

**Private Boat Dock
Carrying Capacity Study**
for
Lake Sidney Lanier, Georgia

Prepared for

US Army Corps of Engineers
Mobile District
Mobile, Alabama

and

Lake Lanier Project Office
Buford, Georgia

by

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Contents

Introduction.....	1
Background Information.....	1
Lake Lanier.....	1
Lake Lanier Shoreline.....	3
Shoreline Zones.....	3
Shoreline Length.....	5
Physical Factors Related to Private Boat Dock Placement.....	5
Adjacent Landowner Property.....	6
Docks in the LDA.....	6
Dock Length and Width.....	7
Length of Floating Ramps and Walkways.....	7
Placement of Anchoring Cables.....	7
Lake Level.....	7
Cove Width.....	7
Slope and Water Depth.....	8
Approach for Background Data Analysis.....	8
Determining Shoreline Length.....	8
Determining LDA Locations and Lengths.....	9
Determining Existing Dock Locations.....	9
Determining the Number of Private Boat Docks in Each LDA.....	11
Determining Development Level in Each LDA.....	12
Results of the Background Data Analysis.....	13
Shoreline Length.....	13
LDA Locations and Lengths.....	13
The Dock Permitting Scenarios.....	14
Scenario 1: Existing Conditions 50-foot Distance Required Between Docks.....	15
Scenario 2: Average Cable Anchor Spacing, 50 Percent Dock Installation Density, Excess Docks in Saturated LDAs Deducted.....	16
Scenario 3: 50-foot Distance Required Between Docks and 50 Percent Dock Installation Density.....	17
Scenario 4: Average Cable Anchor Spacing and 50 Percent Dock Installation Density.....	17
Scenario 5: 100-foot Distance Required Between Docks and 50 Percent Dock Installation Density.....	17
Scenario 6: 82 Feet of Frontage to Corps Property Required to Obtain a Permit.....	18
Scenario 7: 100-foot Distance Required Between Docks.....	19
Scenario 8: Dock Spacing as Prescribed in 1988 SMP, Average Cable Anchor Spacing, and 50 Percent Dock Installation Density.....	20
Scenario 9: SMP Maximum Spacing and 50 Percent Dock Installation Density.....	20
Results of the Dock Permitting Scenarios.....	21
LDA Development Level.....	21
Additional and Total Docks Under the Dock Permitting Scenarios.....	21
Other Factors That Could Affect Dock Permitting.....	21
Soils.....	23
Cove Width.....	24
Sensitive Shoreline Vegetation.....	26
Sensitive Habitats.....	27
Endangered and Threatened Species.....	27
Cultural and Historic Resources.....	28
Visual and Aesthetic Resources.....	28
Summary.....	32
Acronyms and Abbreviations.....	33

References..... 35
APPENDIX A: Excerpts from 1988 Shoreline Management Plan and Engineer Regulation
1130-2-406..... 37
APPENDIX B: LDA Data 38

TABLES

Table 1. Spatial and Linear Shoreline Allocation..... 14
Table 2. Saturated and Unsaturated LDAs Under Dock Permitting Scenarios..... 21
Table 3. Summary of Private Boat Dock Permitting Scenarios..... 22
Table 4. Percent of LDA Shoreline Within Ranges of Slope. 24
Table 5. Scenic Attractiveness Class Definitions. 29
Table 6. Scenic Integrity Definitions. 31
Table 7. Visual Ratings of Photographs With Views of Boat Docks. 31

FIGURES

Figure 1. Lake Lanier location map..... 2
Figure 2. Shoreline allocation..... 4
Figure 3. Distribution of Lake Lanier Shoreline by Shoreline Use. 6
Figure 4. Sample LDA..... 10
Figure 5. Slopes along LDA shoreline..... 25
Figure 6. Relationship between slope of adjacent land and cove width to provide sufficient water depth
for dock permitting. 26
Figure 7. Existing dock viewsheds. 30

1 **Introduction**

2
3 This *Boat Dock Carrying Capacity Study* was prepared by Tetra Tech, Inc. of Fairfax, Virginia under
4 contract to the US Army Corps of Engineers, Mobile District. The study focuses on one aspect of the
5 future management of Lake Sidney Lanier: The number of private boat docks that could be located along
6 the lake’s shoreline at some time in the future when all shoreline areas where boat docks may be
7 permitted are at full capacity for boat dock development. This study, therefore, estimates the maximum
8 number of private boat docks that could be on the lake. That maximum number is estimated under nine
9 different scenarios, which differ primarily in how the private boat docks are spaced along the shoreline:
10 Wider spacing results in a smaller maximum number of docks.

11
12 This study was conducted to examine the relationship between potential private boat dock permitting
13 guidelines at the lake and future shoreline dock density. The study was done in conjunction with
14 updating the Lake Lanier Shoreline Management Plan (SMP). The SMP was last updated in 1988 and an
15 environmental impact statement for the operation and maintenance of the lake, which included an analysis
16 of potential changes to the SMP, was being prepared at the same time that this report was being written.

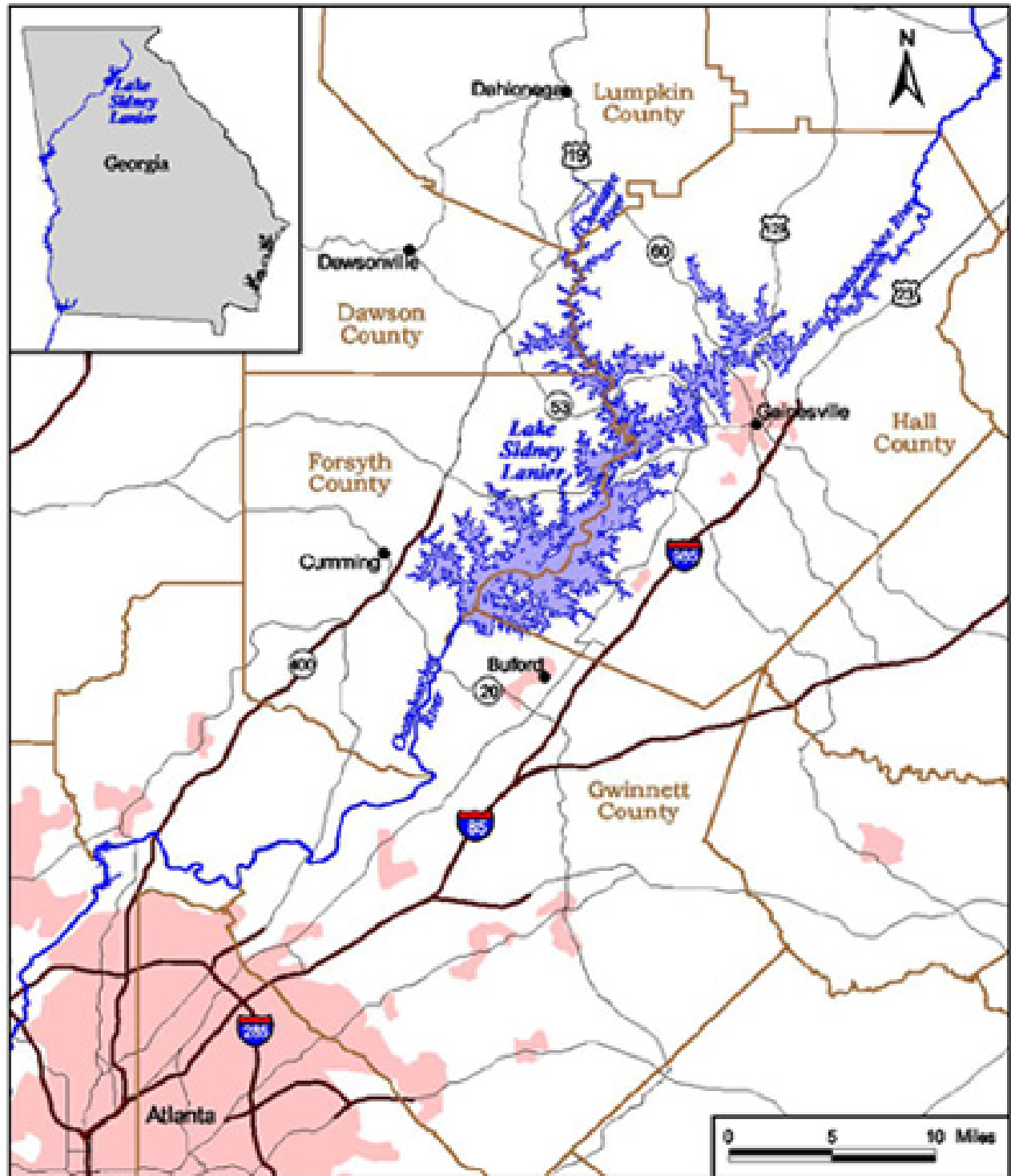
17
18 The study was conducted to:

- 19 • Examine data related to the number and location of boat docks on Lake Lanier.
- 20 • Determine potential future numbers of private docks based on different dock permitting
- 21 scenarios.
- 22 • Determine the effects of environmental factors at the lake on dock installation density.

23
24 **Background Information**

25
26 *Lake Lanier*

27
28 Lake Lanier is a US Army Corps of Engineers Project in the Chattahoochee and Chestatee River Basins
29 of northern Georgia (Figure 1). The Buford Dam forms the multiple-purpose project. Impoundment of
30 the lake was completed in 1957. The lake collects drainage from 1,045 square miles on the southern
31 slopes of the Blue Ridge Mountains. Lake Lanier has 39,038 acres of surface water, 752 miles of total
32 shoreline (mainland and islands), and 17,745 acres of land above the full power pool elevation of 1,071
33 feet above mean sea level (msl). Authorized purposes of the lake include hydroelectric power production,
34 flood control, water quality protection, water supply, fish and wildlife preservation, navigation, and
35 recreation.



- LEGEND**
- Highway
 - Primary Road
 - County Boundary
 - River/Water

Project Location

Figure 1

1 Lake Lanier is north of Atlanta, Georgia, and has been greatly affected by the rapid growth of the Atlanta
2 metropolitan area. The lake's aesthetic and recreational appeal make it one of the most highly used Corps
3 lakes in the country. In addition, only a slim border of government-owned land surrounds the lake, so
4 area residents can live very near the lake in quite attractive settings. Residential development continues
5 in areas surrounding the lake. The development brings more and more landowners with private property
6 adjacent to government property surrounding the lake and who want to install private boat docks along
7 the shoreline.

8
9 As of 2002, Lake Lanier had 8,348 private docks and 11 community docks on its shoreline. Forty-seven
10 percent of Lake Lanier's shoreline is designated as *Limited Development Area*, or LDA, where private
11 and community docks and other private floating facilities may be permitted. Using the current situation
12 as a starting point, each of the permitting scenarios presented later in this report uses a different set of
13 dock spacing criteria to estimate the number of additional docks that could be accommodated on the lake.

14 ***Lake Lanier Shoreline***

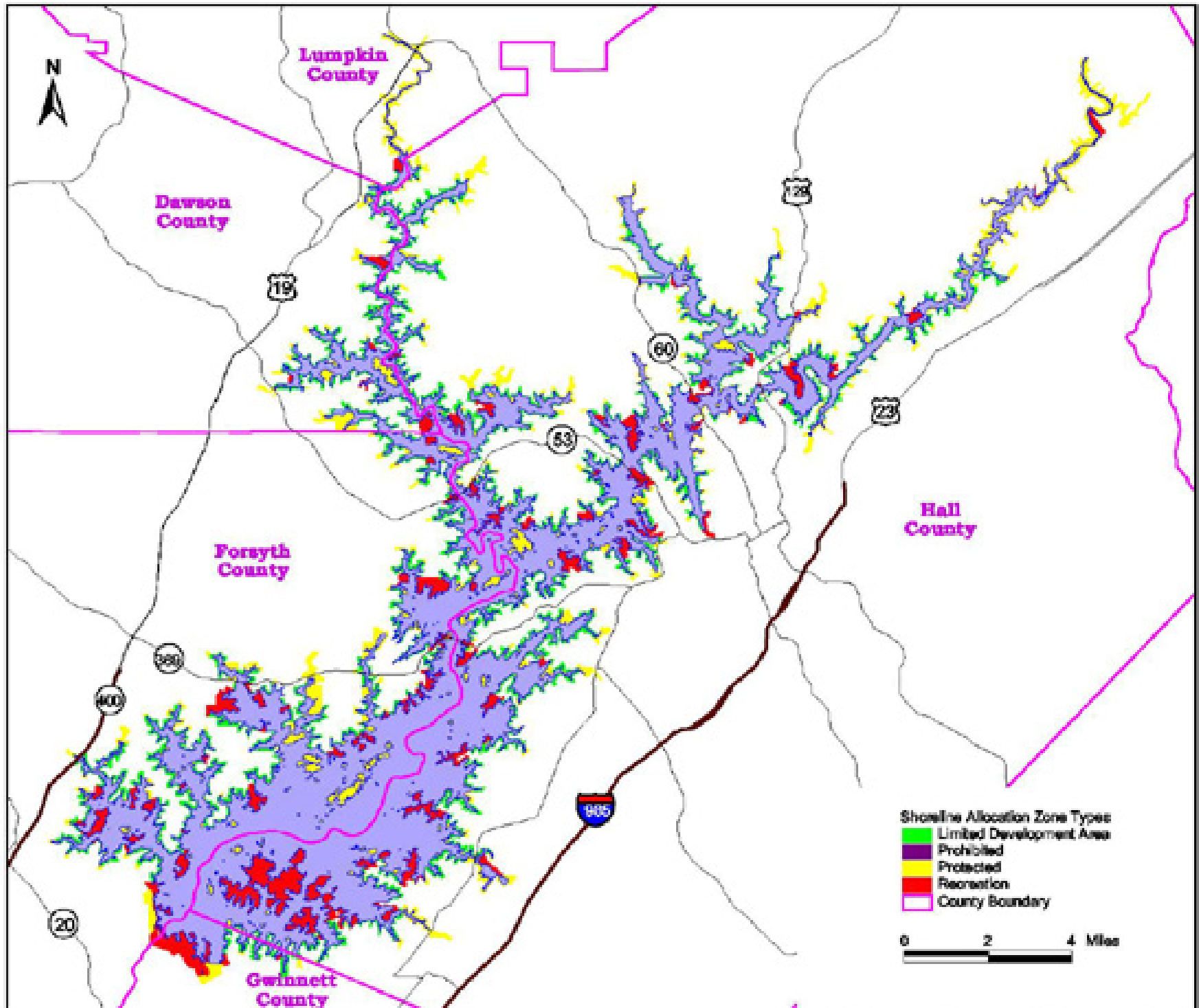
15
16
17 The number of private boat docks on Lake Lanier has been increasing in tandem with the growth of the
18 metropolitan Atlanta region. By 1974 the Corps had issued permits for some 2,500 private docks. The
19 number of dock permits had increased to approximately 6,500 by the time the SMP was last updated in
20 1988. The number of private docks had increased to 8,200 by 2000, and as of the date of this report the
21 number stood at 8,348. An additional 11 community docks are also permitted on the lake. Based on the
22 9-year period between 1992 and 2000, an average of 175 new Shoreline Use Permits for docks are issued
23 each year.

24 ***Shoreline Zones***

25
26
27 The Lake Lanier shoreline is divided into four classifications: Prohibited Access Areas, Protected
28 Shoreline Areas, Public Recreation Areas, and Limited Development Areas (Figure 2).

29
30 *Prohibited Access Areas* are designated to protect project operation areas (Buford Dam, powerhouse
31 intakes, saddle dikes, spillway, tailrace, and Corps marine yard) and the recreational visitor. Restricted
32 access is allowed at most Prohibited Access Areas, and lakeshore use permits are not issued for the areas.
33 Approximately 0.2 percent (1.74 miles) of the shoreline is classified as *Prohibited Access Area*, all of
34 which is on the mainland shoreline.

35
36 *Protected Shoreline Areas* are designated to preserve the scenic appeal of the lake; to avoid conflict
37 between private and public uses; to protect habitat for fish and wildlife; to protect cultural, historical, and
38



Shoreline Allocation

Figure 2

1 archaeological sites; to protect endangered species; to protect navigation channels; to restrict the
2 placement of floating facilities in areas that are too shallow or too exposed to winds and currents; and to
3 protect important natural formations and vistas. Of the 239.86 miles designated *Protected Shoreline*
4 *Area*, 180.58 miles (75.3 percent) are along the mainland shoreline, constituting 24 percent of that
5 shoreline. The other 59.28 miles (24.7 percent) are on lake islands.

6
7 *Public Recreation Areas* are set aside for intensive recreational development or use. Campgrounds; day
8 use parks; primitive or natural areas; lands leased to public groups and other local, state, or federal
9 agencies for recreational use or development; and marine services are located in Public Recreation Areas.
10 The lake's marinas and Lake Lanier Islands complex, for example, are in these shoreline areas. *Public*
11 *Recreation Areas* occur along the mainland shoreline only. Of the 156.61 miles designated *Public*
12 *Recreation Area*, 137.08 miles (87.5 percent) are along the mainland shoreline and occupy 18.2 percent of
13 that shoreline. The remaining 19.53 miles (12.5 percent) are on lake islands.

14
15 *Limited Development Areas* are areas where certain private facilities may be permitted on public lands.
16 Private boat docks are the most conspicuous facility type permitted in LDAs. Other facilities that may be
17 permitted include community boat docks, ski jumps, floats, duck blinds, and facilities associated with
18 private boat docks, including electric lines, water lines, steps or walkways, telephone lines, and pumps.
19 Facilities in LDAs are permitted for 5 years. All 353.83 *Limited Development Area* miles are along the
20 mainland shoreline, occupying 47 percent of that shoreline.

21 *Shoreline Length*

22
23
24 The length of the Lake Lanier shoreline, including all islands on the lake, has historically been considered
25 to be 540 miles long. This shoreline length was estimated before the widespread use of geographic
26 information systems (GIS) for the data analysis. Using the best data currently available and GIS
27 technology, the shoreline is now estimated to be 752 miles long.

28
29 The revised shoreline length (752 miles) and GIS technology were used to arrive at the revised total
30 lengths of shoreline in each shoreline classification provided above. Figure 3 illustrates the relative
31 abundance of each shoreline classification for both the mainland and islands.

32 33 ***Physical Factors Related to Private Boat Dock Placement***

34
35 Many physical factors come into play when the Corps decides where a private boat dock may be located.
36 These factors are discussed in this section.

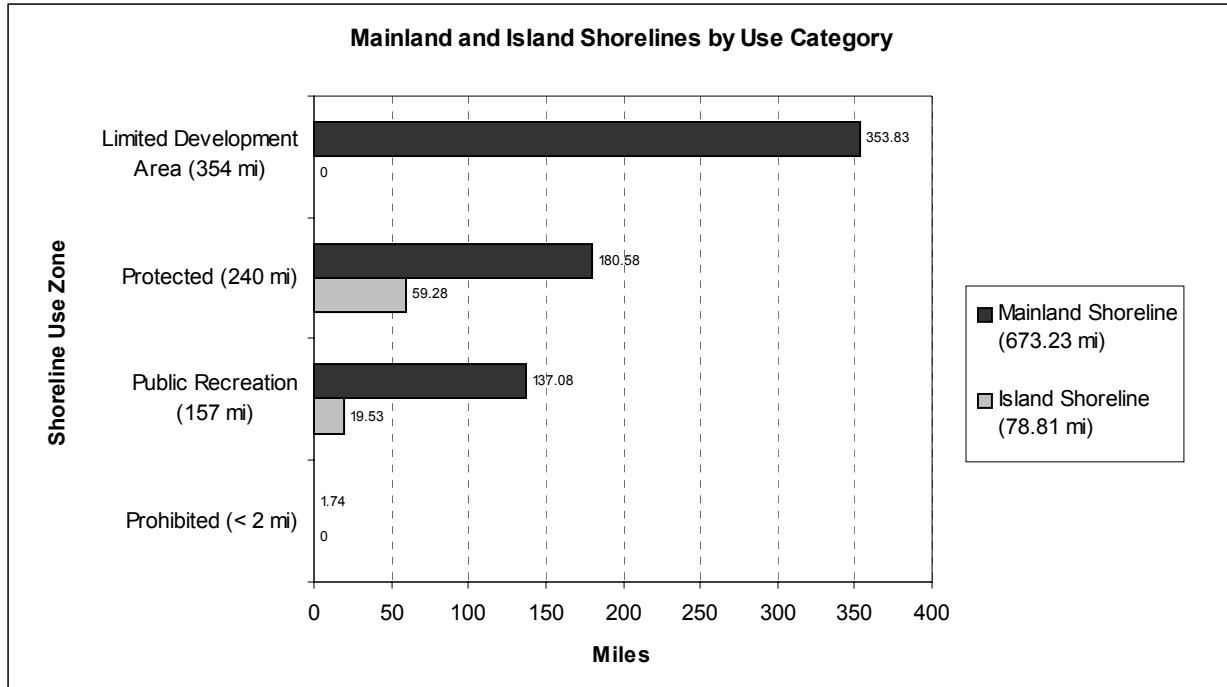


Figure 3. Distribution of Lake Lanier shoreline by shoreline use.

Adjacent Landowner Property

Only adjacent landowners (i.e., landowners who have unrestricted legal access through private property to public lands that are zoned *Limited Development*) are eligible for private boat dock permits. (See Section 12.5.1 of the 1988 SMP [Appendix A]). Docks must be located at the point of the shoreline nearest to the adjacent landowner’s property, though deviations of 100 feet to either side of this point are allowed if water depth or dock spacing is an issue. (See Section 12.5.2 of the 1988 SMP [Appendix A].)

Docks in the LDA

Dock location is configured at the full conservation pool level of the lake, which is 1,071 feet msl. Under the 1988 SMP, docks must be no closer than 50 feet from each other at that level. current docks in a LDA, therefore, restrict the placement of additional docks. (See Section 12.5.2 of the 1988 SMP [Appendix A].) For instance, an existing dock might be too close to the end of a LDA (i.e., closer than 74 feet¹) to allow another dock to be placed in the available space, or two existing docks might be too close together (i.e., less than 124 feet apart¹) to allow placement of a third dock between them.

¹ 74 feet, not 50 feet, is used because docks may be placed no closer than 50 feet from each other, dock edge-to-dock edge. 74 feet would be necessary to achieve this distance for a 24-foot wide dock. 124 feet is used for the minimum spacing of two existing docks to account for the 24-foot wide dock and 50 feet to each side of the dock.

1 *Dock Length and Width*

2
3 The maximum external dimensions of a dock are 32 feet by 32 feet (1,024 square feet), and the maximum
4 size of an attached platform or deck may not exceed 192 square feet. (See Section 12.5.3.1 of the 1988
5 SMP [Appendix A].)

6
7 *Length of Floating Ramps and Walkways*

8
9 A floating ramp leading to a dock may not exceed 40 feet in length, and a land-based fixed-section
10 walkway or steps used in conjunction with the ramp may not exceed 10 feet in length. The land-based
11 portion is considered part of the ramp, and therefore the 40-foot limit applies to the combined length of
12 the land-based and floating portions of a ramp. (See Section 12.5.3.4 of the 1988 SMP [Appendix A].)
13 Together, a walkway, ramp, and dock cannot exceed 72 feet in length, which is the combined maximum
14 length of a walkway and ramp (40 feet) and a dock (32 feet).

15
16 *Placement of Anchoring Cables*

17
18 Cables used to anchor a dock to the shoreline must securely anchor the dock to the shoreline, and they
19 should be placed at a 45-degree angle to the dock itself. (See Section 12.5.3.9 of the 1988 SMP
20 [Appendix A].) Anchor cables must not obstruct the public's use of the shoreline or water surface. In
21 addition, the cables of neighboring docks should not cross each other. (See Section 12.5.3.9 of the 1988
22 SMP [Appendix A].)

23
24 *Lake Level*

25
26 As noted previously, dock location is configured at the full conservation pool level of the lake, 1,071 feet
27 msl. At lake levels marginally below or above this level, the placement of a dock at 1,071 feet msl is
28 approximated. Dock permitting may be suspended when the lake falls to a level where accurate
29 judgments of site requirements cannot be made. The lake level at which dock permitting is suspended is
30 1,063 feet msl. Permitting remains suspended until the lake rises to or above 1,063 feet msl.

31
32 *Cove Width*

33
34 Docks are not to be placed in the water such that they extend into the center third of a cove because that
35 area must remain open for navigation. (See Section 12.5.2 of the 1988 SMP [Appendix A].) This
36 restriction is especially important for dock placement in shallow or narrow coves. See the discussion
37 below under *Slope and Water Depth*.

Slope and Water Depth

The slope of the surrounding land is not in itself a factor that often limits dock placement because the shoreline surrounding Lake Lanier is mostly gentle (less than a 50 percent slope; for example, a 10-foot vertical rise over a 20-foot horizontal length of land). However, the slope of the lake bottom can limit dock placement because the 1988 SMP requires that there be at least 5 feet of water below the edge of the dock farthest from the shoreline. (See Section 12.5.2 of the 1988 SMP [Appendix A].) Very gently sloped areas might not provide sufficient depth of water (5 feet) within 72 feet of the shoreline (the maximum combined length of a dock and approach ramp/walkway) (see *Length of Floating Ramps and Walkways* above) or within the third of the cove (see *Cove Width* above) adjacent to the shoreline.

Approach for Background Data Analysis

Determining Shoreline Length

The length of boundary frontage between Corps property and private property (i.e., the property line between government and private property around the lake) and the length of the shoreline within LDAs were used as the primary factors to determine how many additional private docks could ultimately be permitted on the lake. The boundary frontage length is important because a private property owner must have unrestricted access to government property in order to receive a dock permit (ER 1130-2-406, Section 4(f)). The length of the lake's shoreline within LDAs is important because a minimum distance of 50 feet between private docks is required by the 1988 SMP, though a different distance might be specified if the SMP is revised. ER 1130-2-406 also specifies that floating facilities occupy at most 50 percent of the LDA in which they are located, based on the linear feet of shoreline in the LDA. (See ER 1130-2-406, Section 10 [Appendix A].) The location and length of the Corps property boundary line, the lake's total shoreline length, and the shoreline length within LDAs were determined using GIS information obtained from the Corps.

A high-resolution digital image of the frontage boundary line of Corps property surrounding Lake Lanier and a high-resolution digital image of the lake's shoreline at 1,071 feet msl were used to determine the shoreline length. The two images were combined to create a digital image of the Corps property surrounding the lake and on islands at the full conservation pool level (i.e., 1,071 feet msl). The Corps property then was subdivided by shoreline allocation zone using the *Lake Sidney Lanier Shoreline Use Allocations Atlas* as a guide. The result of this effort was a geographic information system (GIS) data layer that provides information on shoreline use classification for each shoreline zone area

Determining LDA Locations and Lengths

The geographic limits of each LDA were required to determine the lengths of the individual LDAs. The LDA lengths, in turn, were necessary to determine the potential number of boat docks that could be permitted in each LDA. Current shoreline allocation maps in combination with the information developed on the total length of the lake's shoreline were used to determine the limits and lengths of all individual LDAs. Using GIS, the outlines of the LDAs were overlaid on an outline of Corps property around the lake to determine the length of each LDA as accurately as possible.

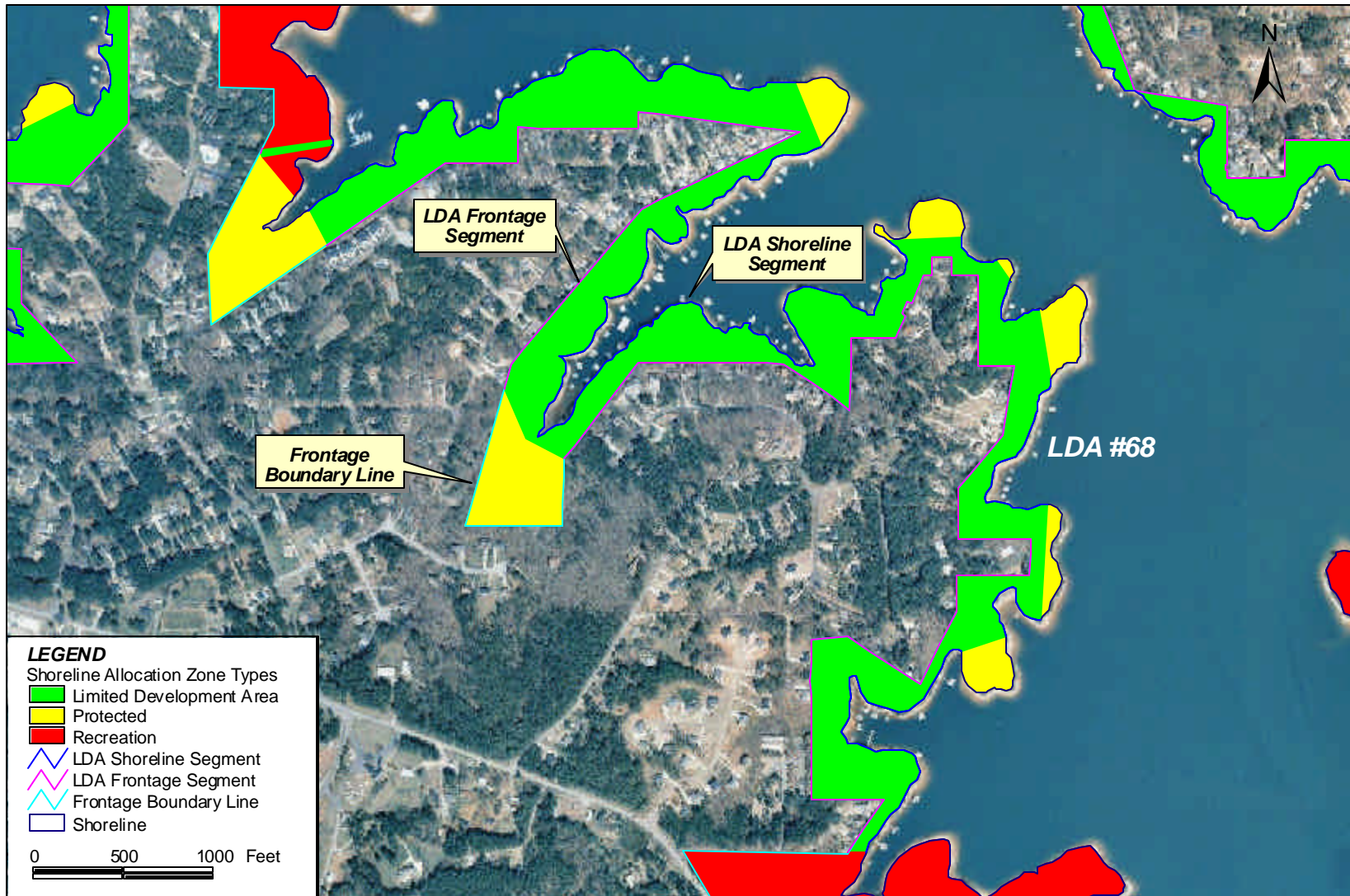
Two sets of limits for each LDA were necessary for the analysis. First, the boundary frontage limits of each LDA were necessary (Figure 4). The boundary limits are the start and end points of the government property line of a LDA and the locations of points where the property line changes direction. With these points the total boundary frontage length of each LDA was determined. Second, the length of each LDA along the shoreline at 1,071 feet msl was needed. Determining this length was slightly more complicated because many LDAs are dissected along their shorelines by segments of shoreline designated as *Protected Shoreline Area* (Figure 4). The total shoreline length of a LDA was determined by summing the lengths of the individual LDA shoreline segments associated with the entire boundary frontage LDA. There are 435 LDAs as determined by boundary frontage (Appendix B), and within those LDAs there are 619 LDA shoreline segments.²

Because of variations in the configurations of the boundary frontages of LDAs and the associated shorelines, the shoreline length of a LDA might be longer or shorter than the same LDA's boundary frontage length.

Determining Existing Dock Locations

Knowledge of the locations and number of boat docks in each LDA at the time of this report (2002) was necessary to determine the potential level of development for each LDA. The Corps identifies the location of private boat docks by giving each dock a shoreline location code. The location codes are assigned to docks according to their distance along the shoreline from the Buford dam moving in a clockwise direction from the dam around the lake (i.e., moving north from the dam and continuing around the lake through Forsyth, Dawson, Lumpkin, Hall, and Gwinnett counties, in that order) (Figure 2). The dock location codes, however, are not accurate enough to determine the precise location of each dock or

² Unless otherwise noted, use of the acronym "LDA" throughout the rest of this report refers to LDAs as determined by boundary frontage.



Sample LDA

Figure 4

1 the distances between docks because the measurements used to assign the location codes were based on
2 an erroneous shoreline length. The codes, however, proved valuable for identifying the LDA in which
3 each dock is located.

4
5 Aerial photography imagery from 1999 was used in conjunction with the Lake Lanier dock permit
6 database, which contains the location codes referred to above, to develop a GIS coverage of the locations
7 of the 8,348 private boat docks and 11 community docks on Lake Lanier. Once a dock on the aerial
8 image was matched to the dock's shoreline location code in the Corps permit database, the dock was
9 digitized. The actual point for the dock was digitized as the center of the boathouse on the edge of the
10 dock closest to the shoreline. In many cases, docks were so close together, forming "clusters," that it was
11 impossible to identify precisely which dock on the image matched with each record in the permit
12 database. This was solved by observing the dock clusters and the gaps (the dock-less areas that separated
13 the clusters) in the database and finding corresponding clusters and gaps on the aerial photos. This
14 approach minimized the error of points digitized from the image not matching the information in the
15 database.

16
17 The Corps dock permit database contains 254 docks that were installed after March 1999 (the date of the
18 aerial photographs), so the photographs do not show these docks. The locations of these 254 docks were
19 estimated using their shoreline location codes in the database in conjunction with the codes of the docks
20 in the database nearest to them (determined based on the location codes).

21
22 Community docks and the number of overnight slips they contain were also incorporated into the GIS
23 database. A final GIS database of the 8,348 private dock locations and 11 community dock
24 locations—the same number as that in the permit database—was realized.

25 ***Determining the Number of Private Boat Docks in Each LDA***

26
27
28 The number of boat docks in each LDA was determined by projecting the digitized dock locations in the
29 GIS to the nearest location on the shoreline and coordinating this information with the previously
30 determined boundaries of each LDA shoreline segment. Some projected locations of docks fell outside
31 shorelines designated LDA. In these instances, the LDA shoreline segment nearest to the dock in
32 question was determined and the dock was assigned to the corresponding LDA. The number of digitized
33 points assigned to a LDA was used as the number of private docks along the LDA.

34
35 For the purposes of this analysis, it was desirable somehow to equate the community docks to private
36 docks, and the method chosen was based on slips. The 11 community docks on the lake have a total of
37 488 slips. Assuming that two slips in a community dock equates to one private boat dock, and taking into

1 account the distribution of the slips on the lake, the number of slips in community docks equates to 245
 2 private boat docks. Thus, for the analyses in this study of the number of total and additional docks that
 3 the lake could accommodate, a total of 8,593 (8,348 + 245) private boat docks was used as the current
 4 number of private docks on the lake.

5 ***Determining Development Level in Each LDA***

6
 7
 8 Knowing the number of private boat docks along a LDA allowed a determination of whether a LDA is
 9 saturated with boat docks. A “saturated” LDA is one that would accommodate no additional docks under
 10 a particular scenario. An “unsaturated” LDA would, of course, accommodate additional docks. All but
 11 one of the dock permitting scenarios considered (the scenarios are described below) used LDA shoreline
 12 length rather than LDA boundary frontage length to determine whether additional docks could be placed
 13 in a LDA. Because the shoreline lengths and boundary frontage lengths of LDAs are not equal and the
 14 scenarios differ in how docks are spaced, whether a LDA is saturated or unsaturated can differ from
 15 scenario to scenario.³

16
 17 Few LDAs are saturated with docks under the current dock permitting policy. That is, when the
 18 minimum 50-foot buffer distance between docks (per Section 12.5.2 of the SMP [Appendix A]) is applied
 19 to existing docks and a 24-foot wide dock is assumed, few LDAs are shorter than the number of existing
 20 docks multiplied by 74 feet—the sum of the width of a dock and its associated dock-to-dock buffer.
 21 Thus, when calculating the amount of LDA shoreline currently occupied by docks, the result was rarely
 22 larger than the LDA shoreline length. To illustrate this, consider a LDA that has 400 feet of shoreline and
 23 six docks. Under the current dock permitting policy (Scenario 1, see below), the six docks were
 24 calculated to occupy 444 feet (6 docks x 74 feet per dock), or an amount of shoreline greater than the
 25 length of the LDA shoreline. This LDA would be considered saturated with docks under Scenario 1.
 26 Under other dock permitting scenarios, up to 100 or more LDAs would be considered saturated with
 27 docks.

28
 29 An excess number of docks in LDAs was dealt with in one of two ways under a scenario: (1) The LDAs
 30 were considered saturated but the excess docks in saturated LDAs were ignored in all further calculations,
 31 or (2) the LDAs were considered saturated and the number of excess docks in saturated LDAs was
 32 subtracted from the number of additional docks the lake could accommodate. This approach followed

³ Example: An LDA 500 feet long with 5 docks would have an occupied shoreline length of 370 feet with a dock permitting scenario of 50 feet between docks and assuming that docks are 24 feet wide ($5 \times [50 + 24] = 370$). Under this scenario the LDA would be unsaturated and would be able to accommodate an additional dock. Under a dock permitting scenario of 100 feet between docks and still assuming 24-foot wide docks, the existing 5 docks would occupy a total LDA shoreline length of 620 feet ($5 \times [100 + 24] = 620$), or more than the total length of the LDA. Under this scenario the same LDA would be saturated.

1 from the requirement of Section 10 of ER 1130-2-406 that in LDAs where the 50 percent density of
2 development criterion is exceeded, docks should be removed by attrition until the 50 percent density is
3 attained (Appendix A). Scenario 2 is the only one in which excess docks were dealt with in the second
4 manner.

5 6 **Results of the Background Data Analysis**

7 *Shoreline Length*

8
9 Using the best data currently available and GIS technology, the estimate of the lake's shoreline length
10 was updated to 752 miles. This is significantly longer than the currently quoted length, 540 miles.

11
12 The 1988 Lake Lanier SMP states that approximately 46 percent of the lake's mainland shoreline, or 248
13 miles, is designated *Limited Development Area*. The estimate was based on a shoreline length of 540
14 miles and a lake surface area of 38,024 acres at 1,071 feet msl. That estimate of the lake's shoreline
15 length was found to be erroneous, however, and this affected the percent and miles of shoreline allocated
16 to each shoreline use classification. Table 1 presents the updated estimate of Lake Lanier's shoreline
17 length and the division of its shoreline among the four shoreline use classifications.
18

19
20 The distribution of shoreline use classifications was calculated linearly (shoreline miles) and spatially
21 (acreage). According to the calculations, there is a relatively even spatial (acreage) distribution of
22 shoreline classifications, with the exception of *Prohibited Access Areas* (Table 1). LDAs, however,
23 occupy relatively more shoreline miles per acre than other shoreline allocations. LDAs occupy 47 percent
24 of the total shoreline and 35 percent of Corps property (0.057 mile/acre). *Public Recreation Areas*, such
25 as day-use parks, campgrounds, and public boat ramp areas, occupy 20.8 percent of the shoreline and 30
26 percent of the property (0.029 mile/acre), and *Protected Areas* occupy 31.9 percent of the shoreline and
27 34.7 percent of the property (0.039 mile/acre). In general, then, LDAs are narrower than either *Public*
28 *Recreation Areas* or *Protected Areas*, and private property lies closer to the lake along LDAs than along
29 shoreline with other use classifications.

30 31 *LDA Locations and Lengths*

32
33 LDA identification numbers, the length of LDAs, and the number of existing docks in the LDAs are
34 provided in Appendix B.
35
36

1

Table 1. Spatial and Linear Shoreline Allocation.

Shoreline Allocation	Length (mi)	Percentage of Total Shoreline	Acres	Percentage of Corps Property
LDA (main shoreline)	344.70	45.8%		
LDA in water ¹	9.13	1.2%		
TOTAL LDA	353.83	47.0%	6,186.6	34.9 %
Protected, islands	59.28	7.9%		
Protected, main shoreline	177.44	23.6%		
Protected in water	3.14	0.4%		
TOTAL Protected	239.86	31.9%	6,163.6	34.7 %
Recreation (main shoreline)	156.34	20.8%		
Recreation in water	0.28	0.04%		
TOTAL Recreation	156.61	20.8%	5,329.5	30.0 %
TOTAL Prohibited	1.74	0.2%	64.9	0.4 %
TOTAL	752.05	100.0%	17,744.6	100.0 %

¹ "...in water" refers to areas where the Corps boundary runs into the water. It is assumed that the shoreline paralleling these segments is of the same classification as the adjacent shoreline segments.

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19

The Dock Permitting Scenarios

The maximum number of docks on Lake Lanier was evaluated under nine different dock permitting scenarios. Scenario 1 reflects existing conditions by using the currently-implemented dock permitting and locating guidelines to determine the number of docks that a LDA could accommodate in the future. Scenario 2 fully complies with the provisions of ER 1130-2-406. Other scenarios base the number of additional docks that the lake could accommodate on variations in the length of shoreline considered to be occupied by a boat dock, whether the 50 percent density of development criterion of ER 1130-2-406 was applied to existing and/or additional docks, and whether dock attrition (per ER 1130-2-406) was accounted for by deducting the number of excess docks in LDAs from the total number of docks that could be accommodated on the lake under the scenario. Unless otherwise noted, a dock width of 24 feet—the average width of docks on Lake Lanier—was used in the scenarios. Explanations of the nine scenarios are provided below.

1 *Scenario 1:*
 2 *Existing Conditions*
 3 *50-foot Distance Required Between Docks*
 4

Scenario Key Points	<ul style="list-style-type: none"> • Current shoreline use permitting policy. • 74 feet of LDA shoreline length deducted for each existing dock (24-ft-wide dock + 50-ft buffer = 74 ft). • Number of additional docks calculated as <i>unoccupied LDA shoreline length</i> ÷ 74. • Excess number of existing docks was ignored. The number of existing docks in excess of the number of docks LDAs should have (based on 74 feet per dock) was not deducted from the total number of additional docks the lake could accommodate in the future. • Does not comply with ER 1130-2-406.
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5 Under this dock permitting scenario, which is the permitting policy currently in place at Lake Lanier, the
 6 number of docks that a LDA could accommodate was determined based on a spacing of 50 feet between
 7 docks, from the nearest edge of one dock to the nearest edge of a neighboring dock. This spacing is
 8 required by Section 12.5.2 of the 1988 SMP. The length of shoreline considered to be occupied by a dock
 9 itself was 24 feet, because most docks on the lake are 24 feet wide. The amount of shoreline occupied by
 10 each existing dock in a LDA, therefore, was 74 feet (i.e., 50 feet between docks plus 24 feet for the width
 11 of a dock). The total length of the LDA shoreline minus the total length of shoreline occupied by existing
 12 docks in the LDA gave the length of LDA shoreline available for additional docks. Because 74 feet is
 13 attributed to each future dock as well, the available shoreline length was divided by 74 to arrive at the
 14 number of additional docks, if any, that the LDA could accommodate in the future. If the length of LDA
 15 shoreline occupied by existing docks was greater than the actual length of the LDA shoreline, the excess
 16 was ignored. That is, the number of existing docks in LDAs in excess of the maximum number of docks
 17 LDAs should have under this scenario was not subtracted from the number of additional docks that the
 18 lake could accommodate in the future.
 19

20 The total shoreline length of LDA, not the length of a LDA along the boundary frontage, was used to
 21 determine the number of future docks that could be located in a LDA. (See Figure 4 for an illustration of
 22 a LDA shoreline.) This was necessary because the scenario uses the distance between docks to determine
 23 the number of additional docks that a LDA could accommodate, and this distance must be measured
 24 along the shoreline, not along the private property boundary frontage of a LDA. (All scenarios except
 25 Scenario 6 use the length of LDA shoreline to determine the number of additional docks that could be
 26 accommodated.)
 27
 28

Scenario 1 does not comply with Section 10 of ER 1130-2-406 (Appendix A) because it does not incorporate the 50 percent density of development criterion nor does it account for dock attrition in saturated LDAs, as required by the regulation.

*Scenario 2:
Average Cable Anchor Spacing, 50 Percent Dock Installation Density,
Excess Docks in Saturated LDAs Deducted*

Scenario Key Points	<ul style="list-style-type: none"> • Uses average cable anchor-to-cable anchor distance of 88 feet. • 176 feet (88 ft. for moorage length + 88 ft. of unused shoreline) of LDA shoreline length deducted for each existing dock. • Number of additional docks calculated as <i>unoccupied LDA shoreline length ÷ 176</i>. • Excess number of existing docks was deducted from the total number of additional docks that would be allowed in the future. • Fully complies with ER 1130-2-406.
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Under Scenario 2, as in Scenario 1, LDA shoreline length was used to determine the number of docks a LDA could accommodate. Each existing dock was considered to occupy 88 feet of LDA shoreline, or the average cable anchor spacing—the distance between the two cable anchors that hold a dock in place (see explanation below). This distance was doubled to 176 feet to account for a 50 percent dock installation density along LDAs, as required by Section 10 of ER 1130-2-406 (see Appendix A). The number of existing docks in LDAs in excess of the maximum number of docks LDAs should have under this scenario was subtracted from the number of additional docks that the lake could accommodate in the future.

Average cable anchor spacing means that 88 feet was used as the average length of LDA shoreline occupied by a dock. The 88-foot average space between cable anchors is based on a series of measurements taken by Lake Lanier Project personnel. In autumn 2001, Project personnel measured the distance between the two points at which individual docks are anchored for 345 docks on Lake Lanier. The average of the 345 measurements was 88 feet between cable anchors.

Scenario 2 complies with Section 10 of ER 1130-2-406 (see Appendix A) because it incorporates the 50 percent density of development criterion and it accounts for dock attrition, as required by the regulation, by reducing the number of additional docks that the lake could accommodate in the future by the number of excess docks in saturated LDAs.

1 *Scenario 3:*
 2 *50-foot Distance Required Between Docks and 50 Percent Dock Installation Density*
 3

Scenario Key Points	<ul style="list-style-type: none"> • 148 feet (24-ft wide dock + 50-ft buffer [dock-to-dock] + 74 ft [to account for 50% LDA utilization]) of LDA shoreline length deducted for each existing dock. • Number of additional docks calculated as <i>occupied LDA shoreline length ÷ 148</i>. • Excess number of existing docks was ignored. • Does not fully comply with ER 1130-2-406.
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4
 5 This scenario duplicates Scenario 1, except that docks are installed at a density of 50 percent in LDAs, as
 6 required by ER 1130-2-406. A 24-foot wide dock with its 50-foot buffer was considered to occupy 74
 7 feet of LDA shoreline. The 50 percent dock installation density was accounted for by doubling this
 8 distance, or attributing 148 feet to each existing and additional dock. Excess docks in saturated LDAs
 9 were ignored, as in Scenario 1.

10
 11 Scenario 3 does not comply with Section 10 of ER 1130-2-406 (see Appendix A) because it does not
 12 account for dock attrition in saturated LDAs, as required by the regulation.

13
 14 *Scenario 4:*
 15 *Average Cable Anchor Spacing and 50 Percent Dock Installation Density*
 16

Scenario Key Points	<ul style="list-style-type: none"> • Uses average cable anchor-to-cable anchor distance of 88 feet. • 176 feet (88 ft. for moorage length + 88 ft. of unused shoreline) of LDA shoreline length deducted for each existing dock. • Number of additional docks calculated as <i>unoccupied LDA shoreline length ÷ 176</i>. • Excess number of existing docks was ignored. • Does not fully comply with ER 1130-2-406.
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17
 18 This scenario duplicates Scenario 2 except that, as in Scenario 1, excess docks in saturated LDAs were
 19 ignored. Because it does not account for dock attrition in saturated LDAs, as required by ER 1130-2-406,
 20 the scenario does not comply with the regulation.

21
 22 *Scenario 5:*
 23 *100-foot Distance Required Between Docks and 50 Percent Dock Installation Density*
 24

Scenario Key Points	<ul style="list-style-type: none"> • 248 feet (24-ft wide dock + 100-ft buffer [dock-to-dock] + 124 ft [to account for 50% LDA utilization]) of LDA shoreline length deducted for each existing dock. • Number of additional docks calculated as <i>unoccupied LDA shoreline length ÷ 248</i>. • Excess number of existing docks was ignored. • Does not fully comply with ER 1130-2-406.
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This scenario duplicates Scenario 3, except that the buffer distance required between docks was increased from 50 feet to 100 feet. The combined width of a dock (24 feet) and the 100-foot buffer was 124 feet, and application of the 50 percent density of development criterion meant that each existing and additional dock was considered to occupy 248 feet of LDA shoreline. Excess docks in saturated LDAs were ignored, as in Scenario 1. Because Scenario 5 does not account for dock attrition in saturated LDAs, as required by ER 1130-2-406, the scenario does not comply with the regulation.

*Scenario 6:
82 Feet of Frontage to Corps Property Required to Obtain a Permit*

Scenario Key Points	<ul style="list-style-type: none"> • LDA boundary frontage length used rather than LDA shoreline length. • 74 feet of boundary frontage deducted for each existing dock (24-ft wide dock width + 50-ft buffer distance). • 82 feet of boundary frontage (50-ft buffer + 32-ft wide dock [the maximum allowable dock width]) required to receive a dock permit. • Number of additional docks calculated as <i>unoccupied LDA boundary frontage length</i> ÷ 82. • Excess number of existing docks was ignored. • Does not fully comply with ER 1130-2-406.
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Under this future dock permitting scenario, only landowners who have 82 feet (50-foot buffer between docks + the maximum allowable dock width of 32 feet) or more of private property frontage with Corps property designated as *Limited Development Area* would be eligible to apply for a dock permit. (See Figure 4 for an illustration of a LDA frontage segment.) The purpose of the scenario would be to discourage the existing practice of developers of creating property boundaries that give adjacent landowners narrow slices of land abutting LDAs, sometimes as narrow as 8 feet, to satisfy the 1988 SMP requirement that a landowner have legal access to the lake shoreline to apply for a dock permit. It would also discourage existing landowners with property frontage along LDAs from selling narrow strips of their property to other property owners to give these other landowners legal access to the shoreline. These types of boundary layouts create situations in which far more property owners have land with frontage along a LDA than the number of docks the LDA can accommodate.

A LDA's development level under this scenario was determined by subtracting 74 feet for each dock in the LDA from the total length of the LDA boundary frontage. The distance of 74 feet was chosen for existing docks because it is length of LDA shoreline attributed to docks under the dock permitting policy currently employed.. After subtracting 74 feet for each existing dock from the LDA boundary frontage length, the LDA boundary frontage length remaining, if any, was divided by 82 feet to arrive at the number of additional docks the LDA could accommodate in the future. Excess docks in saturated LDAs were ignored in this scenario.

1
2 Scenario 6 does not comply with Section 10 of ER 1130-2-406 (see Appendix A) because it is not based
3 on dock spacing along LDA shoreline. Because of this, it also cannot account for the dock attrition policy
4 in saturated LDAs, as stated in the regulation.

5
6 This scenario would be most applicable to currently undeveloped land next to LDAs and not to
7 landowners who currently have land abutting LDAs because it would be unfair to deny the latter group
8 the right to apply for a dock permit when they had that right when they purchased their land. Under this
9 scenario, therefore, landowners who currently own private property that has less than 82 feet of frontage
10 abutting a LDA would not be denied the right to apply for a permit for a boat dock.

11
12 Note that this dock permitting policy, if adopted, would not prevent developers from creating land parcels
13 with less than 82 feet of frontage to a LDA. Once the policy was in place, however, persons purchasing
14 such parcels would do so with the knowledge that they would not be eligible to apply for a boat dock
15 permit. The policy could also encourage developers to create common property access to LDAs for the
16 installation and use of community docks.

17
18 *Scenario 7:*
19 *100-foot Distance Required Between Docks*
20

Scenario Key Points	<ul style="list-style-type: none"> • 74 feet (24-ft wide dock + 50-ft buffer) of LDA shoreline length deducted for each existing dock. • Number of additional docks calculated as <i>unoccupied LDA shoreline length ÷ 124</i>. • Excess number of existing docks was ignored. • Does not fully comply with ER 1130-2-406.
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21
22 This dock permitting scenario duplicates Scenario 1 except that the buffer distance required between
23 additional docks was increased from 50 feet to 100 feet. A dock width of 24 feet was used. A LDA
24 shoreline length of 74 feet was deducted for each existing dock, and a length of 124 feet was deducted for
25 each additional dock. Excess docks in saturated LDAs were ignored, as in Scenario 1.

26
27 Scenario 7 does not comply with Section 10 of ER 1130-2-406 (see Appendix A) because it does not
28 incorporate the 50 percent density of development criterion nor does it account for dock attrition in
29 saturated LDAs, as required by the regulation.
30

1 *Scenario 8:*
 2 *Dock Spacing as Prescribed in 1988 SMP, Average Cable Anchor Spacing, and 50 Percent Dock*
 3 *Installation Density*
 4

Scenario Key Points	<ul style="list-style-type: none"> • Uses average cable anchor-to-cable anchor distance of 88 feet. • 74 feet (24-ft dock + 50-ft buffer) of LDA shoreline length deducted for each existing dock. • Number of additional docks calculated as <i>unoccupied LDA shoreline length ÷ 176</i>. • Excess number of existing docks was ignored. • Does not fully comply with ER 1130-2-406.
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5
 6 This dock permitting scenario has characteristics of Scenario 1 and Scenario 4. Existing docks were
 7 ascribed a length of 74 feet, or the most common dock width (24 feet) plus the 1988 SMP dock-to-dock
 8 buffer distance of 50 feet, as in Scenario 1. This reflects the conditions under which docks have been
 9 permitted to date. Additional docks, however, were considered to occupy 176 feet of LDA shoreline, or
 10 twice the average cable anchor-to-cable anchor distance of 88 feet, as in Scenario 4.

11
 12 Excess docks in saturated LDAs were ignored, as in both Scenario 1 and Scenario 4.

13
 14 Scenario 8 does not comply with Section 10 of ER 1130-2-406 (see Appendix A) because it does not
 15 incorporate the 50 percent density of development criterion for existing docks, nor does it account for
 16 dock attrition in saturated LDAs, as required by the regulation.

17
 18 *Scenario 9:*
 19 *SMP Maximum Spacing and 50 Percent Dock Installation Density*
 20

Scenario Key Points	<ul style="list-style-type: none"> • Assumed cable anchor-to-cable anchor distance of 112 feet. • 224 feet of LDA shoreline length deducted for each existing dock. • Number of additional docks calculated as <i>unoccupied LDA shoreline length ÷ 224</i>. • Excess number of existing docks was ignored. • Does not fully comply with ER 1130-2-406.
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21
 22 This scenario was based on maximum specifications for dock installation as stated in Section 12.5.3 of
 23 the 1988 SMP. The SMP states that the maximum permissible dock width is 32 feet, the maximum
 24 permissible walkway length for a dock is 40 feet, and cable anchors must be extended from a dock at 45-
 25 degree angles. This equates to a cable anchor-to-cable anchor distance of 112 feet (32-foot wide dock +
 26 40 feet to either side). According to ER 1130-2-406, all shoreline between cable anchor points is
 27 “occupied” by a dock and no more than 50 percent of LDA shoreline can be occupied by docks. Thus,
 28 under this scenario the 112 feet occupied by each dock was doubled to attribute 224 feet of LDA
 29 shoreline to each existing and additional dock.

1
2 Excess docks in saturated LDAs were ignored, as in Scenario 1.

3
4 Scenario 9 does not comply with Section 10 of ER 1130-2-406 (see Appendix A) because it does not
5 account for dock attrition in saturated LDAs, as required by the regulation. In addition, although docks
6 may be installed using the maximum measurements stated in the 1988 SMP, empirical evidence has
7 shown that these dimensions are not representative of how most boat docks are installed on Lake Lanier.
8 As previously mentioned, measurements from 345 docks resulted in an average cable anchor-to-cable
9 anchor distance of 88 feet, not 112 feet.

10
11 **Results of the Dock Permitting Scenarios**

12
13 *LDA Development Level*

14
15 As would be expected, the various scenarios resulted in different numbers of saturated and unsaturated
16 LDAs depending on how much shoreline length was attributed to existing docks. LDA development
17 levels under the scenarios are summarized in Table 2.

18
19 **Table 2. Saturated and Unsaturated LDAs Under Dock Permitting Scenarios.**

	Saturated LDAs	Unsaturated LDAs
Scenarios 1, 6, 7, 8	4	431
Scenarios 2 and 4	157	278
Scenario 3	103	332
Scenario 5	259	176
Scenario 9	229	206

Note: Scenarios 1, 6, 7, and 8 are based on existing docks occupying 74 feet; Scenarios 2 and 4 are based on existing docks occupying 176 feet; Scenario 3 is based on existing docks occupying 148 feet; Scenario 5 is based on existing docks occupying 248 feet; and Scenario 9 is based on existing docks occupying 224 feet.

20
21
22 *Additional and Total Docks Under the Dock Permitting Scenarios*

23
24 The results of the nine dock permitting scenarios are summarized in Table 3.

25
26 **Other Factors That Could Affect Dock Permitting**

27
28 Several other factors could affect the maximum number of private boat docks that could be
29 accommodated on Lake Lanier.

Table 3. Summary of Private Boat Dock Permitting Scenarios.

Scenario	Fully in Compliance with ER 1130-2-406	Dock Attrition Considered	Length of Shoreline Consumed by Boat Docks	Buffer Required (distance between docks)	Uses Average Cable Anchor Spacing of 88 ft	Potential Additional Docks	Potential Total Docks	Percent Change in Number of Docks
Scenario 1 (Existing Conditions)	No	No	74 ft for existing docks 74 ft for additional docks	50 ft	No	16,734	25,327	195
Scenario 2	Yes	Yes	176 ft for existing docks 176 ft for additional docks	50 ft	Yes	2,022	10,615	24
Scenario 3	No	No	148 ft for existing docks 148 ft for additional docks	50 ft	No	4,525	13,118	53
Scenario 4	No	No	176 ft for existing docks 176 ft for additional docks	50 ft	Yes	3,053	11,646	35
Scenario 5	No	No	248 ft for existing docks 248 ft for additional docks	100 ft	No	1,291	9,884	15
Scenario 6	No	No	74 ft of boundary frontage for existing docks 82 ft boundary frontage for additional docks	50 ft	No	16,677	25,270	194
Scenario 7	No	No	74 ft for existing docks 124 ft for additional docks	50 ft existing docks 100 ft additional docks	No	9,987	18,580	116
Scenario 8	No	No	74 ft for existing docks 176 ft for additional docks	50 ft	No	7,036	15,629	82
Scenario 9	No	No	224 ft for existing docks 224 ft for additional docks	50 ft	No	1,716	10,309	20

Soils

Soil type is considered a potential limiting factor for dock permitting because in many cases dock owners need to create some sort of access path to the shoreline where their dock is anchored. Soils with characteristics, such as high erodibility and excessive slope might be unsuitable for access paths, and such characteristics would be considered in dock permitting. Shoreline soils of Lake Lanier were evaluated by examining U.S. Geological Survey (USGS) soil surveys for Dawson, Lumpkin, Hall, and Gwinnett counties. A soil survey for Forsyth County was also available, but it was published prior before Lake Lanier was created and, therefore, it does not show the shoreline.

Descriptions of all soil types found along the Lake Lanier shoreline in each of the four county soil surveys investigated were read to determine whether any soil characteristics might be limiting for access path use. USGS soil surveys categorize soils by their suitability for different types of uses and for particular applications within those use categories. *Recreational Development* is one use category, and *Paths and Trails* (Gwinnett and Hall Counties) and *Campsites* (Dawson and Lumpkin Counties) are applications within that category. All soil types are rated as having *slight*, *moderate*, or *severe* limitations for all applications within the use categories. A slight limitation means that little to no adjustment (surface treatment or other engineering modification) is necessary for the intended application. A moderate limitation means that some adjustment might be necessary, but the adjustment could be accomplished easily and at little cost. A severe limitation means that the soil type could be used for the application, but doing so would require extensive adjustment(s) at considerable cost. Because the ratings in the soil surveys were based on using soils for intensive recreational use, not the light use that would be expected for a dock access path, only soil types rated to have severe limitations for *Paths and Trails* or *Campsites* were considered to be potentially limiting for dock access paths. Limiting soil types were further narrowed to those soils with slopes of 50 percent (equivalent to 27 degrees) or more.

No soils along the Lake Lanier shoreline in Gwinnett or Hall Counties were rated severely limiting due to slope. Two soil types that occur along the shoreline in Dawson and Lumpkin Counties were rated severely limiting due to slopes of 25 to 70 percent. Because generally only soils with a slope of 50 percent or more are considered limiting for access paths on Corps property, only a subset of the soils would be considered limiting due to slope for the purposes of this study. That is, those soils within the slope range of 50 to 70 percent. By relating the soil survey information to slope information available from the GIS, it was found that areas with slopes of 50 percent or more are very uncommon along the lake's shoreline, representing only 0.09 percent of the total lake shoreline and 0.2 percent of the shoreline within LDAs. Therefore, soil type, including the soil type characteristics of slope and erodibility, was not

considered a critical factor in future dock permitting. The distribution of slopes along LDA shoreline on Lake Lanier is presented in Table 4 and in Figure 5.

Table 4. Percent of LDA Shoreline Within Ranges of Slope.

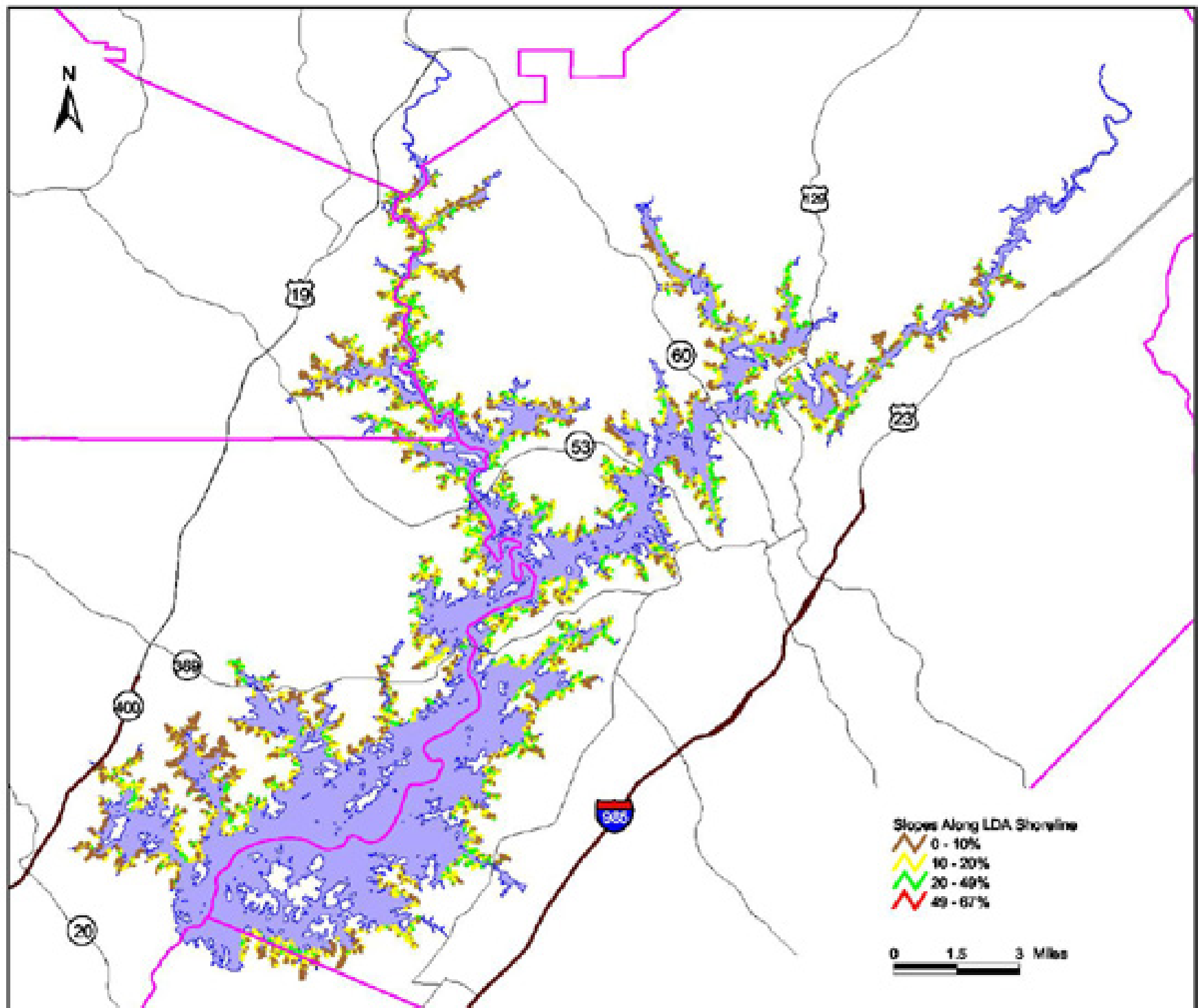
Slope (percent)	Percent of LDA Shoreline
0 – 10	39
10 – 15	25
15 – 20	17
20 – 49	19
> 49	0

Another soil characteristic that could be limiting for access path placement is perpetual or seasonal wetness, which would indicate the presence of wetlands. The 1987 LMP indicates that because of the scarcity of wetlands in northern Georgia, Lake Lanier’s wetlands should be preserved to promote the region’s ecological integrity. Also contained in the LMP is the policy that to maintain wetlands, no permit that involves general or specific use or alteration of wetlands will be issued unless concurrence is gained from the Corps of Engineers, the U.S. Fish and Wildlife Service, and the Georgia Department of Natural Resources.

Wetlands are scarce along the Lake Lanier shoreline, and soils listed in the soil surveys as limiting for *Paths and Trails* or *Campsites* due to seasonal or periodic flooding occur mostly at the ends of coves where tributaries or creeks enter the lake. The limited occurrences of wetlands along the lake’s shoreline and the small extent of wetlands along the shoreline where they do occur were factors considered unlikely to create a situation in which an adjacent landowner would not be able to find a suitable location for an access path. Wetlands, therefore, were not considered to be a critical factor in future dock permitting.

Cove Width

The 1988 Lake Lanier SMP (see Section 12.5.2) and ER 1130-2-406 (Section 10) require that the center third of a cove remain open to permit unobstructed navigation. When docks are permitted, the Corps sites them to ensure that they do not extend into the center third of a cove at a lake level of 1,071 feet msl. When the lake level is lower than 1,071 feet msl, however, landowners may move their docks out from the shoreline to achieve sufficient depth for their boats, but a dock is not to be moved out into the center third of a cove. The combination of the factors of the slope of the adjacent land and the width of a cove determines whether the guideline that the center third of a cove should remain open for navigation is a limiting condition for dock permitting. The relationship between slope and cove width is shown in Figure 6. The figure shows the minimum cove width necessary to provide the minimum 5 feet of water depth (per LMP guidelines) below a private boat dock at a specified slope of land below the water surface. For



Slopes Along LDA Shoreline

Figure 5

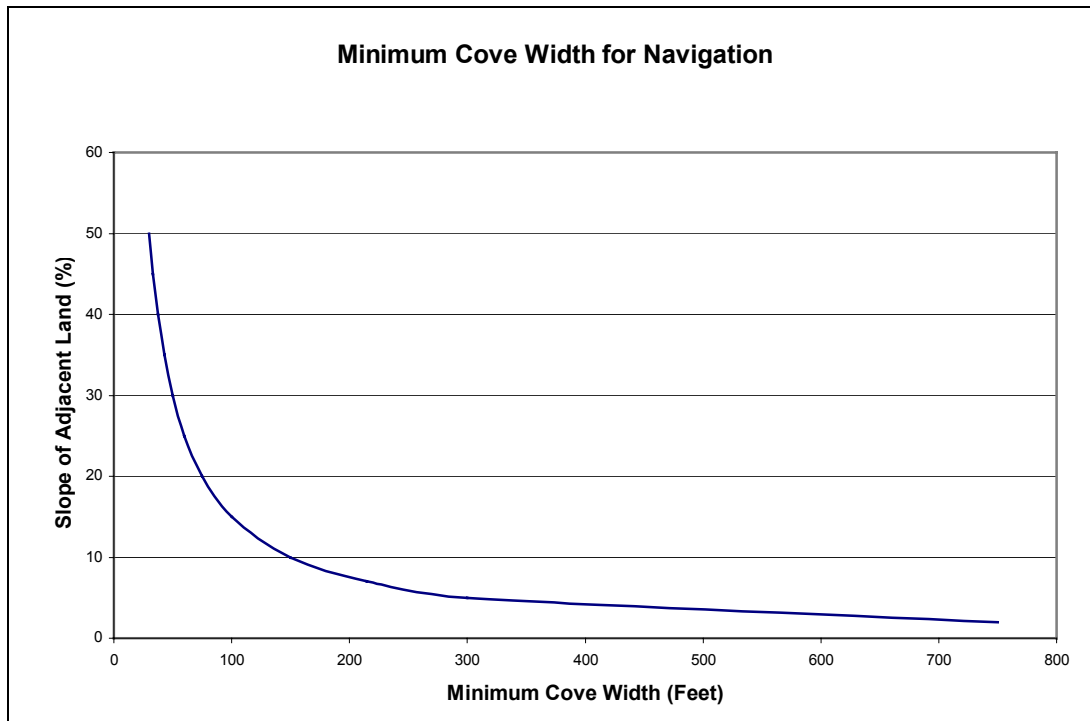


Figure 6. Relationship between slope of adjacent land and cove width to provide sufficient water depth for dock permitting.

instance, a cove must be at least 150 feet wide at 1,071 feet msl to accommodate docks if the slope below the water surface is 10 percent. This follows because the water depth would be 5 feet at 50 feet from the shoreline, which is the limit of dock placement to keep the center third of the cove open for navigation. Seventy-two feet is the farthest distance from the lake shoreline at 1,071 feet msl that a dock may be positioned, given the limit of 32 feet for dock length and 40 feet for walkway length.

Sensitive Shoreline Vegetation

Information about protected and sensitive species of vegetation surrounding the lake was gathered from counties in which the lake lies, The Nature Conservancy, the Georgia Natural Heritage Program, the Lake Lanier Project Office, photographs, and other sources. Several sensitive plant species are known to occur in the Piedmont Physiographic Province of the southeastern United States, which is the physiographic province in which Lake Lanier lies. These species include the black-spored quillwort (*Isoetes melanospora*), little amphianthus (*Amphianthus pusillus*), Michaux's sumac (*Rhus michauxii*), Georgia aster (*Aster georgianus*), and white fringeless orchid (*Platanthera integrilabia*) (Natureserve, 2001a,b; USFWS, 1993a,b).

Only one of these plant species, the Georgia aster, might occur near the lake. Georgia Natural Heritage Program (2001) data indicate there is one population of Georgia aster on Corps property along the Lake Lanier shoreline, directly north of the Buford Dam and powerplant. It is not known whether the population is still extant. No other areas along the lake shoreline appear to support protected or sensitive plant species recommended for protection from disturbance (see below). The lack (or apparent lack) of special vegetative associations, however, does not reduce the importance of protecting natural shoreline vegetation to achieve shoreline and bank stabilization and a visually appealing lake environment.

Sensitive Habitats

The Piedmont region in which Lake Lanier is located is noteworthy for its biological diversity, but the plant communities in this region of the southeastern United States have been extensively altered since European settlement nearly 300 years ago (GDNR, 1997). Cotton and tobacco farming since colonial times depleted and eroded Piedmont soils. Timber harvest and clearing for agriculture peaked in the early 20th century. Most forest communities in the Piedmont today are second-growth forests that have grown on abandoned agricultural lands (GDNR, 1997). The vegetative communities surrounding Lake Lanier consist of a mixture of pine forest, mixed hardwood–pine forest, and non-forested land. Sensitive habitats, which are habitats that support sensitive species or that are easily harmed by and do not recover easily from disturbance, are not known to occur along the Lake Lanier shoreline. However, sensitive habitats might occur along the shoreline and the impact of dock permitting on such habitats, if they do occur, would be determined best by surveying specific areas of shoreline as they are proposed for development (including dock permitting).

Endangered and Threatened Species

The effect of the presence of endangered and threatened species on the installation of boat docks is likely to be small. A few endangered and threatened species are reported from the counties in which Lake Lanier is located, but none appear to use habitat offered by the lake. Bald eagles (*Haliaeetus leucocephalus*) have been reported in Dawson, Forsyth, Gwinnett, Hall, and Lumpkin Counties, and red-cockaded woodpeckers (*Picoides borealis*) are reported from Forsyth, Gwinnett, and Hall Counties (Tucker, 2001). However, Georgia Natural Heritage Program (2001) data does not report any bald eagle nests or red-cockaded woodpecker nesting areas within 1 mile of the lake. Populations of bluestripe shiner (*Cyprinella callitaenia*)—a rare minnow endemic to the Appalachian River drainage in Florida, Alabama, and Georgia—have been observed in the upper Appalachian River, the upper and middle Chattahoochee River, and the middle Flint River (Natureserve, 2001e). The impoundment of 15 reservoirs (including Lake Lanier), however, has eliminated bluestripe shiner habitat because the species

cannot tolerate lentic (non-flowing) conditions. Endangered and threatened species, therefore, are not expected to play a significant role in limiting dock development at the lake.

Cultural and Historic Resources

Consultations with the Georgia State Historic Preservation Officer (SHPO) determined that all project lands with a high potential for historic properties have been surveyed, with the exception of isolated tracts of the upper Chattahoochee and Chestatee Rivers. Six prehistoric and/or historic period archaeological sites exist within the project area that are eligible or potentially eligible for the National Register of Historic Places (NRHP) (Gibbens, D. USACE, Mobile District. Personal communication, 2002; USACE, Mobile District, 1997). Three historic cemeteries, the Little Hall Cemetery, the Shockley cemetery, and one unnamed cemetery, are also located within the fee-owned lands. No standing structures are located within the government owned lands.

Historic sites along the shoreline of Lake Lanier could be affected by dock placement. To protect the resources, their locations are shown in this report. The presence of these resources could limit dock placement in some areas, and archaeological surveys specific to proposed shoreline developments (including dock permitting) would be necessary to determine the significance of these resources to dock permitting decisions. If sites identified as significant (eligible for the National Register of Historic Places) would be adversely affected by the presence of a dock or soil disturbance, impacts would have to be mitigated through data recovery excavations or other mitigation measures, in consultation with the Georgia SHPO and the US Army Corps of Engineers, Mobile District.

Visual and Aesthetic Resources

Visual and aesthetic resources are natural resources, landforms, vegetation, and man-made structures in the environment that generate one or more sensory reactions and evaluations by the observer, particularly with respect to pleasurable responses (Table 5). Sensory reactions are traditionally categorized as visual, auditory, and olfactory responses—sight, sound, and smell. The visual sense is so predominant in the observer's reaction and evaluation that visual resources are the focus of this section.

The visual appearance of the shoreline can affect the quality of a person's recreational experience, but the experience of the visual appearance of the shoreline is personal. Some people might seek a wilderness type of recreational experience, in which case the sight of boat docks might be offensive. Other people might prefer a developed look and appreciate or not be bothered by boat docks along the shoreline.

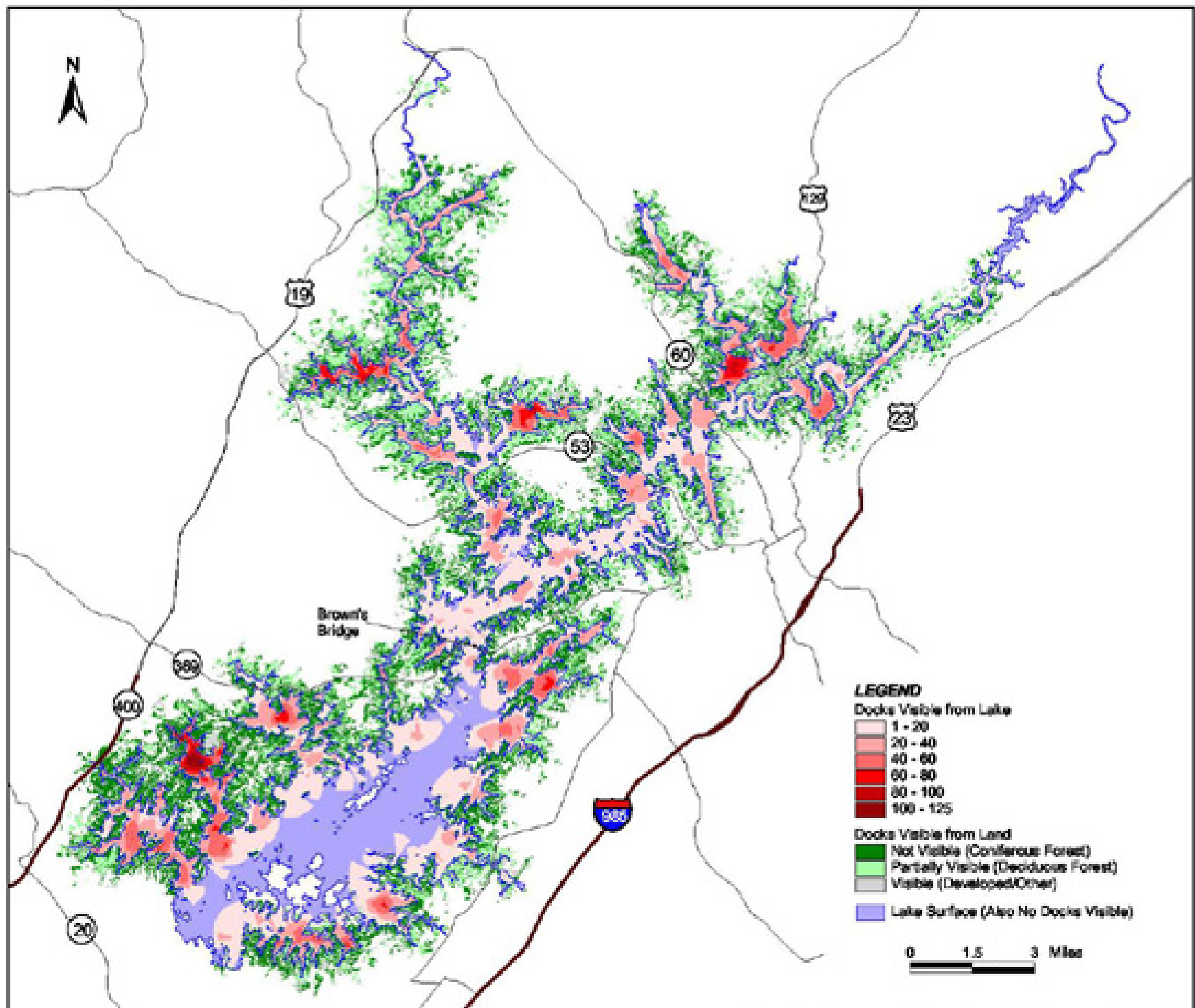
Table 5. Scenic Attractiveness Class Definitions.

Class A Distinctive: Areas where landform, vegetation patterns, water characteristics, and cultural features combine to provide unusual, unique, or outstanding scenic quality. These landscapes have strong positive attributes of variety, unity, vividness, mystery, intactness, order, harmony, uniqueness, pattern, and balance.
Class B Typical: Areas where landform, vegetation patterns, water characteristics, and cultural features combine to provide ordinary or common scenic quality. These landscapes have generally positive, yet common, attributes of variety, unity, vividness, mystery, intactness, order, harmony, uniqueness, pattern, and balance. Normally they would form the basic matrix within the ecological unit.
Class C Indistinctive: Areas where landform, vegetation patterns, water characteristics, and cultural land use have low scenic quality. Often water and rockform features of any consequence are missing in Class C landscapes. These landscapes have weak or missing attributes of variety, unity, vividness, mystery, intactness, order, harmony, uniqueness, pattern, and balance.

Source: USFS, 1995

During scoping meetings held in autumn 2001 for the Environmental Impact Statement being prepared to address operation and maintenance activities at Lake Lanier, several residents expressed the opinion that the distance allowed between boat docks should be increased to create safer boating conditions and a more pleasing visual appearance of shorelines with docks (USACE, 2001). Others were concerned about old, deteriorating docks that cause trash and aesthetic problems. A map of the lake showing areas from which docks are visible and the number of docks visible from those areas visually verifies that except for the central area of the southern portion of the lake (i.e., south of Browns Bridge), docks are visible from nearly all areas on the lake (Figure 7). Docks are most likely visible from many locations in this southern-central area as well, but “visibility” on the map is limited to a ¾-mile distance.

A visual assessment survey of Lake Lanier was conducted from July 10 through 13, 2001. Eighty-five locations were surveyed, 45 of which were assessed from randomly assigned locations on a boat on the lake and 40 of which were assessed from representative park, campground, road, or other vantage points on land surrounding the lake. Photographs of the lake were taken from each location and rated according to scenic attractiveness (Table 5) and scenic integrity (Table 6). As a rough indication of the impact of private boat docks on visual attractiveness and integrity, the ratings of those photographs that showed docks were compared to the ratings of all of the photographs (Table 7). Compared to the ratings for all photographs taken, the highest percentage of photographs showing boat docks rate lower on the scales for scenic attractiveness and scenic integrity. Only a small percentage of photographs showing boat docks rate higher on these scales. This pattern would be expected with respect to scenic integrity because the rating depends heavily on how altered a landscape appears, and docks would be expected to give a scene an altered look. But the pattern also holds for scenic attractiveness as well.



Existing Dock Viewsheds

Figure 7

Table 6. Scenic Integrity Definitions.

Very High (Unaltered): Landscapes where the valued landscape character <i>is</i> intact with only minute if any deviations. The existing landscape character and sense of place is expressed at the highest possible level.
High (Appears Unaltered): Landscapes where the valued landscape <i>appears</i> intact. Deviations may be present but must repeat the form, line, color, texture, and pattern common to the landscape character so completely and at such scale that they are not evident.
Moderate (Slightly Altered): Landscapes where the valued landscape <i>appears slightly altered</i> . Noticeable deviations must remain visually subordinate to the landscape character being viewed.
Low (Moderately Altered): Landscapes where the valued landscape character <i>appears moderately altered</i> . Deviations begin to dominate the valued landscape character being viewed but they borrow valued attributes such as size, shape, edge effect, and pattern of natural openings; vegetative type changes; or architectural styles outside the landscape being viewed. They should only appear as valued character outside the landscape being viewed but compatible or complimentary to the character within.
Very Low (Heavily Altered): Landscapes where the valued landscape character <i>appears heavily altered</i> . Deviations may strongly dominate the valued landscape character. They may not borrow from valued attributes such as size, shape, edge effect, and pattern of natural openings; vegetative type changes; or architectural styles within or outside the landscape being viewed.
Unacceptably Low: Landscapes where the valued landscape character being viewed <i>appears extremely altered</i> . Deviations are extremely dominant and borrow little, if any form, line, color, texture, pattern, or scale from the landscape character.

Source: U.S. Forest Service, 1995

Table 7. Visual Ratings of Photographs With Views of Boat Docks.

Scenic Integrity:	Percent of Photos (↓):	Scenic Attractiveness								
		Distinctive			Typical			Indistinctive		
		Fore	Middle	Back	Fore	Middle	Back	Fore	Middle	Back
Very High	0 (10)									
High	2.6 (14.5)				1					
Moderate	7.7 (13)	1						2		
Low	56.4 (34)				11	3		8		
Very Low	33.3 (28.5)				7			6		
	Percent of Photos (→):	2.6 (12.5)			61.5 (62)			35.9 (25.5)		

How to read this table: The columns at the right rate the scenic attractiveness of the photographs as distinctive, typical, or indistinctive. Additionally, a row below these three ratings indicates from what viewing distance the photograph was taken, foreground (fore), middle ground (middle), or background (back). The leftmost column indicates the scenic integrity of the photograph. Thus, a bold face number in the table indicates the scenic integrity rating, scenic attractiveness rating, and distance from which the photograph was taken. The number indicates how many photographs with views of boat docks had that rating.

In the second column and bottom row, the percent of photographs that showed boat docks in the scenic integrity and scenic attractiveness categories (the first number) is compared to the percent of all photographs in the categories (the number in parentheses). For instance, 2.6% of photographs showing boat docks were rated to have high scenic integrity, while 14.5% of all photographs were rated this way; 61.5% of photographs showing boat docks were rated to have typical scenic attractiveness, while 62% of all photographs were rated this way.

The ratings of scenic attractiveness depend more on the quality of an overall scene to create a sense of order, harmony, or balance. Conceivably, docks well integrated into a landscape could improve scenic attractiveness. At Lake Lanier, however, they seem to decrease scenic attractiveness.

Protecting the visual appearance of the lake is one of the duties of Project staff, and controlling the placement of private boat docks around the lake is one way to accomplish that goal. Project staff want to ensure that a variety of visual experiences are available to visitors at Lake Lanier. Thus, Project staff

want to manage the issuance of boat dock permits such that docks are not equally visible from all portions of the lake and a variety of visual experiences are available in similar types of lake settings (e.g., coves).

Summary

There are currently 8,348 private boat docks and 11 community docks on Lake Lanier. The number of additional docks that the lake could accommodate was determined under nine potential future dock permitting scenarios. The number of boat docks that would be permitted on the lake under each scenario is presented in Table 3. Application of a 50 percent dock installation density policy per ER 1130-2-406 would reduce the number of docks on the lake compared with scenarios that do not incorporate such a policy. Other factors, such as buffer distance between docks and assumed width of dock, also affect the maximum number of docks that the lake could accommodate.

The influence of soil type, cove width, shoreline vegetation, sensitive habitats, endangered and threatened species, and cultural and historic resources on dock permitting were also examined. Cove width was found to have the greatest potential to limit dock placement and potentially the number of docks that could be placed in shallow coves. The other factors were not found to be limiting with respect to dock placement or the number of docks that an LDA could accommodate. In addition, the visual and aesthetic influence of docks on the lake was examined. The presence of docks was found to decrease both the scenic integrity and scenic attractiveness of an area.

Acronyms and Abbreviations

CFR	Code of Federal Regulations
Corps	US Army Corps of Engineers; US Army Corps of Engineers, Mobile District
EIS	environmental impact statement
ER	Engineer Regulation
ESRI	Environmental Systems Research Institute
ft	feet, foot
GIS	geographic information system
LDA	Limited Development Area
mi	mile
msl	(elevation above) mean sea level
NRCS	Natural Resources Conservation Service
LMP	lakeshore management plan
SHPO	State Historic Preservation Officer
US, U.S.	United States
USACE	see “Corps”
USGS	United States Geological Survey

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Lake Sidney Lanier
Boat Dock Carrying Capacity Study

APPENDIX A:

Excerpts from 1988 Shoreline Management Plan

and

Engineer Regulation 1130-2-406

Appendix A

Excerpts from the 1988 Shoreline Management Plan and the USACE Engineer Regulation 1130-2-406

Sections of the 1988 Lake Lanier Shoreline Management Plan Pertinent to Private Boat Docks

Many sections of the 1988 Lake Lanier Shoreline Management Plan (SMP) are referenced in the body of this report. The referenced sections and others that are relevant to dock permitting are presented below verbatim. The full text of the Shoreline Management Plan can be read on the Lake Lanier website (<http://lanier.sam.usace.army.mil/Lakeshore.htm>).

Section 12.5. Permit/License for Lakeshore Use

This is a permit used to authorize certain specific private use of public shoreline designated as "Limited Development." Authority to issue these permits has been delegated to the Project Manager and are issued for the purpose of recreational use only. New as well as "grandfathered" (see Section 12.5.5) facilities authorized are identified in Exhibit XIII [of the SMP].

Section 12.5.1. Eligibility Requirements

Lakeshore Use Permits may be issued in 'Limited Development' zoned areas only. The permit will be issued for a five year period. The permit may be reissued when the current term expires if the permitted facilities and uses of public land are in compliance with the conditions of the permit and CFR [Code of Federal Regulations] Title 36, part 327. Permits are not transferable.

To be eligible for a permit an applicant must have unrestricted legal access through private property to public lands that are zoned "Limited Development."

Proof of unrestricted legal access through private land adjacent to public property may be satisfied by submitting either a copy of a recorded deed or closing statement. Failure to provide proof of access will result in denial of a permit.

Property owners may establish an association for a jointly owned facility on public land where private lands provide common access to public property. Such facilities are for all residents of a specific subdivision. Floating facilities authorized through associations are for courtesy use only, not for overnight storage or mooring purposes. Courtesy docks may not exceed 192 square feet.

Only one permit will be issued per adjacent landowner. Multiple persons listed on a deed will be considered as one adjacent landowner. Only one permit will be issued per adjacent household/family membership. Permits will be issued on a first applicant basis. Permits are not issued for speculative purposes or for enhancement of private property. Permits are not

issued to persons renting private property. The permittee must be the primary user and owner of facilities permitted. Permits are not issued to minors.

Permits are temporary in nature with termination dates. The issuance of a permit does not infer private ownership or rights to public lands. Structures placed on public lands via a Lakeshore Use Permit are private property on public lands authorized only for the term of the permit.

Section 12.5.2. Site Requirements

Locations selected for placement of facilities via permit must conform with the Lakeshore Management Allocation Map (Exhibit I [of the SMP]) and be located along "Limited Development" shoreline. The location and proposed facilities must not cause a safety hazard to the applicant/user or general public.

The selected site for any floating facility must be at the nearest point of shoreline to the adjacent owner's private property. Distance to the nearest point on water has no bearing on the issuance or denial of a permit. Deviations of not more than one hundred (100) feet left or right of this point may be considered if water depth or spacing is a problem. However, placement should not be made that would produce a crossing or cross-over situation; meaning that an applicant's facilities should not go beyond existing neighboring facilities. Cross-over situations cause community discord and therefore, should be avoided. Only under the most unusual situations may crossovers be approved by the Project Manager. Private property lines do not extend onto public lands and do not indicate rights or privileges to or on government property not afforded any other member of the general public; nor does adjacent land ownership guarantee privacy or imply exclusive use of public shoreline.

The proposed location for any new floating facility must provide at least a fifty (50) foot buffer area between the proposed structure and any existing facilities at 1071 MSL [MSL: feet above mean sea level]. This buffer is from the nearest point of one facility to the nearest point of a second facility.

All intended boat mooring sites will allow for five (5) feet of water under the dock at the dock's lakeside or slip end to prevent damage to boating equipment and to allow for slight water fluctuation. Sites or coves with slightly less than five (5) feet, but not less than four (4) feet of water are only suitable for platform/t-docks that do not normally accommodate vessels.

At locations selected for any floating facility the center one-third of the cove or channel must be left open for navigation. At no time may the length of any dock including any moored vessel extend into this center one-third channel at 1071 MSL. Corps policy is to regain this navigable space when considering new permits for old facilities. All new structures will be placed in such a way as to have the least impact on navigation. During periods of low water navigation channels will not be obstructed.

Permits may not be issued in "Limited Development" zoned locations where endangered species exist, at archeological sites, within historical sites, or in areas determined to be wetlands in accordance with CFR Title 33. Such locations will be rezoned to 'Protected' shoreline.'

Section 12.5.3 Floating and Landbased Facilities

The Lake Lanier Project Manager is authorized to issue Lakeshore Use Permits for floating facilities, utility rights-of-way, improved shoreline access, etc. For a complete list of the items currently authorized as well as those "grandfathered" see Exhibit XIII [of the SMP].

Section 12.5.3.1 Floating Facility Types

In accordance with ER [Engineer Regulation] 1130-2-406 [*Shoreline Management at Civil Works Projects*] floating facilities will be permitted for the purpose of docking or mooring a vessel for private, not commercial use. It is important to note that the permit calls for a floating facility, not fixed or suspended and the permit is issued for the purpose of boat storage and related boating apparatus only.

Private floating facilities eligible for permitting are as follows: Boatdock: A structure with or without roof, with or without sides/walls (completely enclosed) with a storage slip(s) for docking or mooring a vessel. Such structures will not exceed the maximum external dimensions of 32' X 32' (see Exhibit II [of the SMP]). The aggregate slip size will not exceed 20'(feet wide) by 28' (feet long). The maximum dimension will include any platform/deck added or constructed to the docking facility. The maximum dimension of any attached platform/deck will not exceed 192 square feet. For the purposes of determining width from length on any type of floating facility, width will always be that portion parallel to the shoreline; length will always be that portion perpendicular to the shoreline...

Section 12.5.3.4. Dock Ramps and Walkways (excerpts)

Unless otherwise approved dock walkways shall be at least four (4) feet, but not more than six (6) feet wide. Walkways less than four feet wide are not allowed due to safety considerations. ... For the purpose of determining the dimensions of an affixed or attached platform/sundeck, the four to six feet of approved walkway adjacent to the slip are not considered a portion of the affixed or attached platform/sundeck.

Floating ramps leading to docks will not be less than four (4) nor more than six (6) feet in width nor exceed forty (40) feet in length. If a land-based fixed section of walkway is approved, in conjunction with a floating approach ramp, it shall not exceed six (6) feet in width by ten (10) feet in length. Any combination of fixed and floating approach walkway shall not cumulatively exceed a total of forty (40) feet. ... All approach ramps must be floating unless otherwise approved by the Project Manager. All floating facilities must have an approach ramp. The minimum approach ramp dimension is eight (8) feet long by four (4) feet wide.

Section 12.5.3.9. Dock Anchoring

An anchorage system shall be provided which will insure secure anchoring of the floating facility taking into consideration the water depth, exposure to wave action, and wind. Shoreline trees or other natural features will not be used as anchors. To prevent stress floating facilities should be anchored perpendicular to the shoreline with anchor cables placed at 45 degree angles to the shoreline. Anchor posts with sleeves set into the lake bottom are

optional but may only be placed on two corners of the structure. A combination of cable and anchor posts with sleeves is acceptable. Anchor cables may be secured to the shoreline with metal or wooden posts, or screw augers placed so not to endanger visitors or damage vegetation. Metal anchor posts are preferred since additional grounding is afforded in case of electrical failure. ... The floating facility must be either floating or resting on the ground at all times; the structure may not be suspended on pilings.

Anchor cables may not obstruct the public's use of the shoreline or water surface. Excessive cabling is not allowed if it blocks off an area for private use. Cables exceeding 45 degree angles may require reinstallation upon inspection. Cables shall be maintained in a taut condition. Cables shall not cross those of an adjacent facility. No cable or anchoring device other than poles with sleeves will be permitted on the lake's bottom. Cables may not be lined with styrofoam or plastic jugs, etc. due to aesthetics. Floating facilities should not share the same anchor post.

Section 20. Wetlands

... To maintain wetlands, no permit will be issued that involves general or specific use or alteration of wetlands unless concurrence is gained from the Corps of Engineers, the U.S. Fish and Wildlife Service, and the State of Georgia Department of Natural Resources. ...

Section 22. Endangered Species

... Permits will not be issued that conflict with the preservation of endangered species. Any permit issued in violation of the Endangered Species Act either past or present will be rescinded. ...

Section 23. Cultural, Historical, and Archeological

... Permits will not be issued that involve general or specific use or alteration of historic sites unless culturally cleared by appropriate agencies. ...

Corps Regulations Pertinent to Private Boat Docks on Lake Lanier Excerpts from Engineer Regulation 1130-2-406

Engineer Regulation (ER) 1130-2-406, revised and adopted in May 1999, authorizes Lake Lanier Project Operations Manager to issue Shoreline Use Permits, which allow certain private, recreational uses of those segments of the public shoreline that have been designated *Limited Development Area*. Shoreline Use Permits are issued for 5 years. They may be reissued at the end of the permit term if the permitted facilities and uses of public land are in compliance with the conditions of the permit and the 36 CFR Title 36, part 327. Permits are not transferable. Relevant sections from ER 1130-2-406 are provided below verbatim.

Section 4. Policy

(c). A Shoreline Management Plan ... will be prepared for each Corps project where private shoreline use is allowed. This plan will honor past written commitments. The plan will be reviewed at least once every five years and revised as necessary...

(d). Where commercial or other public launching and/or moorage facilities are not available within a reasonable distance, group owned mooring facilities may be allowed in Limited Development Areas to limit the proliferation of individual facilities...

(e). The issuance of a private shoreline use permit does not convey any real estate or personal property rights or exclusive use rights to the permit holder. The public's right of access and use of the permit area must be maintained and preserved. Owners of permitted facilities may take necessary precautions to protect their property from theft, vandalism or trespass, but may in no way preclude the public right of pedestrian or vessel access to the water surface or public land adjacent to the facility.

(f). Shoreline Use Permits will only be issued to individuals or groups with legal right of access to public lands.

Section 10. Density of Development

The density of private floating recreation facilities will be established in the Shoreline Management Plan for all portions of Limited Development Areas consistent with ecological and aesthetic characteristics and prior written commitments. The facility density in Limited Development Areas should, if feasible, be determined prior to the development of adjacent private property. The density of facilities will not be more than 50 per cent of the Limited Development Area in which they are located. Density will be measured by determining the linear feet of shoreline as compared to the width of facilities plus associated moorage arrangements which restrict the full unobstructed use of that portion of the shoreline. When a Limited Development Area or a portion of a Limited Development Area reaches maximum density, notice should be given to the public and facility owners in that area that no additional facilities will be allowed. In all cases, sufficient open area will be maintained for safe maneuvering of watercraft. Docks should not extend out from the shore more than one-third of the width of a cove at normal recreation or multipurpose pool. In those cases where current density of development exceeds the density level established in the Shoreline Management Plan, the density will be reduced to the prescribed level through attrition.

**Lake Sidney Lanier
Boat Dock Carrying Capacity Study**

APPENDIX B:

LDA Data

Appendix B

**Lake Lanier Boat Dock Carrying Capacity Study
Appendix B: LDA Data**

LDA_ID	Boundary Frontage LDA Length (ft)	Boundary Frontage LDA Total Shoreline Length (ft)	Number of Docks (in 2002)*
Total	1,997,654.8	1,868,227.4	8,593
1	702.4	967.1	1
2	724.9	779.8	2
3	13,052.5	11,749.5	62
4	635.0	674.8	6
5	6,337.0	6,027.5	21
6	4,215.7	3,372.9	24
7	9,345.3	6,564.3	39
8	584.6	561.2	7
9	414.9	244.4	2
10	16,068.8	13,476.8	102
11	1,175.9	1,581.7	7
12	8,148.8	8,417.5	52
13	3,464.0	3,912.6	25
14	8,451.4	8,188.0	56
15	2,764.6	3,116.0	19
16	6,476.0	6,260.6	52
17	14,334.0	15,816.6	95
18	1,854.3	1,544.4	6
19	3,812.0	4,224.1	18
20	2,376.7	2,428.8	17
21	6,175.4	6,556.1	27
22	277.1	475.9	2
23	10,490.9	9,148.5	26
24	20,306.9	18,152.4	100
25	1,559.0	1,970.4	4
26	6,247.0	5,060.4	38
27	7,913.6	7,318.0	55
28	3,188.5	3,202.8	14
29	3,446.8	3,399.7	17
30	7,796.6	7,503.5	53
31	115.6	240.3	0
32	5,944.7	4,609.5	6
33	11,489.6	10,546.5	14
34	18,405.8	16,614.1	3
35	14,784.6	14,892.5	73
36	6,435.4	6,399.1	21
37	1,637.2	1,287.5	12
38	2,084.0	1,623.3	10
39	674.6	480.7	3
40	1,068.7	975.8	5
41	348.4	205.9	1
42	4,168.3	3,727.5	7

Appendix B

Lake Lanier Boat Dock Carrying Capacity Study
Appendix B: LDA Data

LDA_ID	Boundary Frontage LDA Length (ft)	Boundary Frontage LDA Total Shoreline Length (ft)	Number of Docks (in 2002)*
43	1,962.5	1,963.4	0
44	1,443.4	1,365.5	1
45	1,154.8	1,100.5	1
46	2,641.7	2,059.3	8
47	872.0	1,065.8	1
48	9,837.1	8,735.2	20
49	3,001.9	3,080.2	0
50	1,987.0	1,996.0	0
51	31,347.0	30,956.0	72
52	352.8	295.6	1
53	25,085.0	26,166.6	95
54	9,476.9	7,732.5	47
55	499.0	476.3	1
56	1,498.0	1,452.5	13
57	2,381.6	2,333.8	14
58	10,642.4	10,931.4	64
59	2,435.1	1,824.1	8
60	897.6	830.9	7
61	3,275.8	3,490.2	12
62	6,058.1	6,070.5	20
63	528.4	378.5	0
64	606.2	832.4	0
65	4,056.8	4,538.6	16
66	8,973.9	8,975.4	32
67	672.5	694.4	5
68	14,478.8	15,080.6	108
70	9,003.5	7,421.0	59
72	22,445.3	21,017.6	110
73	6,822.9	6,543.1	25
75	31,089.2	29,539.9	122
76	1,757.2	2,799.2	2
78	20,657.0	21,794.5	89
79	3,427.8	3,793.3	14
80	998.2	1,721.3	1
82	7,559.2	6,909.0	35
84	2,130.5	2,104.0	6
86	5,361.9	4,729.1	17
88	2,728.6	3,212.7	0
89	997.9	1,059.5	0
90	7,966.9	7,236.0	33
92	745.5	719.6	7
94	4,013.6	3,987.7	22
96	677.0	584.5	4
98	1,266.2	1,192.5	2
100	226.1	226.1	2
101	2,244.6	1,354.5	12

Appendix B

Lake Lanier Boat Dock Carrying Capacity Study
Appendix B: LDA Data

LDA_ID	Boundary Frontage LDA Length (ft)	Boundary Frontage LDA Total Shoreline Length (ft)	Number of Docks (in 2002)*
102	967.2	899.0	0
103	527.5	527.5	1
104	22,047.2	18,550.1	103
105	2,188.3	1,826.0	4
106	3,632.6	3,238.5	3
107	1,082.3	1,325.8	0
108	5,378.7	3,695.2	21
109	1,244.0	1,053.1	0
110	1,103.2	1,101.9	1
111	5,527.0	5,365.2	25
112	2,482.2	3,278.6	15
113	10,992.9	9,926.6	29
114	6,656.5	4,962.2	34
115	1,697.5	1,559.4	9
116	2,540.1	1,936.8	8
117	1,859.9	1,777.6	0
118	150.3	186.4	2
119	428.0	717.0	4
120	760.0	751.7	6
121	2,813.6	2,962.2	6
122	2,154.0	1,700.3	5
123	2,100.3	3,288.5	2
124	70.9	658.1	4
125	786.0	1,031.1	7
126	3,670.6	3,135.9	6
127	3,694.4	3,844.4	15
128	2,695.7	2,441.9	14
129	4,686.6	4,611.1	25
130	900.8	1,248.1	1
131	22.8	22.8	0
132	5,943.0	6,009.9	49
133	4,701.4	4,794.2	23
134	5,913.5	5,676.1	39
135	16,024.9	14,864.5	76
136	5,713.7	6,502.7	18
137	876.3	950.9	4
138	3,367.2	4,955.2	17
139	10,258.0	11,650.0	44
140	7,192.0	5,294.6	23
141	3,682.1	3,832.3	8
142	2,009.2	1,599.0	9
143	1,995.2	1,976.6	15
144	2,418.4	1,414.4	0
145	470.6	467.3	0
146	7,591.2	6,288.6	42
147	5,445.1	5,309.0	28

Appendix B

Lake Lanier Boat Dock Carrying Capacity Study
Appendix B: LDA Data

LDA_ID	Boundary Frontage LDA Length (ft)	Boundary Frontage LDA Total Shoreline Length (ft)	Number of Docks (in 2002)*
148	4,048.6	4,224.0	26
149	7,007.5	5,671.6	24
150	2,096.9	1,888.8	8
151	1,646.3	619.2	4
152	4,972.3	4,281.4	41
153	2,209.0	1,828.8	15
154	406.0	596.6	4
155	4,644.1	4,564.0	31
156	2,369.6	2,400.0	21
157	1,655.7	1,412.0	3
158	7,665.6	5,915.8	42
159	4,049.9	4,109.0	21
160	8,036.3	7,105.9	57
161	4,724.3	4,517.6	38
162	1,433.6	999.8	14
163	6,190.2	5,994.3	47
164	5,555.5	4,817.2	4
165	2,025.7	2,600.6	17
166	1,492.3	2,156.9	14
167	6,365.4	6,770.2	37
168	1,574.3	1,639.3	9
169	17,836.8	18,562.3	84
170	14,169.1	15,111.3	86
171	9,030.6	9,742.1	41
172	18,479.9	17,919.2	53
173	11,167.6	12,400.9	45
174	753.5	1,006.0	7
175	5,350.5	6,086.0	25
176	3,844.6	4,051.2	18
177	1,050.4	695.9	3
178	4,130.0	3,968.8	28
179	922.6	844.8	9
180	5,009.7	4,722.8	23
181	1,775.2	1,426.9	15
182	3,574.4	3,951.8	22
183	1,868.8	1,666.8	12
184	9,125.4	7,482.8	44
185	7,190.4	7,523.0	42
186	11,394.5	10,296.6	79
187	4,124.3	3,787.6	24
188	4,654.0	4,639.8	29
189	2,099.6	1,799.4	9
190	1,706.7	4,547.6	7
191	1,784.4	1,880.0	3
192	1,579.6	1,586.1	12
193	2,736.8	2,180.7	18

Appendix B

Lake Lanier Boat Dock Carrying Capacity Study
Appendix B: LDA Data

LDA_ID	Boundary Frontage LDA Length (ft)	Boundary Frontage LDA Total Shoreline Length (ft)	Number of Docks (in 2002)*
194	4,915.0	4,872.0	36
195	3,455.7	2,695.0	19
196	1,038.7	1,076.6	7
197	4,109.2	3,457.8	24
198	3,360.9	2,968.8	26
199	1,433.1	2,174.9	16
200	2,863.1	3,037.6	22
201	2,408.7	1,848.4	3
202	1,138.8	703.2	1
203	462.0	679.3	6
204	4,855.8	4,142.4	22
205	1,983.8	1,296.9	12
206	1,089.6	917.6	8
207	11,904.7	11,776.6	78
208	2,726.9	2,252.3	0
209	12,717.7	11,577.7	55
210	8,248.6	6,663.4	29
211	1,034.2	1,619.5	1
212	5,716.5	6,350.9	35
213	4,780.7	3,729.5	25
214	1,384.5	1,086.2	7
215	3,168.3	3,426.5	21
216	2,029.5	1,337.1	13
217	3,373.5	3,054.0	32
218	8,277.4	7,027.9	40
219	5,834.8	4,671.7	26
220	4,745.1	4,779.8	41
221	1,790.2	1,681.5	13
222	4,315.3	3,302.4	29
223	7,085.9	6,791.9	13
224	6,371.8	6,481.0	30
225	1,352.4	1,830.7	7
226	6,515.4	5,926.4	36
227	4,298.1	3,607.0	23
228	4,691.8	4,272.7	12
229	3,849.2	4,291.3	21
230	12,779.9	12,685.4	101
231	9,073.1	8,367.4	57
232	5,408.1	5,575.5	27
233	580.5	618.6	0
234	5,925.2	7,284.3	32
235	2,542.6	2,848.2	17
236	10,063.5	8,767.0	63
237	2,758.9	2,366.6	21
238	10,554.2	9,627.2	60
239	9,977.4	8,510.6	72

Appendix B

Lake Lanier Boat Dock Carrying Capacity Study
Appendix B: LDA Data

LDA_ID	Boundary Frontage LDA Length (ft)	Boundary Frontage LDA Total Shoreline Length (ft)	Number of Docks (in 2002)*
240	453.8	456.7	0
241	2,113.8	2,350.7	18
242	10,566.9	9,594.4	47
243	6,014.2	5,367.1	33
244	9,246.0	9,113.5	46
245	718.2	570.2	6
246	5,375.4	4,773.7	27
247	10,184.9	8,041.1	82
248	3,370.7	2,732.9	9
249	1,417.0	1,537.3	10
250	1,938.5	1,666.5	11
251	5,859.7	6,226.1	38
252	608.0	727.6	3
253	2,398.4	2,376.1	5
254	763.3	848.5	6
255	246.5	338.3	2
256	241.6	342.1	1
257	1,399.6	1,303.2	7
258	2,768.0	2,000.7	18
259	4,606.7	3,771.0	20
260	4,344.4	2,582.8	16
261	18,161.1	15,107.9	78
262	1,299.0	1,709.0	17
263	2,372.1	2,636.8	23
264	1,190.8	1,702.5	0
265	3,647.9	3,684.2	19
266	2,558.6	2,423.2	8
267	2,984.5	2,576.1	15
268	5,484.3	5,583.6	18
269	19,258.8	15,681.5	63
270	1,413.3	1,140.5	4
271	8,409.2	7,254.9	18
272	2,810.0	2,988.9	12
273	16,609.7	15,676.1	58
274	4,916.2	4,876.4	22
275	1,750.8	2,075.0	3
276	1,262.5	513.7	2
277	3,304.2	1,952.2	1
278	2,122.2	1,975.8	4
279	4,110.5	2,266.8	8
280	10,444.5	7,982.8	13
281	3,153.1	1,949.4	14
282	4,456.3	5,020.4	19
283	11,310.6	10,414.3	46
284	2,255.7	2,249.9	3
285	1,676.2	1,238.4	9

Appendix B

Lake Lanier Boat Dock Carrying Capacity Study
Appendix B: LDA Data

LDA_ID	Boundary Frontage LDA Length (ft)	Boundary Frontage LDA Total Shoreline Length (ft)	Number of Docks (in 2002)*
286	830.7	877.6	8
287	920.6	1,245.2	8
288	202.7	260.8	0
289	1,717.1	1,475.8	14
290	3,682.8	3,214.2	115
291	494.9	318.5	0
292	1,435.9	2,515.1	9
293	822.1	1,109.8	2
294	2,650.6	1,882.5	7
295	3,904.6	3,902.1	14
296	8,579.3	7,678.7	52
297	942.8	535.8	4
298	24,080.0	21,235.1	65
299	4,938.6	4,169.3	30
300	6,377.1	7,211.5	5
301	3,995.9	3,829.6	24
302	1,636.9	2,266.8	0
303	4,601.6	3,942.6	22
304	1,417.5	1,425.7	3
305	14,113.8	13,157.3	59
306	8,611.3	8,508.6	40
307	7,479.4	7,079.7	22
308	2,131.9	1,242.2	2
309	4,375.1	3,044.8	7
310	6,358.8	5,326.2	22
311	1,674.4	1,746.2	5
312	4,442.1	4,573.0	17
313	9,918.1	8,482.1	45
314	2,893.5	2,367.3	6
315	2,783.3	2,525.9	15
316	4,605.4	3,656.6	17
317	1,419.5	1,261.8	9
318	686.7	495.7	4
319	2,043.6	1,522.2	0
320	8,656.2	6,346.8	28
321	2,580.1	2,753.4	17
322	4,463.1	4,478.3	18
323	3,952.8	3,774.0	19
324	1,516.8	2,564.3	5
325	1,045.0	1,561.5	5
326	12,446.8	10,296.0	34
327	1,452.0	1,316.6	1
328	899.2	788.5	2
329	14,085.7	13,173.9	12
330	3,075.5	3,389.1	4
331	1,944.4	1,841.3	11

Appendix B

Lake Lanier Boat Dock Carrying Capacity Study
Appendix B: LDA Data

LDA_ID	Boundary Frontage LDA Length (ft)	Boundary Frontage LDA Total Shoreline Length (ft)	Number of Docks (in 2002)*
332	4,547.8	3,423.2	23
333	923.0	914.6	5
334	10,906.1	9,888.0	37
335	5,123.0	4,524.9	23
336	3,858.0	4,159.5	13
337	4,855.0	4,708.3	12
338	5,372.7	5,184.1	10
339	15,792.7	13,859.1	60
340	1,814.2	2,133.3	11
341	2,340.2	2,093.6	7
342	3,010.8	2,068.3	8
343	586.2	255.6	2
344	1,260.7	1,180.6	6
345	1,224.6	677.7	7
346	1,180.0	1,097.4	8
347	772.6	398.7	3
348	11,646.8	9,102.3	42
349	2,298.8	1,724.1	11
350	2,842.4	1,750.2	4
351	1,453.0	1,372.0	6
352	809.5	831.5	7
353	972.0	900.0	7
354	4,783.3	4,361.6	26
355	5,153.7	5,677.6	15
356	1,110.3	1,497.8	1
357	1,834.0	1,753.6	1
358	2,220.2	1,960.8	9
359	3,690.5	3,660.2	21
360	1,754.2	1,875.5	0
361	983.7	1,007.5	0
362	2,795.4	2,457.6	3
363	5,779.2	3,334.0	0
364	5,758.8	4,860.3	0
365	1,604.9	1,155.8	0
366	6,995.7	7,111.7	0
367	1,829.6	816.3	0
368	7,090.5	5,687.9	1
369	1,706.6	1,317.0	1
370	859.6	1,376.2	3
371	1,831.9	2,326.7	7
372	904.9	274.4	2
373	2,212.8	1,733.3	13
374	1,006.3	1,043.8	10
375	3,836.1	2,632.7	18
376	3,045.8	2,441.3	16
377	3,517.6	2,805.7	0

Appendix B

Lake Lanier Boat Dock Carrying Capacity Study
Appendix B: LDA Data

LDA_ID	Boundary Frontage LDA Length (ft)	Boundary Frontage LDA Total Shoreline Length (ft)	Number of Docks (in 2002)*
378	1,027.1	1,000.7	1
379	1,872.7	2,098.7	0
380	2,560.8	2,449.4	1
381	3,248.3	2,810.1	3
382	937.4	709.0	8
383	4,311.7	3,433.3	16
384	1,128.1	651.6	3
385	384.4	255.4	2
386	6,142.7	6,860.4	14
387	12,469.3	9,617.6	43
388	804.7	573.7	2
389	208.3	239.2	0
390	245.7	331.3	0
391	2,457.7	1,716.5	4
392	1,974.9	1,407.2	8
393	113.5	120.4	6
394	96.3	107.4	6
395	2,990.4	2,533.4	11
396	683.3	948.6	1
397	1,551.8	1,243.3	3
398	5,561.8	5,882.8	23
399	2,011.6	3,155.6	11
400	1,266.3	2,030.4	5
401	3,863.7	3,489.2	17
402	4,144.1	5,131.0	2
403	4,560.4	4,666.0	10
404	2,296.8	1,910.7	1
405	3,775.5	4,360.0	8
406	5,107.6	4,788.6	18
407	597.1	551.8	1
408	3,053.3	3,269.2	7
409	671.5	786.5	6
410	3,880.7	2,955.3	12
411	557.4	532.0	3
412	1,743.4	1,675.8	6
413	6,688.2	5,596.5	16
414	1,400.1	1,662.8	10
415	3,427.0	3,470.3	15
416	4,409.4	4,005.1	5
417	21,590.5	22,901.9	76
418	6,298.9	6,871.2	33
419	392.6	731.8	4
420	523.2	1,219.9	6
421	8,069.7	8,592.6	28
422	23,486.8	19,671.3	83
423	2,865.6	2,878.4	5

Appendix B

**Lake Lanier Boat Dock Carrying Capacity Study
Appendix B: LDA Data**

LDA_ID	Boundary Frontage LDA Length (ft)	Boundary Frontage LDA Total Shoreline Length (ft)	Number of Docks (in 2002)*
424	4,593.8	4,583.9	11
425	1,120.7	642.3	6
426	3,155.2	2,523.0	9
427	1,725.3	1,836.3	0
428	8,933.7	7,558.1	40
429	3,500.0	4,010.0	21
430	4,255.4	4,812.9	27
431	5,152.3	4,955.5	27
432	4,533.4	4,197.6	1
433	5,774.5	5,284.5	30
434	4,486.8	3,468.8	24
435	1,080.6	696.6	6
436	14,686.9	11,791.4	36
437	7,666.1	4,622.1	19
438	1,474.0	491.6	4
439	10,100.4	11,537.2	52
440	2,319.6	2,403.5	15
441	5,430.2	4,445.7	21
442	3,269.5	2,386.0	12
443	3,376.0	3,120.2	23
444	2,714.1	2,347.5	17
445	10,690.1	10,144.2	46
446	7,215.4	5,820.5	32
447	797.7	718.4	2
448	1,006.9	817.1	9
Total	1,997,654.8	1,868,227.4	8,593

* Includes private dock equivalents for community docks.