

4.0 ENVIRONMENTAL CONSEQUENCES

Under the current land allocations, Tracts 1, 3, and 4 are available for development. However, in the proposed action, only tracts 3 and 4 are being considered for development. Adoption of Alternatives 1, 2, or 3 would likely result in commercial and/or residential development of 660 acres (267 ha) of undeveloped TVA land in the long term. Because there is a minor amount of existing commercial recreation development in the area, these alternatives would increase the presence of these types of land uses in the landscape of the general area.

4.1 Vegetation and Wildlife

Adoption of Alternatives 1, 2, or 3 would eventually result in the disruption and loss of about half of the acreage of the natural ecological communities occurring on Tracts 3 and 4. Additionally, clearing and grading, followed by construction of residential dwellings and commercial recreation facilities, would eliminate or reduce the habitat suitability for most of the resident and migratory wildlife species that currently utilize the lands to be developed. These communities are generally representative of those found elsewhere in southeastern Tennessee, and the alluvial valleys of the Tennessee and lower Sequatchie River systems in Marion County. Within the Tennessee River basin portion of the surrounding area, most of these habitats were eliminated by construction of Nickajack Dam, and the subsequent impoundment of Nickajack Reservoir. For the most part, what remains of this type of habitat is confined to Tracts 1, 3, and 4.

Under the three development alternatives, wildlife utilizing habitats associated with Tracts 3 and 4 would either be lost or displaced into surrounding areas of suitable habitat. Over time, these animals would be pushed out of the area on to adjacent private lands and Tract 1. In addition to the loss of wildlife habitat and populations, there would be an associated loss of public opportunity for both consumptive (i.e., hunting and trapping), and non-consumptive (i.e., observation and photography) enjoyment of wildlife on Tracts 3 and 4.

TVA would reallocate approximately 498 acres (202 ha) of the adjacent 637.7-acre (258-ha) industrial tract (Tract 1) for "Wildlife Management." The remaining acreage has already been utilized by TVA for development of the Safety and Emergency Response Training Academy, operations and maintenance complex, law enforcement offices, and a police firing range.

An abandoned landfill site occupies approximately 47 acres (19 ha) of the portion of Tract 1 proposed for reallocation. This area is currently in early successional cover types, and would most likely be maintained in a grass/forb mixture because re-establishment of trees may disrupt the soil layer (i.e., cap) that covers the landfill site.

Also contained on the portion of Tract 1 proposed for reallocation is approximately 150 acres (61 ha) of spoil materials (rock, sand, and gravel) removed during construction of Nickajack Dam. This former spoil disposal area is dominated by a mixture of eastern red

cedar, privet, blackberry briars, sumac, mixed hardwood and pine saplings, along with various grass and forb species. At present, there is no large timber on this site. The area does provide suitable cover for many wildlife species; however, its food production potential is low due to low soil fertility. Some habitat enhancement such as bushhog stripping, burning, or planting of species more favorable to wildlife food production is possible.

Approximately 15 acres (6 ha) of the portion of Tract 1 proposed for reallocation is in mixed hardwood sawtimber, and another 116 acres (47 ha) supports bottomland hardwoods ranging in age from 20 to 70 years. Hard mast producing species are lacking throughout these stands and some management would be required to restore stand vigor and productivity. Within these stands are approximately 15 acres (6 ha) of riparian wetlands that occur along seeps, streambanks, and around the margins of depressional ponds. For the most part, these wetlands are dominated by pole-sized green ash.

Open land conditions persist on approximately 100 acres (40 ha) of the portion of Tract 1 proposed for reallocation. At present, these open lands are licensed by TVA for row crop production. These agricultural lands meet established criteria for "prime farmland". The current crop rotation of corn, soybeans, and various small grains, provides desirable forage for both game and non-game species. Separating these agricultural lands from the Tennessee River are approximately 8 acres (3 ha) of riparian buffer zone. This buffer protects shoreline and riparian habitats and prevents runoff from adjacent agricultural lands into the Tennessee River.

The remaining 62 acres (25 ha) of the portion of Tract 1 proposed for reallocation consists of TVA transmission line right-of-way (ROW) that is maintained as early successional habitat (grass/forb/shrub) through periodic mowing and shear clearing. This acreage could be utilized for wildlife food production, thereby saving TVA the costs associated with periodic ROW maintenance activities. A small portion of this ROW crosses the aforementioned former landfill site.

In its present condition, Tract 1 provides habitat for a variety of game and non-game species, and receives frequent use by sportsmen during the various hunting seasons. Through the Nickajack Reservoir lands planning process, TVA staff evaluated the wildlife resource capability of this tract as "excellent" and identified its potential value as habitat for agriculture related wildlife species such as quail, dove, and rabbit. Staff further concluded that these lands had potential for supporting high populations of wildlife for both consumptive and non-consumptive public uses including hunting, bird watching, and retriever training. Portions of this tract have historically been made available to local hunting organizations for retriever field trials.

Through the proposed reallocation, TVA would commit to retaining these 498 acres (202 ha), and to making these lands available on a long-term basis for wildlife related public uses such as hunting, hunting dog training and field trials, wildlife observation, nature photography, etc.

Under Alternative 4, Tracts 1, 3, and 4 would be retained in public ownership as open space for some indefinite interim period. While the tracts would be available for development consideration, TVA would continue licensing portions of the tract for agricultural purposes and implement programs for improved management of forest and wildlife resources. The area would remain open for both consumptive and non-consumptive uses of wildlife, bank fishing, hiking, and other dispersed forms of outdoor recreation, at least until approvable development proposals, which are consistent with existing allocations, are made. TVA's Shellmound recreation area would continue to operate as in the past.

4.2 Forest Resources

Adoption of Alternatives 1, 2, or 3, and development of the tracts, would lead to a cessation of forest management activities on Tracts 3 and 4, and a reduction in the amount of forested acreage occurring on the tracts. However, because of the vast amounts of forest acreage available within the region, these impacts would be minor and insignificant.

Under Alternative 4, TVA would continue managing forested areas for some indefinite interim period to sustain a diverse array of wildlife habitats and forest age classes.

4.3 Prime Farmland

The Farmland Protection Policy Act (7 U.S. Code 4201-4209) requires that TVA consider potential losses of prime farmland associated with its proposed actions. The regulations implementing the Act set up criteria for determining whether a site is prime farmland. An agency receives a score of a site's relative value from the Natural Resources Conservation Service (NRCS) and then conducts a site assessment to identify the impacts of its program on prime farmland. Sites receiving a total score of less than 160 need not be given further consideration for protection and no additional sites need be evaluated. When a site receives a total score of 160 or more, the agency is encouraged to consider use of other land that is not farmland, the use of other sites that would also serve the proposed purpose, and the extent to which alternative sites fail to consider the special siting requirements.

Under Alternatives 1, 2, and 3, a total of 397 acres (161 ha) of publicly-owned prime farmland on Tracts 3 and 4 would be converted to non-agricultural uses. This conversion would receive an impact rating of 162, which is marginally above the 160 score described above. Because the primary value of the proposed outdoor recreation development is as a lakeside resort and the agency does not have any other nearby sites that qualify for this purpose, including the adjacent industrial tract, TVA does not believe that other nearby land exists that would meet the purpose of this project and that conversion is warranted in this case. In addition, implementation of Alternatives 1, 2, or 3 would result in long-term

protection of prime farmland on Tract 1, land that was originally planned for conversion to industrial uses. Although the NRCS has not been asked to evaluate prime farmland on Tract 1, TVA estimates that about 85 percent of the tract is prime farmland.

Adoption of Alternative 4 would, in the short term, preserve the value of 939 acres (380 ha) of prime farmland on all three tracts. TVA likely would continue licensing at least a portion of this acreage for agricultural uses. The remainder would be managed for wildlife habitat enhancement, improved forest productivity, and maintenance of aesthetic qualities.

4.4 Wetlands

Under Alternatives 1, 2, and 3, expanded recreational use of the reservoir, and the development of adjacent shorelands occurring on Tracts 3 and 4, could result in modification, or loss of, lacustrine fringe and aquatic bed wetlands. These modifications could eventually lead to loss or reductions of beneficial wetland functions and values associated with these wetlands.

TVA is committed to protecting shoreline (i.e., lacustrine fringe and lacustrine aquatic bed communities), and depressional (i.e., sink hole) wetlands associated with Tracts 1, 3, and 4. For the two sink hole ponds identified on Tract 3, TVA would delineate an appropriately-sized wetland protection area surrounding these wetlands (See map in Appendix). Elsewhere on Tracts 3 and 4, TVA would ensure protection of fringe and aquatic bed communities by requiring that the developer prepare, and implement, a detailed shoreline management plan specifying strategies for avoiding, or appropriately mitigating, any anticipated wetland impacts. At a minimum, this plan would specify measures to be used in protecting fringe and aquatic bed wetlands, and for preserving the full range of functions and values associated with these wetlands. If there are situations where potential wetland impacts could not be successfully avoided or minimized, TVA would require an appropriate mitigation response on the part of the developer.

At present, specific plans for development of Tracts 3 and 4 are not known. However, under any development scenario, TVA would require all facilities to be sited to avoid or to have insignificant impacts on wetlands. Through this approach, TVA can ensure that recreation and/or residential development affecting Tracts 3 and 4 could be accomplished consistent with the provisions of Presidential Executive Order No. 11990.

Under Alternative 4, wetlands, and wetlands-associated functions and values, would be protected for some indefinite interim period. As future management activities are planned and implemented, project-specific wetlands evaluations would be conducted to ensure that impacts are avoided or appropriately mitigated.

4.5 Threatened and Endangered Species

Adoption of any of the development alternatives for Tracts 3 and 4 would not affect endangered or threatened aquatic species. As indicated in Section 3.5, no protected aquatic species are known or likely to occur on Tracts 3 or 4. The proposed land use change for Tract 1 would not affect Anthony's riversnail, snail darters, or their habitats in adjacent reaches of the Tennessee River.

Tracts 1, 3, 4, and 5 have been surveyed for endangered or threatened species on six different occasions since 1984. These surveys coincided with earlier land use requests including proposals for recreational development, special use licenses for hunting dog field trials, proposed timber harvests, and the Nickajack Reservoir lands planning process. During each of these surveys, special emphasis was placed on assessing the potential for occurrences of federally listed plant species such as American hart's tongue fern, Price's potato bean, Eggert's sunflower, and large-flowered skullcap. Despite intensive efforts, none of these species have been observed on any of the four tracts in question; and, for at least three of these species, no potentially suitable habitat is known to occur on these tracts. Staff did observe areas of "forest edge" habitat required by Price's potato bean. However, no individuals of this species were observed on the properties, and none are presumed to occur.

In that no federally listed plant species are known from Tracts 3 or 4, no direct impacts to such species would be anticipated as a result of any of the proposed action alternatives. However, in the absence of protection strategies, improved access and increased human visitation to adjacent areas of Tract 5 could result in population reductions for at least four plant species listed by the State of Tennessee. For this reason, TVA would develop and implement a management plan for these lands. This plan would include strategies to minimize the potential for adverse impacts to State-listed plants.

TVA would require development proposals to include measures to avoid impacts to suitable habitat for the gray bat, Indiana bat, and bald eagle. Human use and development of shorelines, and adjacent over-water areas, could reduce the suitability of these habitats for such species as the bald eagle, gray bat, and Indiana bat. Additionally, the type of development proposed for these lands would likely result in increased boat traffic and other recreational activities. While TVA would protect the recently discovered gray bat roost cave on Tract 5, a development nearby could lead to increased visitation and disturbance of the cave. Human disturbance of roost caves is a primary reason for the decline of the gray bat, and human disturbance has long been recognized as a factor contributing to abandonment of preferred roost/nest sites by bald eagles.

To lessen the risk of adverse impacts to bald eagles, gray bats and Indiana bats, TVA would impose the following restrictions under Alternatives 1, 2, and 3 (as applicable) for future development and use of shoreline areas fronting Tracts 3 and 4.

1. All of the shoreline fronting Tracts 3 and 4 would be allocated to one of three management categories - public recreation, shoreline management, and habitat

protection. The preliminary allocations for these three categories are depicted on the maps in the Appendix. The purpose of the habitat protection area is to protect wetlands and the Little Cedar Mountain Cave.

2. Except for those segments allocated for public recreation facilities, TVA would retain an appropriate width management zone for all shoreline areas fronting Tracts 3 and 4. Similarly, habitat protection zones also would be maintained along stream channels and surrounding jurisdictional wetlands. Except for areas within residential access corridors, and those segments used for public recreation facilities, shoreline and streamside management zones would be maintained in a forested condition, with no clearing or removal of vegetation. The width of these zones would vary depending on slope and resource condition, however, in no instance would they be narrower than 100 feet (30 m) as measured landward from the Summer pool elevation.
3. For segments allocated for shoreline management, access corridors would be permitted consistent with applicable TVA policies.
4. To protect the recently discovered gray bat roost and other sensitive resources occurring on adjacent portions of Tract 5, TVA would develop and implement a resource management/protection plan for these lands. In addition to identifying trail corridors, this plan would also address potential impacts resulting from improved public access, and would establish safeguards to avoid adverse impacts.
5. Forest clearing activities associated with removal of larger trees will be completed between October 15 and March 31 to protect Indiana bat habitat.
6. Public visitation and bat usage at Little Cedar Mountain Cave would be monitored, and TVA would consult with the U.S. Fish and Wildlife Service on the need for gates or other restrictive measures.

TVA has informally consulted with the U.S. Fish and Wildlife Service on these measures. By letter dated August 26, 1996, the Service has concurred with TVA's determination that the proposed actions would not effect listed or proposed endangered and threatened species, including locally occurring populations of gray and Indiana bats, or bald eagles. In support of this position, TVA provided the following information to the Service:

Shoreline development restrictions would be imposed under any of the three development alternatives. Since 1993, such restrictions have been routinely prescribed for proposed developments likely to impact TVA owned shorelines (including Swan Harbor, Bat Creek, Marble Bluff, and Norris Crest). These measures would lessen the risk of potentially adverse impacts to bald eagles, gray bats, and Indiana bats.

TVA sees very little potential for significant impacts to individuals, populations, or areas of critical habitat if any of the three development alternatives is selected. In addition, if one of the proposed recreational/residential use alternatives is selected, there is very little, if any, potential that such use would jeopardize the continued existence of, or lead to the further decline of, any federally listed species; or result in adverse modification or destruction of critical habitats.

Subsequent to the release of the Little Cedar Mountain Draft EA, additional field surveys were conducted to further clarify the significance of shoreline and riparian habitats fronting Tracts 1, 3, 4, and 5; and Quarry and Little Cedar Mountain Caves.

Concerning the caves, TVA's recent assessment indicates that there is no significant bat usage of Quarry Cave; and, with the exception of the last room, this cave seems too dry to support cave roosting bats.

During TVA's initial inspection of the entrance to Little Cedar Mountain Cave, small amounts of bat guano was scattered over the large boulders and breakdown that clutter the entrance floor. However, no bats were observed during the peak period for evening emergence, and a thorough examination of accessible passageways revealed only 7 eastern pipistrells (Pipistrellus subflavus) roosting individually throughout the cave. However, three small (< 1 m²) guano piles, and some light ceiling staining confirm some Spring and/or late Summer use by **transient** gray bats.

Even though this cave does not hold major significance as a preferred roost site for either gray or Indiana bats, it does provide suitable habitat for a number of other cave residing species, and is likely used by a variety of bat species throughout the year.

During field inspections, staff also identified important overwater foraging habitats for gray bats, and riparian foraging and roosting habitats for Indiana bats. These habitats occur intermittently along the shoreline fronting Tracts 3 and 4. Based on the numerous shag-bark hickories (Carya ovata), standing snags, and den trees occurring in areas of forested shoreline, and the presence of several woodland ponds, it is possible that Indiana bats forage in this area. Also, lacustrine aquatic bed wetlands observed along the shoreline from Shellmound Recreation Area upstream to I-75 were being used (as confirmed by bat detectors and spotlight surveys) by foraging gray bats. TVA will impose restrictions on the nature and extent of shoreline development as a means of ensuring protection for lacustrine aquatic bed wetlands and shoreline and riparian habitats. Prior to development, staff would delineate buffer zones along the shoreline [This has subsequently been completed.]. During and following development, these zones would be closely monitored to identify and correct encroachments and/or violations.

For the past two years, a pair of bald eagles (Haliaeetus leucocephalus) have nested in a large tulip tree (Liriodendron tulipifera) located approximately 800' north of Tract 1. On June 6, 1996, staff visited the location to examine the nest site and its relationship to adjacent TVA lands. During our inspection, we observed two adult birds and one fledgling. The adult female is marked with a

patagial wing tag and has been identified as a bird that was transplanted from Chesapeake Bay, and hatched at Land Between the Lakes. The close proximity of this nest to occupied dwellings (< 300 ft.) and family gardens (immediately adjacent) indicates that these birds have become acclimated to human activity. Nothing associated with the proposed development of Tracts 3 and 4 would pose any type of threats to these birds. In fact, reallocation of adjacent portions of Tract 1 from Industrial Development to Wildlife Management would actually benefit these birds by ensuring long-term protection for foraging, perching, and loafing habitat located between Nickajack Dam and the mouth of the Sequatchie River.

Upon review of this information, the Service indicated they would concur with the finding of "not likely to adversely affect" the gray and Indiana bats if buffer zones were established along the shorelines and drainages crossing the property. The Service also recommended that TVA restrict all land clearing to dates between October 15 and March 31, and that a bat gate be installed at the entrance of Little Cedar Mountain Cave. TVA concurs with the Service's recommendation regarding the timing of land clearing activities. Additionally, under any of the development alternatives, TVA would establish shoreline management and habitat protection zones as recommended by the Service. With regard to the cave gate, however, TVA would defer a decision on the placement of such a structure until it is determined whether public visitation is likely to become a problem. This is because placement of cave entrance gates in other TVA bat caves has been a less reliable mechanism for protecting these habitats, and in some instances these structures have seriously interfered with movement of bats to and from the cave. TVA views cave entrance gating as a measure of last resort for protection of cave and cave-associated resources. For this reason, TVA will monitor public visitation and bat usage of Little Cedar Mountain Cave, and consult with the Service on the need for gates or other restrictive measures.

Under Alternative 4, there would be no adverse impacts to federally listed species, or sensitive terrestrial habitats at this time. However, since these are interim uses, the potential for adverse impacts to federally listed species would have to be reevaluated at such time as any development is proposed. TVA would continue managing these tracts to maintain biological diversity on lands under its control. The existing landscape mosaic created by agricultural fields interspersed with forest would continue to meet the habitat needs of a diverse array of wildlife and plant species. Maintaining the existing character of these lands, and allowing for a continuation of dispersed recreational uses would not adversely impact sensitive species or habitats.

4.6 Reserving of Access for Tract 5

Actions under Alternatives 1, 2, or 3 would necessitate the designation of an access corridor to Little Cedar Mountain (Tract 5.). The most direct, and least impacting, access would be by way of a 100' wide corridor paralleling the I-24 entrance ramp in an east-

west direction. This would provide access from the reservation access road into the tract. A small parking area could then be used by visitors to the Habitat Protection Area. TVA would ensure that the parking lot is located far enough from the I-24 right-of-way to provide visual buffering for those using the Habitat Protection Area.

Under Alternative 4 (no action), access could remain as it is at present for some indefinite interim period.

4.7 Potential Effects on Water Quality

Under Alternative 1, the increase in roads, parking lots, and buildings would increase the percent of impermeable surface on the site. This has the potential to increase runoff and episodic flooding. This construction would constitute a project covered under EPA's Phase I Storm Water Runoff regulations. Phase I regulations require best management practices (BMP) to prevent erosion, sediment runoff, and deterioration in stream water quality during construction.

Development of a golf course would not significantly alter water quality when compared with the present use of the land for agriculture. Runoff from a professionally maintained, established course is generally less than from comparable agricultural lands. Where deemed necessary, placement of water hazards to act as storm surge and sedimentation ponds would be required by TVA in the golf course design.

Some undesirable water quality effects would be expected as a result of site development. Although BMPs would be required during construction, some small amounts of pollutants could reach the receiving waters. TVA would require buffer zones in the development plan to decrease storm water transport of pollutants into the reservoir.

To accommodate the proposed level of development, potable water and sewage treatment facilities will have to be provided. The city of Jasper has been contacted to determine if its water and wastewater facilities were adequate to service the proposed development. It was learned that the Jasper wastewater treatment plant was currently operating at 50 percent of its design capacity and could easily accommodate the additional wastewater. There is also adequate potable water supply from the Sequatchie River. Water and wastewater transmission pipelines would likely follow existing and proposed road rights-of-way. Connecting to the Jasper utilities sewage treatment plant would increase the nutrient load to the Sequatchie River.

If water and sewage services are obtained from Jasper, the existing community east of Anderson Ridge (which does not now have sewer service) would likely connect to them. This would significantly reduce the chances of contamination of surface water by improperly maintained septic systems.

Under Alternative 2, the mix of public recreational and conference facilities and private residential homes has not been determined. All the potential effects discussed for Alternative 1 would also apply to this alternative. Additionally, residential sites are likely to result in more cumulative impermeable area than would be the case with only recreational and commercial development. To limit the possibility of sewage overflows to the reservoir, no sewer lines would be constructed below the Maximum Shoreline Contour. Sewage pumping stations would have to have backup pumps, an alternative power source, and backup wetwell holding capacity.

Residential lawn runoff contains more pesticides, herbicides and fertilizers than plots maintained by professional greens keepers and agriculturists. The watershed can be expected to experience higher runoff and erosion as urbanization increases. The shallow, restricted embayments can be expected to receive increased nutrient and sediment loading.

Because TVA would not retain ownership of the property under Alternative 3, the provisions of the development proposal would be the primary instrument for assuring that development meets TVA's goals. TVA would require the development plan to specify precautions and mitigation measures which would be taken to minimize adverse water quality impacts. Special conditions which would reduce water pollution and which would be addressed in the development plan are buffer zones, wildlife movement corridors, limits on vegetation removal, no construction below the Maximum Shoreline Contour, and control of dredge and fill. Any proposed golf course would be maintained by a certified landscape manager.

Under Alternative 4, there would be no impacts to water quality for some indefinite interim period; however, because these are interim uses, the potential impacts would be evaluated when proposals to change the land use were received.

4.8 Flood Hazard Analysis

Under Alternatives 1, 2, or 3, Tract 3 and possibly Tract 4 would be developed with commercial and public recreational facilities and possibly residential development (Alternative 2 only on Tract 3 only) or commercial or retail business. Land below the Maximum Shoreline Contour (elevation 640 feet or 195.1 m) would be included in any transfer agreement. However, the only portions of Tracts 3 and 4 that are below the 100-year floodplain are immediately adjacent to the shoreline and would not likely impact the design of the development. Any facilities within the 100-year floodplain are likely to be waer use facilities. All development within the 100-year floodplain would be consistent with Executive Order No. 11988. Conditions would be included in any land transfer agreement. TVA would follow local floodplain requirements resulting from implementation of the National Flood Insurance Program. The placement of fill or other obstructions within the limits of the adopted floodway would be avoided to prevent increases in flood elevations. Activities proposed in the adopted floodway would be accompanied by a "No Rise Certification" indicating that the development would result in

no increases in the 100-year flood and "with floodway" elevations and floodway widths. Under Alternative 4, there would be no change in floodplain conditions for some indefinite interim period.

4.9 Aquatic Life

Changing the use allocation of Tract 1 under Alternatives 1, 2, or 3 would have little or no effect on aquatic life in this area. Habitat conditions in the streams on this tract would stay as they are, or possibly, could improve slightly depending on exactly how the land is managed. Aquatic habitat in the river would not be affected by this change in land allocation.

Adoption of Alternatives 1, 2, or 3 would each result in some, as yet undetermined, amount of habitat loss for aquatic life in Nickajack Reservoir. The extent of this habitat loss would be determined by the location and nature of any land disturbances, the extent of any shoreline modifications, the nature of any sewage or chemical discharges, and the design and volume of any dredging to be conducted. The combination of modest impacts from these activities would reduce conditions for aquatic life at places along the shoreline to facilitate specific human uses.

Only minimal impacts to aquatic life would occur where erosion controls prevent additional sedimentation in the water, where natural vegetative buffers are maintained along the shoreline, where sewage and other pollutants are adequately treated before they enter the water, and where dredging is kept to a minimum and conducted in ways which minimize the disturbance to adjacent aquatic habitats. Each of these types of minimization measures would be covered by appropriate commitments in the transfer or lease document, and by individual Section 26a reviews for shoreline facilities. In light of the environmental safeguards and controls that would be required and implemented for any development proposal, this site can be developed in a variety of ways without causing substantial adverse direct, indirect, or cumulative impacts to the resident aquatic life.

Adoption of Alternative 4 would result in no impact to the resident aquatic life for some indefinite interim period. Maintenance of the existing vegetation along the shoreline would allow fish and other aquatic species to feed and reproduce in this area as they have since the reservoir was built.

4.10 Navigation

Alternative 1 involves development of the shoreline for commercial recreation, including a marina. Alternative 2 includes development of the shoreline for residential use as well as a marina, while Alternative 3 would not include residential uses. TVA would review any structures proposed for construction in the reservoir to ensure that neither a marina nor private water use facilities associated with residential development would encroach upon

the commercial navigation channel. The preferred location for a marina, if proposed by a developer, would be in one of the embayment areas where it would be protected from wind and wave wash action. In addition, private water use facilities fronting on the navigation channel would be restricted to 40 feet (12 m) in length from normal maximum pool elevation 634 feet (193 m). With these restrictions, there would be no significant impact on navigation associated with Alternatives 1, 2, and 3. There would be no impact to commercial navigation under Alternative 4 since there would be no development on the tract for some indefinite interim period.

4.11 Impacts on Public Recreation Opportunities

Most public recreational activities occurring in the project area are generally associated with the developed facilities located at TVA's Shellmound Recreation Area. Each of the four action alternatives allow for continued existence of Shellmound; however, under Alternatives 1, 2, and 3 the area could be incorporated as a part of a total commercial resort development. Short term impacts associated with Alternatives 1, 2, or 3 may be positive in that existing developed facilities could be expanded or improved. Public access would be provided, although operation under a commercial scenario may increase the likelihood of expanded user fees for portions of the recreation area. Alternative 4 provides no specific public recreation enhancements

An additional short term impact associated with Alternatives 1, 2, or 3 might be the relocation of automobile parking for the Annual Fall Color Cruise Festival. Land currently used as an overflow parking lot during this event may be incorporated into a total project development and not be available for that use. An alternative overflow parking area could be established, south of the recreation area, on adjoining TVA property to accommodate this event. Alternative 4 would not impact current activities associated with the festival.

Expanded commercial recreation and/or residential development on the project site under Alternatives 1, 2, or 3 might impact informal recreation opportunities currently available on the site including bank fishing, wildlife observation and pleasure walking. While such development may displace some users, it is possible that many of these opportunities would remain available and potentially be enhanced through the development of additional walking trails and water access facilities. Informal recreational activities not compatible with commercial recreation and residential development (i.e. hunting, field dog trials) would be displaced to other reservoir lands suitable for these type activities. Alternative 4 would not impact current informal recreation use patterns.

Water based recreation activities in the immediate project area could be impacted under Alternatives 1, 2, or 3. Potential development of additional water use facilities associated with a commercial recreation or residential component will likely increase boating traffic in the area. Current boating levels within the project area are considered to be moderate with the highest use occurring during weekends and holidays. Boating activities are generally concentrated near the developed water access facilities at Shellmound and Maple

View recreation areas. Weekday boating activities are considered low to moderate. Any increase in boating activities associated with Alternatives 1, 2, or 3 would likely be minor and comparable to other TVA reservoirs where commercial recreation and residential development occur. Development of any commercial or community water use facilities would be controlled by TVA and permitted subject to resolution of any navigation concerns. Adoption of Alternative 4 would preclude development of any private water use facilities.

None of the identified alternatives are expected to have significant direct, indirect, or cumulative negative impacts on either the water-based or land based recreational activities associated with any county park or commercial recreation facility in the project area. Any increase in recreational visits to the reservoir associated with development options under Alternative 1,2, or 3 would likely have a positive economic impact on these existing facilities.

4.12 Visual Impacts

Development of Tract 3 under any of the Alternatives 1, 2, or 3 would result in a change to the existing visual/aesthetic character of the land. Changes could be viewed positively or negatively depending on each individual's aesthetic values and preferences. Negative visual impacts could result if development is not sensitive to the aesthetic qualities of the existing environment. TVA would review proposals to ensure that development on the tract is done in such a way as to screen major structures, maintain shoreline buffers, and set and enforce standards for residential development. Visual impacts would be a part of the screening. The incorporation of a golf course, designed to create separation and screening of structures, could further mitigate aesthetic impacts.

Commercial development that might occur at the north end of Tract 3, adjacent to I-24, should not create a visual/aesthetic departure from the existing development at this interchange. Commercial/retail types of development that could occur along the reservation access road, away from the interchange, would likely create negative visual impacts. Community residents that regularly travel the reservation access road would be among those most often impacted.

Development of Tract 4 under any of the alternatives would most likely not result in negative visual/aesthetic impacts. Existing commercial development on adjacent tracts in addition to highways and associated traffic is currently the dominant visual factor as seen by passersby in the area. Some visual impact may be experienced by residents to the north of Highway 41-64-72 as they have direct views into the tract. A vegetative screening along this section of highway frontage would lessen impacts.

The greatest visual/aesthetic impact from the development as outlined in Alternatives 1, 2, or 3 would be to the hunter, fisherman, and recreational user that enjoy the use of these tracts and their adjacent waters. The net visual/aesthetic impact created by Alternatives 1,

2, or 3 should be insignificant when all viewers, frequency of views, and vantage points are weighed.

Under Alternative 4 (no action) visual character of the tracts should remain unchanged for some indefinite interim period.

4.13 Historical and Cultural Resources

Under Alternatives 1, 2, or 3, site 40MI197 would have to be subjected to a phase II survey to determine site significance. If the site is determined to be significant, any adverse impact to it would have to be avoided or mitigated in accordance with a research proposal approved by TVA, the Tennessee Historical Commission, and the Advisory Council on Historic Preservation. Alternative 4 would not result in any adverse impact to 40MI197.

The cemetery (site 40MI194) would be protected under all alternatives through appropriate prohibitions in land transfer agreements.

4.14 Socioeconomic Impacts

Under Alternative 1, the proposed commercial and public recreational uses would increase jobs and income in the area, both during construction and during operation. Not only would these facilities attract users from nearby Chattanooga, but they would also be in an accessible location from most of the Southeast, including Atlanta, and the Midwest. A well-designed and well-promoted complex might attract a large number of conventions and other groups from these areas, with possibilities for smaller numbers from the mid-Atlantic and other more distant sections of the country. The natural beauty and relative seclusion of the area could provide a competitive advantage to the complex.

Infrastructure needs for such a development would include roads, water and sewer, energy. While the exact configuration of these infrastructure improvements will not be known until a detailed proposal is received, there is already interstate highway access and public water supply available at the site, and sewer lines are nearby. Therefore, these impacts would be primarily local and are expected to be insignificant. Construction would provide some economic benefit to the area, but it would probably be relatively small.

The development would increase tax revenues to the county through increased sales and property tax collections. Costs of infrastructure needed for the development would presumably be borne by the developer. However, there would be some increased expense to the local government, such as more frequent road repair due to heavier traffic on public roads. The excellent interstate access of the site would help to ensure that these impacts are insignificant. The increase in local government revenues likely would be greater than the increase in local government expenditures.

Potential economic benefits of Alternative 2 from the commercial and public recreation development would be similar to those above. However, residential development might diminish the attractiveness of the recreational components unless they were carefully located and designed. Residential development would increase the population of Marion County. Given the small population base now in the county, this could be a noticeable increase, depending on the number of residential lots made available. However, many of the residents are likely to be persons who otherwise would live in Hamilton County or another nearby county, probably working in Chattanooga.

Infrastructure needs would be similar to those in Alternative 1, but probably somewhat greater, especially with respect to roads. The increased population on the site would increase demands for public services, including education, law enforcement, water, and waste disposal. Local government revenues likely would exceed local government expenditures for the recreation components. On the other hand, costs could exceed increased tax revenues from the residential development, even though the developer would be expected to pay the front-end construction costs of infrastructure; these residential effects may depend largely on the number of children. Existing county subdivision regulations would assure that the residential development meets reasonable standards such that the impacts are not significant.

Depending on the type of development chosen, economic impacts of Alternative 3 would be similar to those of Alternative 1 or Alternative 2 for the recreational development portion. Infrastructure needs would also be similar. Transfer to state or local government should have no significant economic impacts, given the same type, quality, and intensity of development. However, if the development were to remain in government ownership, local government revenues might be less than under Alternatives 1 and 2.

Because the same uses would continue without development of any facilities, there would be no additional economic impacts from Alternative 4. There also would be no significant new infrastructure needs.

4.15 Air and Noise

Detailed proposals and construction schedules have not yet been received; however, during construction under Alternatives 1, 2, or 3, any open burning activity would be required to comply with applicable state and federal air pollution control requirements. Pollution from fossil-fuel combustion in construction equipment, fugitive dust emissions from operation of this equipment under dry conditions, and increased traffic during construction would cause some minor and temporary air quality degradation in the vicinity of the project. After construction is completed under Alternative 2, normal residential activities such as wood stoves and fireplaces would contribute somewhat to deterioration in air quality. Although the number and the type of these is unknown, new wood stoves

would comply with EPA's particulate matter standards, and particulate matter air quality standards are expected to be protected.

Any construction noise under Alternatives 1, 2, or 3 would be short-term in nature. Facilities that might exceed community noise standards would be very unlikely in a commercial recreation and resort community. Potential noise sources would include trucks and construction equipment. Under Alternatives 1, 2, or 3, TVA would review development plans to ensure that no significant air emitting or noise emitting facilities are included. No significant air quality or noise impacts would be expected from construction or operation of facilities under Alternatives 1, 2, or 3. No significant air quality or noise impacts would be expected under Alternative 4 for some indefinite interim period.

4.16 Cumulative Impacts

If Tract 3 were developed with a residential component under Alternative 2, some portion of the four miles (6 km) of shoreline fronting the tract could have residential shoreline alterations, assuming that they would be consistent with conditions in Section 5.0. Currently, 13.4 miles (21.6 km) of the 178.7 miles (302.7 km) of shoreline on Nickajack Reservoir are developed for residential uses, and an additional 84.6 miles (136.5 km) are undeveloped flowage easement which could potentially be developed by the landowners. Some of these privately-owned lands are likely to be developed over the next 25 years, but exactly when, how, and where is unknown. An area across the lake from the proposed development, called "The Bluffs," is currently being developed. The development of an additional four miles (6 km) under Alternative 2 would raise the total percentage of shoreline that could be developed for residential uses in the long term from 55 percent to 57 percent of Nickajack Reservoir.

Development of flowage easement shoreline for residential uses could have many of the same impacts described for development of Tract 3, including potential impacts to wildlife, endangered and threatened species, wetlands, water quality, and aquatic life. As a result, TVA would consider the cumulative impacts of any development of Tracts 3 and 4 when considering Section 26a applications for shoreline facilities elsewhere on the reservoir.

Although development of the tracts under Alternative 4 is not likely to occur in the near term, development in the area outside of TVA lands may continue as envisioned in Alternatives 1, 2, and 3. However, the extent of development in the absence of development on TVA lands is uncertain. It is likely that lakefront residential and commercial recreation development could occur on nearby flowage easement lands, thus creating some of the same impacts to water quality in Nickajack Lake discussed in Alternatives 1, 2, and 3. Except for water use facilities, this is beyond TVA's control.

4.17 Conclusions

Development under Alternatives 1, 2, or 3 would likely result in adverse environmental impacts. However, as described in the analysis, potential adverse environmental impacts can be substantially avoided or minimized through commitments and environmental protection measures which are built into the alternatives. Construction of commercial recreation and residential facilities would lead to losses of the potential use of this land for agriculture, wildlife habitat, and associated wildlife-oriented recreation. There would also be aesthetic impacts. However, increased development of the area would generate new jobs and income, leading to enhanced long-term economic productivity. Fuel and energy used in construction and operation of the development would be irreversibly lost.

There would be some irretrievable losses of renewable resources if development alternatives were chosen. Potential renewable resources that would be lost include agricultural lands and wildlife habitat. Specialized resources such as wetlands and threatened and endangered species would be avoided or protected under any of the alternatives. With the inclusion of additional measures for avoiding or minimizing adverse development impacts, implementation of Alternatives 1, 2, or 3 would not be expected to result in regionally significant impacts to wildlife, water quality, aquatic life, cultural resources, or other environmental resources. The allocation of Tract 1 for long-term wildlife management would enhance wildlife resource management and protection and help to preserve other natural resources on that tract. Development of Tracts 3 and/or 4 would be beneficial to public recreation in the region. Therefore, from an environmental standpoint, the site is suitable for development as proposed under Alternatives 1, 2, or 3.