and "resistance" surrogates (soil cohesive strength and vegetation characteristics). These variables have been statistically correlated with RGA scores. EPA recommends that TVA review the study results, as these are useful for prioritization of any proposed bank stability projects.

Summary

Currently, it appears that the Beaver Creek reservoirs will remain unplanned. Overall, the LMP has identified lands for specific uses and a clear vision on managing public lands. EPA Region 4 recommends that TVA coordinate its efforts and/or become an active participant with the Beaver Creek Task Force (BCTF). It is essential that the FEIS provide a clear understanding of the potential direct, indirect (secondary), and cumulative environmental impacts the proposed alternatives will have on the aquatic and other affected resources within the project area in association with other past, present and reasonably foreseeable projects. Therefore, EPA recommends that the FEIS provide a cumulative impact analysis for the Beaver Creek Reservoirs.

EPA's Alternative preference is Alternative B in which TVA would prepare an RLMP addressing the seven NTRs with minimum land disturbance.

We rate this document EC – 2. We have concerns that the preferred alternative will have impacts on the environment that could and should be avoided. The draft EIS does not contain sufficient information for the EPA to fully assess the environmental impacts that should be avoided in order to fully protect the environment. Additional information, data, analyses, or discussion should be included in the final EIS.

We appreciate the opportunity to review this document. Please call Ken Clark of my staff at (404) 562-8282 or clark.ken@epa.gov if you have questions on our comments.

Sincerely,

Heinz J. Mueller, Chief
NEPA Program Office
Office of Policy and Management

Appendix D – Public Comments and Responses

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PUBLIC COMMENTS
Received by TVA on the Draft Environmental Impact Statement Northeastern Tributary Reservoirs Land Management Plan
November 2009

Introduction

The draft environmental impact statement (DEIS) for the Northeastern Tributary Reservoirs Land Management Plan (NTRLMP) was distributed in October 2009. TVA announced a comment period of October 9 to November 23, 2009, but continued to accept comments until December 18, 2009. TVA received 37 comments from 20 commenters (some commenters submitted more than one comment) by letters, electronic mail, TVA's web-based comment system, and oral statements during the comment period on the DEIS. TVA held an open house at the Johnson City Power Board in Johnson City, Tennessee, on October 27, 2009, where 40 people attended. Written and oral comments were received from one organization, nine citizens, and 10 interested agencies. TVA has reviewed all of the comments.

All comments are listed below, organized into logical topics and themes. The order of appearance is not related to importance; all comments were considered. The largest grouping of the public responses to the DEIS focused on natural resources including threatened and endangered species, water resources, and aquatic and terrestrial ecology. There were also comments about the NEPA process and alternatives, historic resources, recreation, and how TVA's land policy is applied.

The comments and TVA's responses to them appear below. In some cases, the EIS was changed because of the information or issues presented in the comments. The names of those individuals, agencies, and organizations providing comments appear after the comment text. Names of persons providing comments may appear in more than one comment if they identified more than one issue. All original comments and letters are kept in the administrative record and are available from TVA upon request. Letters from agencies and some organizations providing more information appear in Appendix C. The Department of the Interior submitted comments on behalf of the U.S. Fish and Wildlife Service's Ecological Services offices in Tennessee and Virginia.

Endangered and Threatened Species

1. Comment: The South Fork Holston River has been designated as a "Threatened and Endangered Waters" by the Virginia Department of Game and Inland Fisheries (VDGIF) and the associated species are the little-winged pearlymussel (*Pegias fabula*, G1/S1/LE/LE), sharphead darter and slabside pearlymussel. The large-leaf pondweed (*Potamogeton amplifolius*, G5/S1S2/NL/NL) has also been historically documented in the South Fork Holston River. Due to the legal status of some of the

natural heritage resources, DCR recommends coordination with USFWS and VDGIF to ensure compliance with the protected species legislation. (Robert Munson, Planning Bureau Manager, Virginia Department of Conservation and Recreation)

Response: TVA coordinated with the USFWS and VDGIF during the scoping period, and both agencies were sent copies of the draft EIS with a request to provide comments. Letters from the VDGIF and the U.S. Department of Interior (of which USFWS is part) are included in Appendix C of this EIS. Review of the TVA Natural Heritage database indicated no records of large-leaf pondweed (*Potamogeton amplifolius*) within 5 miles of the NTRs. If TVA were to develop, or receive proposals to develop, future projects along the NTRs, TVA would conduct a project-specific environmental review of the potential effects to resources including threatened and endangered aquatic plants and animals. TVA would coordinate with state and federal agencies regulating natural resources, as appropriate, during that project-specific review.

2. Comment: According to our records, Middle Fork Holston River which feeds into [South Holston Reservoir] is designated a Threatened and Endangered Species Water due to the presence of federal Threatened state Threatened spotfin chub, state Threatened longhead darter, state Threatened slabside pearlymussel, state Threatened black sandshell and federal Endangered state Endangered rough rabbitsfoot. It appears the lands adjacent to this water as it empties into the reservoir are not owned by TVA. In the case that it is or that it may be acquired by TVA, we recommend that the riparian lands adjacent to this water be placed into Zone 3: Sensitive Resource Management and that naturally vegetated riparian buffers of at least 300 ft be maintained on this water.

   According to our records, South Fork Holston River which feeds into the reservoir is designated a Threatened and Endangered Species Water due to the presence of state Endangered sharphead darter. It appears the lands adjacent to this water as it empties into the reservoir is not owned by TVA except perhaps for the area designated as "Access Area 7" and shown as a hatched green polygon. In the case that it is or that it may be acquired by TVA, we recommend that the riparian lands adjacent to this water be placed into Zone 3: Sensitive Resource Management and that naturally vegetated riparian buffers of at least 300 ft be maintained on this water. (Amy Ewing, Environmental Services Biologist, Virginia Department of Game and Inland Fisheries)

   Response: The NTRLMP addresses each of the species noted, except the rough rabbitsfoot, for which the TVA Natural Heritage database indicated no records within 10 miles of TVA-managed parcels on South Holston Reservoir. State designations for these waters have been incorporated into the South Holston Reservoir Land Management Plan. TVA does not manage property along the Middle Fork Holston River. Lands adjacent to the South Fork Holston River as it empties into the reservoir are not owned by TVA with the exception of Parcel 32, designated as “Access Area 7.” Parcel 32 contains a riparian buffer that is important to sensitive aquatic species nearby, and it is allocated to Zone 4 (Natural Resource Conservation) under Alternative C, TVA’s preferred alternative. TVA has no current plans to acquire additional lands along either of these rivers.

3. Comment: TVA has determined that no plants or habitat suitable for plants that are federally listed were identified on or within 5 miles of the parcels addressed in the NTRLMP. Additionally, TVA has determined that land planning on the NTRs has no potential to affect on any federally listed terrestrial species. TVA has also assumed that none of the parcel allocations in the NTRLMP would have the potential to affect federally listed aquatic species. We recommend that TVA consult with the Department on individual site-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 Department advises that "likely to adversely affect" is the appropriate determination at the programmatic consultation level, also. However, after reviewing the EIS and discussing the NTRLMP with TVA staff, we believe that the likelihood of reaching a determination of "likely to adversely affect" at the site specific consultation level in the future is unlikely. In view of this, we believe that the requirements of Section 7 of the Endangered Species Act (Act) of 1973, as they apply to the NTRLMP, have been fulfilled. (Gregory Hogue, Environmental Officer, U.S. Department of the Interior)

   Response: TVA agrees that it is unlikely that future project-specific environmental reviews on the NTRs parcels evaluated in the NTRLMP EIS would reach a determination of "likely to adversely affect" a federally listed species. Any future action on NTR lands that is proposed by TVA or subject to approval through Section 26a of the *TVA Act* would undergo site-specific environmental reviews, and would be subject to the requirements of NEPA, the *Endangered Species Act*, and other regulations. TVA would coordinate with federal and state regulatory agencies, including the USFWS, as appropriate during these reviews.

Water Resources and Wetlands

4. Comment: The Division of Water Supply has received and reviewed the Draft Environmental Impact Statement …. There are several privately owned dams adjacent to the proposed project area. A review of the community and non-community water supplies in the area shows that a significant portion of the proposed project will be in Source Water Protection Area. There are private water supplies in the proposed area. Please be advised that not all the water wells that are in existence are in this database and there may be older wells that we have no record of as well as hand dug wells whose existence we would not have recorded. All water wells that are encountered should be plugged and abandoned by a licensed well contractor. There are a number of system registered underground injection control (UIC) sites within the proposed project area. The system should be properly plugged and abandoned before construction. Please be advised that not all old large capacity septic systems or storm water injection points that are in existence are on this database. All UIC wells that are encountered should be plugged and abandoned according to approval from the UIC program. The plan for the proposed project locates the project in a karst area, the county you are working in is in mature karst terrain and has abundant sinkholes and other karst features. In Tennessee the modification of sinkholes is regulated under the Underground Injection Control (UIC) program, which is housed in the Ground Water Management section. If there is to be a modification of any sinkhole on this project it will be necessary for you to have a letter of authorization from the UIC program to proceed. (Scotty Sorrells, Manager, Ground Water Management Section, Division of Water Supply, Tennessee Department of Environment and Conservation)

Response: Any future action on NTR lands that is proposed by TVA or subject to approval through Section 26a of the *TVA Act* would undergo site-specific environmental reviews that fulfill the requirements of NEPA and other regulations. This includes assessing potential impacts to drinking water supplies, potable water, surface water, and groundwater systems. Coordination with regulatory agencies is part of the site-specific review, when appropriate. It is also indicated on the TVA Section 26a Permit that TDEC approval/coordination is needed.

5. Comment: Work involving earthmoving, land clearing, or similar activities that meet the criteria for a discharge of dredged or fill material in tributaries, wetlands, or other waters of the United States is likely to require Section 404 Clean Water Act permits. Further, it is very important to document efforts to avoid, minimize, and only after all efforts to avoid and minimize, then mitigate for adverse aquatic impacts. We can also verify that the South Fork of the Holston River is a navigable water from the Virginia line to Loves Mill Dam (river mile 93.8) as regulated by Section 10 of the Rivers and Harbors Act, so that permits would be required for work or structures in that waterway. (John Evans, Acting Chief, U.S. Army Corps of Engineers, Norfolk District, Western Virginia Regulatory Section)

   Response: Any future action on NTR lands that is proposed by TVA or subject to approval through Section 26a of the *TVA Act* would undergo site-specific environmental reviews that fulfill the requirements of NEPA and other regulations. This includes assessing potential impacts to wetlands or other Waters of the United States. Coordination with the USACE pursuant to the *Clean Water Act* and the *Rivers and Harbors Act* would be part of the site-specific review, when appropriate.

6. Comment: EPA Region 4 recommends that TVA coordinate its efforts and/or become an active participant with the Beaver Creek Task Force (BCTF). In 1998, EPA led a group of agencies, institutions, and utilities to form a partnership to determine how to address impacts to impaired streams in this rapidly urbanizing watershed. The BCTF has undertaken a number of major projects, including a flood study, a watershed inventory, and an outreach & education program. The partnership currently includes:

   Beaver Creek Watershed Association
   AmeriCorps
   City of Knoxville
   Environmental Protection Agency, Region 4
   Hallsdale-Powell Utility District
   Knox County Engineering and Public Works Storm Water Management Division
   Knox County Health Department
   Knox County Parks and Recreation
   Knox County Soil Conservation District
   Knox Land and Water Conservancy
   Knoxville-Knox County Metropolitan Planning Commission
   Knoxville/Knox County Utility Board GIS
   Legacy Parks Foundation
   Tennessee Department of Education and Conservation
   Tennessee Department of Transportation
   Tennessee Valley Authority

Tennessee Water Resources Research Center, University of Tennessee
USDA Natural Resources Conservation District
United States Geological Survey
Water Quality Forum
West Knox Utility District
(Heinz J. Mueller, Chief, NEPA Program Office, Office of Policy and Management)

Response: As noted in the comment, TVA is currently a participating member of the BCTF (see also responses to Comments 7 and 8 below). However, the BCTF addresses the Beaver Creek watershed in Knox County, Tennessee, in the Lower Clinch River watershed (06010207). The NTRLMP EIS addresses Beaver Creek Reservoir and Beaver Creek in Washington County, Virginia, in the South Fork Holston River watershed (06010102). Beaver Creek and Beaver Creek Reservoir in Washington County, Virginia, are not connected to the Beaver Creek watershed in Knox County, Tennessee.

7. Comment: EPA recommends that future TVA watershed activities remain in compliance with all approved FEMA flood studies that have been completed in the Beaver Creek Watershed. (Heinz J. Mueller, Chief, NEPA Program Office, Office of Policy and Management)

   Response: The Beaver Creek watershed (Knox County) is not within the scope of the NTRLMP EIS. However, if TVA should conduct activities within the Beaver Creek watershed, impacts to floodplains would be evaluated as a standard part of TVA's site-specific environmental review.

8. Comment: EPA also recommends that TVA coordinate its future efforts with the EPA Region 4 TMDL Program. A number of pathogens and sediment TMDLs have been approved by EPA for the Beaver Creek Watershed, and the NPS should consider the allowable loadings and available assimilative capacity (if any) in the water bodies with established TMDLs. EPA is also currently working with the local governments to develop a formal Ecological Trading Program, and TVA should consider joining in this endeavor. Sediment and nutrient trading plans are currently being developed using work accomplished for the TMDL studies. (Heinz J. Mueller, Chief, NEPA Program Office, Office of Policy and Management)

   Response: The Beaver Creek watershed (Knox County) is not within the scope of the NTRLMP EIS. However, in response to EPA's comment, TVA is currently working with the Beaver Creek Watershed Association in Knox County, Tennessee, to implement a Section 319 grant that addresses pathogens and sediment in the impaired streams. TVA has provided technical support including water quality monitoring and pollutant load modeling, which served as a basis for the load reduction strategies in the Watershed Restoration Plan and 319 grant implementation plan. TVA used the available state total maximum daily loads (TMDLs) to set the initial load reduction goals in the Watershed Restoration Plan and 319 grant implementation plan. TVA has hosted members of USEPA Region 4 offices and the Washington office to tour the Beaver Creek watershed and will continue to provide updates as efforts move forward.

   TVA is currently working with the BCTF to implement a pilot Eco-trading project in Beaver Creek watershed in Knox County, Tennessee. The project is named

Watershed Based Demonstration for Tennessee's Beaver Creek Watershed. The goal of the project is stated as: To develop and pilot-test an Ecological Credit Market designed to achieve water quality goals and ecosystem benefits in the Beaver Creek watershed. The scope of the project, for which we are requesting funds at this time, consists of six tasks: (1) Market Assessment; (2) Credit Definition and Development; (3) Market Framework - principles and tools; (4) Market Transactions; (5) Project Evaluation; and (6) Grant Administration. This project will result in a credit market that will address sediment and nutrients within the framework of Knox County's new Storm Water Ordinance and the NPDES permits for Hallsdale-Powell and West Knox Utilities.

TVA would welcome an opportunity to further collaborate with USEPA and local governments on additional Ecological Trading Program projects.

9. Comment: EPA Region 4 also recommends that TVA coordinate its efforts with the State of Tennessee's Nonpoint Source Management Program, which has been created to measurably reduce nonpoint source pollution and thus improve water quality. (Heinz J. Mueller, Chief, NEPA Program Office, Office of Policy and Management)

   Response: Comment noted. TVA is coordinating with partners to address nonpoint source pollution. TVA is currently working with partners to implement a Section 319 grant in the Beaver Creek watershed in Knox County, Tennessee, to address nonpoint source pollution as referenced above. TVA has a good working relationship with the Tennessee Department of Agriculture, which administers the 319 grant program. The State of Tennessee's Nonpoint Source Management Program staff has been very supportive of TVA, the BCTF, and Beaver Creek Watershed Association, and we greatly appreciate the support.

10. Comment: EPA recommends that TVA review the [sediment model for the Beaver Creek Watershed (completed by the University of Tennessee in 2005)] results, as these are useful for prioritization of any proposed bank stability projects. (Heinz J. Mueller, Chief, NEPA Program Office, Office of Policy and Management)

    Response: Comment noted. As noted above, the Beaver Creek watershed (Knox County, Tennessee) is not within the scope of this EIS.

Aquatic Ecology

11. Comment: Cox Mill Creek which feeds into [South Fork Holston River, South Holston] reservoir has been designated a wild trout water known to support rainbow trout. We recommend consideration of this important fishery during development of the land management plan. Access to this water for angling by the public and sampling by our biologists should be incorporated into that plan. We recommend coordination with Bill Kittrell, VDGIF Region III Fisheries manager regarding this resource. (Amy Ewing, Environmental Services Biologist, Virginia Department of Game and Inland Fisheries)

    Response: TVA-managed property adjacent to the Cox Mill Creek confluence with the South Fork Holston River (Parcel 38) is committed under a recreation easement to Washington County, Virginia. The TVA-managed parcel is undeveloped land

fronting Washington County Roadside Park. Opportunities for informal bank fishing and other recreational activities currently exist and would continue under any of the alternatives proposed in the NTRLMP. Requests for formal water access or water use facilities on the parcel allocated to Zone 6 would be considered, but only from the Washington County Park Board.

12. Comment: According to our records, Beaver Creek has been designated a stockable trout water. We recommend that the land management plan for this reservoir consider this important fisheries resource. We recommend coordination with Bill Kittrell, VDGIF Region III Fisheries Manager regarding stocking and angling activities as well as opportunities for recreational access in and around the reservoir, if appropriate. (Amy Ewing, Environmental Services Biologist, Virginia Department of Game and Inland Fisheries)

    Response: The current uses (and allocations) of TVA property on Beaver Creek do not affect the stockable trout stream designation. TVA's proposed reservoir land management plan would not modify the current land uses or allocations. TVA-managed public land located on Beaver Creek Reservoir contains approximately 250 acres of the 400-acre Sugar Hollow Park. It is under easement to the City of Bristol, Virginia, to provide developed recreation facilities. Sugar Hollow Park offers a variety of facilities including a softball complex, soccer fields, picnic tables, picnic shelters, the Waldo Miles Pavilion, a campground, a swimming pool, playgrounds, biking trails, and hiking trails. The remainder of the 40 acres on Beaver Creek Reservoir makes up the Beaver Creek Dam Reservation. Dispersed recreation, including bank fishing, is allowed in the park and on the Beaver Creek Dam Reservation.

13. Comment: According to the information currently in our files, the South Fork-Middle Fork Holston River Stream Conservation Unit [SCU] is located within Access Area 7 (Parcel Number 32). SCUs identify stream reaches that contain aquatic natural heritage resources, including 2 miles upstream and 1 mile downstream of documented occurrences, and all tributaries within this reach. SCUs are given a biodiversity significance ranking based on the rarity, quality, and number of element occurrences they contain; on a scale of 1-5, 1 being most significant. The South Fork-Middle Fork Holston River Stream Conservation Unit has been given a biodiversity significance ranking of B2, which represents a site of very high significance. (Robert Munson, Planning Bureau Manager, Virginia Department of Conservation and Recreation)

    Response: Parcel 32 on South Holston Reservoir contains a small undeveloped parking area and riparian buffer that is important to sensitive aquatic species nearby. It is allocated to Zone 4 (Natural Resource Conservation) under the preferred alternative. Any future activities proposed for this parcel would undergo site-specific environmental and programmatic review, and would be subject to the requirements of the ESA and NEPA as well as TVA's Land Policy and state and federal permitting requirements.

14. Comment: To minimize adverse impacts to the aquatic ecosystem as a result of the proposed activities, DCR recommends the implementation of and strict adherence to applicable state and local erosion and sediment control/storm water management laws and regulations. (Robert Munson, Planning Bureau Manager, Virginia Department of Conservation and Recreation)

    Response: As a regional federal agency, TVA's best management practices (BMPs) are required to be as stringent as any of the seven surrounding states to ensure compliance across the Power Service Area. As a federal agency, TVA must comply with all federal and state laws, regulations, and codes. All actions on TVA land parcels would require compliance with the Section 26a General and Standard Conditions/BMPs (TVA 2005).

Recreation and Natural Areas

15. Comment: I would like to see camping stay on TVA sites. (Beverly Jenkins)

    Response: Overnight camping is a popular recreational pursuit on public and private lands adjacent to northeastern tributary reservoirs. A list of camping (and other recreation) opportunities on TVA-managed lands on the NTRs can be found at: www.tva.com/river/recreation. Primitive camping with a maximum 14-day stay is also available on TVA lands that support dispersed recreation. TVA lands that provide camping at developed and dispersed areas are indicated in the individual land plans.

16. Comment: We have two boat ramps on South Holston Reservoir. One is located near the confluence of Fifteenmile Creek and one is located near the location on the map designated as "Area 6 ramp." We recommend that the land management plan for this reservoir include consideration of these boat ramps and the need for continued access to the ramps for management and maintenance purposes. We support continuing to allow the public access to this reservoir. Bill Kittrell may be contacted for more information or guidance about recreational access. (Amy Ewing, Environmental Services Biologist, Virginia Department of Game and Inland Fisheries)

    Response: TVA's proposed South Holston Reservoir Land Management Plan identifies both boat ramps mentioned by VDGIF. TVA does not propose changes to the management strategies of those parcels. TVA's recreation strategy and implementation process encourage partnerships, especially with government agencies, to manage and maintain access to land and water on TVA reservoirs. TVA is pleased with the VDGIF's commitment to providing safe and quality boat access on South Holston Reservoir.

17. Comment: The management plan for the Holston River addresses the recreational and scenic needs of the lake. However, there are few boat launch opportunities along the entire lake shoreline and the existing ones need to be mapped better. Providing additional boat launches will help to address the great demand for boat access to Virginia's waters. The lake is also within the proposed corridor for the Beaches to bluegrass statewide trail. Coordinate existing trail upgrades and the construction of new trails, so that they can be a part of that statewide trail system. (Robert Munson, Planning Bureau Manager, Virginia Department of Conservation and Recreation)

    Response: TVA's recreation strategy and implementation process encourage partnerships, especially with government agencies, to manage and maintain access to land and water on TVA reservoirs. TVA is receptive to coordinating with local governments to meet and manage unmet recreation needs, particularly when they relate to SCORP (State Comprehensive Outdoor Recreation Plans). As such, TVA is interested in the statewide trail system and invites VDCR's coordination if the proposed trail could/would bisect TVA land. Additionally, TVA has online resources that promote recreation opportunities on public and private lands adjacent to TVA reservoirs (www.tva.com/river/recreation). Currently TVA is updating spatial data and linking this with online map services such as Google Earth.

18. Comment: Our files do not indicate the presence of any State Natural Area Preserves under DCR's jurisdiction in the project vicinity. Please contact DCR for an update on this natural heritage information if a significant amount of time passes before it is utilized. (Robert Munson, Planning Bureau Manager, Virginia Department of Conservation and Recreation)

    Response: Comment noted.

Terrestrial Ecology

19. Comment: The Virginia Karst Program and the Virginia Speleological Survey know of one cave within the polygon, a resurgence (spring associated) cave called Thomas Cave No. 2. Please coordinate with Wil Orndorff to document and minimize adverse impacts to karst features. (Robert Munson, Planning Bureau Manager, Virginia Department of Conservation and Recreation)

    Response: TVA appreciates the data provided by VDCR. Based upon the map provided, the subject cave is located about 0.5 mile from the nearest TVA-managed parcel. TVA has determined that activities greater than 200 feet from a cave entrance do not normally adversely affect cave habitat. As there are no changes proposed for the area surrounding this cave, the proposed actions within the plan would not result in impacts to this resource. Monitoring and assessing impacts to cave environments is a standard part of TVA's environmental review procedures.

Cultural and Historic Resources:

20. Comment: The Boones Creek Historical Trust ('BCHT') strongly recommends that TVA consider joint development of Section 33 - current site of the William Bean Historical Monument (near the confluence of Boones Creek and Carroll Creek into Boone Lake) into a historical park. We envision a Picnic/Meeting Pavilion

containing a diorama illustrating historic sites and a timeline of the development of the first community in East Tennessee - Boones Creek. This pavilion would provide a setting for family enjoyment, historical lectures and conferences. Nature trails and historical placards could be developed to educate the casual visitor. We truly believe that this land should be preserved and utilized to recognize the historical presence of the William Bean cabin site down in the lake. Please let me know if BCHT should submit a formal application to participate in this potential development. Thank you in advance for your consideration. (Carlos C. Whaley, President, Boones Creek Historical Trust)

Response: TVA agrees that William Bean was an important historical figure in the early development of East Tennessee. TVA manages reservoir lands to provide multiple public benefits including recreation and conservation of sensitive resources. To pursue this proposed project, TVA encourages you to contact the Holston-Cherokee-Douglas Watershed Team office in Gray, Tennessee.

21. Comment: I live on the lake, Carroll Creek area, Johnson City. As a member of the Boone Creek Historical Trust, was interested in locating the William Beam (*sic*) monument. He was a gunsmith, he was the father of Russell Beam, who was the first child born to a settler in Tennessee. The monument was moved from under water to the portion that you have marked at 40-40 William Beam Historical on the map. It's Zone 3, Sensitive Resource Management area. It contains a little over twenty-five acres. It was in the pines and the pines were eaten up with the beetles, and it would have been dangerous to get in there. The Historical Trust would like to work out a deal some way to get a pathway or some development in that area where people could get to the monument, because right now, about the only way to get there is by boat. (George E. Boy)

    Response: TVA agrees that William Bean was an important historical figure in the early development of East Tennessee. TVA manages reservoir lands to provide multiple public benefits including recreation and conservation of sensitive resources. To pursue this proposed project, TVA encourages you to contact the Holston-Cherokee-Douglas Watershed Team office in Gray, Tennessee.

NEPA Document and Alternatives

22. Comment: Thank you for the opportunity to participate. This is a very thorough and well written document. I would suggest adding the maps to the document for increased clarity. (Richard Odum)

    Response: Maps showing the location and proposed zone allocation for each TVA-managed parcel are available in a pocket at the end of each reservoir land management plan (Volumes II-VI) and on TVA's Web site at http://www.tva.gov/environment/reports/ntrlmp/index.htm.

23. Comment: Parcel 29 on Boone Reservoir has good designation of Natural Resource Conservation. Thank you for a great presentation and study. (Bryan Mount)

    Response: Comment noted.

24. Comment: My Department prefers Alternative C, too. (Mike Atchison, Tennessee Department of Economic and Community Development)

    Response: Comment noted.

25. Comment: I live on Boone Lake and after reviewing the document I support either Alternative B or Alternative C since they are the same on Boone Lake. (Richard Odum)

    Response: Comment noted.

26. Comment: Recognizing that the difference in acreage allotted to Zone 3 is minor (35 acres) between Alternative B and C and that there would be added protection to the Carolina Hemlock/Great Laurel Forest under Alternative C, we agree with TVA's decision to select Alternative C as the preferred alternative. This is also taken into account, the potential for dispersed recreation and potential associated indirect impacts from such activities. (Gregory Hogue, Environmental Officer, U.S. Department of the Interior)

    Response: Comment noted.

27. Comment: The Tennessee Wildlife Resources Agency recommends a blend of Alternatives B and C that would honor existing land use commitments and agreements, increase boating access for hunters and fishermen where needed, protect rare plants where present, and expand the acreage allocated to the Natural Resource Conservation zone. (Robert Todd, Tennessee Wildlife Resource Agency)

    Response: Comment noted. The difference between Alternatives B and C in number of acres allocated to each zone is minor. Both Alternatives B and C honor existing land use commitments and agreements. Threatened or endangered plants would be protected under both alternatives. Both alternatives were developed to be as consistent as possible with TVA's goals for multiple land uses, which include recreation and conservation of natural resources. Therefore, TVA believes the addition of another alternative would not offer a meaningful variation from existing alternatives.

28. Comment: I concur with Alternative "C" but would ask that an additional category be included - "historical or preserved locations". This would incorporate any <if any> zones <or micro-zones> that might contain a location of historical value <cemetery, mills, special significance areas> that may be historical, of community significance, or archeological in present or future value. (Charles Jones)

    Response: The existing Zone 3 (Sensitive Resource Management) provides for the protection of significant or potentially significant archaeological resources and historic sites and structures listed, or eligible for listing, in the National Register of Historic Places.

29. Comment: It is essential that the FEIS provide a clear understanding of the potential direct, indirect (secondary) and cumulative environmental impacts the proposed alternatives will have on the aquatic and other affected resources within the project area in association with other past, present, and reasonably foreseeable

future projects. Therefore, EPA recommends that the FEIS provide a cumulative impact analysis for the Beaver Creek Reservoir. (Heinz J. Mueller, Chief, NEPA Program Office, Office of Policy and Management)

Response: Direct, indirect, and cumulative impacts of the proposed action and alternatives, including on lands around Beaver Creek Reservoir, are addressed in the FEIS.

30. Comment: EPA's Alternative preference is Alternative B in which TVA would prepare an RLMP addressing the seven NTRs with minimum land disturbance. Heinz J. Mueller, Chief, NEPA Program Office, Office of Policy and Management)

    Response: Comment noted.

31. Comment: We rate this document EC-2. We have concerns that the preferred alternative will have impacts on the environment that could and should be avoided. The draft EIS does not contain sufficient information for the EPA to fully assess the environmental impacts that should be avoided in order to fully protect the environment. Additional information, data, analyses, or discussion should be included in the final EIS. (Heinz J. Mueller, Chief, NEPA Program Office, Office of Policy and Management)

    Response: Comment noted. Based on the full comments provided by EPA, TVA believes the rating and EPA's concerns are based upon the EPA's assumption that the EIS addresses the Beaver Creek watershed in Knox County, Tennessee. As noted in the response to Comment No. 6 above, the Beaver Creek and Beaver Creek Reservoir addressed in the NTRLMP is within the South Fork Holston River watershed in southwest Virginia. Data clarifying the watersheds in which NTRs are located has been added to Chapter 3.1 of the FEIS.

Section 26a Approval

32. Comment: I am a property owner in The Harbour neighborhood on Watauga Lake. I am a property rights advocate but also value the scenic beauty of the reservoir. I want to make certain this plan does not mean the application process for docks on Watauga Lake will be discontinued. Will there be any major changes to the way property owners can use their lands? (Anonymous)

    Response: Access rights are determined by the landrights in your deed, through TVA policy, or are implied, and will not change as a result of the NTRLMP. The proposed NTRLMP would not change the Section 26a application or approval process, or TVA's Land Policy. Reservoir shorelines with residential access rights have been identified and designated as Zone 7 (Shoreline Access).

Reservoir and Shoreline Conditions

33. Comment: On coves such as Sharps Creek on South Holston Lake, the inlet is filling in rapidly and trees are toppling. We lost 10 horizontal feet of bank in a year. The problem is that TVA refuses to recognize small coves such as this must be declared no wake. Jet skiers circle continually in the cove. Yes, I know the state authorities must take legislative action, but TVA needs to facilitate the action. (Powell Foster)

    Response: State agencies regulate boating and evaluate the appropriate locations of "no wake zones." In this location, placement of no wake buoys is the jurisdiction of the Tennessee Wildlife Resources Agency.

34. Comment: Land Management Plan associated with Boone Lake. I see nothing in the plan relating to the enormous effort or funding for cleaning and removing trash from Boone Lake. Only Boone Lake Association [BLA] makes any effort in removing trash from the shores and waters. TVA is cutting BLA's support when it should be increasing it. Included in this plan should be generous allocations for removing trash hazardous to wildlife, environment and recreational users. (Allison Hall)

    Response: Budgeting for specific TVA projects is not part of the reservoir land management plan. TVA expresses appreciation and commitment to the association for the scope and depth of their work on Boone Reservoir. TVA management decisions are based upon aligning with TVA's Strategic Plan.

Beaver Creek Flood Control

35. Comment: Our only comments to your draft EIS pertain to Beaver Creek Dam, described in Chapter 3 and further discussed in Volume II of the document. In December 2004 the Corps completed an Environmental Assessment (EA) addressing flood damage reduction to the cities of Bristol, Tennessee and Bristol, Virginia. TVA adopted this EA and signed a Finding of No Significant Impact in March 2006. One alternative planned for implementation includes modifying the outlet structure of Beaver Creek Dam to increase detention times for smaller storm events and heavy rainfalls to allow floodwaters below the dam to move through the twin cities before releasing water from the upper Beaver Creek drainage area. We suggest your draft EIS recognize the modification to the structure and address any implications thereof relevant to your study. (Patricia Coffey, Chief, Project Planning Branch, Nashville District, U.S. Army Corps of Engineers)

    Response: TVA adopted the Corps-prepared EA and issued a FONSI for the Bristol Flood Damage Reduction Study, as stated in the comment and in Section 1.5 of the EIS. TVA and the Corps developed a draft memorandum of agreement (MOA) for construction, operation, and maintenance of the proposed outlet structure on Beaver Creek Dam. However, the MOA was never signed, and the construction of the modified outlet has not begun. TVA is prepared to work with the Corps if this project is funded in the future.

Roads

36. Comment: Any changes to entrances or the use of an existing entrance to state owned rights of way will need to be coordinated through the Abingdon Residency Office. (Donald Necessary, Virginia Department of Transportation)

    Response: Comment noted. Should any future proposed actions involve entrances to state-owned rights-of-way, TVA will coordinate with the Virginia Department of Transportation.

37. Comment: Thank you for the opportunity to comment on the scope of the [NTRLMP Draft EIS]. At this time, the Tennessee Department of Transportation has no comments. (Gerald F. Nicely, Commissioner, Tennessee Department of Transportation)

    Response: Comment noted.

Appendix E – Forecast System Designations

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Forecast Designation	Definition
Dam Reservation	*Land managed to protect the integrity of the dam and associated switchyards and power lines*. Most TVA dam reservations provide a visitor reception building that overlooks the facilities. Day use recreational activities such as picnicking, fishing, hiking, and bird watching are encouraged. Campgrounds and boat launching facilities are often available. Generally speaking, maintenance levels and care of the facilities are higher on dam reservation land than on other areas of the reservoir. Hunting and unregulated camping are generally prohibited on the reservation.
Public Recreation	*Land set aside for use by the public for recreational activities*. This includes informal, dispersed activities such as hunting, hiking, fishing, and primitive camping, as well as more formal activities in developed areas such as parks, boat launching areas, and campgrounds.
Reservoir Operations (Islands)	*Islands in the mainstream or tributaries used for informal, dispersed recreation and natural resource management projects.*
Reservoir Operations (Mainland)	*Generally narrow bands of shoreland retained by TVA for flood control and other reservoir operations purposes*. Although there are no outstanding rights to construct water use facilities, TVA allowed back-lying residential property owners to construct facilities on these lands until 1992. Since 1992, facilities have only been allowed on reservoir operations land in those areas where existing facilities have been permitted.
Power Transmission and Power Needs	*Land reserved for future power development or to maintain the integrity of existing power lines*. Interim wildlife enhancement projects are often implemented on these lands.
Commercial Recreation	*Land that TVA has reserved primarily for commercial use.* This use includes, but is not limited to marinas, commercial boat docks, and campgrounds. Informal, dispersed recreational activities often occur on this land as an interim use.
Minor Commercial Landings	*Tracts allocated for minor commercial landings available for public or private development of small-scale barge facilities*. These are sites that can be used for transferring pulpwood, sand, gravel, and other natural resource commodities between barges and trucks. Since this use is intermittent and usually not a major activity, there would generally be no significant impact on adjacent land uses.
Industrial	*Land that TVA identified as having potential for future industrial development*. Informal, dispersed recreational activities often occur on this land as an interim use.
Navigation Safety Harbors Landings	*Sites used for tying off commercial barge tows and recreational boats during adverse weather conditions*. Safety landings are straight stretches of shoreline fronting the commercial channel, and safety harbors are shoreline areas recessed into coves or creeks off the commercial channel.
Forestry Research	*Tracts used as ongoing sites for monitoring tree growth and stress*. In addition, trees are used in these areas to produce reliable seed sources.
Steam Plant Study	*Tracts set aside to potentially serve as a future steam plant location*. The actual construction of a steam plant would depend on energy demands and cost-benefit considerations.
Wildlife Management	*Land managed for the enhancement of natural resources for human use and appreciation*. Management of resources is the primary focus of this designation. Management strategies include planting food plots, selective timber harvesting, and other forms of manipulating habitat to attract certain wildlife species. Appropriate activities in this zone include hunting, wildlife observation, and camping on undeveloped sites.
Small Wild Areas	*These TVA natural areas are areas managed by TVA or in cooperation with other public agencies or private conservation organizations to protect exceptional natural or aesthetic qualities that can also support dispersed, low-impact types of outdoor recreation.* Where appropriate, development could include foot trails, signs, parking areas, and primitive camping. Efforts can be undertaken to encourage public use and interpretation for visitors.

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Appendix F – Conversion Tables

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Table F-1. Total Area by Zone and Alternative for All Seven Northeastern Tributary Reservoirs

Zones	Alternative A		Alternative B		Alternative C	
	Acres	%	Acres	%	Acres	%
2 - Project Operations	2,076.9	42.1	1,550.1	31.4	1,550.4	31.4
3 - Sensitive Resource Management	335.1	6.8	284.3	5.8	277.7	5.6
4 - Natural Resource Conservation	1,408.3	28.5	2,070.9	42.0	2,043.5	41.4
5 - Industrial	125.4	2.5	125.4	2.5	125.4	2.5
6 - Developed Recreation	939.4	19.0	854.2	17.3	888.1	18.0
7 - Shoreline Access	48.1	1.0	48.0	1.0	48.0	1.0
Total	**4,933.1**	**100.0**	**4,932.8**	**100.0**	**4,933.1**	**100.0**

Table F-2. Total Area by Zone and Alternative for Beaver Creek Reservoir

Zones	Alternative A		Alternative B		Alternative C	
	Acres	%	Acres	%	Acres	%
2 - Project Operations	40.5	14.0	40.5	14.0	40.5	14.0
3 - Sensitive Resource Management	0.0	0.0	0.0	0.0	0.0	0.0
4 - Natural Resource Conservation	0.0	0.0	0.0	0.0	0.0	0.0
5 - Industrial	0.0	0.0	0.0	0.0	0.0	0.0
6 - Developed Recreation	249.7	86.0	249.7	86.0	249.7	86.0
7 - Shoreline Access	0.0	0.0	0.0	0.0	0.0	0.0
Total	**290.2**	**100.0**	**290.2**	**100.0**	**290.2**	**100.0**

Table F-3. Total Area by Zone and Alternative for Clear Creek Reservoir

Zones	Alternative A		Alternative B		Alternative C	
	Acres	%	Acres	%	Acres	%
2 - Project Operations	13.8	100.0	13.8	100.0	13.8	100.0
3 - Sensitive Resource Management	0.0	0.0	0.0	0.0	0.0	0.0
4 - Natural Resource Conservation	0.0	0.0	0.0	0.0	0.0	0.0
5 - Industrial	0.0	0.0	0.0	0.0	0.0	0.0
6 - Developed Recreation	0.0	0.0	0.0	0.0	0.0	0.0
7 - Shoreline Access	0.0	0.0	0.0	0.0	0.0	0.0
Total	**13.8**	**100.0**	**13.8**	**100.0**	**13.8**	**100.0**

Table F-4. Total Area by Zone and Alternative for Boone Reservoir

Zones	Alternative A		Alternative B		Alternative C	
	Acres	%	Acres	%	Acres	%
2 - Project Operations	245.6	27.9	210.2	23.9	210.2	23.9
3 - Sensitive Resource Management	335.1	38.1	149.1	16.9	149.1	16.9
4 - Natural Resource Conservation	224.0	25.4	445.5	50.6	445.5	50.6
5 - Industrial	0.0	0.0	0.0	0.0	0.0	0.0
6 - Developed Recreation	75.1	8.5	75.1	8.5	75.1	8.5
7 - Shoreline Access	0.6	0.1	0.6	0.1	0.6	0.1
Total	**880.3**	**100.0**	**880.3**	**100.0**	**880.3**	**100.0**

Table F-5. Total Area by Zone and Alternative for Fort Patrick Henry Reservoir

Zones	Alternative A		Alternative B		Alternative C	
	Acres	%	Acres	%	Acres	%
2 - Project Operations	166.1	58.6	75.3	26.6	75.6	26.7
3 - Sensitive Resource Management	0.0	0.0	18.6	6.6	21.3	7.5
4 - Natural Resource Conservation	3.1	1.1	118.5	41.9	115.8	40.9
5 - Industrial	0.0	0.0	0.0	0.0	0.0	0.0
6 - Developed Recreation	84.8	29.9	41.4	14.6	41.4	14.6
7 - Shoreline Access	29.3	10.3	29.3	10.3	29.3	10.3
Total	**283.3**	**100.0**	**283.1**	**100.0**	**283.4**	**100.0**

Table F-6. Total Area by Zone and Alternative for South Holston Reservoir

Zones	Alternative A		Alternative B		Alternative C	
	Acres	%	Acres	%	Acres	%
2 - Project Operations	901.5	39.7	643.8	28.3	643.8	28.3
3 - Sensitive Resource Management	0.0	0.0	97.9	4.3	5.4	0.2
4 - Natural Resource Conservation	798.0	35.1	954.6	42.0	1,045.4	46.0
5 - Industrial	125.4	5.5	125.4	5.5	125.4	5.5
6 - Developed Recreation	431.3	19.0	434.4	19.1	436.1	19.2
7 - Shoreline Access	14.8	0.7	14.8	0.7	14.8	0.7
Total	**2,271.0**	**100.0**	**2,270.9**	**100.0**	**2,270.9**	**100.0**

Table F-7. Total Area by Zone and Alternative for Watauga Reservoir

Zones	Alternative A		Alternative B		Alternative C	
	Acres	%	Acres	%	Acres	%
2 - Project Operations	661.0	58.2	518.1	45.6	518.1	45.6
3 - Sensitive Resource Management	0.0	0.0	18.7	1.6	102.0	9.0
4 - Natural Resource Conservation	379.5	33.4	542.8	47.8	427.3	37.6
5 - Industrial	0.0	0.0	0.0	0.0	0.0	0.0
6 - Developed Recreation	92.7	8.2	53.6	4.7	85.8	7.5
7 - Shoreline Access	3.4	0.3	3.4	0.3	3.4	0.3
Total	**1,136.6**	**100.0**	**1,136.6**	**100.0**	**1,136.5**	**100.0**

Table F-8. Total Area by Zone and Alternative for Wilbur Reservoir

Zones	Alternative A		Alternative B		Alternative C	
	Acres	%	Acres	%	Acres	%
2 - Project Operations	48.4	83.6	48.4	83.6	48.4	83.6
3 - Sensitive Resource Management	0.0	0.0	0.0	0.0	0.0	0.0
4 - Natural Resource Conservation	3.7	6.4	9.5	16.4	9.5	16.4
5 - Industrial	0.0	0.0	0.0	0.0	0.0	0.0
6 - Developed Recreation	5.8	10.0	0.0	0.0	0.0	0.0
7 - Shoreline Access	0.0	0.0	0.0	0.0	0.0	0.0
Total	**57.9**	**100.0**	**57.9**	**100.0**	**57.9**	**100.0**

Table F-9. Allocation of Beaver Creek and Clear Creek Reservoirs Parcels Under Alternatives A, B, and C

Parcel Number	Acres	Previous Designation	Alternative			Committed or Uncommitted	Shoreline Access Rights
			A*	B	C		
Beaver Creek							
1	38.30	Unplanned	6	6	6	C	N
2	40.50	Unplanned	2	2	2	C	N
3	211.40	Unplanned	6	6	6	C	N
Clear Creek							
1	13.80	Unplanned	2	2	2	C	N

*Equivalent land use zone

Table F-10. Allocation of Boone Reservoir Parcels Under Alternatives A, B, and C

Parcel Number	Acres	Previous Designation	Alternative			Committed or Uncommitted	Shoreline Access Rights
			A*	B	C		
1	191.05	TVA Project Operation	2	2	2	C	N
2	10.37	TVA Project Operation	2	2	2	C	N
3	51.47	Recreation	6	6	6	C	N
4	2.65	TVA Project Operation	2	2	2	C	N
5	118.07	Natural Resource Conservation	4	4	4	C	N
6	2.98	Sensitive Resource Management	3	3	3	C	N
7	0.12	Residential Access	7	7	7	C	Y
8	1.07	Recreation	6	6	6	C	N
9	5.28	Natural Resource Conservation	4	4	4	U	N
10	13.78	Natural Resource Conservation	4	4	4	U	N
11	0.17	Recreation	6	6	6	C	N
12	3.05	Natural Resource Conservation	4	4	4	U	N
13	0.23	TVA Project Operation	2	2	2	C	N
14	0.93	Recreation	6	6	6	C	N
15	4.50	Natural Resource Conservation	4	4	4	U	N
16	0.03	New	--	2	2	C	N
17	0.11	Residential Access	7	7	7	C	Y
18	0.64	Sensitive Resource Management	3	3	3	C	N
19	0.02	New	--	2	2	C	N
20	0.81	Natural Resource Conservation	4	4	4	U	N
21	3.57	Recreation	6	6	6	C	N
22	0.09	Natural Resource Conservation	4	4	4	U	N
23	0.37	Recreation	6	6	6	C	N
24	0.70	Recreation	6	6	6	C	N
25	5.39	Sensitive Resource Management	3	3	3	C	N
26	151.36	Sensitive Resource Management	3	4	4	C	N
27	70.14	Sensitive Resource Management	3	4	4	C	N
28	35.47	TVA Project Operation	2	3	3	C	N
29	76.74	Natural Resource Conservation	4	4	4	C	N
30	1.77	Sensitive Resource Management	3	3	3	C	N
31	5.81	TVA Project Operation	2	2	2	C	N
32	0.26	Sensitive Resource Management	3	3	3	C	N
33	1.50	Natural Resource Conservation	4	4	4	U	N
34	6.40	Sensitive Resource Management	3	3	3	C	N
35	4.29	Sensitive Resource Management	3	3	3	C	N
36	0.40	Recreation	6	6	6	C	N
37	0.62	Recreation	6	6	6	C	N
38	0.33	Residential Access	7	7	7	C	Y
39	0.13	Natural Resource Conservation	4	4	4	U	N
40	25.28	Sensitive Resource Management	3	3	3	C	N
41	13.80	Recreation	6	6	6	C	N
42	2.00	Recreation	6	6	6	C	N
43	7.17	Sensitive Resource Management	3	3	3	C	N
44	59.40	Sensitive Resource Management	3	3	3	C	N

*Equivalent land use zone

Table F-11. Allocation of Fort Patrick Henry Reservoir Parcels Under Alternatives A, B, and C

Parcel Number	Acres	Previous Designation	Alternative			Committed or Uncommitted	Shoreline Access Rights
			A*	B	C		
1	17.58	Dam Reservation	2	3	3	C	N
2	0.83	unplanned	7	7	7	C	Y
3	2.36	Dam Reservation	2	2	2	C	N
4	69.01	Dam Reservation	2	2	2	C	N
5	0.44	unplanned	7	7	7	C	Y
6	0.88	unplanned	6	6	6	C	N
7	10.40	unplanned	6	6	6	C	N
7a	2.39	unplanned	2	2	2	C	N
8	0.04	unplanned	2	2	2	C	N
9	0.30	unplanned	4	4	4	U	N
10	66.78	Reservoir Operations	2	4	4	U	N
10a	2.67	Reservoir Operations	2	4	3	U	N
11	3.25	unplanned	7	7	7	C	Y
12	2.98	unplanned	7	7	7	C	N
13	1.28	Reservoir Operations	6	4	4	U	N
14	0.91	unplanned	6	6	6	C	N
15	5.35	unplanned	7	7	7	C	Y
16	1.59	unplanned	7	7	7	C	Y
17	3.50	Reservoir Operations	2	4	4	U	N
18	1.75	unplanned	6	6	6	C	N
19	2.27	unplanned	7	7	7	C	Y
20	8.39	Reservoir Operations	7	7	7	C	Y
21	42.17	Industry and Public Recreation	6	4	4	U	N
22	1.40	unplanned	2	2	2	C	N
23	1.80	unplanned	4	4	4	U	N
24	1.42	unplanned	7	7	7	C	Y
25	0.72	unplanned	7	7	7	C	Y
26	2.01	unplanned	7	7	7	C	Y
27	1.03	unplanned	4	3	3	C	N
28	1.90	unplanned	6	6	6	C	N
28a	0.28	unplanned	2	2	2	C	N
29	17.58	unplanned	6	6	6	C	N
30	0.73	unplanned	6	6	6	C	N
31	5.39	unplanned	6	6	6	C	N
32	0.46	unplanned	6	6	6	C	N
33	0.10	unplanned	2	2	2	C	N
34	1.35	unplanned	6	6	6	C	N

*Equivalent land use zone

Table F-12. Allocation of South Holston Reservoir Parcels Under Alternatives A, B, and C

Parcel Number	Acres	Previous Designation	Alternative			Committed or Uncommitted	Shoreline Access Rights
			A*	B	C		
1	97.89	Dam Reservation	2	3	4	C	N
2	139.48	Dam Reservation	2	4	4	C	N
3	373.18	Dam Reservation	2	2	2	C	N
4	16.18	Industrial	6	6	6	C	N
5	24.40	Industrial	2	2	2	C	N
6	125.42	Industrial	5	5	5	C	N
7	1.63	unplanned	7	7	7	C	Y
8	0.81	unplanned	6	6	6	C	Y
9	0.84	Dam Reservation	2	4	4	C	N
10	56.15	unplanned	4	4	4	C	N
11	7.85	unplanned	6	6	6	C	N
12	4.10	Dam Reservation	2	4	4	C	N
13	1.29	unplanned	2	2	2	C	N
14	229.55	Public Recreation	6	6	6	C	N
15	8.23	unplanned	4	4	4	C	N
16	55.52	Dam Reservation	2	2	2	C	N
17	0.10	unplanned	6	6	6	C	N
18	0.14	unplanned	7	7	7	C	Y
19	23.50	Public Recreation	4	6	6	U	N
20	0.29	Public Recreation	2	2	2	C	N
21	15.71	Public Recreation	6	4	4	C	N
22	1.40	Public Recreation	6	6	6	C	N
23	1.39	Public Recreation	6	4	6	U	N
24	56.25	Public Recreation	6	6	6	C	N
25	6.96	Reservoir Operations	2	4	4	U	N
25a	5.34	Reservoir Operations	2	4	3	U	N
26	0.39	Reservoir Operations	2	2	2	C	N
27	0.06	unplanned	7	7	7	C	Y
28	0.25	unplanned	4	4	4	U	N
29	1.24	unplanned	7	7	7	C	Y
30	3.32	Public Recreation	6	6	6	C	N
31	1.17	unplanned	7	7	7	C	Y
32	7.39	Public Recreation	6	6	4	U	N
33	10.92	Public Recreation	6	6	6	C	N
34	2.20	Public Recreation	6	6	6	U	N
35	1.73	Public Recreation	6	4	6	U	N
36	5.96	Public Recreation	6	4	6	U	N
37	4.34	Public Recreation	6	4	4	U	N
38	14.03	unplanned	6	6	6	C	N
39	45.10	unplanned	4	4	4	C	N
40	7.92	unplanned	4	4	4	C	N
41	63.87	unplanned	4	4	4	C	N
42	90.32	unplanned	4	4	4	C	N
43	3.03	unplanned	2	4	4	C	N
44	40.20	unplanned	4	4	4	C	N
45	24.31	unplanned	4	4	4	C	N

Parcel Number	Acres	Previous Designation	Alternative			Committed or Uncommitted	Shoreline Access Rights
			A*	B	C		
46	13.09	unplanned	4	6	6	C	N
47	11.98	unplanned	4	4	4	C	N
48	0.53	unplanned	4	4	4	C	N
49	20.07	unplanned	4	4	4	C	N
50	8.61	Reservoir Operations	7	7	7	C	Y
51	4.31	Public Recreation	6	4	4	C	N
52	1.96	unplanned	7	7	7	C	Y
53	5.22	unplanned	6	6	6	C	N
54	62.44	unplanned	4	4	4	C	N
55	5.88	unplanned	4	4	4	C	N
56	1.25	unplanned	4	4	4	C	N
57	79.36	unplanned	4	4	4	C	N
58	1.88	unplanned	4	4	4	C	N
59	10.67	unplanned	4	4	4	C	N
60	2.49	unplanned	4	4	4	C	N
61	23.48	unplanned	4	4	4	C	N
62	42.63	unplanned	6	6	6	C	N
63	4.68	unplanned	4	4	4	C	N
64	90.77	unplanned	4	4	4	C	N
65	3.48	unplanned	4	4	4	C	N
66	1.68	unplanned	4	4	4	C	N
67	2.32	unplanned	4	4	4	C	N
68	77.41	unplanned	4	4	4	C	N
69	3.35	unplanned	4	4	4	C	N
70	1.63	unplanned	4	4	4	C	N
71	4.85	unplanned	4	4	4	C	N
72	106.10	Dam Reservation	2	2	2	C	N
73	82.67	Reservoir Operations	2	2	2	C	N
74	6.50	unplanned	4	4	4	C	N
75	1.83	unplanned	4	4	4	C	N
76	0.85	unplanned	4	4	4	C	N
77	0.84	unplanned	4	4	4	C	N
78	4.24	unplanned	4	4	4	C	N
79	0.56	unplanned	4	4	4	C	N

*Equivalent land use zone

Table F-13. Allocation of Watauga Reservoir Parcels Under Alternatives A, B, and C

Parcel Number	Acres	Previous Designation	Alternative			Committed or Uncommitted	Shoreline Access Rights
			A*	B	C		
1	508.74	Dam Reservation	2	2	2	C	N
2	5.84	unplanned	4	4	3	C	N
3	2.28	unplanned	4	4	3	C	N
4	31.52	unplanned	4	4	3	C	N
5	14.11	unplanned	4	4	3	C	N
6	24.74	unplanned	4	4	3	C	N
7	2.29	unplanned	7	7	7	C	Y
8	21.26	Reservoir Operations	2	4	4	C	N
9	1.94	unplanned	6	6	6	C	N
10	0.23	unplanned	6	6	6	C	N
11	10.25	Public Recreation	6	4	4	U	N
12	0.93	unplanned	7	7	7	C	Y
13	33.42	unplanned	4	4	4	C	N
14	0.12	unplanned	2	2	2	C	N
15	2.83	Public Recreation	6	6	6	C	N
16	8.06	Public Recreation	6	4	4	U	N
17	80.10	unplanned	4	4	4	C	N
17a	3.00	unplanned	4	4	6	C	N
18	0.93	unplanned	6	6	6	C	N
19	6.05	unplanned	4	4	4	C	N
20	1.79	unplanned	4	4	4	U	N
21	18.69	unplanned	4	3	3	C	N
22	17.31	Public Recreation	6	4	4	U	N
23	118.29	Reservoir Operations	2	4	4	C	N
24	9.13	unplanned	2	2	2	C	N
25	3.33	unplanned	2	4	3	C	N
26	0.68	unplanned	4	4	3	U	N
27	1.02	unplanned	4	4	4	C	N
28	3.38	unplanned	6	6	6	C	N
29	4.81	unplanned	4	4	4	C	N
30	12.97	unplanned	4	4	4	C	N
31	0.22	unplanned	4	4	3	U	N
32	0.53	unplanned	4	4	3	U	N
33	12.45	unplanned	4	4	4	C	N
34	4.41	unplanned	4	4	4	C	N
35	0.48	unplanned	4	4	4	C	N
36	6.80	unplanned	4	4	4	C	N
37	0.12	unplanned	7	7	7	C	Y
38	2.07	unplanned	4	4	4	C	N
39	0.11	unplanned	7	7	7	C	Y
40	0.67	unplanned	4	4	4	C	N
41	3.48	Commercial Recreation	6	4	4	U	N
42	4.57	unplanned	4	4	4	C	N
43	3.55	unplanned	4	4	4	C	N

Parcel Number	Acres	Previous Designation	Alternative			Committed or Uncommitted	Shoreline Access Rights
			A*	B	C		
44	0.22	unplanned	4	4	4	C	N
45	0.10	unplanned	2	2	2	C	N
46	26.20	unplanned	4	4	4	C	N
47	0.57	unplanned	4	4	4	C	N
48	2.13	unplanned	6	6	6	C	N
49	18.70	unplanned	4	4	4	C	N
50	9.13	unplanned	4	4	6	C	N
51	10.69	unplanned	6	6	6	C	N
52	7.66	unplanned	4	4	4	C	N
53	11.90	unplanned	6	6	6	C	N
54	14.60	unplanned	4	4	4	C	N
55	8.21	unplanned	6	6	6	C	N
56	5.58	unplanned	4	4	4	C	N
57	6.50	unplanned	6	6	6	C	N
58	4.81	unplanned	6	6	6	C	N
59	20.07	unplanned	4	4	6	C	N

*Equivalent land use zone

Table F-14. Allocation of Wilbur Reservoir Parcels under Alternatives A, B, and C

Parcel Number	Acres	Previous Designation	Alternative			Committed or Uncommitted	Shoreline Access Rights
			A*	B	C		
1	5.87	Public Recreation	6	4	4	U	N
2	17.70	Dam Reservation	2	2	2	C	N
3	1.14	unplanned	4	4	4	C	N
4	1.68	unplanned	4	4	4	C	N
5	0.84	unplanned	4	4	4	C	N
6	30.71	Dam Reservation	2	2	2	C	N

*Equivalent land use zone

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Appendix G – Supporting Data

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Table G-1. Acres of Prime Farmland and Farmland of Statewide Importance on Northeastern Tributary Reservoir Parcels

Reservoir	Parcel	Common Name	Total Acres in Parcel	Acres Prime Farmland	Acres Farmland of Statewide Importance	Allocation		
						Alternative A*	Alternative B	Alternative C
Beaver Creek	1	Sugar Hollow Park	38.3	0.0	1.6	6	6	6
Beaver Creek	2	Dam Reservation	40.5	0.0	1.2	2	2	2
Beaver Creek	3	Sugar Hollow Park	211.4	18.2	117.2	6	6	6
Boone	1	Dam Reservation	191.5	37.4	0.0	2	2	2
Boone	2	Dam Reservation	10.4	3.6	0.0	2	2	2
Boone	27	Deerlick Island	70.4	13.8	0.0	3	4	4
Boone	44	Green Tract	7.2	3.7	0.0	3	3	3
Clear Creek	1	Dam Reservation	13.8	0.0	2.5	2	2	2
Fort Patrick Henry	1	Tailwater/Island	17.6	17.6	0.0	2	3	3
Fort Patrick Henry	2	Kendrick Creek	0.8	0.8	0.0	7	7	7
Fort Patrick Henry	3	Island Below Dam	2.4	2.4	0.0	2	2	2
Fort Patrick Henry	4	Dam Reservation	69.0	3.1	0.0	2	2	2
Fort Patrick Henry	10	I-81	66.8	15.4	0.0	2	4	4
Fort Patrick Henry	15	Pitt Road	5.4	5.2	0.0	7	7	7
Fort Patrick Henry	19	Smith Shoals Subdivision	2.3	1.7	0.0	7	7	7
Fort Patrick Henry	29	Warriors Path State Park	17.6	3.4	0.0	6	6	6
South Holston	1	Emmett Tailwater	97.9	41.8	0.0	2	3	4
South Holston	2	Tailwater	139.5	75.5	0.0	2	4	4
South Holston	3	Dam Reservation	373.2	80.2	0.0	2	2	2
South Holston	4	Ruritan Ballfields	16.2	1.4	0.0	6	6	6
South Holston	5	Water Treatment Plant	24.4	3.5	0.0	2	2	2
South Holston	6	Industrial Park	125.4	6.5	0.0	5	5	5
South Holston	14	Sullivan County Park	229.6	3.6	0.0	6	6	6
South Holston	23	Spring Creek Marginal	1.4	0.0	1.3	6	4	6
South Holston	24	Washington County Park	56.3	0.0	14.6	6	6	6
South Holston	25	Wolf Creek	7.0	4.7	7.0	2	4	4
South Holston	26	Green Spring Fire Department	0.39	0.0	0.1	2	2	2

Reservoir	Parcel	Common Name	Total Acres in Parcel	Acres Prime Farmland	Acres Farmland of Statewide Importance	Allocation		
						Alternative A*	Alternative B	Alternative C
South Holston	28	Avens Bridge SW	0.3	0.0	0.3	4	4	4
South Holston	29	Webb Access	1.2	0.0	0.6	7	7	7
South Holston	30	Area 1 Ramp	3.3	0.0	1.9	6	6	6
South Holston	32	Access Area 7	7.4	3.1	2.9	6	6	4
South Holston	33	Area 6 Ramp	10.9	0.0	9.1	6	6	6
South Holston	35	Access Area 4	1.7	0.0	1.7	6	4	6
South Holston	36	Access Area 3	6.0	0.0	5.1	6	4	6
South Holston	73	Bouton River Access	82.7	71.3	0.0	2	2	2
Watauga	21	Williams Island	18.7	12.4	0.0	4	3	3
Total			**1,968.9**	**430.3**	**167.1**			

*Equivalent land use zones

Table G-2. Boone Reservoir
South Fork Holston River Flood Profiles

River Mile		100-Year Flood[1]	500-Year Flood[1]	Landmark
18.60		1385.0	1385.0	Boone Dam
19.93		1385.0	1385.0	Watauga River
22.40		1385.0	1385.0	Wagner Creek
22.60		1385.0	1385.0	Candy Creek
25.47		1385.0	1385.0	Muddy Creek
26.21		1385.0	1385.0	Devault Bridge
29.00		1385.0	1385.0	
29.50		1385.0	1385.1	
29.56		1385.0	1385.1	Beaver Creek
30.00		1385.0	1385.1	
30.60		1385.0	1385.1	
30.72	D*	1385.0	1385.1	Rainbow Bridge
30.72	U*	1385.0	1385.1	
31.00		1385.1	1385.1	
31.10		1385.1	1385.1	
31.70		1385.1	1385.1	
32.00		1385.1	1385.1	
32.20		1385.1	1385.1	
32.70		1385.1	1385.2	
33.00	D*	1385.1	1385.2	U. S. Highway 11E
33.00	U*	1385.1	1385.2	
33.70		1385.3	1385.7	
34.00		1385.5	1386.0	
34.41	D*	1385.7	1386.5	Andrew Johnson Highway
34.41	U*	1385.8	1386.8	
34.70		1386.2	1387.7	
34.78	D*	1386.4	1388.1	Southern Railway
34.78	U*	1386.6	1388.4	
34.90	D*	1386.9	1389.0	Swinging Bridge
34.90	U*	1386.9	1389.0	
35.00		1387.1	1389.4	
35.23	D*	1387.6	1390.2	Island Park Bridge
35.23	U*	1388.0	1390.8	
35.56		1390.6	1393.2	
36.00		1398.0	1401.1	
36.30		1403.3	1406.8	

[1]All Elevations are NGVD 1929
* Downstream and Upstream at Bridges

My documents\Reservoir Data\boone-sfholston for land plan.xls

Table G-3. Boone Reservoir
Watauga River Flood Profiles

River Mile		100-Year Flood[1]	500-Year Flood[1]	Landmarks
0.30		1385.0	1385.0	
4.80		1385.0	1385.0	Reedy Creek
5.60		1385.0	1385.0	
6.00		1385.0	1385.0	
6.77		1385.1	1385.1	
7.00		1385.1	1385.1	
7.38		1385.1	1385.1	
7.73		1385.1	1385.1	
8.00		1385.1	1385.1	
8.30		1385.1	1385.1	
8.58		1385.1	1385.2	Carroll Creek
8.89		1385.1	1385.2	
9.00		1385.1	1385.2	
9.60		1385.2	1385.3	
10.00		1385.3	1385.5	
10.74		1385.6	1385.8	
10.84		1385.6	1385.9	
10.97	D*	1385.7	1386.0	Andrew Johnson Hwy - Devault Bridge
10.97	U*	1385.8	1386.2	
11.00		1385.8	1386.2	
11.18		1385.9	1386.3	
11.30		1386.0	1386.5	
11.43		1386.1	1386.6	Knob Creek
11.88		1386.4	1387.1	
12.00		1386.4	1387.1	
12.47		1386.5	1387.2	
12.88		1386.5	1387.2	
13.00		1386.9	1387.7	
13.01	D*	1386.9	1387.7	Austin Springs Bridge
13.01	U*	1387.2	1388.2	
13.07		1387.4	1388.5	
13.33		1388.2	1389.4	
14.00		1390.1	1391.5	
14.01		1390.1	1391.5	
14.45		1391.9	1393.3	
15.00		1395.4	1397.1	
15.59	D*	1399.2	1401.0	Gibson Bridge
15.59	U*	1399.5	1401.3	
15.80		1402.7	1404.4	

[1]All Elevations are NGVD 1929
Downstream and Upstream at Bridges

Table G-4. Watauga River Flood Profiles Downstream of Wilbur Dam

River Mile	100-Year Flood[1]	500-Year Flood[1]	Landmark
33.40	1584.8	1585.3	Lower Limit of TVA Property
33.68	1586.2	1586.6	
34.00	1587.4	1587.8	Downstream of Wilbur Dam

[1]All Elevations are NGVD 1929

Table G-5. Boone Reservoir
South Fork Holston River Flood Profiles Downstream of South Holston Dam

River Mile		100-Year Flood[1]	500-Year Flood[1]	Landmark
46.50		1472.6	1475.1	
46.79		1474.8	1477.4	
47.00		1476.1	1478.8	
48.00		1482.2	1485.4	
48.26	D*	1483.8	1487.1	Bristol Water Works Dam
48.26	U*	1484.0	1487.1	
48.32		1484.5	1487.5	
48.43	D*	1485.4	1488.3	Osceola Island Foot Bridge
48.43	U*	1485.5	1488.4	
48.49	D*	1486.0	1488.8	TVA Labyrinth Weir
48.49	U*	1487.4	1489.1	
48.52		1487.6	1489.3	
48.56		1487.8	1489.6	
48.64		1488.2	1490.1	
48.80		1489.2	1491.3	
49.00		1490.5	1492.9	
49.04		1490.7	1493.2	
49.27		1492.8	1495.8	
49.44		1494.8	1498.5	
49.52		1495.1	1498.8	
49.80		1495.6	1499.2	Downstream of South Holston Dam

[1]All Elevations are NGVD 1929
* Downstream and Upstream at Bridges, Dams, and/or Weirs

Table G-6. South Fork Holston River Flood Profiles Downstream of Fort Patrick Henry Dam

River Mile		100-Year Flood[1]	500-Year Flood[1]	Landmark
7.40		1205.4	1211.4	Lower Limit of TVA Property
7.68		1206.6	1212.5	
7.95	D*	1207.9	1213.8	U. S. Highway 23
7.95	U*	1208.5	1214.5	
8.20		1209.6	1215.5	Downstream of South Holston Dam

[1]All Elevations are NGVD 1929
* Downstream and Upstream at Bridge

Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, Tennessee 37902-1499

September 4, 2008

Mr. E. Patrick McIntyre, Jr.
State Historic Preservation Officer
Tennessee Historical Commission
2941 Lebanon Road
Nashville, Tennessee 37243-0442

NORTHEASTERN TRIBUTARIES LAND MANAGEMENT PLAN, GREENE, CARTER, AND SULLIVAN COUNTIES, TENNESSEE

Dear Mr. McIntyre:

The Tennessee Valley Authority (TVA) is developing a Land Management Plan (LMP) for TVA lands on Beaver Creek, Boone, Cherokee, Clear Creek, Douglas, Fort Patrick Henry, Nolichucky, South Holston, Watauga, and Wilbur Reservoirs in Virginia and Tennessee.

In Tennessee, the southern portion of the Holston Reservoir extends into Sullivan County, Tennessee. South Holston, Boone, and Fort Patrick Henry Reservoirs lie on the South Fork of the Holston River near Kingsport, Tennessee. Watauga and Wilbur Reservoirs impound portions of the Watauga River which converges with the South Fork of the Holston River to form the Holston River. Cherokee Reservoir is located approximately halfway between this confluence and the city of Knoxville, Tennessee. To the south of the Holston River lies the Nolichucky Reservoir (or Davy Crockett Lake) on the Nolichucky River halfway between the headwaters and its confluence with the French Broad River. Douglas Reservoir lies on the French Broad River below the Nolichucky River to the east and above Knoxville to the west.

TVA prepares LMPs with the participation of public agencies and officials, private organizations, and the public 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 LMP currently being prepared, TVA Cultural Resources staff has identified the area of potential effects (APE) pursuant to 36 CFR Parts 800.4(a)(1) and 80.16(d) as the 880 acres on Boone, 9120 acres on Cherokee, 2055 acres on Douglas, 283 acres on Fort Patrick Henry, 1143 acres on Nolichucky, 2099 acres on South Holston, 1136 acres on Watauga, and 58 acres on Wilbur Reservoir in Tennessee. Future use of these lands is being planned or has been previously committed to specific land uses. Maps depicting the specific land parcels to be addressed by the LMP may be accessed on TVA's website at http://www.tva.com/environment/reports/ntrlmp/index.htm. However, if you require hard copies for your initial review, our office will be glad to furnish a set.

Mr. E. Patrick McIntyre, Jr.
Page 2
September 4, 2008

TVA has previously conducted cultural resources surveys on portions of the lands addressed by this LMP, and numerous historic properties potentially eligible for listing on the National Register of Historic Places have been identified by these surveys. TVA has also conducted a survey of certain parcels on Nolichucky, South Holston, and Watauga Reservoirs that are associated with the proposed LMP (Gage 2008). A copy of this report is included for your review.

Pursuant to 36 CFR Part 800.3(f)(2) of the Advisory Council's regulations, TVA is also inviting Indian tribes that might attach religious or cultural significance to historic properties in the APE to be consulting parties. Because of the location of this project, TVA is inviting the following groups to be consulting parties to the proposed project: Cherokee Nation, Eastern Band of the Cherokee Indians, United Keetoowah Band of Cherokee Indians in Oklahoma, Muscogee (Creek) Nation of Oklahoma, Thlopthlocco Tribal Town, Alabama-Coushatta Tribe of Texas, Alabama-Quassarte Tribal Town, Kialegee Tribal Town, Absentee Shawnee Tribe of Oklahoma, Shawnee Tribe, Eastern Shawnee Tribe, The Chickasaw Nation, and the Choctaw Nation of Oklahoma.

TVA requests your concurrence that the existing Programmatic Agreement between TVA and the Tennessee State Historic Preservation Officer would fulfill TVA's obligations under section 106 of the *National Historic Preservation Act* regarding the effects of the LMP on historic properties in Tennessee.

If you have any questions or need additional information, please contact Ted Wells at (865) 632-2259 or by email: ewwells@tva.gov.

Sincerely,

Thomas O. Maher, Ph.D.
Manager
Cultural Resources

EWW:IKS
Enclosure
cc: Ms. Jennifer Barnett
Tennessee Division of Archaeology
Cole Building # 3
1216 Foster Avenue
Nashville, Tennessee 37210

Files, CR, WT 11D-K

TENNESSEE HISTORICAL COMMISSION
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
2941 LEBANON ROAD
NASHVILLE, TN 37243-0442
(615) 532-1550

September 26, 2008

Dr. Thomas O. Maher
Tennessee Valley Authority
400 West Summet Hill Dr.
Knoxville, Tennessee, 37902-1499

RE: TVA, NORTHEAST TRIBUTARIES LAND MANAGEMENT PLAN, UNINCORPORATED, MULTI COUNTY

Dear Dr. Maher:

Pursuant to your request, received on Tuesday, September 9, 2008, this office has reviewed documentation concerning the above-referenced undertaking. This review is a requirement of Section 106 of the National Historic Preservation Act for compliance by the participating federal agency or applicant for federal assistance. Procedures for implementing Section 106 of the Act are codified at 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739)

Based on the information provided, we find that the current documentation adequately mitigates project effects upon properties eligible for listing in the National Register of Historic Places as stipulated in the existing Programmatic Agreement (PA).

Therefore, this office has no objection to the implementation of referenced project elements covered by the PA. Your continued cooperation is appreciated.

Sincerely,

E. Patrick McIntyre, Jr.
Executive Director and
State Historic Preservation Officer

EPM/jyg

May 09 06 04:28p ACHP 606 5072 p.2

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:~~ Bennett

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.

2

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: _____
[ ]

Table G-7. State-designated impaired TVA reservoirs and tailwaters within the scope of the Northeastern Tributary Reservoirs Land Management Plan.

Waterbody ID	Affected Waterbody	State	County	Miles/Acres Impaired	Cause	Pollutant Source
TN060101012 001 - 2000	South Fork Holston River	TN	Sullivan	2.4 miles	Low dissolved oxygen Flow alteration Thermal Modification	Upstream Impoundment (Fort Patrick Henry)
TN06010102 006 - 1000	Boone Reservoir	TN	Washington Sullivan	4400 ac	PCBs Chlordane	Contaminated Sediment
TN06010102 014 - 1000	South Fork Holston River	TN	Sullivan	4.4 miles	Flow alteration Thermal Modification	Upstream Impoundment (South Holston)
TN06010102 015 - 1000	South Holston Reservoir	TN	Sullivan	7577 ac	Mercury	Atmospheric Deposition
TN06010103 020 - 1000	Watauga Reservoir	TN	Carter Johnson	6427 ac	Mercury	Atmospheric Deposition

Table G-8. TVA's Reservoir Ecological Health ratings for dissolved oxygen, sediment quality, chlorophyll, benthic macroinvertebrates, and fish assemblage at each location monitored on Northeastern Tributary Reservoirs.

Location	Monitoring Years																	Rating Summary*
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	
Boone Forebay																		
Dissolved Oxygen	Fair	Good	Fair	Good	Good	*NS*	Fair	*NS*	Poor	*NS*	Poor	Poor	Good	Fair	Poor	Poor	Poor	G/F/P
Sediment	*NS*	*NS*	Fair	Fair	Fair	*NS*	Fair	*NS*	Fair	*NS*	Fair	*NS*	Fair	*NS*	Fair	*NS*	Good	F
Chlorophyll	Fair	Fair	Good	Good	Fair	*NS*	Poor	*NS*	Poor	*NS*	Fair	Poor	Poor	Poor	Good	Poor	Fair	G/F/P
Benthic Community	*NS*	*NS*	**	Fair	Poor	*NS*	Poor	*NS*	Poor	*NS*	Fair	*NS*	Poor	*NS*	Fair	*NS*	Poor	F/P
Fish Community	**	**	Poor	Fair	Fair	*NS*	Fair	*NS*	Fair	*NS*	Fair	*NS*	Fair	*NS*	Fair	*NS*	Fair	F
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	
Boone Mid-Res South Holston																		
Dissolved Oxygen	Poor	Poor	Poor	Poor	Poor	*NS*	Good	*NS*	Poor	*NS*	Poor	Poor	Good	Poor	Poor	Poor	Poor	P
Sediment	*NS*	*NS*	Fair	Fair	Fair	*NS*	Fair	*NS*	Fair	*NS*	Fair	*NS*	Fair	*NS*	Fair	*NS*	Fair	F
Chlorophyll	Poor	Poor	Fair	Poor	Poor	*NS*	Poor	*NS*	Poor	*NS*	Poor	Poor	Poor	Poor	Poor	Poor	Poor	P
Benthic Community	*NS*	*NS*	**	Poor	Poor	*NS*	Poor	*NS*	Poor	*NS*	Poor	*NS*	Poor	*NS*	Poor	*NS*	Fair	P
Fish Community	**	**	Fair	Fair	Fair	*NS*	Fair	*NS*	Fair	*NS*	Fair	*NS*	Fair	*NS*	Fair	*NS*	Fair	F
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	
Boone Mid-Res Watauga																		
Dissolved Oxygen	Good	Fair	Fair	Good	Good	*NS*	Good	*NS*	Good	*NS*	Good	Good	Good	Good	Good	Good	Good	G
Sediment	*NS*	*NS*	Poor	Poor	Poor	*NS*	Poor	*NS*	Poor	*NS*	Poor	*NS*	Fair	*NS*	Fair	*NS*	Fair	P → F
Chlorophyll	Poor	Poor	Fair	Poor	Poor	*NS*	Poor	*NS*	Poor	*NS*	Fair	Poor	Poor	Poor	Poor	Poor	Poor	P
Benthic Community	*NS*	*NS*	**	Poor	Poor	*NS*	Poor	*NS*	Poor	*NS*	Poor	*NS*	Poor	*NS*	Poor	*NS*	Poor	P
Fish Community	**	**	Fair	Fair	Fair	*NS*	Fair	*NS*	Fair	*NS*	Fair	*NS*	Fair	*NS*	Fair	*NS*	Fair	F

Location	Monitoring Years																	Rating
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Summary*
Fort Pat Forebay																		
Dissolved Oxygen	*NS*	*NS*	Good	Good	Good	Good	Good	*NS*	Good	*NS*	Good	*NS*	Good	*NS*	Good	Good	Good	G
Sediment	*NS*	*NS*	Good	Fair	Fair	Fair	Fair	*NS*	Fair	*NS*	Fair	*NS*	Fair	*NS*	Good	*NS*	Good	G/F
Chlorophyll	*NS*	*NS*	Fair	Poor	Poor	Poor	Poor	*NS*	Poor	*NS*	Poor	*NS*	Good	*NS*	Poor	Poor	Poor	P
Benthic Community	*NS*	*NS*	**	Fair	Poor	Fair	Poor	*NS*	Fair	*NS*	Fair	*NS*	Fair	*NS*	Fair	*NS*	Poor	F/P
Fish Community	*NS*	*NS*	Fair	Fair	Poor	Fair	Fair	*NS*	Fair	*NS*	Fair	*NS*	Poor	*NS*	Fair	*NS*	Fair	F/P
Location	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	
South Holston Forebay																		
Dissolved Oxygen	Poor	Poor	Poor	Poor	*NS*	Poor	*NS*	Poor	*NS*	Poor	*NS*	Poor	*NS*	Poor	*NS*	Poor	Poor	P
Sediment	*NS*	*NS*	Good	Good	*NS*	Fair	*NS*	Fair	*NS*	Good	*NS*	Fair	*NS*	Good	*NS*	Good	*NS*	G/F
Chlorophyll	Good	Good	Good	Fair	*NS*	Good	*NS*	Good	*NS*	Good	Good	Good	Good	Good	Good	Good	Fair	G
Benthic Community	*NS*	*NS*	**	Fair	*NS*	Poor	*NS*	Poor	*NS*	Poor	*NS*	Poor	*NS*	Poor	*NS*	Poor	*NS*	P
Fish Community	**	**	Good	Good	*NS*	Good	*NS*	Good	*NS*	Fair	*NS*	Fair	*NS*	Fair	*NS*	Fair	*NS*	G/F
Location	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	
South Holston Mid-Res																		
Dissolved Oxygen	Poor	Poor	Poor	Poor	*NS*	Poor	*NS*	Poor	*NS*	Poor	*NS*	Poor	*NS*	Poor	Poor	Poor	Poor	P
Sediment	*NS*	*NS*	Fair	Good	*NS*	Fair	*NS*	Fair	*NS*	Fair	*NS*	Fair	*NS*	Good	*NS*	Good	*NS*	G/F
Chlorophyll	Good	Good	Good	Good	*NS*	Good	*NS*	Fair	*NS*	Poor	Poor	Fair	Fair	Good	Fair	Poor	Good	G→G/F/P
Benthic Community	*NS*	*NS*	**	Poor	*NS*	Poor	*NS*	Poor	*NS*	Poor	*NS*	Poor	*NS*	Poor	*NS*	Fair	*NS*	P
Fish Community	**	**	Good	Fair	*NS*	Fair	*NS*	Good	*NS*	Fair	*NS*	Fair	*NS*	Good	*NS*	Fair	*NS*	G/F

Location	Monitoring Years																	Rating Summary*
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	
Watauga Forebay																		
Dissolved Oxygen	Fair	Good	Good	Fair	*NS*	Good	*NS*	Fair	*NS*	Fair	*NS*	Good	*NS*	Good	Good	Fair	Fair	G/F
Sediment	*NS*	*NS*	Fair	Good	*NS*	Good	*NS*	Fair	*NS*	Good	*NS*	Good	*NS*	Good	*NS*	Good	NS	G/F
Chlorophyll	Good	Good	Good	Good	*NS*	Good	*NS*	Good	*NS*	Good	*NS*	Good	*NS*	Good	Good	Good	Good	G
Benthic Community	*NS*	*NS*	**	Poor	*NS*	Poor	*NS*	Poor	*NS*	Poor	*NS*	Poor	*NS*	Poor	*NS*	Fair	*NS*	P
Fish Community	**	**	Fair	Fair	*NS*	Fair	*NS*	Fair	*NS*	Fair	*NS*	Fair	*NS*	Fair	*NS*	Fair	*NS*	F
Location	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	
Watauga Mid-Res																		
Dissolved Oxygen	Fair	Fair	Fair	Poor	*NS*	Fair	*NS*	Poor	*NS*	Poor	*NS*	Poor	Poor	Good	Poor	Poor	Poor	F/P
Sediment	*NS*	*NS*	Fair	Fair	*NS*	Fair	*NS*	Fair	*NS*	Fair	*NS*	Fair	*NS*	Fair	*NS*	Good	NS	F
Chlorophyll	Good	Good	Good	Good	*NS*	Good	*NS*	Good	*NS*	Good	*NS*	Good	*NS*	Good	Good	Good	Good	G
Benthic Community	*NS*	*NS*	**	Fair	*NS*	Poor	*NS*	Poor	*NS*	Fair	*NS*	Fair	*NS*	Fair	*NS*	Fair	*NS*	P/F
Fish Community	**	**	Good	Fair	*NS*	Fair	*NS*	Good	*NS*	Fair	*NS*	Good	*NS*	Fair	*NS*	Fair	*NS*	G/F

* = The rating summaries represent the typically rating for each indicator and may not reflect all the rating categories applied to a given indicator.
Rating Summary Codes: *G = Good; F = Fair; P = Poor; more than one rating code (e.g., G/F) for an indicator means that ratings have fluctuated generally between the rating categories shown; an arrow (→) between rating codes signifies that the indicator has exhibited a trend towards either improved or lower ratings.*
NS = Not Sampled
** = The difference in reservoir benthic scoring methodology from 1990-1993 prevents a direct comparison to results from 1994-2007, and a difference in RFAI scoring methodology from 1990-1992 prevents a direct comparison to results from 1993-2007.

Table G-9. Invasive Exotic Pest Plants Rank 1 – Severe Threat*

Common Name	Scientific Name
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.*

Source: Tennessee Exotic Plant Pest Council (TN-EPPC). 2001. *Invasive Exotic Pest Plants in Tennessee*. Retrieved from < http://www.tneppc.org/>. (Accessed: September 23, 2008

* Rank 1 — Severe Threat: Exotic plant species that possess characteristics of invasive species and spread easily into native plant communities and displace native vegetation

Table G-10. Invasive Exotic Pest Plants Rank 2 – Significant Threat*

Common Name	Scientific Name
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.

Common Name	Scientific Name
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

Source: Tennessee Exotic Plant Pest Council (TN-EPPC). 2001. *Invasive Exotic Pest Plants in Tennessee*. Retrieved from < http://www.tneppc.org/>. (Accessed: September 23, 2008

*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

Table G-11. Invasive Exotic Pest Plants Rank 3 –Lesser Threat*

Common Name	Scientific Name
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.*

Source: Tennessee Exotic Plant Pest Council (TN-EPPC). 2001. *Invasive Exotic Pest Plants in Tennessee*. Retrieved from < http://www.tneppc.org/>. (Accessed: September 23, 2008

*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

Table G-12. Nonnative, Noninvasive Species Suitable for Erosion Control/ Stabilization Activities

Common Name	Scientific Name
Annual ryegrass	*Lolium multiflorum*
Browntop millet	*Panicum ramosum*
Japanese millet	*Echinochloa esculenta*
Winter wheat	*Triticum aestivum*
Oats (spring variety)	*Avena sativa*
Orchardgrass	*Dactylis glomerata*
Perennial ryegrass	*Lolium perenne*
Redtop	*Agrostis gigantea*
Rye	*Secale cereal*
Timothy	*Phleum pretense*
Weeping lovegrass	*Eragrostis curvula*
Crimson, red, and ladino clovers	*Trifolium incarnatum, Trifolium pretense, Trifolium repens*

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