
SECTION 4.0

ENVIRONMENTAL AND SOCIOECONOMIC CONSEQUENCES

4.1 INTRODUCTION

This section presents the results of the analysis of the direct, indirect, and cumulative environmental and socioeconomic effects that would likely occur upon implementation of the No Action Alternative and Preferred Alternative. The methodologies and assumptions used in the analysis are described in Appendix H. In addition, this section identifies any adverse environmental effects that cannot be avoided; the relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity; and any irreversible or irretrievable commitments of resources that would be involved in implementing the proposed action.

Direct versus Indirect Effects. The terms *effect* and *impact* are synonymous as used in this EIS. Effects may be beneficial or adverse and may apply to the full range of natural, aesthetic, historic, cultural, and economic resources of Lake Lanier and the surrounding area. Definitions and examples of direct and indirect impacts as used in this document are as follows:

- **Direct Impact.** A direct impact is one that would be caused directly by implementing one of the two alternatives and that would occur at the same time and place.
- **Indirect Impact.** An indirect impact is one that would be caused by implementing one of the two alternatives and that would occur later in time or farther removed in distance but would still be a reasonably foreseeable outcome of the action. Indirect impacts may include induced changes in the pattern of land use, population density, or growth rate, and indirect effects to air, water, and other natural resources and social systems.
- **Relationship of Direct versus Indirect Impacts.** For direct impacts to occur, a resource must be present. For example, if highly erodible soils were disturbed as a direct result of the use of heavy equipment during construction of a home, there could be a direct effect on soils due to erosion. This could further indirectly affect water quality if storm water runoff containing sediment from the construction site enters the lake.

Short-Term versus Long-Term Effects. Effects are also expressed in terms of duration. The duration of short-term impacts is considered to be 1 year or less. For example, the construction of a building would likely expose soil in the immediate area of construction. However, this effect would be considered short-term because it would be expected that vegetation would be reestablished on the disturbed area within a year of the disturbance.

Long-term impacts are described as lasting beyond 1 year. They can potentially continue into perpetuity, in which case they would also be described as permanent.

Cumulative Effects. Evidence is increasing that the most severe environmental degradation does not result from the direct effects of any particular action, but from the combination of effects of multiple, independent actions over time. As defined in 40 CFR 1508.7 (CEQ Regulations), a cumulative effect is the “impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions.”

Some authorities contend that most environmental effects can be seen as cumulative because almost all systems have already been modified. Principles of cumulative effects analysis, as described in the CEQ guide *Considering Cumulative Effects under the National Environmental Policy Act*, are presented in Table 4-1.

Table 4-1
Principles of Cumulative Effects Analysis

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- Cumulative effects are caused by the aggregate of past, present, and reasonably foreseeable future actions.
 - Cumulative effects are the total effects, including both direct and indirect effects, on a given resource, ecosystem, and human community of all actions taken, no matter who (federal, nonfederal, or private) has taken the actions.
 - Cumulative effects need to be analyzed in terms of the specific resource, ecosystem, and human community being affected.
 - It is not practical to analyze the cumulative effects of an action on the universe; the list of environmental effects must focus on those that are truly meaningful.
 - Cumulative effects on a given resource, ecosystem, and human community are rarely aligned with political or administrative boundaries.
 - Cumulative effects may result from the accumulation of similar effects or the synergistic interaction of different effects.
 - Cumulative effects may last for many years beyond the life of the action that caused the effects.
 - Each affected resource, ecosystem, and human community must be analyzed in terms of the capacity to accommodate additional effects, based on its own time and space parameters.
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Intensity of Effects. The following terms are used to describe the degree of direct and indirect impacts, whether they are adverse or beneficial.

- **Negligible.** The impact is at the lowest levels of detection.
- **Minor.** The impact is slight but detectable.
- **Moderate.** The impact is readily apparent.
- **Major.** The impact is severely adverse or exceptionally beneficial.

The descriptor “major” does not imply a significant impact (see below) unless specifically stated. Refer to the following section for a discussion of significance.

Significance. In accordance with CEQ regulations and implementing guidance, impacts are also evaluated in terms of their being significant. The term *significant*, as defined in 40 CFR 1508.27, part of the CEQ regulations for implementing NEPA, requires considerations of both context and intensity. *Context* means that the significance of an action must be analyzed in several settings, such as society as a whole (human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend on the effects on the locale rather than on the world as a whole. Both short- and long-term effects are relevant to the consideration of the significance of an impact.

Intensity refers to the severity of impact and includes the above ratings (i.e., negligible through major). Factors contributing to the evaluation of the intensity of an impact include, but are not limited to, the following:

- The balance of beneficial and adverse impacts, in a situation where an activity has both.
- The degree to which the action affects public health or safety.
- The unique characteristics of the geographic area where the action is proposed, such as proximity to parklands, historic or cultural resources, wetlands, prime farmlands, wild and scenic rivers, and ecologically critical areas.
- The degree to which the effects on the quality of the human environment are likely to be controversial.

- The degree to which the effects of the action on the quality of the human environment are likely to be highly uncertain or involve unique or unknown risks.
- The degree to which the action might establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.
- Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.
- The degree to which the action might adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the NRHP or might cause loss or destruction of significant scientific, cultural, or historical resources.
- The degree to which the action might adversely affect an endangered or threatened species or habitat that has been determined to be critical under the Endangered Species Act of 1973.
- Whether the action threatens a violation of federal, state, or local law or requirements imposed for the protection of the environment.

Mitigation. Where significant adverse impacts are identified, measures that would or could be used to mitigate these effects are discussed. Mitigation could include the following:

- Avoiding an impact altogether by stopping or modifying an action.
- Minimizing an impact by limiting the degree or magnitude of the action and the activities associated with its implementation.
- Rectifying an impact by repairing, rehabilitating, or restoring the affected environment.
- Reducing or eliminating an impact over time by preservation and maintenance operations during the life of the action.
- Compensating for an impact by replacing or providing substitute resources or environments.

Mitigation of adverse effects associated with implementing the proposed action is generally the responsibility of the U.S. Army Corps of Engineers, but it may be the responsibility of a non-Corps entity.

4.2 ***PROPOSED ALTERNATIVES***

No Action Alternative

Since its creation and official designation in 1956, Lake Sidney Lanier has undergone modifications that reflect the dramatic changes that have occurred in the area surrounding it. The natural cycle of the lake is still the same as it has always been: The lake collects rainfall from the watershed above Buford Dam and has done so every year since the dam was completed. In years with abundant rainfall, the lake's level rises, while in drought years the lake's level falls. Imposed upon this natural cycle has been the enormous growth in the population of Atlanta and the areas surrounding it. Along with this growth have come roads, houses, and businesses, as well as a great demand for recreational opportunities for residents of Atlanta, residents around the lake, and vacationers from throughout the region and the nation. This growth has led to changes on and around Lake Lanier. Residences and businesses are now located along the lake's shoreline, as are private docks, marinas, and public recreation areas. The lake now receives more than 7 million visitors a year.

Like most areas that have grown dramatically over the past 50 years, the environment has sometimes paid a heavy price in terms of air pollution, water pollution, loss of vegetation, and loss of wildlife and their habitats. Despite the best efforts of the PMO, Lake Lanier has not escaped the adverse effects of these changes, and such impacts can only be expected to worsen as more areas around the lake are developed and the ever-increasing population demands more recreation and water from the lake.

The No Action Alternative, the consideration of which CEQ regulations prescribe, serves as a benchmark against which the other alternatives can be evaluated. Under the No Action Alternative, the Mobile District would make no changes in its operational and maintenance activities at Lake Lanier and would not update the existing SMP. No new management actions would be adopted, and no existing management activities would be modified. Shoreline allocations, actions on permit applications, and administration of permits would continue as at present. The total number of additional private boat docks that could be permitted under this alternative is 16,734, for a potential total of 25,327 docks. Activities under the Lake Lanier Master Plan and the OMP would continue unchanged.

By implementing the No Action Alternative, lake managers would essentially operate and manage Lake Lanier without accounting for the ever-increasing demands being placed on it. If the No Action Alternative were to be adopted, the area surrounding the lake and the lake itself could be expected to change in much the same way as they have in the past decade or so. Wildlife habitat around the lake would continue to decline as more homes are built. Many more boat docks would be installed on the lake, which would decrease public access to and use of the lake's shoreline. Navigation in and recreational use of coves would become increasingly difficult in areas densely populated with boat docks. Water quality would gradually degrade with the addition of sediment, bacteria, and other pollutants from erosion along the shoreline; failing or poorly maintained septic tanks; and dilapidated boat docks. The lake would gradually become less visually appealing with the additional boat docks, poorly maintained docks, intensified use of the mainland and island shorelines, and increased crowding at public recreation facilities. These anticipated effects of implementing the No Action Alternative are discussed in more detail later in this section.

Preferred Alternative

In an attempt to slow the degradation of the lake's water quality and aesthetic appeal and to provide for continuing use of the lake's resources, the Lake Lanier Project Office has examined the activities currently conducted under the O&M program and has recommended improvements in the way some of those activities are performed. The reasons behind the need to make improvements are (1) recognition that the current O&M program was not developed within the context of the current situation and the changes taking place beyond both the lake's boundaries and the control of lake managers, and (2) recognition that the management of the lake must respond to those changes if the ability of the lake to satisfy recreation and other project uses is to be preserved. The modified O&M program is referred to as the Preferred Alternative.

Implementation of the Preferred Alternative could occur at various levels. At a low level of implementation, only a few of the recommended improvements to the O&M program would be implemented. At a high level, most or all of the recommended improvements would be implemented. The analysis of the effects of implementing the Preferred Alternative, provided later in this section, corresponds to a high implementation level, in which all recommended improvements are implemented. The proposed modifications to ongoing O&M programs are summarized in Table 2-13.

The Preferred Alternative includes a change in the Shoreline Use Permitting Policy to account for the tremendous growth in the number of private boat dock permits and the demands that this growth has placed on the resources and facilities of Lake Lanier. The Corps has selected Scenario 2 from the *Private Boat Dock Carrying Capacity Study* as part of the Preferred Alternative. Scenario 2 bases future dock installation on the average length of shoreline occupied by docks now on the lake (88 feet, cable anchor-to-cable anchor, determined from actual on-the-ground measurements) and complies with the provisions of ER 1130-2-406, which stipulates that no more than 50 percent of the shoreline of an individual LDA may be occupied by private boat docks. The Preferred Alternative accounts for LDAs that now have more than 50 percent of their shoreline occupied by private boat docks by reducing the number of docks that could potentially be installed on the lake in the future by the excess number of docks now in overdeveloped LDAs.

If the Preferred Alternative is adopted, it is foreseen that the lake would benefit in many ways: Recreational opportunities would be expanded and distributed more evenly across the lake, some of the pressure on recreational facilities on the southern part of the lake would be relieved, the shoreline would be more vegetated and less susceptible to erosion, habitat for wildlife and fish would increase and improve, and Styrofoam pollution would be less of a problem. Changes in how use of the lake is managed would result in improved maintenance of private and community boat docks; more community docks and community boat launch facilities and fewer private boat docks; more coves kept open for navigation and recreation; improved public access to the shoreline; a lower boating density on the southern part of the lake; increased boat launching facilities in the northern part of the lake; and expanded opportunities for rafting, kayaking, and canoeing. Requirements associated with Shoreline Use Permits would result in better water quality maintenance because of better shoreline erosion control and policies linking the permits to septic tank maintenance and Styrofoam disposal. Finally, the beauty of the lake and the chances to enjoy it would be preserved and expanded by having fewer docks impeding access to the shoreline; more shoreline vegetation; a more even distribution of recreational facilities across the lake; reduced crowding at recreation facilities in the southern part of the lake; and enhanced opportunities to fish, hike, watch birds, and bike along the lake's shoreline.

4.2.1 Lake Lanier Water Resources

The Lake Lanier watershed was divided into three zones to examine the effects of the No Action Alternative on the water quality in Lake Lanier. Zone 1 is the government-controlled area, Zone 2 is private property adjacent to Zone 1, and Zone 3 is the regional area representing the upstream

watersheds that drain to Lake Lanier. The effects on surface water quality resulting from changes that might occur in Zones 1 and 2 under the No Action Alternative are discussed below. It is assumed for the purposes of this water quality analysis that new docks would be associated with LDAs adjacent to private property that is currently undeveloped. Although installation of additional private boat docks would have no direct effect on pollutant loads to Lake Lanier, indirect impacts could result if new residential housing was built in conjunction with these docks. Note that the Corps has no control over development on private property adjacent to the lake, and it is not known to what extent the Corps's dock permitting policy affects how adjacent land is developed. Development can and most likely will occur adjacent to LDAs even if new docks are not permitted. Effects on water quality resulting from changes in Zone 3 under the No Action Alternative are discussed in the *Cumulative Effects* portion of this section (Section 4.3) under the *Development in the Watershed* heading.

4.2.1.1 No Action Alternative

Short-term and long-term indirect negligible adverse effects would be expected under the No Action Alternative. Activities allowed under the current management plan that could affect water quality in Lake Lanier include dock installation under Shoreline Use Permits in LDAs, new shoreline activity, increased boating activity, and potential increases in pollutant runoff from public recreation areas. The conversion of forestland to residential lots can increase pollutant loadings through increasing both the volume of storm water runoff and the load of pollutants to the lake. More residential development would result in the conversion of an estimated 11,985 acres of forestland to residential lots in Zone 2. The increased pollutant loading resulting from this change was estimated and compared with year 1997 loading conditions, which reflect existing land use and established loads from the Lake Lanier watershed and the immediate watershed areas draining directly into the lake. Table H-7 in Appendix H presents the year 1997 conditions and the estimated increases in loadings for the Lake Lanier watershed by zone.

Surface Water Quality. Under the No Action Alternative, the annual average sediment loads from Zone 1 would be expected to contribute 0.25 percent of the sediment load to the lake as a whole, a negligible adverse effect. Loads from Zone 2 would be expected to contribute 87 percent of the sediment load to the lake as a whole, an indirect major adverse effect.

Under the No Action Alternative, the annual average total phosphorus (TP) loads from Zone 1 would be expected to contribute 1.4 percent of the phosphorus load to the lake as a whole, a negligible adverse effect. The average annual TP load from Zone 2 would contribute 38 percent of the phosphorus load to the lake as a whole, an indirect major adverse effect.

Under the No Action Alternative, the annual average total nitrogen (TN) loads from Zone 1 would be expected to contribute approximately 2.5 percent of the nitrogen load to the lake as a whole, a negligible adverse effect. The average annual nitrogen load from Zone 2 would contribute 32 percent of the nitrogen load to the lake as a whole.

Boats and boating activity would be expected to have negligible adverse effects on water quality. Increased boating activity and in-lake boat storage could affect water quality through fueling operations (accidental spills) and storm water runoff from parking lots.

It is not expected that the growing number of boats and increased boating activity would have a direct impact on fecal coliform or biological oxygen demand loadings typically associated with marine sanitation device (MSD) discharges. The state of Georgia has classified Lake Lanier as a “no discharge” zone, meaning that watercraft are prohibited from having the capability to discharge MSD waste to the lake.

Groundwater Resources. No effects on groundwater quality or quantity would be expected under the No Action Alternative. Groundwater quality in the Lake Lanier area is generally considered to be good under current management practices.

4.2.1.2 Preferred Alternative

Short-term and long-term indirect negligible adverse effects would be expected under the Preferred Alternative. An estimated 1,448 acres of land would be changed from forested to light residential land use to construct the houses that would be associated with the potential 2,022 new docks under the Preferred Alternative. Increased pollutant loadings to the lake were estimated and compared with the year 1997 loading condition. Table H-4 in Appendix H quantifies the relative effects of the land use alterations on loadings to the lake.

Surface Water Quality. Negligible adverse effects to sedimentation would be expected under the Preferred Alternative. The annual average sediment load from Zone 1 would be expected to contribute approximately 0.3 percent of the sediment load to the lake as a whole, a negligible

adverse effect. The annual average sediment load from Zone 2 would increase by approximately 2 percent, or contribute approximately 85 percent of the sediment load to the lake as a whole.

Negligible effects to nutrient loads would occur because of alteration of landuse conditions with the implementation of the proposed changes to the operations and management activities in the immediate watershed of Lake Lanier. Under the Preferred Alternative, the annual average TP loads from Zone 1 would be expected to contribute approximately 1.3 percent of the TP load to the lake as a whole, a negligible adverse effect. The annual average TP contribution from Zone 2 is expected to be approximately 36 percent of the TP load to the lake as a whole. Under the Preferred Alternative, the annual average TN contribution from Zone 1 is expected to be about 2.2 percent of the TN load to the lake as a whole. The annual average TN contribution from Zone 2 would be approximately 29 percent of the TN load to the lake as a whole.

Negligible adverse effects on water quality would be expected from additional boats and boating activity under the Preferred Alternative. Increased boating activity and in-lake boat storage could affect water quality through fueling operations (accidental spills) and storm water runoff from parking lots in parks. No changes to fecal coliform or biological oxygen demand loadings typically associated with MSD discharges are expected.

Groundwater Resources. Long-term, indirect, minor beneficial effects to groundwater would be expected in the high lake level scenario. The more stringent program modifications proposed for shoreline management and water quality O&M are expected to have a beneficial effect on groundwater quality in the area.

Under shoreline management O&M improvements, maintaining a minimum 100-foot vegetative shoreline buffer, improving shoreline vegetation with additional planting of native species, and continuing to deny requests for vegetation removal will reduce the potential for surface pollutants to reach groundwater sources. The increased vegetation can serve as a filter to catch pollutants before they can be transported to the groundwater.

Under water quality O&M improvements, confirming that households are serviced by municipal or public treatment system, requiring that individual or collective septic systems are certified by a professional engineer that they will not adversely affect the lake's water quality, and requiring any property owner seeking to renew a Shoreline Use Permit show that their septic system poses no threat to water quality by proving that it was cleaned within the past 2 years or certifying with a professional engineer that the septic system poses no threat to the lake's water quality, could

limit pathogens, nitrate, phosphorus, and other pollutants entering groundwater. The O&M improvements will encourage better public maintenance practices for individual and collective septic systems and can limit pollutant inputs to groundwater from septic system malfunction.

The potential increase in the number of septic systems adjacent to the lake is not expected to adversely affect groundwater resources. Generally, septic system malfunctions result in release of pollutants to the surface. Under such a situation, pollutants would be more likely to enter nearby surface water bodies via storm water runoff than to enter groundwater resources. The potential effect of septic system malfunction on surface water quality is incorporated into the Surface Water Quality discussion above.

4.2.2 Land Use, Land Cover, and Land Use Controls

4.2.2.1 No Action Alternative

Land Use. The continuing implementation of the current O&M program at Lake Lanier would not be expected to affect land use on Corps property. Long-term indirect moderate adverse effects would occur within Zone 2, or the lands immediately adjacent to government-owned property around the lake, and no impacts on land use would be expected in Zone 3 from implementation of the No Action Alternative. Residential development, assuming that each additional dock was associated with an additional home that occupies an average of 0.72 acre, would be expected to convert 11,985 acres (18.73 mi²) from forest land use to low-density urban land use on property adjoining the lake. Conversion of land from forest to a developed land use is considered adverse because of the inherently greater risks to water quality, aesthetics, wildlife, and other natural qualities of the lake associated with having developed land surrounding the lake. The potential indirect impacts of the change in land use in Zone 2 on other resource areas are addressed in the Biological Resources, Cultural Resources, Recreation and Recreational Facilities, Visual and Aesthetic Resources, and Water Quality sections.

Land Cover. Long-term direct and indirect moderate adverse effects on land cover on government property (Zone 1) and on property adjacent to government property (Zone 2) would be expected if the No Action Alternative were implemented. Within Zone 1, continued overuse of the islands by visitors could result in the loss of vegetative cover on the islands. Continued vegetation clearing on government property by landowners with adjacent property, expansion of boat trailer parking facilities, or development of new public recreation facilities could result in

some land cover changes from forest to open or semi-wooded. Land cover changes within Zone 2 would primarily be from forest to low-density urban.

Implementation of the No Action Alternative is not expected to have any impact on land cover within Zone 3.

Land Use Controls. No conflicts with existing state, county, or local land use plans, policies, or controls would be anticipated to occur if the No Action Alternative was implemented, and thus no impacts on land use controls would be expected.

4.2.2.2 Preferred Alternative

Land Use. Long-term direct negligible beneficial effects on land use in Zone 1 (government property) and long-term indirect minor adverse effects on land use in Zone 2 (private property adjacent to government property) would be expected to result from implementation of the Preferred Alternative. Encouraging existing private dock permit holders to convert to community docks could result in an increase in Protected Shoreline Area if after a community dock is installed, the shoreline is rezoned from LDA to Protected Shoreline Area. An increase in Protected Shoreline Area would be beneficial to wildlife and habitats, shoreline protection (erosion control), and public access. This beneficial effect is analyzed as being negligible because of the voluntary and therefore uncertain nature of converting from private docks to community docks.

Conversion of forest land use to low-density urban land use within Zone 2 surrounding the lake would have an adverse effect on the lake. If the assumptions for dock installation and home development (0.72 acre per home and one home per private dock) are used, the additional 2,022 private docks that could be permitted and installed under the Preferred Alternative would result in 1,448 acres (2.26 square miles) of forest land use being converted to residential land use. This effect is considered to be adverse because of the indirect effects (discussed under the appropriate resource area analyses in this section) on aesthetics, water quality, and biological resources, as mentioned above. It is considered to be minor in comparison to the effects anticipated from implementing the No Action Alternative, under which 8.3 times as much forest would be converted to residential land use.

Land Cover. Many proposed O&M program improvements would have long-term direct minor to moderate beneficial effects on land cover within Zone 1 at Lake Lanier, and some proposed O&M program improvements could have long-term direct minor adverse effects on land cover in

Zone 1. Table 4-2 summarizes the expected direct effects on land cover from implementation of the Preferred Alternative.

Long-term indirect minor adverse effects on land cover would be expected to occur in Zone 2 from implementation of the Preferred Alternative. A total of 1,448 acres of forest cover in Zone 2 would be converted to residential areas. No effects on land cover within Zone 3 would be expected to result from implementing the Preferred Alternative.

Land Use Controls. No conflicts with existing state, county, or local land use plans, policies, or controls would be anticipated to occur if the Preferred Alternative was implemented, and thus no impacts on land use controls would be expected.

4.2.3 Infrastructure

4.2.3.1 No Action Alternative

Long-term indirect negligible and minor adverse effects on infrastructure resources would be expected from the implementation of the No Action Alternative. About 175 new Shoreline Use Permits are issued per year, and the potential total number permitted under the No Action Alternative would be 25,327. The installation of the additional boat docks, along with associated access paths to those docks, would be expected to have minor effects on landfill capacity because dock construction would generate negligible quantities of waste. Electrical outlets associated with the new boat docks would create a negligible additional electrical demand on the existing system. Increased residential development on lands contiguous to Corps property would create additional demands on infrastructure over time. Some existing road infrastructure may need to be upgraded to allow for the increase in community traffic. Although minor, new residential development would place additional demands on potable water supplies, wastewater treatment capabilities, and storm drainage as well. As discussed in Section 3.8.1 (Soils), some soils in areas around Lake Lanier have limited functional capabilities for septic systems. The total acreage of these areas is small and would not create an impediment to development. Solid waste disposal would be affected by the construction of new housing and associated infrastructure, as well as by the increased population. Further development would also place additional demands on police, fire, and rescue services.

**Table 4-2
Anticipated Effects on Land Cover Under the Preferred Alternative**

Proposed O&M Program Improvement	Anticipated Effects
<i>Shoreline Management:</i>	
Maintaining a vegetative (forested) shoreline buffer consisting of native woody shrubs and trees (understory and overstory) along all shoreline allocation zones, excluding Prohibited Areas.	<i>Beneficial:</i> Long-term direct moderate. Would increase forest cover along the shoreline. <i>Adverse:</i> None
Improving shoreline vegetation through additional planting of native species.	<i>Beneficial:</i> Long-term direct minor. Would increase vegetative cover. <i>Adverse:</i> None
Approving or renewing Specified Acts Permits when work is for the purpose of wildlife habitat enhancement or forest stand improvement.	<i>Beneficial:</i> Long-term direct minor. Would lead to some forest cover increase and improvement. <i>Adverse:</i> None
Requiring all open areas where grass mowing is not authorized under the existing Shoreline Use Permits to be revegetated by the permittee or at the Corps' discretion.	<i>Beneficial:</i> Long-term direct moderate. Would cause some change from lawn cover to forest. <i>Adverse:</i> None
Encouraging those with grandfathered authorization to mow to cease mowing project lands.	<i>Beneficial:</i> Long-term direct moderate. Would create some change from lawn cover to forest, though this improvement is not a requirement so the magnitude of the effect would depend on landowner cooperation. <i>Adverse:</i> None
<i>Island Management:</i>	
Encouraging day uses (e.g., bank fishing, sunbathing, wading, hiking, swimming, birdwatching, and picnicking).	<i>Beneficial:</i> Long-term direct minor. To the extent that campers are responsible for loss of vegetation on the islands, this would be reduced. <i>Adverse:</i> None
Increasing O&M actions to establish the islands as wildlife sanctuaries through vegetation, timber stand, and habitat management activities.	<i>Beneficial:</i> Long-term direct minor. Would increase forest cover on the islands. <i>Adverse:</i> None
<i>Nonnative Plant Management:</i>	
Developing programs to provide better control of invasive and noxious species (e.g., kudzu, English ivy, and poison ivy).	<i>Beneficial:</i> Long-term direct negligible. Would decrease the spread of noxious species; may not change vegetative cover. <i>Adverse:</i> None
<i>Erosion Management:</i>	
Requiring that owners plant natural vegetation or install riprap or other shoreline or bank stabilization measures when applying for a new Shoreline Use Permit, renewal of a Shoreline Use Permit for a private boat dock or community boat dock, or upon granting or renewing USACE outgrants.	<i>Beneficial:</i> Long-term direct minor. Would increase vegetative cover along the shoreline. <i>Adverse:</i> None

**Table 4-2
Anticipated Effects on Land Cover Under the Preferred Alternative**

Proposed O&M Program Improvement	Anticipated Effects
<i>Day Use Park Operations:</i>	
Giving preference to funding the development of the northern portion of the lake (above Brown's Bridge) and shifting emphasis from boating-related activities and facilities (e.g., ramps) to lake-related activities (e.g., swimming, use of beaches) and facilities (i.e., campgrounds, picnic areas, and beaches).	<i>Beneficial:</i> None <i>Adverse:</i> Long-term direct minor. Some facility development could involve forest clearing and conversion to open area or recreational facilities.
Establishing additional boat launch facilities in the northern portion of the lake, but only to offset the number of launch facilities that are expected to be closed in the southern parts of the lake.	<i>Beneficial:</i> Long-term direct minor. Launch facilities closed in the southern part of the lake might become revegetated. <i>Adverse:</i> Long-term direct minor. Some clearing of forest would occur to establish launch facilities.
Establishing additional foot trails in forested areas and on the points of Protected Areas for expanding nonconsumptive uses such as the watchable wildlife program.	<i>Beneficial:</i> None <i>Adverse:</i> Long-term direct negligible. Some tree and shrub clearing would be associated with establishing the foot trails.

4.2.3.2 Preferred Alternative

Long-term indirect minor beneficial and minor adverse effects could be expected with implementation of the Preferred Alternative. Requiring that prior to the issuance of a Shoreline Use Permit for a community boat dock, an applicant clearly show that wastewater generated by the residential development will not adversely affect the lake's water would increase the operating efficiency and effectiveness of both treatment and septic systems. Demands on potable water systems, electrical systems, landfills, solid waste disposal facilities, and storm drainage systems would increase less under the Preferred Alternative than under the No Action Alternative because the potential number of private boat docks would be limited to 10,615 rather than 25,327. Funding the development of the northern portion of the lake (above Brown's Bridge) and shifting the emphasis from boating-related activities and facilities to lake-related activities and facilities would decrease the intensity of use and crowding in the southern portion of the lake. This would be expected to reduce congestion on area roads in the southern portion of the lake during peak periods of use and increase traffic on surrounding roads in the northern portion.

4.2.4 Socioeconomic Conditions

4.2.4.1 No Action Alternative

Operation and Maintenance. No effects on socioeconomic conditions would be expected. Continuation of the current O&M activities at Lake Lanier would not affect the regional economy. The O&M activities would not result in a change in ROI employment, personal income levels, or the region's output of goods and services.

Economic Effect of Lake Level Fluctuations. Long-term minor adverse effects could be expected. An analysis was conducted to see if fluctuations in lake elevations (i.e., due to drought or rain) would affect lake visitation.¹ Low water levels can create unsafe boating conditions, ground marinas and private dock slips, make beaches undesirable for use, and affect the overall physical attractiveness of the lake. Together, these factors could reduce the number of recreational visitors to the lake and therefore the level of consumer spending in the ROI.

An analysis of lake elevation levels and USACE monthly visitor data indicated that there is no significant correlation between lake elevation levels and visitor attendance for historical lake level fluctuations (from 1,059 feet msl to 1,071 feet msl) (see Tables A-2 and A-3 in Appendix A). Visitation levels generally followed a seasonal trend, increasing during the spring and summer months and diminishing during the fall and winter. Furthermore, anecdotal evidence suggests that decreases in visitation during the peak season are related more to short-term weather conditions, such as precipitation on weekends, than to lake levels (Williams, personal communication, 2002).

The lake level analysis was then taken one step further. It was assumed that if the lake levels dropped below historical levels, attendance *would* decrease. Since the actual impact of unusually low water levels on lake attendance could not be accurately predicted, three different visitor scenarios were analyzed: a 10 percent drop in annual attendance, a 25 percent drop in annual attendance, and a 50 percent drop in annual attendance.² The estimated drop in attendance was measured against projected visitation levels that were based on data from the USACE. This projected visitation is referred to as the baseline scenario.

¹ The Lake Lanier O&M activities addressed in this EIS do not result in lake level fluctuations. The lake elevation changes due to natural conditions beyond the control of the USACE.

² Given the high degree of uncertainty associated with these scenarios, the modeling results should be used as an indication of the range of economic consequences from significantly lower lake water levels rather than a forecast of a particular outcome.

This study also took into account the potential decrease in dock construction activity. If lake elevation drops below 1,063 feet msl, the Drought Management Action Plan would be implemented. Under this plan, no new docks can be permitted. Because new private docks could not be built, a negative economic impact would be expected because of the decrease in construction sales.

A regional economic model was used to estimate the potential economic impacts from the 10, 25, and 50 percent decrease in recreational visitors, along with the reduction in economic activity from a decrease in dock construction (see Appendix A for a detailed description of the model). Table 4-3 lists the impacts on employment, gross regional product (GRP), and population under each visitor reduction scenario.³ Results are presented as the actual value (in numbers of people or in dollars) and as the percentage difference from the baseline scenario. For example, under the baseline scenario, regional employment was projected to be 546,341. Under the 10 percent scenario, regional employment was projected to be at 545,748, or a 0.109 percent reduction from baseline.

Table 4-3
Summary of Results:
Employment, GRP, and Population Decreases from Baseline Conditions by 2020

	Employment (thousands)	GRP (billion fixed 92\$)	Population (thousands)
Baseline Scenario	546.341	40.675	1,186.267
10 Percent Scenario	545.748	40.659	1,185.075
% Decrease from Baseline	-0.109	-0.038	-0.100
25 Percent Scenario	544.895	40.638	1,183.372
% Decrease from Baseline	-0.265	-0.092	-0.244
50 Percent Scenario	543.463	40.600	1,180.508
% Decrease from Baseline	-0.527	-0.184	-0.485

As shown in the table, economic indicators for employment, GRP, and population, even with a 50 percent decrease in recreational visitors, would drop about 0.5 percent or less from baseline conditions. The magnitude of these adverse impacts would be small, especially in comparison with the size of the regional economy. However, it should be noted that these decreases in

economic activity would be focused on the service and retail sectors of the local economy. Specifically, businesses that are linked to recreational activity at Lake Lanier (such as boat dock builders, outdoor equipment supply stores, souvenir shops, restaurants, and boat rental and sales) would be affected the most, experiencing direct employment and income reduction from the decrease in the number of visitors to the lake.

4.2.4.2 Preferred Alternative

Operation and maintenance. Long-term minor adverse effects on socioeconomic conditions would be expected. Under the Preferred Alternative, a new Shoreline Use Permitting Policy would be implemented. This policy would decrease the potential number of additional private boat docks to 2,022, or about 1,500 fewer docks than under the No Action Alternative.⁴ However, the economic impacts from this decrease in construction spending would be negligible when distributed over the five-county ROI and the 20-year study period (see Appendix A).

No economic effects would be expected from other O&M proposed program improvements (e.g., maintenance of shoreline vegetation, erosion management, endangered species management, island management, nonnative plant management). These improvements would not affect the regional economy. There would be no change in personal income levels or the region's output of goods and services. It is possible that a few rangers could be hired to handle any additional workload created by the proposed O&M program improvements. However, this would not have a measurable effect on the ROI economy.

Economic Effect of Lake Level Fluctuations. Long-term minor adverse effects could be expected. As discussed under the No Action Alternative, an analysis of USACE visitor data and lake elevation levels was conducted to see if historical changes in lake elevation (due to drought or rain) would affect lake visitation and therefore consumer spending in the ROI.⁵ The study indicated that there is no significant correlation between lake elevation levels and visitor attendance for historical lake level fluctuations (see Tables A-2 and A-3 in Appendix A).

³ GRP is a measure of a region's total output of goods and services.

⁴ Given current human resource constraints, 175 is the maximum number of permits that can be issued per year. Therefore, under the No Action Alternative, up to 3,500 additional docks could be built on the lake within the 20-year study period (175 x 20 = 3,500). Under the Preferred Alternative, because of changes in the Shoreline Use Permitting Policy, only 2,022 additional private boat docks could be permitted.

⁵ It should be emphasized that the Lake Lanier O&M activities addressed in this EIS do not result in lake level fluctuations. The lake elevation changes due to natural conditions are beyond the control of the USACE.

Therefore, historical fluctuations in lake elevation would not be expected to affect recreational visitors or consumer spending.

However, if lake levels dropped below historical levels, it was assumed that visitor attendance and new dock construction would be affected. If lake elevation were to drop below 1,063 feet msl, the Drought Management Action Plan would be implemented. Under this plan, no new docks can be permitted. For lake visitation, since the actual impact of unusually low water levels on lake attendance could not be accurately predicted, three different visitor scenarios were analyzed: a 10 percent drop in annual attendance, a 25 percent drop in annual attendance, and a 50 percent drop in annual attendance. A regional economic model was used to estimate the potential economic impacts under each scenario (see Appendix A for a detailed description of the model). The model results showed that even with a 50 percent decrease in recreational visitors and the decrease in new dock construction, economic indicators for employment, GRP, and population would drop only about 0.5 percent or less from baseline conditions, resulting in long-term minor adverse effects to the ROI economy (see Section 4.2.4.1, Table 4-3).

4.2.5 Visual and Aesthetic Resources

4.2.5.1 No Action Alternative

Implementation of the No Action Alternative would be expected to have long-term direct minor to major adverse effects on the aesthetics and visual resources of Lake Lanier. A significant adverse effect would be expected if the current private boat dock permitting policy continues to be implemented into the future. Installation of 16,734 additional private boat docks would severely affect the aesthetic quality of the Lake Lanier environment and potentially affect public safety because of reduced navigation within coves and along the shoreline. The number of boat docks on the lake, the quality of boat dock maintenance, and the spacing of boat docks were raised as scoping issues for this EIS (refer to Section 1.6.1). The additional docks that could be added under the No Action Alternative would also be expected to be significantly controversial among those who use the lake and live near it.

The duration and intensity of the expected results are described in Table 4-4.

**Table 4-4
Anticipated Effects on Aesthetics and Visual Resources Under the No Action Alternative**

Current O&M Program Policy	Anticipated Effects
<i>Shoreline Management:</i>	
Continuing implementation of the existing Shoreline Use Permitting Policy.	<i>Beneficial:</i> None <i>Adverse:</i> Long-term direct major significant. Implementation of the No Action Alternative would potentially result in the installation of 16,734 new private boat docks, which would create a less visually appealing shoreline.
Permitting private boat docks in new residential developments.	<i>Beneficial:</i> None <i>Adverse:</i> Long-term direct moderate. LDAs that currently have no or few docks would become populated with docks.
Continuing to permit private docks without the encouragement to convert to community docks.	<i>Beneficial:</i> None <i>Adverse:</i> Long-term direct minor. Few LDAs that now have private docks would be expected to convert to community docks.
(1) Allowing incomplete inspection and enforcement of private and community boat dock maintenance standards; (2) Allowing cited defects or deficiencies in a boat dock to remain unrectified for 30 days or longer; (3) Renewing Shoreline Use Permits for private or community boat docks with cited defects.	<i>Beneficial:</i> None <i>Adverse:</i> Long-term direct minor. Poorly maintained docks would be expected to be found along the shoreline and persist in a poorly maintained state for a long period of time in some instances.
(1) Permitting boats at private or community docks to be longer than slips; (2) Permitting the mooring of boats to other boats.	<i>Beneficial:</i> None <i>Adverse:</i> Long-term direct minor. Excessively large boats at docks and many boats at single docks are generally considered to be visually unappealing.
Allowing the use of boat slips to be used for boats or personal watercraft that have mufflers above the waterline—a violation of state law.	<i>Beneficial:</i> None <i>Adverse:</i> Long-term direct negligible. Noise is an aspect of aesthetics, and boats or other watercraft with mufflers above the waterline are particularly loud.
<i>Island Management:</i>	
(1) Continuing to implement existing camping and day use policies on the islands; (2) Continuing to implement minimal O&M actions for vegetation, timber stand, shoreline protection and stabilization, and habitat management activities on the islands.	<i>Beneficial:</i> None <i>Adverse:</i> Long-term direct minor. Overuse of the islands is causing deterioration of vegetation and shorelines.
<i>Erosion Management:</i>	
Continuing to implement minimal adjacent landowner requirements for shoreline vegetation or other shoreline or bank stabilization measures associated with Shoreline Use Permit renewal or with granting or renewing USACE outgrants.	<i>Beneficial:</i> None <i>Adverse:</i> Long-term direct moderate. Existing and future landowners with Shoreline Use Permits would be expected to continue to clear vegetation to gain improved views of the lake and to create manicured-lawn-type lakefront property.

**Table 4-4
Anticipated Effects on Aesthetics and Visual Resources Under the No Action Alternative**

Current O&M Program Policy	Anticipated Effects
<i>Water Quality Management:</i>	
Continuing to issue Shoreline Use Permits without requirements to demonstrate that wastewater generated by a residential development or private residence will not adversely affect the lake's water quality.	<i>Beneficial:</i> None <i>Adverse:</i> Long-term direct minor. A 15 percent septic system failure rate is assumed, and as development continues around the lake, this will account for an increasing quantity of water contamination, potentially leading to visual deterioration of the lake.
<i>Sections 10/404 Permitting:</i>	
Continuing to permit the use of sea walls/bulkheads.	<i>Beneficial:</i> None <i>Adverse:</i> Long-term direct minor. Seawalls and bulkheads tend to fail, and those that do fail have an adverse visual impact.
<i>Pollution Abatement:</i>	
Continuing to prohibit the use of beaded Styrofoam and require that all new dock flotation systems, and repairs to existing flotation systems, use encapsulated flotation materials, while not requiring that owners certify that they have properly disposed of any previously used Styrofoam or that only encapsulated flotation materials are in place for continued use of the boat dock.	<i>Beneficial:</i> None <i>Adverse:</i> Long-term direct minor. Newly permitted docks would not have Styrofoam flotation, but some older docks would be expected to continue to contribute visually unsightly Styrofoam beads to the shoreline.
<i>Day Use Park Operations:</i>	
Maintaining but not modernizing recreational sites.	<i>Beneficial:</i> None <i>Adverse:</i> Long-term direct negligible. Some deterioration of facilities over time would be expected.
Permitting development on the lake where demand pressure is greatest and for the type of facilities (boating-related or non-boating-related) in greatest demand.	<i>Beneficial:</i> Long-term direct minor. Development would be expected to occur primarily in the southern portion of the lake, leaving the northern portion, except around Gainesville, relatively undeveloped. <i>Adverse:</i> Long-term direct moderate. Development would be expected to occur primarily in the already-overused southern portion of the lake, with increasing development in the northern portion of the lake as Gainesville grows, and pressure would be expected to be greatest for boating-related facilities.

Landscape Visibility. Landscape visibility, specifically the additional acres from which boat docks would be visible from the lake and surrounding land, was discussed in Section 3 as the metric by which the impacts of the No Action Alternative and Preferred Alternative would be

quantified. The intensity of the effect of additional boat docks on the aesthetics of the lake is based on the landscape visibility changes that could occur. Figure 4-1 depicts areas of the lake from which the 8,359 existing private and community boat docks⁶ and the potential 16,734 new boat docks that could be permitted under the No Action Alternative would be clearly visible. Using the 0.75-mile visibility range discussed in Section 3.0, one or more docks would be visible from 78 percent (30,584 acres) of the lake's surface after all 16,734 new docks were installed. Currently, one of the 8,359 docks is visible from 75.6 percent (29,507 acres) of the lake surface (Table 4-5). Docks would be more visible from the shoreline as well. One or more boat docks are currently visible from 557 miles of the shoreline, and after an additional 16,734 docks were installed, one or more docks would be visible from an additional 35 miles (a 6 percent increase) of the shoreline.

Although the total area of the lake from which one or more boat docks would be clearly visible from the surface of the lake would change by less than 4 percent (1,077 acres), there would be large increases in lake acreages from which many boat docks would be visible (Table 4-5):

- There would be a 214 percent increase in lake acreage from which 41 to 80 boat docks would be visible (from 3,384 to 10,639 acres).
- There would be a 2,763 percent (or 27-fold) increase in lake acreage from which 81 to 120 boat docks would be visible (from 195 acres to 5,583 acres).
- There would be a 716-fold increase in lake acreage from which more than 121 docks would be visible (from 4 to 2,864 acres).
- The above-mentioned increases would decrease the area of the lake from which few docks (1 to 40) would be visible by 37 percent (from 25,924 to 11,497 acres).

⁶ Note that the actual number of docks on the lake (8,348 private docks and 11 community docks) is used for visibility analysis. Community docks, therefore, have not been translated into private-dock equivalents here.

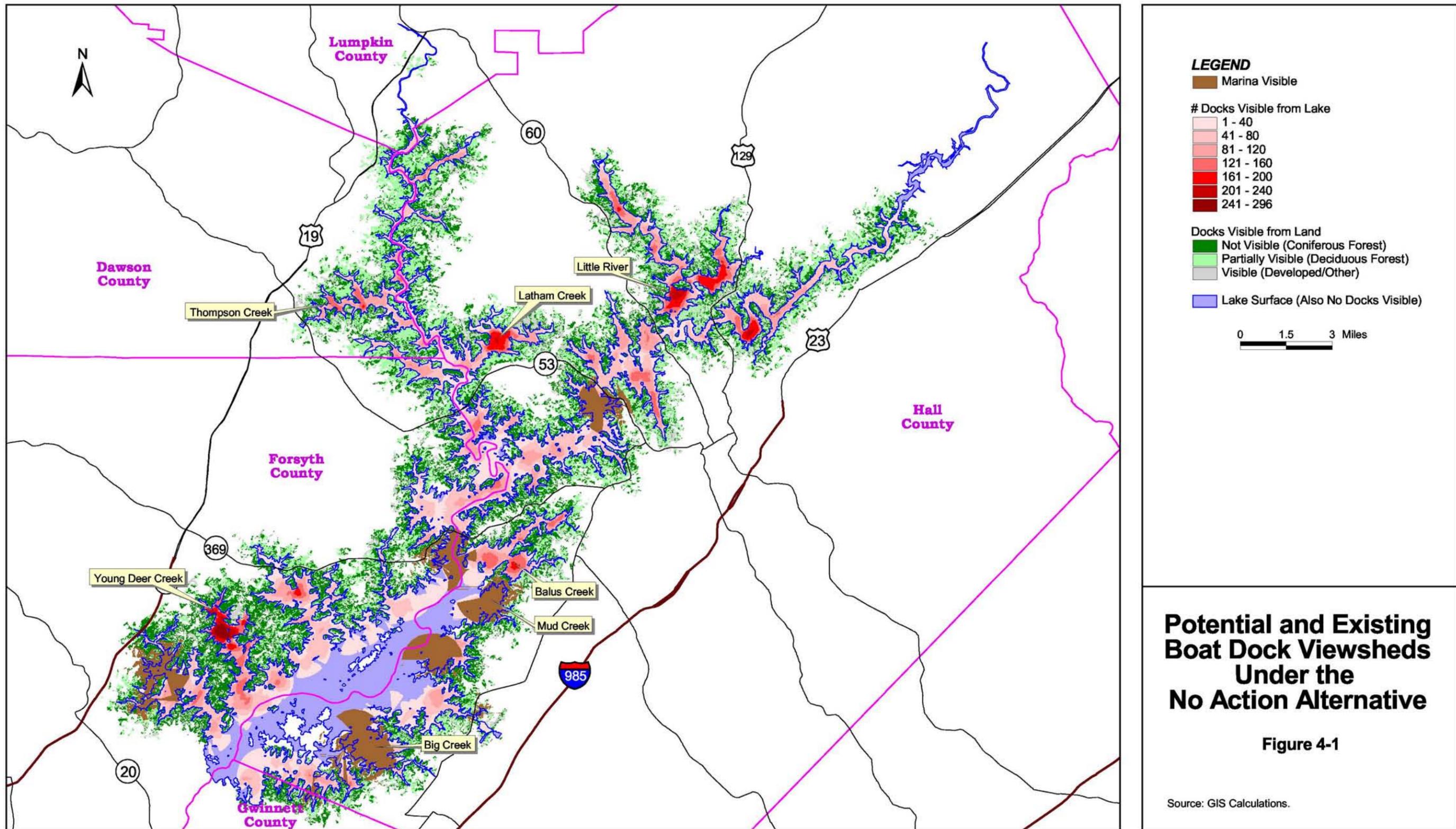


Table 4-5
Acreeage of Lake From Which Boat Docks Would Be Clearly Visible

Existing Docks and Alternatives Plus Existing Boat Docks				
Number of Visible Docks	Existing Docks		No Action Alternative Plus Existing	
	Lake Acreage	% Lake Area	Lake Acreage	% Lake Area
1-40	25,924	66.4	11,497	29.5
41-80	3,384	8.7	10,639	27.3
81-120	195	0.5	5,583	14.3
121 plus	4	0.0	2,864	7.3
TOTAL	29,507	75.6	30,584	78.3
Number of Visible Docks	Existing Docks		Preferred Alternative Plus Existing	
	Lake Acreage	% Lake Area	Lake Acreage	% Lake Area
1-40	see above		24,631	63.1
41-80			5,235	13.4
81-120			343	0.9
121 plus			7	0.0
TOTAL			30,217	77.4

Source: GIS calculations.

The 16,734 new boat docks that would be allowed under the No Action Alternative, when added to the 8,359 existing boat docks, would make boat docks clearly visible from large contiguous areas of the lake surface. When compared to Figure 3-14 in Section 3.0, which shows the existing boat dock viewsheds, the most notable areas affected would be Young Deer Creek, Big Creek, Mud Creek, and Balus Creek on the south section of Lake Lanier; Latham Creek and Thompson Creek on the Chestatee River north section; and the Gainesville Speedway area and Little River areas of the Chattahoochee River north section (Figure 4-1).

Figure 4-1 also shows the area from which potential new boat docks would be visible from land surrounding the lake under the No Action Alternative. Depending on vegetative cover and season of the year, one or more docks would be visible from 49,560 acres of land surrounding the lake after all 16,734 new docks were installed. The 8,359 existing docks are now visible from 43,715 acres of land surrounding the lake.

4.2.5.2 Preferred Alternative

Implementation of the Preferred Alternative would be expected to have long-term direct negligible to major beneficial effects on aesthetics at Lake Lanier. A significant beneficial effect would be expected from implementation of a new Shoreline Use Permitting Policy. The duration and intensity of the expected effects are summarized in Table 4-6.

**Table 4-6
Anticipated Effects on Aesthetics and Visual Resources Under the Preferred Alternative**

Proposed O&M Improvement	Anticipated Effects
<i>Shoreline Management:</i>	
<p>(1) Maintaining vegetative (forested) shoreline buffer consisting of native woody shrubs and trees (understory and overstory) along all shoreline allocation zones, excluding Prohibited Areas; (2) continuing to deny requests for vegetation removal with the exception of removal of hazardous trees; (3) approving or renewing Specified Acts Permits when work is for the purpose of wildlife habitat enhancement or forest stand improvement; (4) requiring all open areas where grass mowing is not authorized under the existing Shoreline Use Permits to be revegetated by the permittee or at the Corps's discretion; (5) encouraging those with grandfathered authorization to mow to cease mowing project lands; (6) allocating budget resources to provide for vigorous enforcement of prohibitions against unauthorized removal of vegetation.</p>	<p><i>Beneficial:</i> Long-term direct moderate. These improvements would be expected to result in visible improvement of the shoreline. <i>Adverse:</i> None</p>
<p>Implementing a new Shoreline Use Permitting Policy. Policy changes include 50 percent utilization of LDAs per ER 1130-2-406; Based on total length of LDA shoreline excess number of private boat docks in overdeveloped LDAs is subtracted from the total that can be permitted in underdeveloped LDAs.</p>	<p><i>Beneficial:</i> Long-term direct major significant. The Preferred Alternative would result in 14,712 fewer docks than would implementation of the No Action Alternative and would, compared to the No Action Alternative, ensure a more appealing shoreline in the future. LDAs with no or few docks and LDAs that are not yet at capacity for docks but which have many docks would be protected from significant additional visual and aesthetic deterioration. <i>Adverse:</i> None</p>
<p>Requiring the use of community docks in all new residential developments.</p>	<p><i>Beneficial:</i> Long-term direct minor. A single community dock is visually less detractive than many individual docks. <i>Adverse:</i> Community docks that have many slips can be visually disturbing.</p>
<p>Allowing communities that install courtesy docks rather than private docks to build a private ramp within the community for ready access by its residents.</p>	<p><i>Beneficial:</i> Long-term direct minor. Courtesy docks would be smaller and less visually detractive than community docks. <i>Adverse:</i> None</p>
<p>Encouraging existing private dock permittees to convert to community docks followed by rezoning of the shoreline from LDA to protected.</p>	<p><i>Beneficial:</i> Long-term direct negligible. Conversion to community docks would be a visual improvement, but would not be required and would depend on dock owner cooperation. <i>Adverse:</i> None</p>
<p>Implementing vigorous inspection and enforcement of private and community boat dock maintenance standards.</p>	<p><i>Beneficial:</i> Long-term direct minor. Fewer poorly maintained docks would be found along the shoreline. <i>Adverse:</i> None</p>

**Table 4-6
Anticipated Effects on Aesthetics and Visual Resources Under the Preferred Alternative**

Proposed O&M Improvement	Anticipated Effects
Requiring the mooring of boats in boat slips and prohibiting the regular mooring of boats to other boats.	<i>Beneficial:</i> Long-term direct minor. In areas where more boats are at docks than the dock has slips, a visual improvement would result by reducing the number of boats at the docks. <i>Adverse:</i> None
Prohibiting the use of boat slips, approved through issuance of Shoreline Use Permits, to accommodate boats or personal watercraft (e.g., Jet Skis, Wave Runners), of any size, having mufflers above the waterline—a violation of state law. State law stipulates that mufflers must be at or below the waterline.	<i>Beneficial:</i> Long-term direct negligible. Noise is an aspect of aesthetics, and this improvement would result in a more pleasing noise environment by eliminating access to the lake from docks for boats in violation of the law. <i>Adverse:</i> None
<i>Island Management:</i>	
Prohibiting camping on islands, but encouraging day uses (e.g., bank fishing, sunbathing, wading, hiking, swimming, birdwatching, and picnicking).	<i>Beneficial:</i> Long-term direct minor. Islands would be expected to improve visually after this improvement was implemented. <i>Adverse:</i> None
Increasing O&M actions to establish the islands as wildlife sanctuaries through vegetation, timber stand, and habitat management activities.	<i>Beneficial:</i> Long-term direct minor. Islands would have a more natural appearance as a result of this improvement. <i>Adverse:</i> None
Establishing an Adopt-An-Island program, or something similar, as a source of funding for shoreline protection and stabilization activities.	<i>Beneficial:</i> Long-term direct minor. Reducing the quantity of severely eroding shoreline on islands would improve them aesthetically. <i>Adverse:</i> None
<i>Nonnative Plant Management:</i>	
Developing programs to provide better control of noxious species (e.g., kudzu, English ivy, and poison ivy) by encouraging adjacent owners' and volunteers' efforts and providing educational and outreach programs to inform the public about desirable and undesirable plant species.	<i>Beneficial:</i> Long-term direct negligible. This improvement probably would create only minor improvements in the naturalness of the shoreline. <i>Adverse:</i> None
<i>Erosion Management:</i>	
(1) Requiring that owners plant natural vegetation or install riprap or other shoreline or bank stabilization measures when applying for a new Shoreline Use Permit, renewal of a Shoreline Use Permit for a private boat dock or community boat dock, or upon granting or renewing USACE outgrants; (2) Allowing permit or lease applicants to mitigate effects of their use of the shoreline by constructing mitigation measures at locations other than the sites that are the subject of proposed or renewed permitted activities or leases.	<i>Beneficial:</i> Long-term direct moderate. All land owners with Shoreline Use Permits or those applying for a first permit potentially would be affected, and the amount of unattractive shoreline in LDAs due to erosion would decrease. <i>Adverse:</i> None

**Table 4-6
Anticipated Effects on Aesthetics and Visual Resources Under the Preferred Alternative**

Proposed O&M Improvement	Anticipated Effects
<i>Water Quality Management:</i>	
(1) Requiring that before issuance of any Shoreline Use Permit for a community boat dock, applicants clearly show that wastewater generated by the residential development will not adversely affect the lake's water quality; (2) requiring any adjacent property owner seeking to renew a Shoreline Use Permit for a private boat dock to indicate whether his or her residence uses a septic system and, if so, to clearly show that the septic system poses no threat to the lake's water quality.	<i>Beneficial:</i> Long-term direct minor. Septic systems can be significant sources of bacterial and nutrient pollution and lead to algae blooms or excessive plant growth. Prevention of that type of pollution would improve lake aesthetics. <i>Adverse:</i> None
Providing for immediate revocation of any Shoreline Use Permit for a private boat dock permit or privileges in a Shoreline Use Permit for a community boat dock upon disposal to Lake Lanier of human waste from a watercraft or disposal to Lake Lanier of any pollutant in connection with use of a watercraft.	<i>Beneficial:</i> Long-term direct negligible. Some pollution may be prevented or arrested because of this improvement, but few boats would be expected to be affected. <i>Adverse:</i> None
<i>Sections 10/404 Permitting:</i>	
Discontinuing the use of seawalls and bulkheads and requiring riprap or biostabilization only.	<i>Beneficial:</i> Long-term direct minor. The number of failing seawalls and bulkheads would be decreased and their negative visual impact would be reduced. <i>Adverse:</i> None
<i>Pollution Abatement:</i>	
(1) Continuing to prohibit use of beaded Styrofoam and requiring that all new dock flotation systems and repairs to existing flotation systems use encapsulated flotation materials; (2) requiring that prior to Shoreline Use Permit renewal, owners certify that (a) they have properly disposed of any previously used Styrofoam and (b) only encapsulated flotation materials are in place for continued use of the boat dock.	<i>Beneficial:</i> Long-term direct moderate. Increased effort to control Styrofoam floatation pollution would ensure that the aesthetically negative effect of deteriorated Styrofoam beads along the shoreline would decrease. <i>Adverse:</i> None
Accepting volunteer services to collect Styrofoam or other failed dock flotation materials.	<i>Beneficial:</i> Long-term direct minor. More Styrofoam currently along the shoreline would be removed than if project personnel alone were to accomplish the task. <i>Adverse:</i> None
<i>Day Use Park Operations:</i>	
Emphasizing the modernization of recreational sites that have substantial investments in infrastructure (e.g., waterborne toilets, showers, boat ramps, picnic facilities, playgrounds).	<i>Beneficial:</i> Long-term direct moderate. Modernized facilities would be more aesthetically appealing. Evidence also indicates that visitors maintain facilities better when they are new. <i>Adverse:</i> None

Table 4-6
Anticipated Effects on Aesthetics and Visual Resources Under the Preferred Alternative

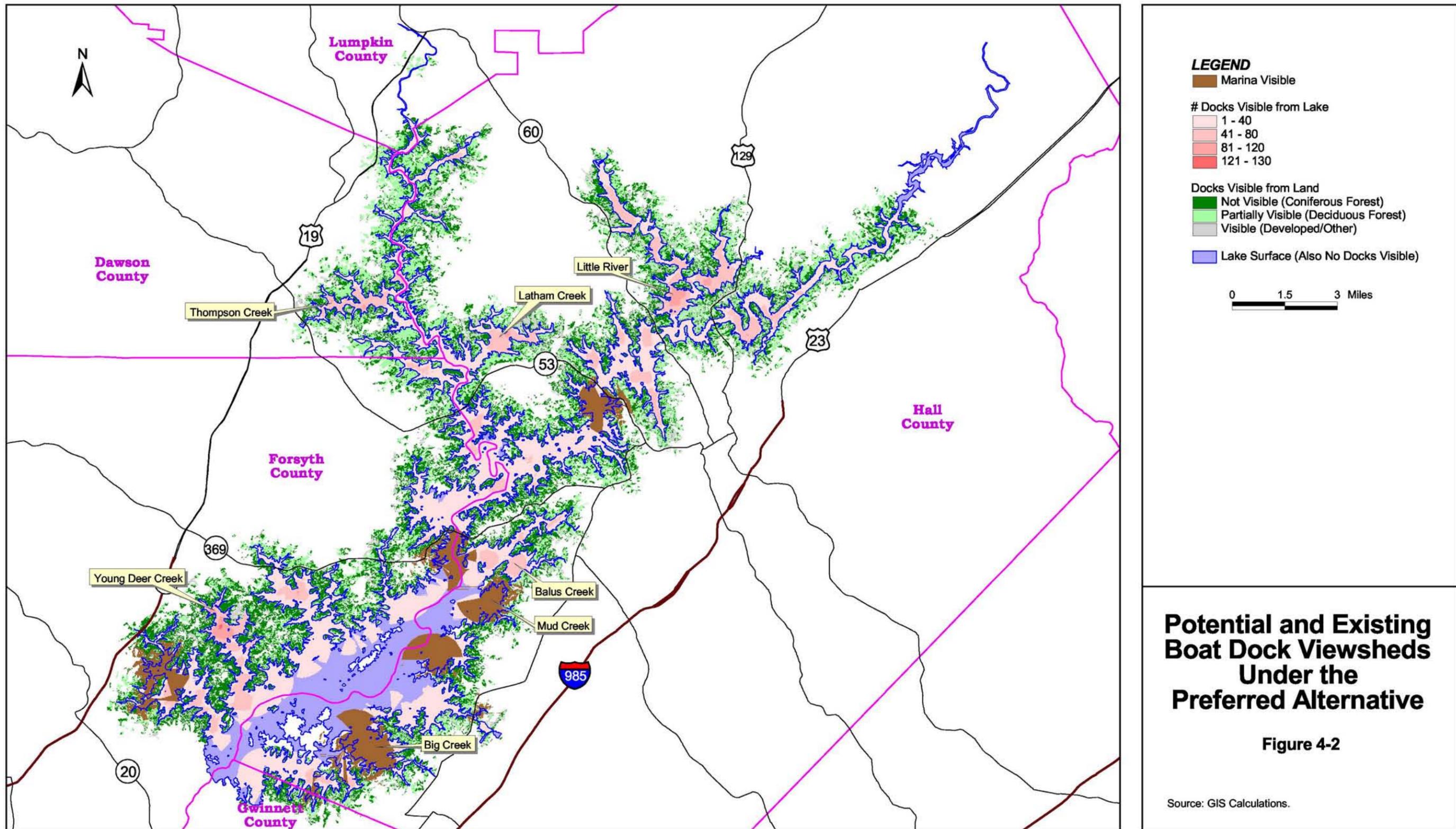
Proposed O&M Improvement	Anticipated Effects
Giving preference to funding the development of the northern portion of the lake (above Brown's Bridge) and shifting emphasis from boating-related activities and facilities (e.g., ramps) to lake-related activities.	<p><i>Beneficial:</i> Long-term direct moderate. Such a development policy would relieve recreational pressure on the southern portion of the lake and at the same time encourage use of the northern lake, where recreational pressure is not as great, creating a more appealing recreational environment.</p> <p><i>Adverse:</i> Long-term direct minor. Policy-directed development of the northern portion of the lake would decrease the area's visual appeal.</p>

Landscape Visibility. As discussed above, landscape visibility, measured as the additional acres from which boat docks would be visible from the lake and surrounding land, was mentioned in Section 3.0 as the metric by which the aesthetic impacts would be quantified. A significant beneficial effect on the aesthetics of the lake could be realized by implementing the Preferred Alternative instead of the No Action Alternative. Figure 4-2 depicts areas of the lake from which the 8,359 existing boat docks and the 2,022 additional boat docks that could be installed under the Preferred Alternative would be clearly visible. Using the 0.75-mile visibility range discussed in Section 3, one or more docks would be visible from 77 percent of the lake's surface after all 2,022 new docks were installed. The existing and new docks would be visible from 30,217 acres of the lake, compared to 29,507 acres from which one or more existing boat docks are visible.

Installing the additional 2,022 docks under the Preferred Alternative would increase the length of shoreline from which a dock is visible by 26 miles, compared to 35 miles under the No Action Alternative. There are currently 557 miles of shoreline from which at least one dock can be seen.

Although the total area of the lake from which one or more boat docks would be clearly visible from the surface of the lake would change by less than 3 percent (710 acres), Table 4-5 illustrates that the amount of lake acreage from which many docks would be visible would increase:

- There would be a 55 percent increase in lake surface from which 41 to 80 boat docks would be visible (from 3,384 to 5,235 acres).
- There would be a 76 percent increase in lake surface from which 81 to 120 boat docks would be visible (from 195 to 343 acres).



- There would be only a small area from which more than 121 docks would be visible (from 4 to 7 acres).

The above-mentioned increases would decrease the area of the lake from which few docks (1 to 40) would be visible by 3 percent (from 25,924 to 24,631 acres) (Table 4-5).

The 2,022 new boat docks that would be allowed under the Preferred Alternative, when added to the 8,359 existing boat docks, would make boat docks clearly visible from large contiguous areas of the lake surface. When compared to Figure 3-14 in Section 3.0, which shows the viewsheds of existing boat docks, the most notable of these large areas would be the same areas most affected by the No Action Alternative, namely, Young Deer Creek, Big Creek, Mud Creek, and Balus Creek on the south section of Lake Lanier; Latham Creek and Thompson Creek on the Chestatee River north section; and the Gainesville Speedway area and Little River areas of the Chattahoochee River north section. The last two areas would not be affected as much under the Preferred Alternative as under the No Action Alternative (Figure 4-2).

Figure 4-2 also shows the area of land surrounding the lake from which existing and new boat docks would be visible under the Preferred Alternative. Depending on vegetative cover and season of the year, one or more docks would be visible from 47,006 acres of land surrounding the lake. The 8,359 existing boat docks are visible from 43,715 acres of land surrounding the lake. Figure 4-3 provides a comparison of the effects of the Preferred Alternative and the No Action Alternative relative to baseline conditions in terms of landscape visibility.

4.2.6 Recreation and Recreational Facilities

4.2.6.1 No Action Alternative

Long-term direct negligible to moderate adverse effects and long-term indirect negligible and minor beneficial effects would be expected under the No Action Alternative. Adverse effects would be expected to far outweigh the beneficial effects of implementing the No Action Alternative. Table 4-7 describes the anticipated effects of maintaining the current O&M program, or of not implementing proposed improvements, and assesses the duration and intensity of the anticipated effects.

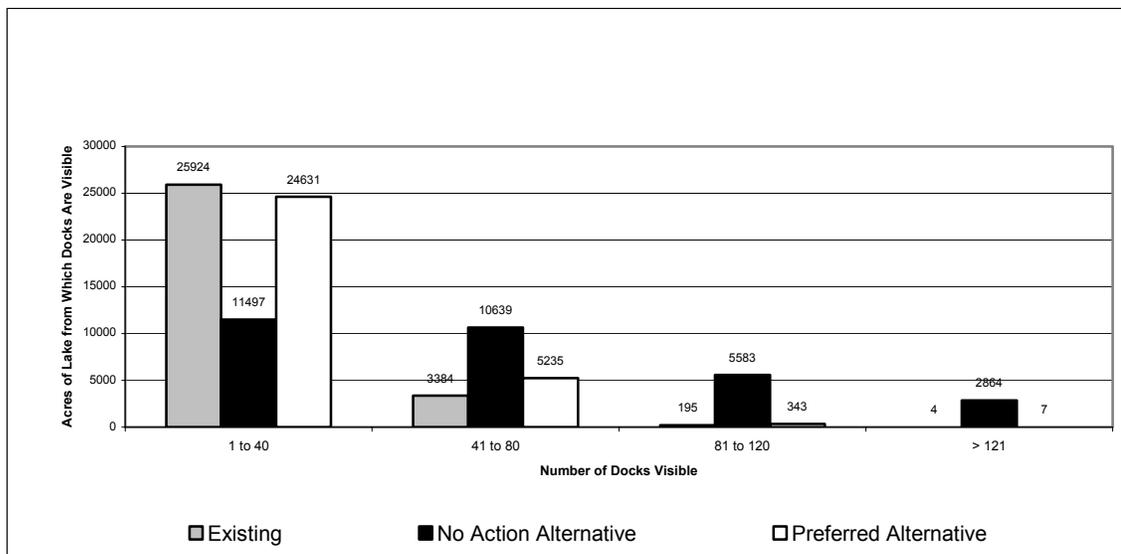


FIGURE 4-3. COMPARISON OF EXISTING LANDSCAPE VISIBILITY TO LANDSCAPE VISIBILITY UNDER THE NO ACTION ALTERNATIVE AND PREFERRED ALTERNATIVE.

**Table 4-7
Anticipated Effects on Recreation and Recreational Resources
Under the No Action Alternative**

O&M Activity	Anticipated Effects
<i>Shoreline Management:</i>	
Adding a total of 16,734 private boat docks; <i>not</i> imposing an 82-foot boundary footage length requirement to qualify for a private boat dock; <i>not</i> requiring the use of community docks in all new residential developments.	<i>Beneficial:</i> None <i>Adverse:</i> Long-term direct moderate. By imposing no new limitations on private boat dock installation, dock density would increase in more areas to levels unsafe for navigation, and the potential maximum boating density on the lake would be increased.
<i>Not</i> allowing communities that install courtesy docks rather than private docks to build a private ramp within the community for ready access by its residents.	<i>Beneficial:</i> None <i>Adverse:</i> Long-term direct minor. If no courtesy docks are allowed, more private docks would be installed and since fewer residents will have access to ramps, more crowding would occur at public access sites.
<i>Not</i> limiting the size of boat slips, <i>not</i> requiring the mooring of boats in boat slips, and <i>not</i> prohibiting the regular mooring of boats to other boats.	<i>Beneficial:</i> None <i>Adverse:</i> Long-term direct negligible. Continued impedance of navigation where this is a problem.
<i>Island Management:</i>	
<i>Not</i> increasing O&M actions to establish the islands as wildlife sanctuaries.	<i>Beneficial:</i> None <i>Adverse:</i> Long-term direct minor. Minor degradation of islands, which would limit their use for recreation.

**Table 4-7
Anticipated Effects on Recreation and Recreational Resources
Under the No Action Alternative**

O&M Activity	Anticipated Effects
<i>Day Use Park Operations:</i>	
Increasing the capacity of boat ramps to park <i>more</i> than the current capacity of 2,470 boat trailers.	<i>Beneficial:</i> None <i>Adverse:</i> Long-term direct minor. Continued growth in the number of trailer parking spaces—and launch ramps to handle increased capacity—resulting in increased on-lake boat density.
<i>Not</i> modernizing recreational sites that have substantial investments in infrastructure.	<i>Beneficial:</i> Long-term direct negligible. The sites would be less crowded than if they were modernized. <i>Adverse:</i> Long-term direct minor. Without modernization, existing facilities would slowly deteriorate.
<i>Not</i> increasing the number of locations and facilities suitable for bank fishing.	<i>Beneficial:</i> None <i>Adverse:</i> Long-term direct minor. Without additional bank fishing facilities as use of the lake increases, either more people will have to boat to go fishing, increasing boat density, or fewer people will be able to fish from the bank.
Developing <i>both</i> the northern and southern portions of the lake and <i>not</i> shifting emphasis from boating-related activities and facilities to lake-related activities.	<i>Beneficial:</i> Long-term direct moderate. More recreational facilities would be available to visitors in more parts of the lake. <i>Adverse:</i> Long-term direct and indirect moderate. Presumably, pressure on southern facilities will increase, since this is the part of the lake closest to and most accessible from Atlanta. Some users would be expected to shift their use to the northern lake, increasing pressure on facilities there. As Gainesville develops, more crowding on the northern lake would be expected.
Establishing additional boat launch facilities in the northern portion of the lake <i>beyond</i> the number of launch facilities that are expected to be closed in the southern part of the lake, or without closing facilities in the southern part.	<i>Beneficial:</i> Long-term direct moderate. More boating facilities would be available on the lake. <i>Adverse:</i> Long-term direct minor. The potential maximum boating density on the lake would increase.
<i>Not</i> strictly enforcing vehicle and trailer parking at public access sites, especially during peak use periods; <i>not</i> establishing sites in the northern portion of the lake to be used exclusively for bank fishing.	<i>Beneficial:</i> Long-term direct moderate. More people would be accommodated daily at public access sites. <i>Adverse:</i> Long-term direct minor. Continued overuse at public access sites, increasingly as more public access sites are developed; increased potential maximum boating density.
<i>Special Events:</i>	
<i>Not</i> closing the Clark's Bridge area to boat traffic more frequently to accommodate frequent rowing events	<i>Beneficial:</i> Long-term direct negligible: Presumably, there would be fewer rowing events, or they would be more difficult to operate in the presence of boat traffic. <i>Adverse:</i> Long-term direct negligible. Rowing events would be held less frequently or would interfere with boat traffic in the area.

Private boat docks on Lake Lanier are a considerable economic burden on lake management staff (USACE, Mobile District, 1985). Boat dock permits have a 5-year term, which means that on average one-fifth of the permits must be renewed each year, in addition to the processing of any new requests received during the year. (Approximately 175 new requests are received each year.) Currently (2000), this implies the renewal of 1,732 boat dock permits every year. Under the No Action Alternative, with a maximum of 25,327 private boat docks, project staff would have to review 5,065 permits per year, or approximately 20 per day. Researchers who conducted the 1984 boating capacity study at Lake Lanier calculated that in 1984 the burden of reviewing 1,500 permits, conducting boat dock inspections, and handling office administration associated with boat dock permits created a net annual cost to the government of between \$91,000 and \$188,000 (1984 dollars) and required the full-time or part-time efforts of the Resource Manager, three rangers, two clerks, and six technicians. The administrative and economic burdens would be considerably increased with implementation of the No Action Alternative.

Other continuing O&M program activities under the No Action Alternative might indirectly affect recreation at the lake, primarily in an aesthetic sense; effects on aesthetics are discussed in Section 4.2.5.

4.2.6.2 Preferred Alternative

Implementation of the Preferred Alternative would be expected to have long-term direct negligible to major beneficial effects and long-term direct negligible to minor adverse effects on recreation and recreational resources. The Preferred Alternative would be expected to result in fewer private boat docks, more community docks, a greater limitation on the potential number of boats that could be on the lake simultaneously (though not necessarily on the actual number of boats on the lake simultaneously), an increased variety of recreational opportunities, and a redistribution of recreational use and recreational resources across the lake. Table 4-8 lists the anticipated effects of implementing the O&M program improvements proposed under the Preferred Alternative and assesses the duration and intensity of the effects.

**Table 4-8
Anticipated Effects on Recreation and Recreational Resources
Under the Preferred Alternative**

O&M Improvement	Anticipated Effects
<i>Fisheries and Wildlife:</i>	
Establishing a proactive deer management program.	<i>Beneficial:</i> Long-term direct negligible. Good for hunters, establishing a new opportunity with little impact. <i>Adverse:</i> None
<i>Shoreline Management:</i>	
Maintaining vegetative (forested) shoreline buffer consisting of native woody shrubs and trees (understory and overstory) along all shoreline allocation zones, excluding Prohibited Areas.	<i>Beneficial:</i> Long-term direct minor. While not essentially recreation program improvements, shoreline improvements would be beneficial to those participating in wildlife viewing along the shoreline. <i>Adverse:</i> None
Implementing a new Shoreline Use Permitting Policy that would result in only 2,022 additional private boat docks.	<i>Beneficial:</i> Long-term direct moderate. Limits the density of docks in LDAs, the overall number of docks on the lake, and interference with navigation. <i>Adverse:</i> Long-term direct minor. Areas where the new docks are installed would be less navigable.
Requiring an 88-foot boundary frontage for a new boat dock and a 6-foot depth at the end of the dock.	<i>Beneficial:</i> Long-term direct moderate. Limits the number of boat docks. <i>Adverse:</i> None
Requiring the use of community docks in all new residential developments.	<i>Beneficial:</i> Long-term direct moderate. Limits the number of private docks; provides boating access for all residents of an area. <i>Adverse:</i> None
Allowing communities that install courtesy docks rather than private docks to build a private ramp within the community for ready access by its residents.	<i>Beneficial:</i> Long-term direct minor. Encourages community, not private docks, and provides access for all residents, reducing pressure on and need for additional public ramps. <i>Adverse:</i> None
Encouraging existing private dock permit holders to convert to community docks.	<i>Beneficial:</i> Long-term direct negligible. This could result in a reduction in the number of private docks. <i>Adverse:</i> None
Implementing vigorous inspection and enforcement of private and community boat dock maintenance standards.	<i>Beneficial:</i> Long-term direct minor. There might be fewer dilapidated or poorly maintained private facilities on the lake. <i>Adverse:</i> None
Providing that Shoreline Use Permits for private or community boat docks limit the size of boats to the length of the slip.	<i>Beneficial:</i> Long-term direct minor. Navigation would be improved in coves affected by this provision. <i>Adverse:</i> None
Requiring the mooring of boats in boat slips and prohibiting the regular mooring of boats to other boats.	<i>Beneficial:</i> Long-term direct minor. Congestion in some coves would be reduced and navigation improved. <i>Adverse:</i> None

**Table 4-8
Anticipated Effects on Recreation and Recreational Resources
Under the Preferred Alternative**

O&M Improvement	Anticipated Effects
<i>Island Management:</i>	
Increasing O&M actions to establish the islands as wildlife sanctuaries.	<i>Beneficial:</i> Long-term direct minor. Islands would be better for wildlife viewing and general recreation. <i>Adverse:</i> None
<i>Campground Operations:</i>	
Pursuing the leasing of the War Hill Park Campground to Dawson County.	<i>Beneficial:</i> Long-term direct minor. Would provide the only marina on the Chestatee River. <i>Adverse:</i> None
Converting campground sites to day use sites in the southern portion of the lake and developing new campground sites in the northern portion of the lake.	<i>Beneficial:</i> Long-term direct moderate. More users per week would be able to use the converted facilities, and the quantity of facilities in northern lake would increase. <i>Adverse:</i> Long-term direct moderate. Recreational pressure on the northern lake would increase, and intensified use of the converted southern sites could cause some deterioration to the facilities.
<i>Environmental Education:</i>	
Establishing an Environmental Education Center.	<i>Beneficial:</i> Long-term direct minor. Create an additional educational recreation opportunity. <i>Adverse:</i> None
<i>Day Use Park Operations:</i>	
Maintaining the current capacity of public boat ramps to park not more than 2,470 boat trailers.	<i>Beneficial:</i> Long-term direct negligible. Limit the density of boats on the lake by limiting the capacity of boat ramp launches. <i>Adverse:</i> None
Continuing the closure and/or leasing of recreational areas where public utilization is low. The areas under consideration are listed in Table 2-9.	<i>Beneficial:</i> Long-term direct minor. These sites are primarily in the northern lake, so leasing could enhance recreational opportunities there. <i>Adverse:</i> None
Emphasizing the modernization of recreational sites that have substantial investments in infrastructure.	<i>Beneficial:</i> Long-term direct moderate. Improve conditions for recreation while not increasing the potential maximum boating capacity. <i>Adverse:</i> Long-term direct moderate. Modernization could increase recreational use pressure at the sites.
Increasing the number of locations and facilities suitable for bank fishing.	<i>Beneficial:</i> Long-term direct minor. Increase capacity for non-boating, low-impact recreation. <i>Adverse:</i> None
Giving preference to funding the development of the northern portion of the lake and shifting emphasis from boating-related activities and facilities to lake-related activities.	<i>Beneficial:</i> Long-term direct moderate. Reduce pressure on recreational facilities in the southern lake, expand opportunities in the southern lake, overall accommodating more people without an increase in recreational pressure. <i>Adverse:</i> Long-term direct minor. Until facilities are provided on the northern lake, pressure on southern facilities would grow as the region grows.

**Table 4-8
Anticipated Effects on Recreation and Recreational Resources
Under the Preferred Alternative**

O&M Improvement	Anticipated Effects
Establishing additional boat launch facilities in the northern portion of the lake only to the extent that launch facilities are closed in the southern portion of the lake.	<i>Beneficial:</i> Long-term direct minor. No increase in potential maximum boating capacity, but a redistribution to reduce density in the crowded southern lake area. <i>Adverse:</i> Long-term direct minor. Closing facilities on the southern lake would increase pressure on facilities that remain open.
Strictly enforcing vehicle and trailer parking at public access sites, especially during peak use periods, and closing boat launch facilities as parking lots become full.	<i>Beneficial:</i> Long-term direct minor. Reduce congestion at sites, reduce overuse on peak use days and weekends. <i>Adverse:</i> Long-term direct minor. Strict enforcement would deny some people access to the lake.
Establishing additional foot trails in forested areas and on the points of Protected Areas.	<i>Beneficial:</i> Long-term direct minor. Increase recreational variety and opportunities without increasing boating density on the lake. <i>Adverse:</i> None
<i>Special Events:</i>	
Closing the Clark's Bridge area to boat traffic more frequently to accommodate frequent rowing events.	<i>Beneficial:</i> Long-term direct negligible. This would accommodate the rowing events for participants and observers. <i>Adverse:</i> Long-term direct negligible. Boaters in the area during events would be inconvenienced.

The administrative and economic burdens associated with approving and renewing boat dock permits would be considerably less under the Preferred Alternative. A maximum of 10,615 private docks would increase the yearly permit review burden to 2,123 permits, or approximately 9 per day. Fewer additional staff would be necessary to accomplish this task than under the No Action Alternative, and the Preferred Alternative would implement many of the measures recommended to the project in 1984 to limit the density of boats on the lake and to keep the administrative and economic burdens of permit review from becoming overwhelming. These recommendations include the following:

- Limit boat storage on government land and water, including private boat docks and commercial marinas.
- Provide control gates at entrances to public ramp parking areas that could be closed when the lot is full.

- Maintain the capacity of boat launching ramps and parking facilities that the lake had at the time of the study (1984).
- Provide one or two marinas with limited storage capacity (dry only) at the northern end of the lake above Brown's Bridge.
- Increase the number and authority of patrols on the lake.
- Increase user education.

4.2.7 Geology and Soils

4.2.7.1 No Action Alternative

Long-term indirect minor adverse impacts and long-term indirect negligible beneficial effects on geology and soils would be expected from implementation of the No Action Alternative. Continued development adjacent to USACE property around Lake Lanier would have minor adverse effects. Some increase in soil disturbance would be expected in previously undisturbed areas. Soil disturbance and sediment runoff would occur during residential home and boat dock access path construction. Increases in soil disturbance would create more potential for sheet and rill erosion, which could potentially increase sedimentation into the lake. An increase in impervious surfaces such as rooftops and roads would increase surface runoff and thereby increase the potential for erosion.

Minor adverse impacts on soils would be expected from landowners with property adjacent to government property continuing to clear vegetative buffers illegally. The reduction in vegetative cover could increase soil erosion. If grassy cover was to remain in modified areas and bare soil was not exposed, the amount of soil erosion would be limited. An increase in boating traffic could increase shoreline erosion due to wave action caused by boat wakes.

Negligible adverse impacts and negligible beneficial and adverse impacts on soils would be expected from the installation of private boat docks. Installation of docks could temporarily increase soil erosion when docks are anchored to the shoreline. Docks also reduce shoreline erosion by attenuating waves and boat wakes. Users of boat docks might cause some soil disturbance as they walk over soils to access docks. In addition, the small potential increase in boating activity under this alternative might increase wave action and thus cause some shoreline erosion.

4.2.7.2 Preferred Alternative

Long-term indirect minor beneficial and adverse effects would be expected. Several proposed modifications to the Shoreline Management Plan would have the potential to help control stream bank erosion and subsequent sediment deposition in Lake Lanier. The required installation of native vegetation or riprap, if necessary, when renewing or being granted a Shoreline Use Permit and the proposed creation of a vegetative buffer would lessen overall stream bank and shoreline erosion. The problem of vegetation removal would be reduced by the initiative to punish violating homeowners by revoking their Shoreline Use Permits. Requiring community docks instead of individual private docks and encouraging existing private dock permittees to convert to community docks would decrease the erosion caused by the placement and use of dock access footpaths. Minor beneficial effects on soils would be expected by increasing O&M actions to establish the islands as wildlife sanctuaries and establishing an adopt an island program by potentially decreasing overall erosion from the islands.

Minor adverse effects would be the result of increasing both boating activity and the number of boat docks. Increasing the number of boat docks might cause an increase in the number of boats on the lake. Expanding boating activity could increase the amount of wave action on the lake, causing additional shoreline erosion. Increasing the number of boat docks and therefore the number of footpaths could increase the amount of erosion caused by storm water runoff.

4.2.8 Ecological Systems

4.2.8.1 No Action Alternative

Long-term direct and indirect minor beneficial and adverse impacts on ecological systems would be expected under the No Action Alternative. Minor adverse impacts on vegetative communities would also be expected. Vegetation would continue to be destroyed by illegal cutting of trees and clearing of underbrush on project lands. Current penalties for cutting vegetation on project lands have not been sufficient to deter this behavior. The loss of forest and increase in residential development, as discussed in Section 4.2.2, would decrease the extent of forest communities.

Minor adverse impacts on terrestrial wildlife would be expected under the No Action Alternative. As forests decrease and lawns increase in shoreline areas, generalist species such as white-tailed deer and Canada geese would be expected to increase under the No Action Alternative. Without a deer management program, deer browsing could reduce or eliminate some species of plants.

Minor beneficial and adverse effects on aquatic wildlife would be expected from approving and installing 16,734 potential new boat docks. Minor adverse effects on aquatic plants would be expected because boat docks block light to the water that plants and some aquatic wildlife need to grow (Chmura, 1978). Minor benefits to fish would be expected because floating docks and breakwaters function as fish attractors and provide structure for other aquatic organisms (USACE, 1993). Effects on water resources, as discussed in Section 4.2.1, and on geology and soils, as cited in Section 4.2.7, could have minor adverse impacts on aquatic organisms.

Minor adverse and beneficial effects on vegetation and wildlife would be expected from continuing to conduct forest management on Lake Lanier under a multiple use concept. Before conducting timber sales, the Corps would continue to complete a Timber Availability Memorandum. Minor benefits would be expected from continuing to perform thinning prescriptions to maintain healthy and vigorous residual stands of timber. Lake Lanier would continue to use thinning to reduce the basal area of pine stands to 60 to 80 square feet per acre to maintain vigorous growth of trees and minimize the risk of southern pine beetle mortality. Removal of hazardous trees around the lake would reduce the benefits of standing dead timber to wildlife, even though it would benefit public safety. Minor adverse effects of timber management on vegetation would also be expected from soil disturbance and soil compaction by log skidders and other equipment.

No impacts on sensitive species would be expected under the No Action Alternative because only one federal candidate plant species, Georgia aster, is thought to persist within a mile of the lake and it would be unlikely to be affected by O&M activities.

The anticipated effects of implementing the No Action Alternative on ecological systems are summarized in Table 4-9.

4.2.8.2 Preferred Alternative

Long-term direct and indirect minor beneficial effects and long-term direct minor adverse effects on ecological systems would be expected under the Preferred Alternative. Minor beneficial effects on vegetative communities would be expected from maintaining (and in some cases replanting) a vegetative buffer of native woody shrubs and trees around the lake. Revegetation would be expected to increase food and cover available for native wildlife and also to reduce soil erosion that could lead to accelerated sedimentation in the lake. Using native species to replant the shoreline would be expected to restore native plant communities on project lands, as would

developing programs to provide better control of noxious species (e.g., kudzu, English ivy, and poison ivy). Denying requests for vegetation removal, with the exception of hazardous trees, would be expected to minimize new adverse impacts on shoreline vegetation. Timber management programs described in the No Action Alternative would also be implemented under the Preferred Alternative.

Table 4-9
Anticipated Effects on Ecological Systems Under the No Action Alternative

O&M Activity	No Action Alternative
Continue with the existing deer management program.	<i>Beneficial:</i> None. <i>Adverse:</i> Without a more effective deer management program, deer browsing could reduce or eliminate some species of plants palatable to deer.
Maintain vegetation along the lake shoreline as currently done.	<i>Beneficial:</i> None. <i>Adverse:</i> It is currently illegal to cut vegetation on project lands, but some areas are cleared or thinned by landowners and this practice would be expected to continue and possibly increase in the future.
Continue with existing efforts to control illegal vegetation cutting on project lands.	<i>Beneficial:</i> None. <i>Adverse:</i> Current penalties for cutting vegetation on project lands have not been sufficient to deter illegal cutting.
Permit adjacent landowners to construct new private boat docks.	25,327 total boat docks possible under the No Action Alternative could affect 334.3 acres or 0.86 percent of the total lake. <i>Beneficial:</i> Floating docks and breakwaters function as fish attractors and provide structure for other aquatic organisms. <i>Adverse:</i> Boat docks block light to the water that plants need to grow.
Continue with existing efforts to control noxious plants and use native plant species on project lands.	<i>Beneficial:</i> None. <i>Adverse:</i> Without new programs to educate landowners, nonnative plants would be expected to continue to displace native vegetation in some parts of the lakeshore.
Conduct multiple-use forest management on Lake Lanier for timber production, wildlife habitat, air and water quality, soil, aesthetics, and recreation.	<i>Beneficial:</i> Multiple use management would be expected to increase the growth of forests, reduce the risks of southern pine beetle infestations, protect water quality, and protect other ecological and cultural resources. <i>Adverse:</i> None.
Require that all new dock flotation systems use encapsulated flotation materials.	<i>Beneficial:</i> Encapsulated flotation materials are less likely to pollute the lake with Styrofoam, which waterfowl can mistake for food. <i>Adverse:</i> None.

Minor beneficial effects on wildlife would be expected from establishing a vegetative buffer around the lake and replanting cleared areas with native trees and shrubs. Replanting trees in the buffer would increase the quality of habitat for terrestrial species adapted to forested habitats.

Aquatic species would also be expected to benefit from establishing and protecting vegetation on the shoreline. Shoreline trees produce woody debris that naturally falls into the water and creates cover for fish and invertebrates. Beneficial effects on terrestrial wildlife and vegetation would be expected from granting Specified Acts Permits for the purpose of wildlife habitat or forest stand improvement and coordinating with Georgia DNR to establish a proactive deer management program that used bowhunting or other discrete methods to harvest deer.

Negligible to minor beneficial and adverse effects on aquatic organisms would be expected from approving and constructing an additional 2,022 potential new boat docks. The adverse effects of docks on aquatic plants by creating shade in the water, and the benefits of docks to fish by providing fish structure are described under the No Action Alternative (Section 4.2.8.1). Indirect minor adverse effects on vegetation and wildlife would be expected from approving new boat docks because they would be expected to be accompanied by new development that could destroy or displace vegetation and wildlife.

The anticipated effects of implementing the Preferred Alternative on ecological systems are summarized in Table 4-10.

4.2.9 Cultural Resources

4.2.9.1 No Action Alternative

No effects or minor adverse effects on cultural resources would be expected under the No Action Alternative due to increases in vandalism and erosion. Erosion can disturb archaeological sites, and existing measures to limit surface and shoreline erosion would not be changed. Under the existing O&M program, protecting areas of recreational or cultural significance is a secondary goal of bank stabilization.

4.2.9.2 Preferred Alternative

No effects, negligible adverse effects, or minor beneficial effects on cultural resources would be expected. Archaeological sites can be disturbed by erosion and vandalism, and the risk of disturbance to cultural and historic resources from erosion would be less under the Preferred Alternative than under the No Action Alternative. Proposed O&M program improvements that would reduce erosion would account for the reduced risk to cultural resources.

Table 4-10
Anticipated Effects on Ecological Systems Under the Preferred Alternative

O&M Activity	Preferred Alternative
Coordinating with Georgia DNR to establish a deer management program that includes using discreet hunting methods to improve the condition of the herd.	<i>Beneficial:</i> Would be expected to reduce deer browse on vegetation palatable to deer. <i>Adverse:</i> None.
Maintaining a vegetative shoreline buffer of native woody shrubs and trees along the shoreline, except in Prohibited Areas.	<i>Beneficial:</i> Riparian forest buffers have been shown to benefit wildlife, capture sediment and nutrients in runoff, and also reduce nutrients in subsurface flow. A 100-foot vegetated buffer along 752 miles of shoreline could protect as many as 7,833 acres of natural vegetation. <i>Adverse:</i> None.
Revoking Shoreline Use Permits for all violations involving the unauthorized removal of vegetation.	<i>Beneficial:</i> Allowing for the revocation of Shoreline Use Permits for unauthorized removal of vegetation on project lands would be expected to provide a strong deterrent to future unauthorized tree cutting and brush clearing. <i>Adverse:</i> None.
Permit adjacent landowners to construct new private boat docks.	10,615 total boat docks possible under the Preferred Alternative could affect 140.1 acres or 0.36 percent of the total lake. <i>Beneficial:</i> Floating docks and breakwaters function as fish attractors and provide structure for other aquatic organisms. <i>Adverse:</i> Boat docks block light to the water that plants need to grow.
Developing programs to provide better control of noxious plants and encouraging the use of native plant species to revegetate project lands.	<i>Beneficial:</i> Using native species to replant shoreline areas now managed as mowed lawns or nonnative species would be expected to restore native plant communities on project lands. <i>Adverse:</i> None.
Conduct multiple-use forest management on Lake Lanier for timber production, wildlife habitat, air and water quality, soil, aesthetics, and recreation.	<i>Beneficial:</i> Multiple use management would be expected to increase the growth of forests, reduce the risks of southern pine beetle infestations, protect water quality, and protect other ecological and cultural resources. <i>Adverse:</i> None.
Discontinuing the use of seawalls/bulkheads, and requiring either riprap or biostabilization.	<i>Beneficial:</i> Discontinuing the use of sea walls/bulkheads and requiring riprap or biostabilization would be expected to re-establish native woody vegetation along the shoreline in areas with moderate water level fluctuations. <i>Adverse:</i> None.
Require that all new dock flotation systems use encapsulated flotation materials.	<i>Beneficial:</i> Under the Preferred Alternative encapsulated flotation would continue to be required, and further benefits to wildlife would be expected from requiring, prior to Shoreline Use Permit renewal, that owners certify that they have properly disposed of any previously used Styrofoam in a landfill. <i>Adverse:</i> None.

4.2.10 Air Quality

4.2.10.1 No Action Alternative

Long-term indirect minor adverse impacts would be expected from implementation of the No Action Alternative. Continuing to implement the existing O&M program would be expected to result in increases in air emissions from construction, automobiles, and watercraft. The installation of 16,734 boat docks and the expected accompanying construction of new houses associated with those docks would increase air emissions around the lake. The automotive emissions from the occupants of the new houses would also add new emissions. Watercraft emissions would increase with increases in boating activity.

4.2.10.2 Preferred Alternative

Long-term indirect minor adverse and beneficial effects would be expected. An increase in the number of boat docks on Lake Lanier would have the potential to increase the number of watercraft on the lake and therefore the amount of mobile source emissions. Emissions from construction activities associated with homes with docks would be less under the Preferred Alternative but would still result in short-term, periodic air pollutant emissions.

Decreasing the potential number of boat docks could reduce the amount of boating activity on the lake and therefore potentially decrease emissions from boats. Overall, maintaining the current capacity of parking spaces at public boat ramps could also help control the number of boats and boat emissions on the lake.

4.2.11 Hazardous and Toxic Substances and Pollution

4.2.11.1 No Action Alternative

Long-term indirect minor adverse effects would occur from implementation of the No Action Alternative. The installation of an additional 16,734 boat docks would increase boating-related activities along the shoreline, such as boat maintenance and fueling. These activities would be expected to result in some increase in the amounts of potentially harmful substances—including cleansers used for boat cleaning, boat motor oil products and solvents, boat paints, and other maintenance products—spilled into Lake Lanier or on land near the lake. Expanded public boat launching facilities would increase the amount of pollutants leaked or spilled onto parking lots. Additional boating activity would increase the amount of oil and fuel from boat motors released to the lake.

4.2.11.2 Preferred Alternative

Long-term indirect minor beneficial effects would occur from implementation of the Preferred Alternative. Limiting the number of private boat docks on the shoreline would reduce the potential for spills and leaks of hazardous or toxic compounds. Although boating-related activities would be expected to increase in the future, limiting the number of boats on the lake through some of the O&M program improvements (e.g., not increasing public parking at boat launching facilities) would also limit the potential for hazardous and toxic spills.

4.2.12 Noise

4.2.12.1 No Action Alternative

Long-term indirect minor adverse impacts would be expected under the No Action Alternative. Continuing to implement the O&M program with no revisions would be expected to result in increased noise from construction, automobiles, and watercraft. Under this alternative, 16,734 more boat docks could be installed on the lake, more public boat launching lanes would be available, and less vigorous enforcement of a law prohibiting boats with mufflers above the waterline would occur. All these factors could increase noise levels on the lake. The construction of new homes off Corps property with which new docks would be associated would add to noise levels over the short term. Further reduction of vegetation along the lake's shoreline would reduce the noise buffering effect of vegetation.

4.2.12.2 Preferred Alternative

Long-term direct and indirect minor beneficial effects would be expected. Limiting the number of boat docks on Lake Lanier could slow the growth of boating activity and thereby lessen the increase in noise from watercraft. Creation of a vegetative buffer along the shoreline would reduce noise because vegetation has noise-absorbing qualities. A more restrictive policy for boat mooring and not increasing the number of public boat launch ramps could limit and help control the overall amount of watercraft noise on the lake. A beneficial effect would also be expected from stricter enforcement of the prohibition against boats and personal watercraft that have mufflers above the waterline.

4.2.13 Summary of Effects

4.2.13.1 No Action Alternative

The No Action Alternative would lead to a significant, long-term, direct adverse effect on the aesthetics of the lake. Continuing to implement the current private boat dock permitting policy would allow the addition of 16,734 private boat docks to the lake along LDAs, and the lake could then have a total of 25,327 private boat docks along its shoreline. That would equate to one private dock for every 74 feet of LDA shoreline. Such a dramatic change in boat dock density would reduce public safety at the lake by limiting the space available for navigation in many coves and along many stretches of shoreline. Based on comments received from the Scoping Meeting for the EIS, permitting such a high density of private docks would also be controversial among nearby residents, recreational users of the lake, and environmental organizations.

Other aspects of the No Action Alternative would lead to reduced shoreline vegetation, more shoreline erosion, decreased wildlife habitat along the mainland and island shorelines, and water pollution problems (Table 4-11). Over the 20-year period between baseline conditions (2000) and 2020 (the period considered in the EIS), an increase in demand for facilities and visitation to the lake would lead to greater boater and visitor density in the southern part of the lake. The Corps would respond to these changes under the No Action Alternative by developing even more recreational facilities in the southern part of the lake which would result in more boating traffic on the southern part of the lake. Public safety would suffer with the additional traffic. Navigation in and recreational use of coves would be more difficult because of the additional docks.

Under the No Action Alternative, minor additional demands would be placed on infrastructure resources—landfill capacity; road infrastructure; potable water supplies; wastewater treatment capabilities; storm drainage; solid waste disposal facilities; and police, fire, and rescue services—but these effects would generally be dwarfed in comparison to the demands placed on these resources by normal growth and development within the greater Atlanta area. The region's economy would not be affected by the No Action Alternative unless the lake level dropped to a level at which the Corps would suspend issuing permits for boat docks or visitation at the lake was affected, but these economic effects would be small in the context of the regional economy.

**Table 4-11
Summary of Environmental and Socioeconomic Effects**

Resource Area	Effects Under the No Action Alternative	Effects Under the Preferred Alternative
Lake Lanier Watershed	Minor degradation of water quality due to sedimentation, bacteria, and petroleum compounds.	Some improvement to water quality due to reduced sedimentation, less bacterial pollution, and less Styrofoam from dock floatation.
Groundwater	No effects.	Minor improvements due to the required 100-foot vegetative shoreline buffer and better public maintenance practices for septic systems.
Land Use, Land Cover, and Land Use Controls	Degradation of vegetative cover and habitats along the shoreline and on the islands.	More dense vegetative cover on shorelines, and ecological improvements to island habitats.
Infrastructure	Minor increased demand for utilities and infrastructure.	Minor increased demand for utilities and infrastructure.
Socioeconomics	Minor stimulation of the local economy.	Negligible effects.
Visual and Aesthetic Resources	Significant deterioration in the aesthetic quality of the lake's shoreline due to private docks.	Significant preservation of the lake's aesthetic quality due to limiting the number of private boat docks on the lake's shoreline.
Recreation and Recreational Facilities	Increased crowding at recreation facilities on the southern lake and increased boating density on the southern lake.	Redistribution of lake use and recreational facilities across the lake and more opportunities for all types of recreational activities.
Geology and Soils	Minor increases in shoreline and soil erosion.	Reduced shoreline erosion and sediment in the lake.
Ecological Systems	Reduced vegetation and wildlife habitat along the shoreline and on the islands, more exotic and nuisance plant species.	Improved island and mainland vegetative cover, healthier and more diverse wildlife populations, more native vegetation and less nuisance plants.
Cultural Resources	Minor losses of cultural and historic resources on Corps property.	Reduced likelihood of disturbance of cultural and historic resources on Corps property.
Air Quality	Minor, localized increases in air pollution from boats and automobiles.	Reduced likelihood of localized increases in automobile and boat emissions.
Hazardous and Toxic Substances	Minor increases in gas and oil spills in parking lots and from boats.	Negligible increases in gas and oil spills in parking lots and from boats.
Noise	Potentially more noise from boats in the southern part of the lake and reaching shoreline residents.	Reduction in noise to shoreline residents due to more vegetation and no increase in noise from boats.

The No Action Alternative would have only minor effects on the resource areas of air quality, cultural resources, noise, and hazardous and toxic substances. Table 4-12 summarizes the environmental and socioeconomic consequences of the No Action Alternative for each resource area.

4.2.13.2 Preferred Alternative

Adopting the Preferred Alternative would have a significant, long-term, direct beneficial effect on the lake. The lake would have 14,712 fewer docks along LDAs under the Preferred Alternative than it would have under the No Action Alternative. The 10,615 private docks that could be on the lake under the Preferred Alternative would increase the number of docks by only 2,022 more than the lake had in 2000. Whereas under the No Action Alternative the lake would have a dock for every 74 feet of LDA shoreline, under the Preferred Alternative LDAs would have a dock for every 176 feet. In addition to the aesthetic benefits of a less cluttered shoreline, fewer docks would allow for better navigation in coves and along the shoreline, better public safety, and greater public access to the shoreline (Table 4-11). The policy to limit the number of docks on the lake would also be less controversial among lake residents, lake users, and environmental organizations than continuing to implement the current dock permitting policy.

The Preferred Alternative is a response by the Corps to the significantly changed environment around Lake Lanier. Explosive growth has occurred in the Greater Metropolitan Atlanta region, and Lake Lanier managers see a need to improve the management of the lake to respond to this growth and the pressure it creates on the lake's resources. The Preferred Alternative includes improvements to the Corps's O&M program that would protect vegetative communities and wildlife habitats along the lake's shoreline, reduce the amount of Styrofoam and boat dock debris on the shoreline, decrease shoreline erosion, and maintain and enhance island habitats for wildlife and recreational enjoyment. Project staff would modernize the heavily used recreational facilities on the lake and create additional recreational facilities to redistribute boating and recreational pressure from the southern part of the lake to the northern part. This redistribution could reduce boating density and crowding at recreational facilities in the southern portion of the lake.

Table 4-12.
Alternatives Impacts Comparison Analysis

Resource Areas	No Action Alternative		Preferred Alternative	
	Direct Effects	Indirect Effects	Direct Effects	Indirect Effects
Lake Lanier Water Resources		○		○
Land Use, Land Cover, & Land Use Controls	⊖	⊖	⊖	⊖
Infrastructure		⊖		⊖
Socioeconomics	⊖	⊖	⊖	⊖
Visual and Aesthetic Resources	⊖		⊕	
Recreation & Recreational Facilities	⊖	⊕	⊕	
Geology & Soils		⊖		⊖
Ecological Systems	⊖	⊖	⊖	⊕
Cultural Resources	⊖	⊖	⊖	⊖
Air Quality		⊖		⊖
Hazardous and Toxic Substances & Pollution		⊖		⊕
Noise		⊖	⊕	⊕

Impacts Legend

-  Long-term Effect
-  Minor to Negligible Effect
-  Beneficial Effect
-  Short-term Effect
-  Major to Moderate Effect
-  Adverse Effect
-  Significant Effect

Examples:

-  Long-term negligible/minor adverse effects
-  Short- and long-term major/moderate adverse effects
-  Short- and long-term moderate/major adverse & long-term significant beneficial effects
-  No effects

The impacts on infrastructure, air quality, cultural resources, noise, and hazardous and toxic pollution under the Preferred Alternative would be minimal. Table 4-12 summarizes the environmental and socioeconomic consequences of the Preferred Alternative for each resource area.

4.3 CUMULATIVE EFFECTS

CEQ regulations define a cumulative impact as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions.”

Two actions pose potential for creation of cumulative effects, that is, environmental or socioeconomic effects when considered in combination with those considered in this EIS due to Corps operation and maintenance activities that will be conducted at Lake Lanier. They are imposition of a water allocation formula within the Apalachicola-Chattahoochee-Flint (ACF) River Basin that could affect water levels at Lake Lanier on a permanent basis and continuing development near the lake and within the larger watershed draining to the lake.

Water Allocation. The ACF River Basin Commission is developing a water allocation formula to provide an equitable sharing of basin water among the three states of Alabama, Florida, and Georgia (USACE, Mobile District, 1998). This action could require that Lake Lanier be permanently maintained at one of three elevation levels: high, medium, or low. The high lake level scenario would maintain the lake level between 1,067 feet msl and 1,071 feet msl, which is the same as under the alternatives analyzed in the EIS. This scenario would pose no cumulative effects. A decision to maintain the lake at a medium lake level of between 1,057 and 1,066 feet msl or a low lake level of between 1,043 and 1,056 feet msl, however, could cause cumulative effects. The lower lake levels would result in a reduction in shoreline length, would affect dock placements and densities and result in issuance of fewer dock permits, and would create increased acreages among the four classifications of shoreline at the lake. Some recreational areas could be closed due to a lower lake level, or access to the lake could be limited at some locations, and the aesthetics of the lake would be changed.

Development. Development is expected to continue on private lands immediately adjacent to the lake and within watershed areas above the lake’s immediate environs. Development would occur primarily in the form of new residential and commercial construction, which would be

accompanied by additional roads and other infrastructure elements. The increased population that would accompany growth and development would place greater demands on lake resources and potentially lead to further development of facilities at the lake. Air pollution, noise, congestion on roads, and other effects that normally accompany growth would be anticipated.

In combination with the actions evaluated in this EIS, the two above actions could create cumulative effects to Lake Lanier's water quality. The overall watershed loadings to the lake dominate the Lake Lanier system and provide the bulk of the loadings to the lake. Development would have the most direct influence in creating adverse effects to water quality due to increases in concentrations of total phosphorus and total nitrogen, and a decrease in dissolved oxygen. Average annual total phosphorus loading from the total watershed would increase by approximately 33 percent, with the majority of the load originating in the upper watershed of the Chattahoochee River. The average annual total nitrogen loading from the total watershed would increase by approximately 26 percent. A lower lake level under a water allocation formula decision would cause the dissolved oxygen concentrations to drop, though the greatest change would occur in the bottom layer of the lake where anoxic conditions prevail. Neither alternative evaluated in this EIS would affect this outcome because of the overriding influence that runoff from the watershed has on the lake's water quality.

An ACF River Basin allocation decision reducing lake levels at Lake Lanier and continued residential development would compound effects to recreation and recreational facilities. In a medium or low lake level scenario there would be fewer boat docks. A lower lake level, however, would decrease the surface area of the lake and therefore exacerbate the effect of the amount of boating activity on the lake due to the concentration of boating activity on a smaller surface area. Implementation of the Preferred Alternative would reduced these effects, however, because there would be fewer boat docks allowed to be installed and boating activity would be distributed more evenly across the lake.

4.4 MITIGATION SUMMARY

The Corps will take necessary measures to mitigate any significant adverse effects that might occur from implementation of the alternative that is selected. Only one significant adverse effect has been found to be expected from implementation of one of the alternatives: A significant, long-term, direct adverse effect on the aesthetics of the lake under the No Action Alternative. To mitigate the adverse aesthetic effects of a shoreline densely populated with private boat docks, the

Corps would adhere strictly to the dock installation and spacing requirements, continue to issue citations to owners of poorly maintained and dilapidated docks, and encourage or require the use of earth-tone or green-colored materials to help docks blend with the background.

4.5 UNAVOIDABLE ADVERSE EFFECTS

Both of the alternatives evaluated in the EIS would result in some adverse environmental effects beyond that which could be reduced through mitigation. The principal unavoidable adverse effects on the environment are summarized below.

Visual and Aesthetic Resources. Some loss of scenic attractiveness and scenic integrity would be associated with the implementation of either the No Action Alternative or the Preferred Alternative. Implementing the No Action Alternative, under which 16,734 new boat docks could be permitted, would have significantly more visual and aesthetic impact than implementing the Preferred Alternative, under which only 2,022 new boat docks could be permitted.

Recreation. The potential density of boats on the lake—which is related to the number of private and community docks, marina slips, and boat launch ramps on the lake—would be expected to increase under either of the alternatives considered in the EIS. Conflicts between boaters, navigation difficulties associated with additional docks, and boating accidents would all be expected to increase in the future. Water-related accidents and fatalities on Lake Lanier, however, have actually decreased over the past 15 years even as the number of watercraft has increased.

4.6 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS OF RESOURCES

Irreversible and irretreivable resource commitments are related to the use of nonrenewable resources and the effects that use of these resources would have on future generations. Irreversible effects primarily result from use or destruction of a specific resource (e.g., energy and minerals) that cannot be replaced within a reasonable time frame. Irretreivable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of a proposed action (e.g., extinction of a threatened or endangered species).

No irreversible commitments of resources would be expected to result directly from implementing either of the alternatives evaluated in this EIS. Land and natural resources (flora, fauna, water) within the area addressed by the alternatives would be managed with sound

stewardship, minimal damage, and a long-term goal of sustainability and the avoidance of irreversibility. A direct action governed by the alternatives, shoreline use permitting, would result in changes to the aesthetics of the lake environment. Once private boat docks are permitted and installed along the shoreline, it is practical to assume that they will remain installed indefinitely even with changes in ownership of adjoining private property. This loss of aesthetic value, therefore, would be irretrievable. The loss would be most evident under the No Action Alternative with the potential permitting of an additional 16,734 private docks.

4.7 *SHORT-TERM USES OF THE ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY*

Significant conflicts between short-term use and long-term sustainability of the lake environment are not foreseen under the Preferred Alternative. Under the No Action Alternative, shoreline permitting policies would result in extensive shoreline development and enhanced development activities in the watershed that in turn are likely to result in increased sediment loadings to the lake. Although the sediment loadings have the potential to be significant in their immediate vicinity, there would be no significant effect on the overall system. These short-term disturbances in the watershed during construction activities, however, could result in long-term localized accumulations of sediments, which might adversely affect benthic aquatic life. Under the No Action Alternative, nutrient loadings would have only a minor impact on the overall system. Because most of the nutrient loadings come from the upstream watersheds, significant alteration would have to occur in the watersheds in the immediate vicinity of the lake to have more than minor effects on the loadings to the system. The increases in nutrient loadings resulting from Corps activities are not likely to result in long-term adverse effects on the aquatic ecological productivity of the lake.

In the long term, vegetation management and clearing along the shoreline, as well as in the watershed, might result in minor adverse effects on biological productivity for terrestrial systems for each alternative. Clearing vegetative cover would reduce foraging and breeding habitat for species of wildlife, such as neotropical migrant birds, bats, and white-tailed deer. Reducing this habitat would place further strain on species, such as the white-tailed deer, that are currently exceed normal carrying capacity in certain locations.

For visual and aesthetic resources, conflicts between short-term use of the environment and long-term sustainability are not likely with the Preferred Alternative. Because boat docks could, at

least in theory, be removed, neither alternative forecloses future options for use of the lake's shoreline. It would be unlikely, however, that shoreline areas would revert back to their predevelopment condition once they were rezoned as LDA and development occurred.