ALABAMA POWER COMPANY PRELIMINARY LICENSING PROPOSAL

MARTIN DAM PROJECT
FERC PROJECT NO. 349

Prepared by:

ALABAMA POWER
A SOUTHERN COMPANY

Kleinschmidt
Energy & Water Resource Consultants

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ALABAMA POWER COMPANY
BIRMINGHAM, ALABAMA

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MARTIN DAM PROJECT
PRELIMINARY LICENSING PROPOSAL- ACRONYMS

A	
A&I	Agricultural and industrial water supply
ac	Acre
ACT	Alabama – Coosa – Tallapoosa
ADA	Americans with Disabilities Act
ADCNR	Alabama Department of Conservation and Natural Resources
ADEM	Alabama Department of Environmental Management
af	Acre-feet
AL SHPO	Alabama State Historic Preservation Officer
AL	Alabama
ARA	Alabama Rivers Alliance
B	
BMP	Best Management Practices
BOD	Biochemical Oxygen Demand
C	
C	Celsius
CEII	Critical Energy Infrastructure Information
CEWA	Central Elmore Water Authority
CFR	Code of Federal Regulations
cfs	Cubic feet per second
Cl	Cecil stony loam
Cm	Cecil gravelly sandy loam
CRP	Comprehensive recreation plan
Csl	Cecil stony sandy loam
Cst	Cecil slate loam
CWA	Clean Water Act
CWP	Clean Water Partnership
D	
Dl	Durham coarse sandy loam
DO	Dissolved oxygen
E	
EAP	Emergency Action Plan
EPA	Environmental Protection Agency
F	
F	Fahrenheit
F&W	Fish and wildlife
FERC	Federal Energy Regulatory Commission
FPA	Federal Power Act

MARTIN DAM PROJECT PRELIMINARY LICENSING PROPOSAL- ACRONYMS	
ft	Feet
G	
GA	Georgia
GPS	Global Positioning Systems
H	
HPMP	Historic Properties Management Plan
hp	Horsepower
Hz	Hertz
I	
ILP	Integrated Licensing Process
in	Inches
K	
K	Erosion factor
Ksat	saturated hydraulic conductivity (with regards to soil)
kV	Kilovolts
Kva	Kilovolt ampere
kW	Kilowatt
Kw	Pertains to erosion factors
kWh	Kilowatt-hour
L	
Lg	Louisa gravelly sandy loam
LIDAR	Light Detection and Ranging
LMHOBO	Lake Martin Home Owners and Boat Owners Association
LMRA	Lake Martin Resource Association
Ls	Louisa sandy loam
LWF	Limited warm water fishery
M	
M	Meter
M or Mc or C	Meadow
MD	Martin Datum
mgd	Million gallons per day
mi	Miles
MIG	Martin Issue Group
ml	Milliliters
ml/l	Milliliters per liter
msl	Mean sea level
MW	Megawatt
MWh	Megawatt-hour
N	

MARTIN DAM PROJECT PRELIMINARY LICENSING PROPOSAL- ACRONYMS	
NEPA	National Environmental Policy Act
NGO	Non-governmental organization
NMFS	National Marine Fisheries Service
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NTU	Measure of turbidity
O	
OAR	Office of Archaeological Research
OAW	Outstanding Alabama Water
ONRW	Outstanding National Resource Water
P	
PA	Programmatic Agreement
PAD	Pre-Application Document
pH	measure of the acidity or basicity of a solution
PID	Preliminary Information Document
PLP	Preliminary License Proposal
PME	Protection, Mitigation and Enhancement
PWS	Public water supply
R	
R	Rough stone land
Rb	Rough broken land
RCW	Red-cockaded woodpecker
RM	River miles
S	
S	Swimming
SCORP	Alabama Statewide Comprehensive Outdoor Recreation Plan
SH	Shellfish harvesting
SHPO	State Historic Preservation Officer
SMP	Shoreline Management Plan
T	
TMDLs	Total maximum daily loads
TSI	Trophic State Index
U	
ug/l	micrograms per liter (one millionth of a gram per liter)
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

MARTIN DAM PROJECT
PRELIMINARY LICENSING PROPOSAL- ACRONYMS

W	
WWF	World Wildlife Fund
Y	
Ysl	York sandy loam

PRELIMINARY LICENSING PROPOSAL

MARTIN DAM PROJECT
FERC PROJECT NO. 349

ALABAMA POWER COMPANY
BIRMINGHAM, ALABAMA

1.0 INTRODUCTION

The Martin Dam Hydroelectric Project (Project) is an existing hydropower facility owned and operated by Alabama Power Company (Alabama Power) and licensed by the Federal Energy Regulatory Commission (FERC or Commission) as Project Number 349. Completed in 1926, the project is located on the Tallapoosa River in eastern Alabama and is operated as a peaking facility to provide power to the grid, supporting power needs of Alabama and surrounding states.

Alabama Power submits this Preliminary Licensing Proposal (PLP) pursuant to section 5.16 of 18 CFR and in concurrence with the process requirements determined under the Commission's Integrated Licensing Process (ILP). In accordance with these processes, participating agencies and stakeholders will have 90 days to provide comment on the PLP from the date of its issuance.

1.1 PURPOSES OF THE PRELIMINARY LICENSING PROPOSAL

The purposes of the PLP, as defined by 18 CFR § 5.16 are to:

- Describe the existing and proposed project facilities, including project lands and waters;
- Describe the existing and proposed project operation and maintenance plan, to include measures for protection, mitigation, and enhancement (PME) with respect to each resource affected by the Project proposal; and
- Provide Alabama Power's draft environmental analysis of the continuing and incremental impacts of the PLP by resource area, including the results of studies conducted under the approved study plans.

In consultation with participating federal, state and local agencies, non-governmental organizations (NGOs), Native American tribes, and the public, Alabama Power developed study plans, which were filed with the Commission and approved under the Commission's Study Plan Determination in a letter dated April 17, 2009 (contained in the "Study Plans" folder on the "Martin Project PLP and Supporting Documents" DVD). These studies were completed in 2009

and 2010, and the results of these studies have been incorporated into the associated analysis of resources in the PLP. Copies of all draft and final reports are available on Alabama Power's website at http://www.alabamapower.com/hydro/m_migs.asp and in the "Draft Study Reports" and "Final Study Reports" folders on the "Martin Project PLP and Supporting Documents" DVD.

This PLP contains a draft environmental analysis of Alabama Power's five operating alternatives that modify the Flood Control Guide Curve and proposed Protection, Mitigation, and Enhancement (PME) measures to accompany each of the five distinct operational alternatives.

1.2 COMMONLY USED TERMS IN THE PLP

In this PLP, there are a number of terms used to discuss the Project and proposed measures. Those terms and definitions are listed below for the reader's reference.

1. **Project Boundary** – this term refers to the land and water contained in the area defined by the FERC as the lands and waters necessary to operate the Project.
2. **Project Area** – this term refers to the land and water in the Project Boundary and immediate geographic area adjacent to the Project Boundary.
3. **Project Vicinity** – this term refers to a larger geographic area near the Project, for example, a county.
4. **Flood Control Guide Curve** – the maximum elevation at which the lake is normally maintained in the interest of flood control. This term refers to the various operating alternatives (alternate flood control guidelines in increasing increments of 1 foot to 5 feet; early filling of the reservoir to summer full pool by April 1; and extension of the summer full pool until October 15 that were part of Study Plan 12(a) and presented in this PLP.
5. **Protection, Mitigation and Enhancement Measures** – this term refers to a "package" or "suite" of environmental, recreational, and cultural measures that a licensee might propose to protect project resources, mitigate for project impacts, and/or enhance various aspects of the project resources.

1.3 REVIEW SCHEDULE

This PLP is being provided to participating agencies, tribes, NGOs, and the public for review and comment. As required by 18 CFR § 5.16(e), comments must be filed with FERC no later than 90 days from the issuance date of the PLP, or April 7, 2011.

Comments to FERC should be sent to:

Ms. Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, DC 20426

A copy of comments sent to FERC should also be sent to Alabama Power at the following address:

Mr. Jim Crew
Alabama Power Company
600 North 18th Street
Birmingham, AL 35291

1.4 DOCUMENT ORGANIZATION

This PLP is organized to follow the content requirements outlined in 18 CFR § 5.16 and contains the following sections:

Section 1	Introduction
Section 2	Proposed Action, including a description of existing and proposed Project facilities, proposed Project operation, and proposed protection, mitigation, and enhancement measures
Section 3	Summary of Pre-filing Consultation
Section 4	Discussion and Selection of Alternatives
Section 5	Environmental Analysis
Section 6	Consistency with Comprehensive Plans

2.0 PROPOSED ACTION

The following sections serve to provide 1) background information including descriptions of the Project and associated facilities; 2) Alabama Power's proposal for the continued operation of the Project; and 3) an initial description of the proposed PME measures with further detail provided in the Environmental Analysis, Section 4.0.

2.1 PROJECT DESCRIPTION

Martin Dam is located approximately 60.6 river miles (RM) upstream of the junction of the Tallapoosa and Coosa River, which forms the Alabama River. The Project is located between the R.L. Harris Dam, which is approximately 78.5 RM miles upstream, and the Yates and Thurlow Dams located approximately 7.9 and 10.9 RM downstream, respectively. All four dams are owned and operated by Alabama Power. Figure 2-1 and Figure 2-2 shows the Project location in the state and its proximity to Harris, Yates, and Thurlow developments.

Alabama Power began construction on the Martin Project in 1923 and it was placed in service in 1926. In the 1920s, when land was being purchased for construction of the Project, a locally established reference point known as Martin Datum (MD) was used for determining elevations. Today, most figures, drawings, and general references are shown in mean sea level, which FERC also uses as its standard. An elevation listed as "mean sea level" is equivalent to 1 foot greater than Martin Datum Elevation, which means that elevation 490 Martin Datum is equivalent to 491 mean sea level (msl).

Throughout this document elevations are presented in mean sea level rather than Martin Datum.

2.1.1 PROJECT FACILITIES

The Project consists of a concrete gravity dam with an earth dike section, about 2,000 ft in length and with a maximum height of 168 ft. The dam contains a 720-foot long arched concrete gravity gated spillway with 20 vertical lift steel spillway gates measuring 30 feet wide by 16 feet high. The spillway gates are used to pass floodwaters in excess of turbine capacity. The deck elevation above the spillway is 501 ft msl.

There is a 255-foot concrete gravity non-overflow section on the right abutment, and an approximately 1,000-foot compacted homogeneous earth embankment on the east (left) abutment (Finlay Engineering, 2005).

Project headworks include a 280-foot concrete gravity intake structure with 12 intake gates (three per unit) measuring 9 feet wide by 24 feet high. Each intake is fitted with a trash rack, and there are four steel penstocks (Alabama Power Company, 2005a).

The Martin powerhouse is a brick, steel, and concrete structure standing 99 feet above the generator floor and is integral with the intake facilities. It houses four vertical flow units totaling 182.5 MW. The building measures 307.9 feet long by 58 feet wide by 99 feet high. It contains an overhead crane with a capacity of 200 tons. The crane is used to perform maintenance on the units. Generators 1, 2, and 3, installed in 1926, were upgraded between 2001and 2004 and have a rating of 40 to 45 MW. Each is driven by a vertical type Francis turbine with 54,000 to 61,000 horsepower. The fourth generator, installed in 1952, has a rating of 55.2 MW and is driven by a 78,000 horsepower vertical type Francis turbine (Alabama Power Company, 2005b). Unit 1 refurbishment was completed and put into service on March 10, 2002, with an increase in capacity from 33.0 to 45.8 MW. Unit 2 was refurbished and placed into service on February 4, 2004 with an increase in capacity from 33.0 to 41.0 MW. Unit 3 was refurbished and placed back into service on March 28, 2003 with an increase in capacity from 33.0 to 40.5 MW. Unit 4 has not been upgraded since its installation in 1952 (Alabama Power Company, 2005b).

The Project intake structures' inverts are located 68 feet below normal full pool elevation. During the 2007 drought, Alabama Power asked General Electric to investigate the minimum operational elevation at which water could be released through the turbines without causing damage to the equipment. It was determined that elevation 445.5 mean sea level was the lowest elevation the Project could safely operate the turbines. The Project also includes two short (450-ft-long) 115-kilovolt transmission lines and appurtenant facilities (FERC, 2005).

Table 2-1 contains a list of minimum and maximum hydraulic capacities along with the installed capacity. Alabama Power has no operating experience with discharges less than best gate on all units (minimum hydraulic capacity). Because of the unknown consequences, operating points lower than best gate cannot be used for long periods of discharge.

TABLE 2-1 MINIMUM AND MAXIMUM HYDRAULIC CAPACITY FOR THE MARTIN PROJECT (Source: pers. comm., Andy Sheppard, Alabama Power Company, 2008)

UNIT	CFS		MW
	MIN HYDRAULIC CAPACITY (BEST GATE)	MAX HYDRAULIC CAPACITY (FULL GATE)	AUTHORIZED / INSTALLED CAPACITY
1	4,024	4,631	45.8
2	3,653	3,951	41.0
3	3,563	3,968	40.5
4	4,464	5,616	55.2

Alabama Power supplies electric power throughout a large part of Alabama and exchanges electric power with other operating subsidiaries of Southern Company in Florida, Mississippi, and Georgia, and with the Tennessee Valley Authority by means of physical connections of the transmission systems of each.

Units 1, 2, and 3 are connected through a bank of three, single line phase 12/115 kilovolt step-up transformers, rated 14,000 kilovolt amperes each. Unit 4 is connected through a bank of three, single phase 12/115 kilovolt step-up transformers, rated 23,333 kilovolts each. These transformers are located on the downstream side of the headworks, immediately behind the powerhouse, and are connected to a switching station located at the west end of the dam. The generating plant is connected into the integrated transmission system through nine 115 kilovolt transmission lines terminating at this switching station. The Project also includes two short (450-foot long) 115-kilovolt transmission lines and appurtenant facilities (Alabama Power Company, 2005a). A single line diagram for the Martin Project is included on the "Martin Project PLP and Supporting Documents" DVD.

2.1.2 PROJECT LANDS AND WATERS

Lands, waters, and structures needed to operate the Project are required by FERC to be enclosed by a Project Boundary. Figures 2-3 through Figure 2-7 depict the Project Boundary for this Project. Alabama Power is responsible for managing activities within the FERC Project Boundary, which also includes a 30-foot control strip (measured horizontally from elevation 491) located in some areas of the Martin Project.

The Martin reservoir, commonly referred to as Lake Martin, extends up the river for approximately 31 miles with approximately 700 miles of shoreline. The reservoir surface area is about 40,000 acres at the normal full pool elevation of 491 ft msl and has a mandatory drawdown of 10 ft in the winter months (Finlay Engineering, 2005). The normal tailwater elevation is 344 ft msl. The gross storage capacity of Lake Martin is 1,628,000 acre-feet; active storage in the available 45.5 ft drawdown is 1,202,000 acre-feet (FERC, 1978; modifications from personal comm., Ashley McVicar, Alabama Power Company).

FIGURE 2-1 LAKE MARTIN PROJECT BOUNDARY

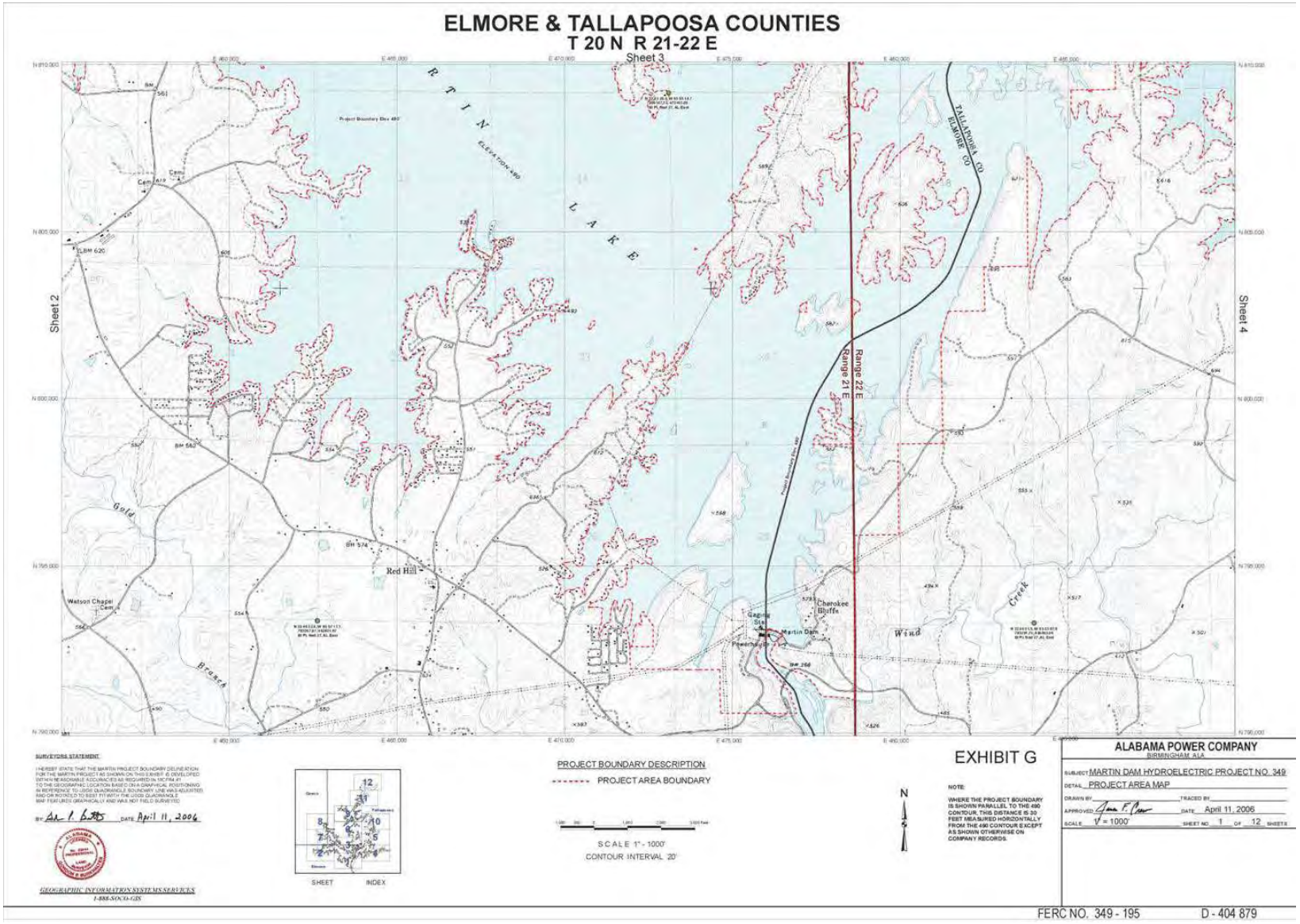


FIGURE 2-2 LAKE MARTIN PROJECT BOUNDARY, CONTINUED

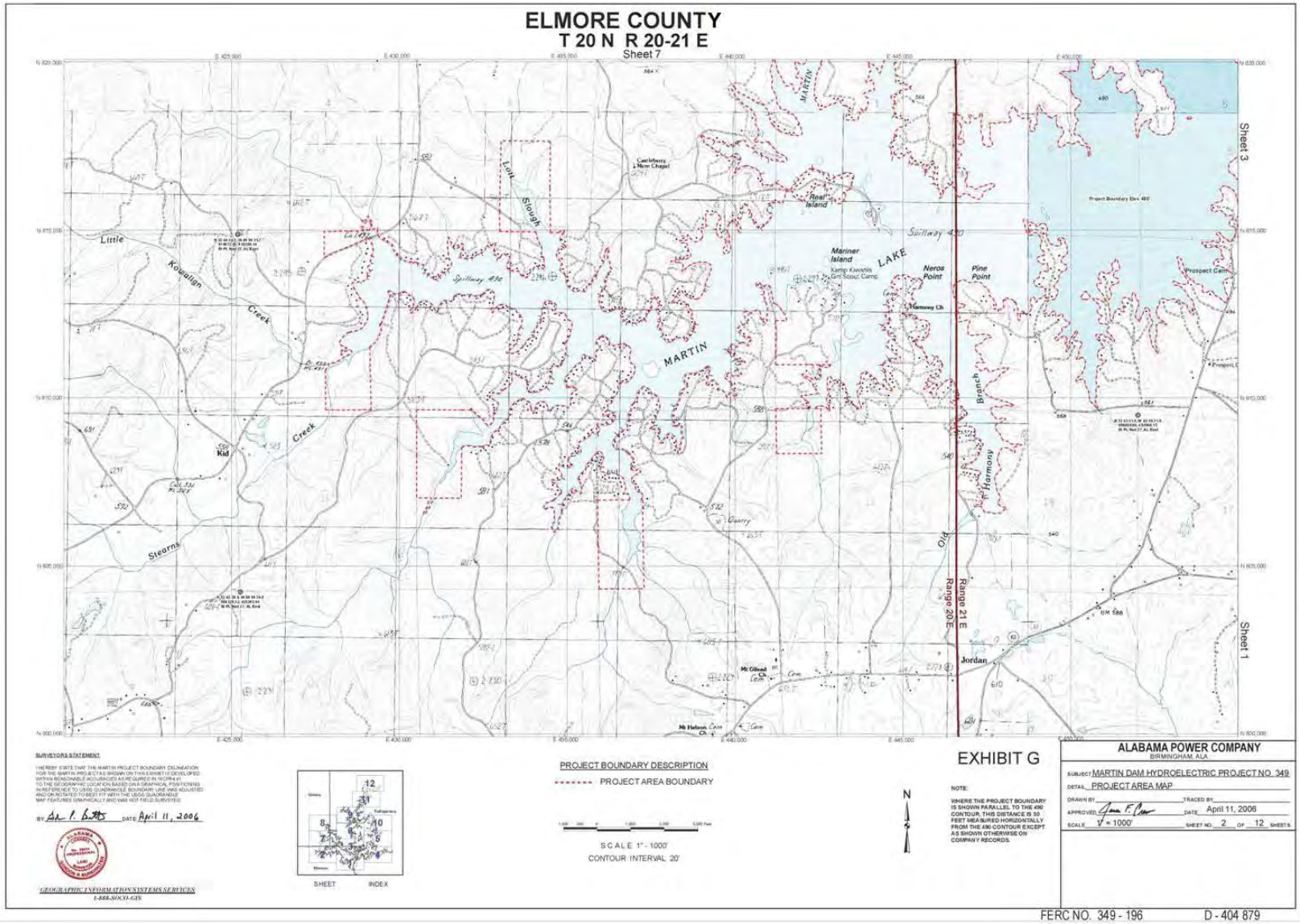


FIGURE 2-3 LAKE MARTIN PROJECT BOUNDARY, CONTINUED

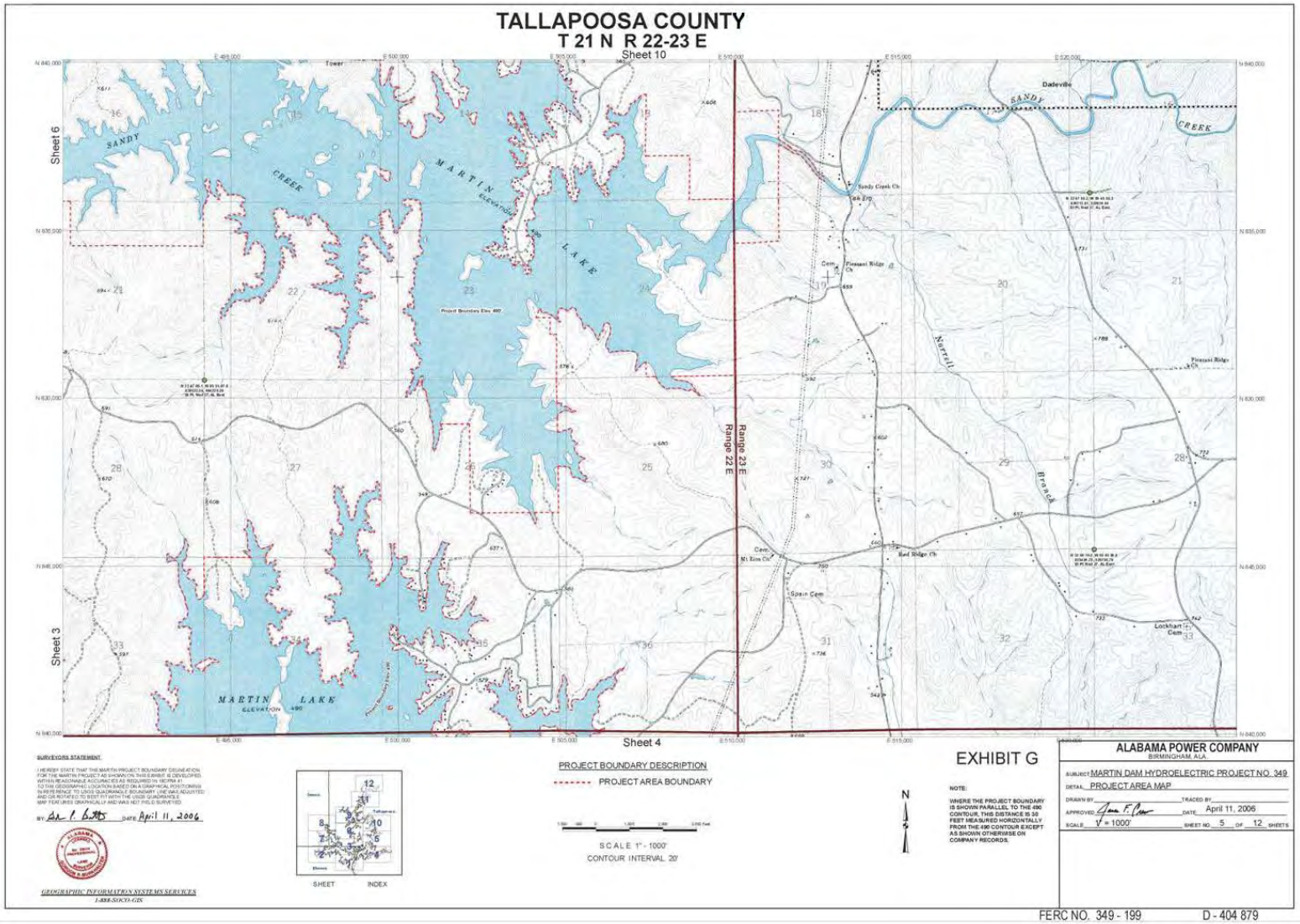


FIGURE 2-4 LAKE MARTIN PROJECT BOUNDARY, CONTINUED

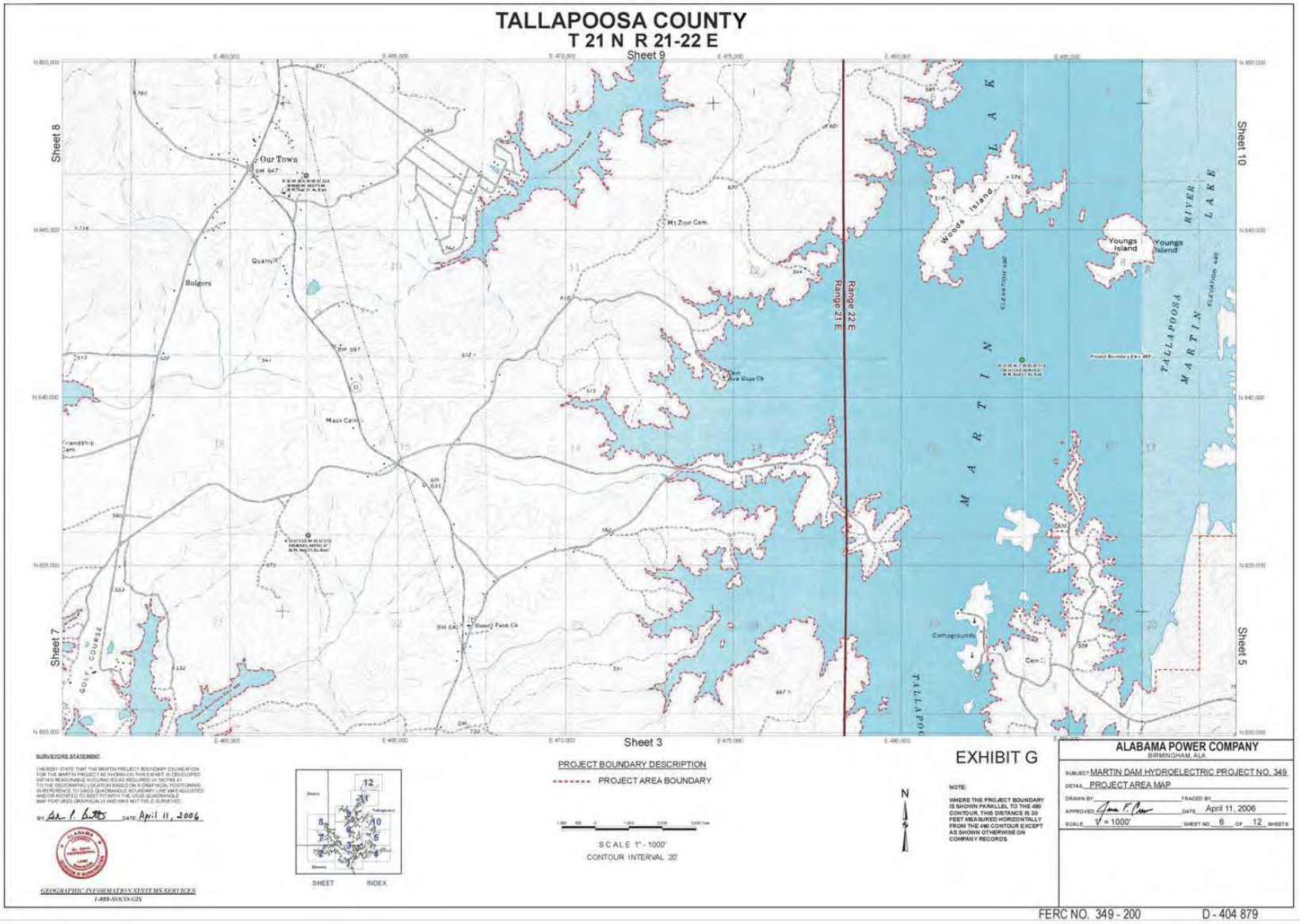


FIGURE 2-5 LAKE MARTIN PROJECT BOUNDARY, CONTINUED

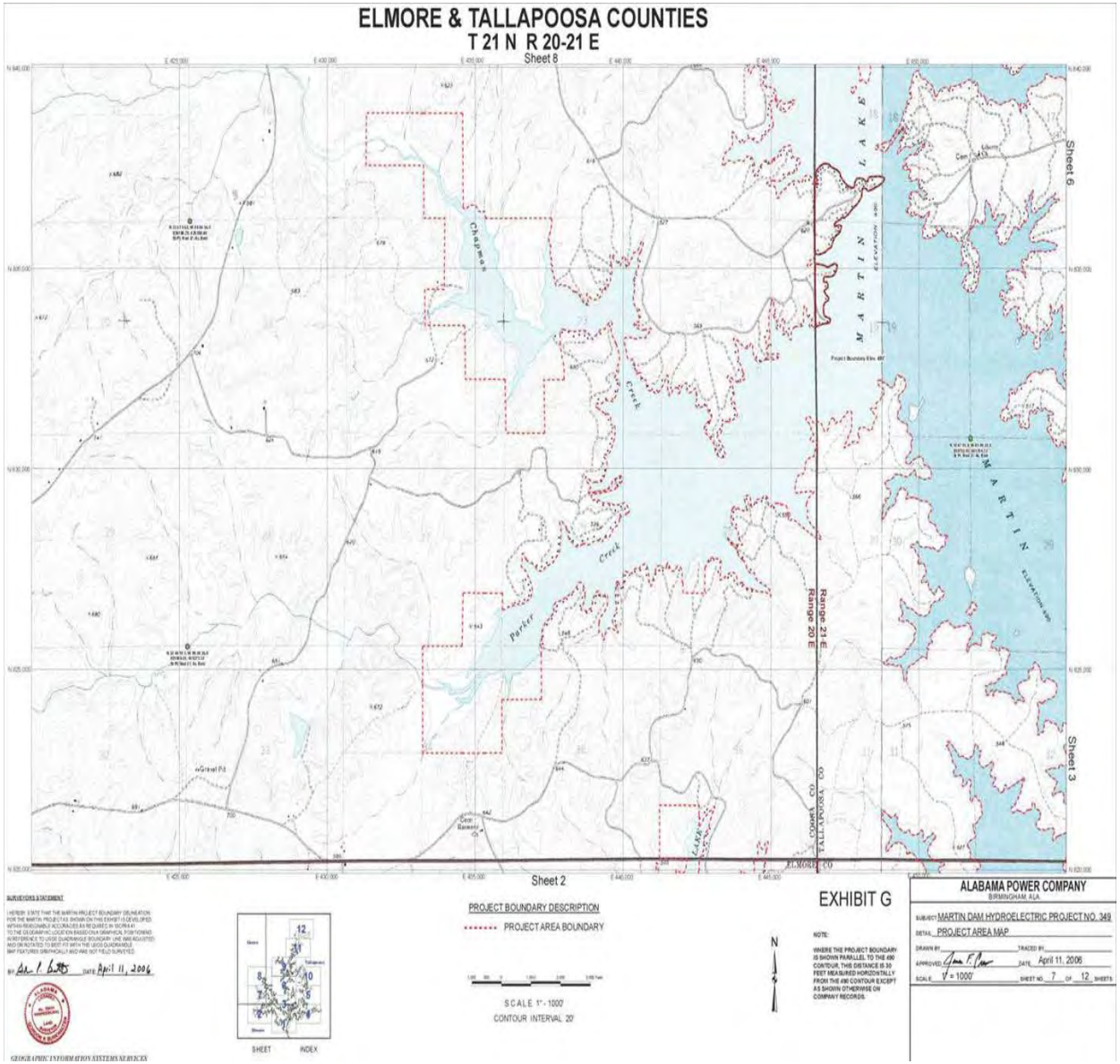


FIGURE 2-6 LAKE MARTIN PROJECT BOUNDARY, CONTINUED

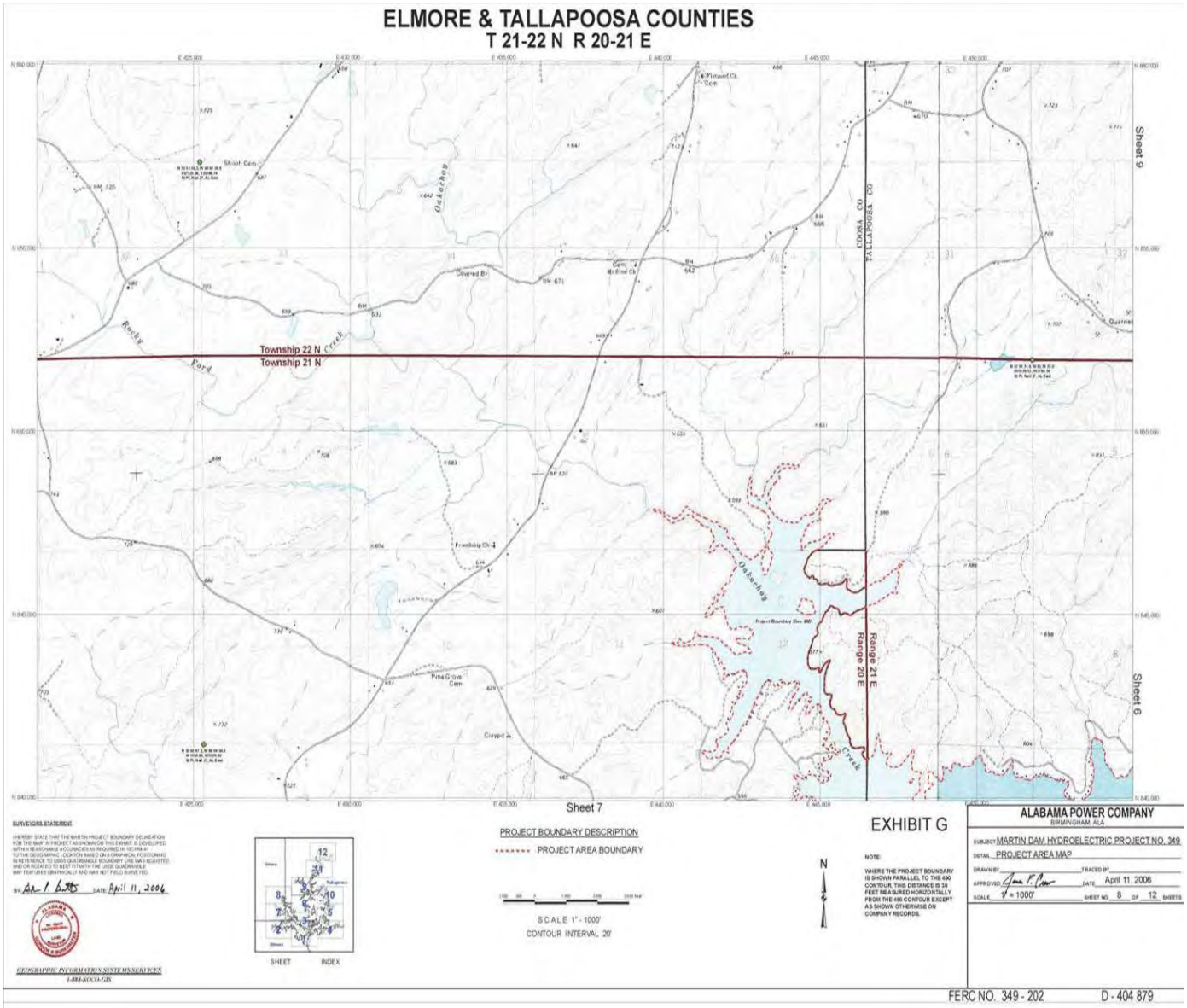
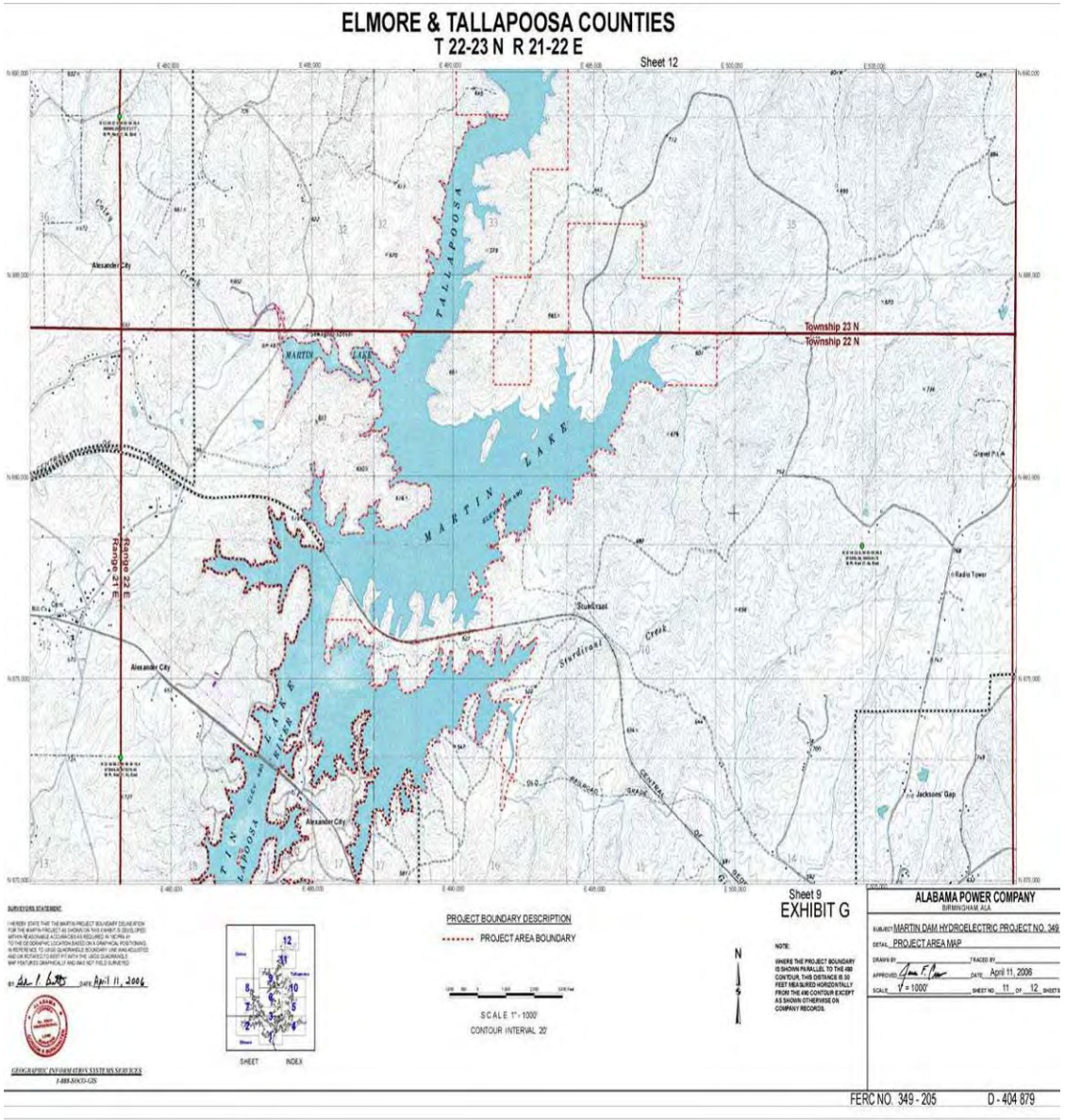


FIGURE 2-7 LAKE MARTIN PROJECT BOUNDARY, CONTINUED



2.1.3 EXISTING PROJECT OPERATION

The Project is a multipurpose storage reservoir. This means the lake level fluctuates seasonally to provide the many benefits the Project was built to support. These purposes include hydroelectric power, limited seasonal flood control when the reservoir is in drawdown condition, recreation, municipal and industrial water supply, water quality enhancement, aquatic flow maintenance, and navigation flow support. Some of these operational purposes enhance uses upstream of the dam, some help with needs downstream of the dam, and others, like hydroelectric power generation, directly benefit many people throughout the state.

Alabama Power uses three different guide curves in its operations of the Project—the Flood Control Guide, the Operating Guide, and the Drought Contingency Curve. These curves are illustrated on Figure 2-8.

The Flood Control Guide is the upper curve on Figure 2-8. It reflects the maximum elevation at which the lake is normally maintained in the interest of flood control. Beginning in January, the curve is at elevation 481 ft msl and remains constant until February 17. On this date, the curve begins rising until it reaches 491 feet mean sea level on April 28. The curve remains at this elevation until August 30, when it begins to lower. The curve lowers 10 ft to 481 ft msl by December 31 and remains constant until filling begins the next February 17. At times when the reservoir is below 491 ft, Alabama Power has the ability to store floodwater to help control high river flow events. After peak flood flows recede, Alabama Power lowers the lake elevation to or below the Flood Control Guide elevation (Figure 2-8).

When the inflow to and outflow from the reservoir cause the reservoir elevation to exceed the Flood Control Guide the plant is operated in the following manner:

1. Between elevation 481 msl and 486 msl, turbines at Martin Dam are operated to provide continuous outflow from Thurlow Dam of at least the equivalent of the hydraulic capacity of the turbines at Yates Dam, approximately 12,400 cfs.
2. Between elevation 486 msl and 489 msl, turbines at Martin Dam are operated to provide continuous outflow from Thurlow Dam of at least the plant capacity at that dam, approximately 13,200 cfs.
3. Above elevation 489 msl, turbines at Martin Dam are operated as in #2 above and further, if required to avoid rising above elevation 491 msl, will be operated to provide an outflow from Martin Dam at least equivalent to all turbine units available operating at full

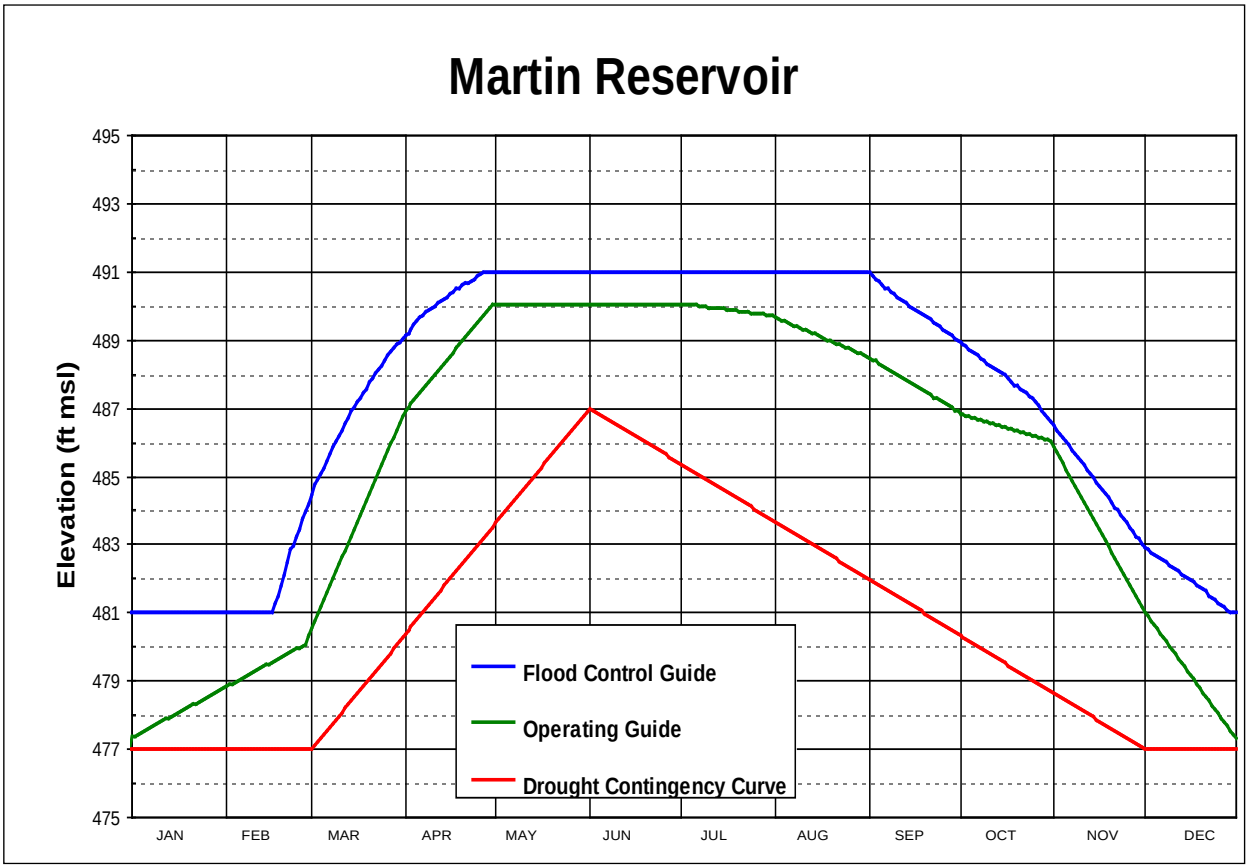
gate and gates will be raised so that the reservoir will not exceed elevation 491 msl except after all gates are raised and inflow exceeds the gate capacity. At elevation 491 msl the spillway will have a discharge capacity of 133,000 cfs.

The middle curve reflected on Figure 2-8 is the Operating Guide. This curve was developed in the 1970s through discussions with homeowner and boat owner groups who desired a higher pool elevation with less seasonal fluctuation than had been experienced historically. Under the original federal operating license issued in 1923, Alabama Power often operated the Project in a manner that lowered the lake twenty or more feet below 491 feet mean sea level. During relicensing in the 1970s, Alabama Power and certain stakeholders agreed to change the operation of the Project so that a higher pool elevation could be maintained for normal Project operations.

The area between the Flood Control Guide and the Operating Guide represents the range in which Alabama Power operates Lake Martin under normal conditions. Alabama Power attempts to maintain Lake Martin at or near the upper end of this operating range as often as possible. By operating the Project at or near the Flood Control Guide, Alabama Power optimizes Project benefits and is better able to refill the lake to near full pool each summer.

When the lake elevation drops below certain levels on the Operating Guide and remains there for seven days, Alabama Power reports this occurrence, by letter, to FERC and the Lake Martin Resource Association (LMRA). During this period, discharges are restricted to those that are necessary to fulfill requirements that include critical electrical system needs, downstream flow augmentation for navigation, water quality, fish and wildlife, and municipal/industrial water supply purposes.

FIGURE 2-8 MARTIN RULE CURVE



The lower curve on Figure 2-8 is the Drought Contingency Curve. This curve provides an indication of impending hydrologic drought conditions. During the 1990s, Alabama Power developed drought contingency curves for each of its hydroelectric projects, including the Martin Project. This action was prompted by a comprehensive study of the Alabama-Coosa-Tallapoosa River (ACT) Basin, which was being conducted by the states of Alabama, Georgia, and Florida as part of an ongoing water rights dispute among the three states. As part of the study, reservoir simulation models were developed for U.S. Army Corps of Engineers (USACE) and Alabama Power projects in the ACT Basin. These simulation models needed criteria for decision logic on how and when releases would be made from reservoirs under drought conditions.

Alabama Power prepared these drought contingency curves for Alabama Power's projects as part of this modeling effort. The intent of the curves is to flag conditions when reservoirs are in drought conditions. The Martin Drought Contingency Curve is not intended to dictate operations of the Project. Rather, the curve is used as one of several factors in evaluating drought reservoir operations. The curve was developed to reflect drought operations that occurred in 1986 and in

1988. In the recent droughts of 2000 and 2007, reservoir operations did not change at the instant when Lake Martin fell below the Drought Contingency Curve; however, this indication was one of several factors used in planning reservoir operations in coordination with Alabama Power's other reservoirs in the ACT Basin during these past two droughts.

The Project is a peaking project that usually operates Monday through Friday to meet peak power demands (CH2MHILL, 2005). During generation, the Project's four turbines release up to 17,900 cfs. Hours of generation each day depend principally on reservoir inflows which can vary significantly between wet and dry periods of the year. During the wetter periods (December through April), the Project usually operates eight to twelve hours daily on weekdays and for five to seven hours on Saturday. The Project would not typically operate on Sunday. During the drier periods (May through November), the Project usually experiences reduced inflows. Daily operation then becomes four to six hours Monday through Saturday and little or no operation on Sundays.

Releases from the Project flow directly into the Yates development's 2,000-acre reservoir and 45.5 MW powerhouse with a hydraulic capacity of approximately 12,400 cfs. Releases from Yates flow directly into the Thurlow development's 574-acre reservoir and 85.0 MW powerhouse with a hydraulic capacity of approximately 13,200 cfs (the Yates and Thurlow developments are licensed to Alabama Power as FERC Project No. 2407). Thus, the entire River segment from the Project to Thurlow Dam is impounded. Downstream of Thurlow Dam, the Tallapoosa River flows unimpeded for 45 miles (FERC, 1994).

Flows downstream of the Martin Project typically range from leakage (from the dam) to approximately 17,900 cfs. Alabama Power operates the Yates-Thurlow Project as run-of-river projects that take advantage of peaking releases from Martin. Since 1991, Alabama Power has provided a continuous 1,200 cfs minimum release from Thurlow powerhouse, with the exception of periods of extreme drought. On many occasions, releases from Martin Dam are necessary to meet this requirement. There are currently procedures in the Yates-Thurlow license that reduce the release requirement at Thurlow Dam whenever inflows to the Yates-Thurlow Project are abnormally low. Thus, normal flows downstream of Thurlow Dam typically vary from 1,200 cfs to 17,900 cfs. Flow in the Tallapoosa River, as measured ten miles downstream of the Project at

the U.S. Geological Survey (USGS) Milstead gage, average 4,822 cfs http://waterdata.usgs.gov/al/nwis/ uv?02419500 Accessed May 14, 2008).

2.1.3.1 SUMMARY OF PROJECT GENERATION AND OUTFLOW RECORDS

Alabama Power's operation of its Tallapoosa hydroelectric projects has many purposes. Alabama Power operates its four reservoirs on the Tallapoosa River to, among other things, meet a minimum release of 1,200 cfs below Thurlow Dam at Tallassee, Alabama and to maintain a flow of 4,640 cfs at Montgomery, Alabama as part of the ACT Basin system-wide agreement.

On average, the Martin Project generates about 40 percent of the electricity of Alabama Power's Tallapoosa River fleet of dams. The 10-year average annual generation for Martin Dam is approximately 333,000 MWh (Table 2-2). In addition, Lake Martin contributes to the energy that is generated at Yates and Thurlow dams because of its ability to store and release water that would otherwise be spilled. Furthermore, because of Martin Dam's operational flexibility, it is able to store water during low electrical usage periods and then generate with the same water during periods of high electrical use when production costs would normally be higher. This results in lower production costs to Alabama Power and savings for its customers. All of the electric energy generated at the Project is used in the interconnected system of Alabama Power for public utility purposes.

TABLE 2-2 MARTIN DAM PROJECT AVERAGE ACTUAL GENERATION FROM 1996 TO 2005 (Source: pers. comm., Andy Sheppard, Alabama Power Company, 2008)

MONTH	KWH
January	34,683,000
February	36,014,000
March	39,765,000
April	25,560,000
May	24,976,000
June	25,764,000
July	27,029,000
August	20,871,000
September	18,046,000
October	17,428,000
November	28,614,000
December	34,338,000
YEAR	**333,088,000**

2.2 PROPOSED PROJECT OPERATION

Alabama Power proposes to change the Flood Control Guide Curve elevation between 1 foot (482 msl) and 5 ft (486 msl) during the winter months, as described herein.

As part of the Project relicensing process, many stakeholders requested that Alabama Power investigate the feasibility of changing the Flood Control Guide Curve for the Martin reservoir. In response to these requests, Alabama Power conducted a series of studies that evaluated an increase in the winter pool elevation in increments of 1-foot from 481 ft msl to 486 ft msl (i.e., 482, 483, 484, 485, and 486 ft msl) as well as extending the summer pool level in the shoulder seasons (raise Lake Martin to full pool earlier in the Spring and maintain full pool into the early/mid Fall). Figure 2-9 shows the proposed Flood Control Guide Curve. These analyses resulted in 24 distinct alternatives, including baseline, as described in Table 2-3. The analyses were performed so that Alabama Power and its stakeholders could consider the effects of any proposed changes and could include these effects and the associated PME measures in this PLP.

FIGURE 2-9 FLOOD CONTROL GUIDE CURVE ALTERNATIVES

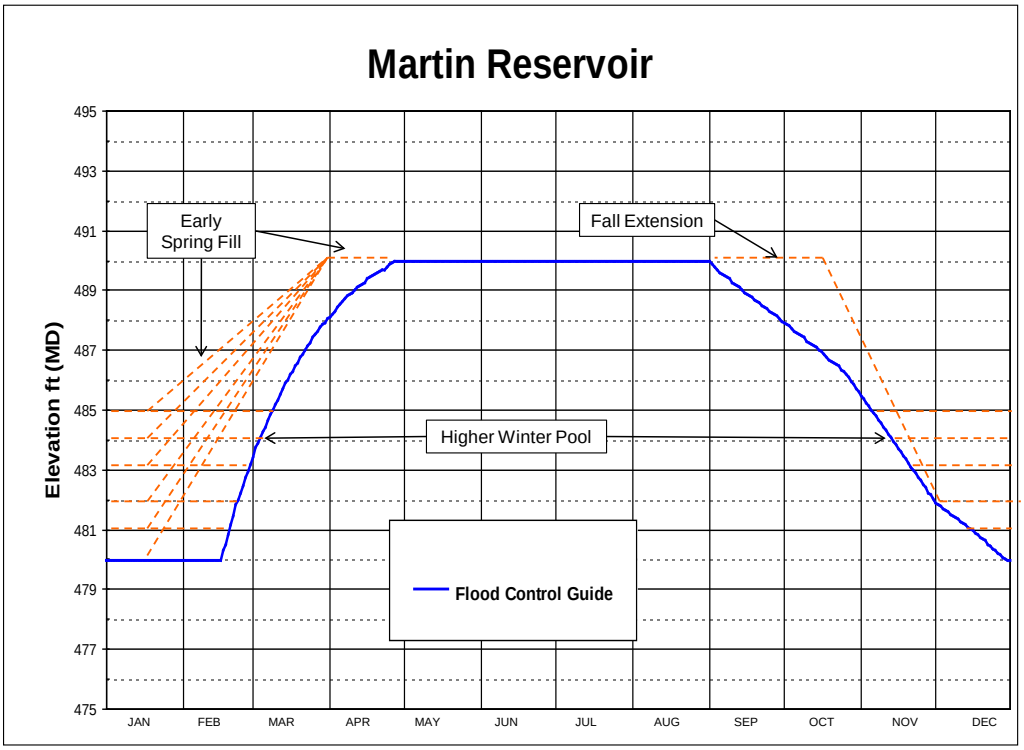


TABLE 2-3 ALTERNATIVES (INCLUDING BASELINE) FOR CHANGING THE FLOOD CONTROL GUIDE CURVE AT THE MARTIN PROJECT

HIGHER WINTER POOL	ALTERNATIVES																							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
EARLY SPRING							X	X	X	X	X	X							X	X	X	X	X	X
EXISTING BASE	X						X						X						X					
1		X						X						X						X				
2			X						X						X						X			
3				X						X						X						X		
4					X						X						X						X	
5						X						X						X						X
FALL EXTENSION													X	X	X	X	X	X	X	X	X	X	X	X

1 Baseline
2 1 ft winter
3 2 ft winter
4 3 ft winter
5 4 ft winter
6 5 ft winter
7 early spring
8 early spring – 1 ft winter
9 early spring – 2 ft winter
10 early spring – 3 ft winter
11 early spring – 4 ft winter
12 early spring – 5 ft winter
13 fall extend
14 fall extend – 1 ft winter
15 fall extend – 2 ft winter
16 fall extend – 3 ft winter
17 fall extend – 4 ft winter
18 fall extend – 5 ft winter
19 early spring & fall extend
20 early spring & fall extend – 1 ft winter
21 early spring & fall extend – 2 ft winter
22 early spring & fall extend – 3 ft winter
23 early spring & fall extend – 4 ft winter
24 early spring & fall extend – 5 ft winter

2.2.1 MULTIPLE DECISION CRITERIA ANALYSIS

There are many methods for making a decision in complex, multi-faceted projects including "Ad Hoc," Cost-Benefit Analysis (CBA), and Comparative Risk Assessment (CRA); each of these methods has strengths and weaknesses. Alabama Power selected a process called "Multi-Criteria Decision Analysis" (MCDA) to evaluate the 24 potential Flood Control Guide Curve alternatives (see Table 2-3). The MCDA for the Martin Project utilizes the pertinent data from the 22 FERC-approved study plans and subsequent reports, as well as the input of various stakeholder groups.

The purpose of an MCDA is to aid in the evaluation and selection of a preferred course of action among numerous alternatives based on multiple criteria. The MCDA is a mathematical tool that provides a systematic approach for the comparison of alternatives involving both quantitative (e.g., number of days, costs, etc.) and qualitative data (e.g., "good" or "bad"). MCDA identifies conflict areas and highlights areas of agreement and/or compromise through a transparent process. The MCDA can also accommodate disparate datasets.

The MCDA has four primary strengths:

- creates a systematic process for analyzing discrete Multi-Variate Decisions or alternatives;
- creates a Standard Scoring (Ranking);
- creates a means of documenting decisions; and
- facilitates an iterative process.

Alabama Power used the MCDA process as a screening tool to narrow the alternatives to the top five, based on the data, stakeholder rankings of the major criteria, and a stochastic analysis. Alabama Power hosted two meetings on the MCDA—October 13, 2010 and October 26, 2010. These meetings were designed to familiarize stakeholders with the MCDA process, allow them input to ranking the major criteria and allow them time to use the process and study the results. The first round of analysis resulted in Alternatives 2-6 as the most favorable given the quantitative and qualitative data and stakeholder input. The early spring fill, fall extension, and the early spring/fall extension combination scored lower than the increased winter pool elevations from 1-5 ft.

At the October 26, 2010 meeting, Alabama Power presented another round of analysis which confirmed that the top five highest ranking alternatives were the 1-5 foot winter pool increases (Flood Control Guide Curve) and those alternatives (renamed Alternative 1- Alternative 5) would be further evaluated in the PLP. The MCDA tool in Excel format was distributed to all stakeholders at the October 13, 2010 meeting. The MCDA spreadsheet, meeting summaries, presentations, stakeholder comments and Alabama Power's response to comments are presented on the "Martin Project PLP and Supporting Documents" DVD.

To summarize, the five operating alternatives from the MCDA process that Alabama Power is analyzing in the PLP include:

- Alternative 1 – 1 ft change in winter pool elevation (482 msl);
- Alternative 2 – 2 ft change in winter pool elevation (483 msl);
- Alternative 3 – 3 ft change in winter pool elevation (484 msl);
- Alternative 4 – 4 ft change in winter pool elevation (485 msl); and
- Alternative 5 – 5 ft change in winter pool elevation (486 msl).

Alabama Power proposes to select one of the five alternatives and a PME package to present in the Final License Application, which will be filed with FERC on or before June 8, 2011.

2.2.2 PROPOSED ENVIRONMENTAL MEASURES

In addition to proposing a change in the Flood Control Guide Curve at the Project, Alabama Power is also proposing various measures that provide additional protection, mitigation, and/or enhancement to the Project resources. A schedule for completing the PME plan is contained below the description of this draft PME plan. The following PME measures are proposed for each of the five operating alternatives described in section 2.2. Alabama Power proposes to:

- Prepare and implement a Shoreline Management Plan (SMP):
  - Provide more detail in Alabama Power's general shoreline permitting program regarding the use of rip-rap with or without seawalls.
  - Include Best Management Practices (BMP) for maintaining natural shorelines and/or shoreline buffers.
  - Educate private property owners on the benefits of maintaining natural shoreline as part of shoreline development.
  - Continue to retain a 30-foot Control Strip on any Project lands removed from the Project and encourage private land owners to establish or maintain a 30-foot buffer on privately owned shoreline lands.

- Implement measures to protect sensitive resources in the Project Boundary – specifically wetlands areas, cultural resources, and rare, threatened and endangered species (RTE) habitat.

- Prepare and Implement a Public Education Program:
  - Consult with ADCNR to develop methods for informing and educating anglers on the results of the striped bass hooking mortality study (Shorelines, Lake Martin magazine, etc.).
  - Consult with appropriate regulatory agency(ies) to develop methods for informing and educating boaters and homeowners on ways to prevent erosion and sedimentation.

- Implement a Wildlife Management Plan for Project lands
- Provide 500 acres for a Public Hunting Area
- Monitor potential increases in invasive aquatic vegetation in the Lake as part of a change in the Flood Control Guide Curve
- Monitor specific environmental water quality parameters based on consultation with ADEM, as necessary to evaluate the impacts from a Flood Control Guide Curve change
- Provide periodic winter draw-downs to 481 msl (original Flood Control Guide Curve) that would be dependent on hydrologic conditions
- Prepare a final Recreation Plan to include various enhancements as described in the recreation plan
- Prepare and implement a Historic Properties Management Plan (HPMP) and Programmatic Agreement (PA) for cultural resources

2.2.2.1 PME PLAN SCHEDULE

Alabama Power proposes to continue consultation with stakeholders and provide FERC a final PME plan on or before June 8, 2011 in conjunction with the filing of the Final License application. Requests for other PME measures will be addressed in the Final License Application. For example, by letter dated December 3, 2010, the Lake Martin Resource Association (LMRA) requested that Alabama Power consider studying ways to retain available water longer into October (fall extension) each year as an additional measure to protect, maintain or enhance Lake Martin. They cited the secondary ranking of this alternative and recreation and socioeconomic benefits described in Southwick 2010 (see sections 4.4.6 and 4.4.9). Alabama Power intends to analyze LMRA's proposed PME measure along with the PME measures discussed in Section 2.2.2 and present Alabama Power's analysis and recommendation in the Final License Application.

3.0 PRE-FILING CONSULTATION SUMMARY

3.1 STAKEHOLDER CONSULTATION

Alabama Power began the consultation process in 2006 by meeting with federal, state, and local agencies and other stakeholders to tour the Project, discuss potential project issues and gather available information. In January 2007, Alabama Power also held Issue Identification Workshops to facilitate discussions with stakeholders of the potential issues and data needs at the Project. The formal relicensing process began in June of 2008 with the filing of the Pre-Application Document (PAD) and Notice of Intent (NOI). Table 3-1 summarizes the consultation history up to the filing of the PLP for the Martin Project. Copies of formal comment letters and a transcript of the FERC Scoping meeting are available on FERC's e-library (http://www.ferc.gov/docs-filing/elibrary.asp) under Project No. 349.

TABLE 3-1 CONSULTATION SUMMARY FOR MARTIN PROJECT RELICENSING

YEAR	NAME	DESCRIPTION	DATE OF MEETING
2006	USFWS & ADCNR Meeting	Agency Meeting	03/10/06
2006	Boat Tours of Lake Martin	Agency Meeting	06/23/06
2006		Agency Meeting	08/17/06
2007	Issue Identification Workshop- Day		01/30/07
2007	Issue Identification Workshop- Evening		01/30/07
2007	Informational Meeting Presentation	Public Meeting	05/24/07 to 05/25/07
2007		Agency Meeting	06/12/07
2007		Agency Meeting	09/11/07
2007		MIGS	09/26/07 to 09/27/07
2008		Martin HOBO	02/13/08
2008		Agency Meeting	02/14/08
2008		ARA and WWF	02/15/08
2008	Study No.2 Shoreline Habitat Study Plan	ADCNR	03/05/08
2008	Martin Rule Curve Update		03/06/08
2008	Informational Meeting	Public Meeting	04/01/08

YEAR	NAME	DESCRIPTION	DATE OF MEETING
2008		MIG Meeting	04/01/08 to 04/02/08
2008	Cultural Resources	Project Overview	05/21/08
2008	Informational Meeting	Agency Meeting	08/06/08
2008	Striped Bass Conference Call	Agency or MIG 1	08/14/08
2008		LMRA and LMHOBO	08/28/08
2008	FERC Scoping Meeting	Public Meeting	09/10/08 to 09/11/08
2008		MIG 3 Meeting	10/06/08
2009	Study Plan Meeting		01/07/09
2009	Striped Bass Focus Group		01/08/09
2009	Martin Technical Workshop	spreadsheets	02/10/09
2009	Agency Meeting		02/26/09
2009	Socioeconomic Meeting		03/11/09
2009	MIG 6	Project and Process Overview; review study plan	03/12/09
2009	Recreation study		03/24/09
2009	MIG 6	Cultural Resources	04/22/09
2009	MIG 4	Shoreline Management	06/10/09
2009	MIG 6	Technical Workshop	06/18/09
2009	MIG 6	Technical workshop	07/23/09
2009	MIG 5	MIG meeting	08/06/09
2009	Stillwater, HOBO, Lake Watch	recreation-boat ramp issue	09/15/09
2009	Wildlife Management	Wildlife Management Program with agencies	09/23/09
2009	MIG 3	Technical workshop	09/29/09
2009	MIG 1, 2, 4, and 5	MIG meeting	10/21/09
2009	MIG 6	Site Visit	10/22/09
2009	Wildlife Management	ADCNR, USFWS	11/10/09
2009	Downstream flow	ADCNR, USFWS	11/10/09
2009	FERC Update Meeting	update on all study plans	12/03/09
2010	MIG 1 and 2 Meeting		03/30/10
2010	Technical Workshop-Present Modeling Reports		03/31/10
2010	MIG 6	Site Visit	05/06/10
2010	MIG 3 Update Meeting		05/19/10
2010	Water Quality Expert		07/27/10

YEAR	NAME	DESCRIPTION	DATE OF MEETING
	Panel		
2010	Updated Study Report Meeting		09/14/10
2010	PME with Agencies		10/07/10 10/08/10
2010	MIG 6 Cultural Resource	PA Review	10/13/10
2010	MCDA Meeting		10/13/10
2010	MCDA Follow-up		10/26/10
2010	MIG 3-12g and h		11/16/10
2010	MIG 4 and 5		11/16/10
2010	MIG 6	PA Review	11/16/10

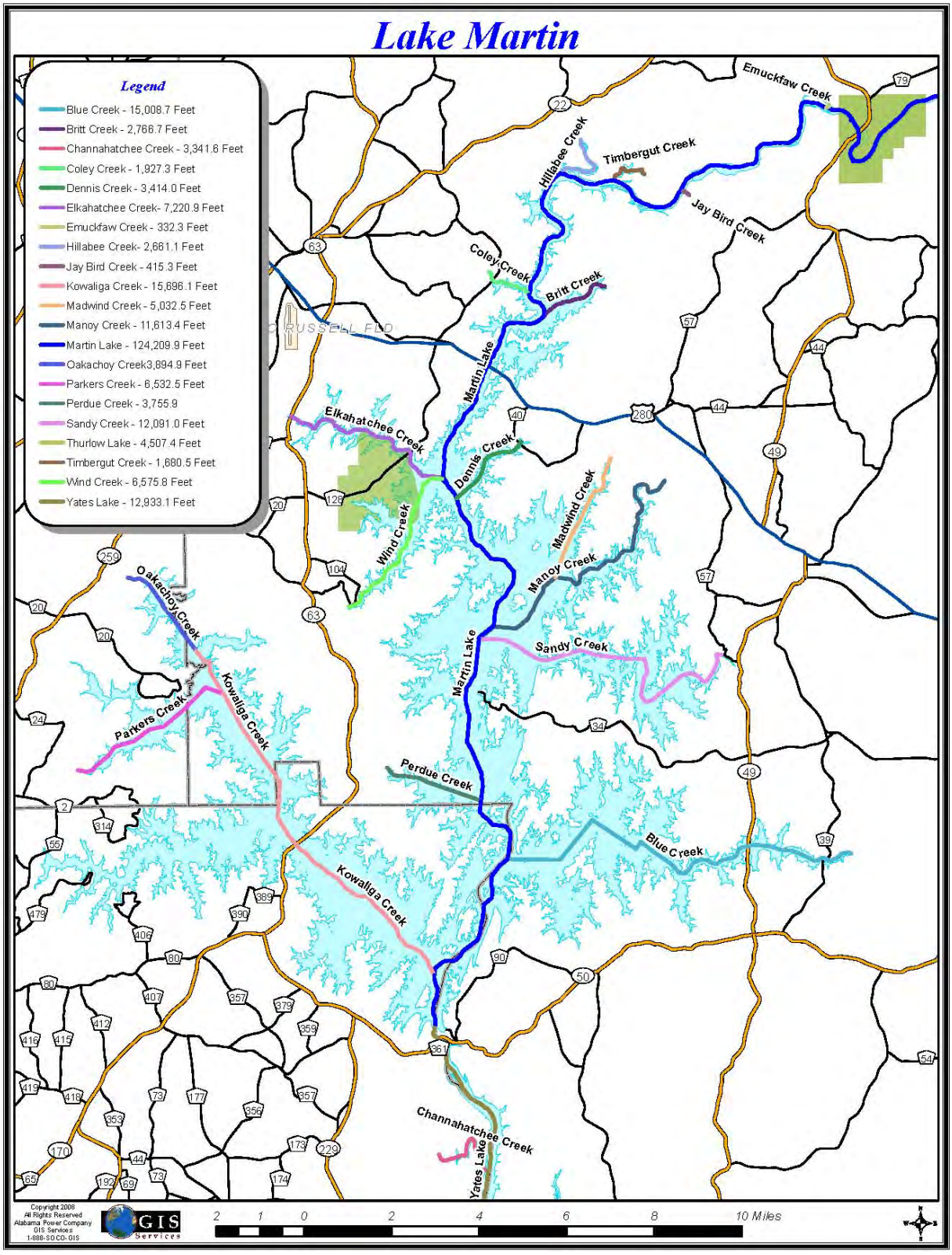
4.0 ENVIRONMENTAL ANALYSIS

4.1 GENERAL DESCRIPTION OF THE RIVER BASIN

The Tallapoosa River basin begins in western Georgia and flows southwesterly through east central Alabama (Figure 4-1). Lake Martin is a 31-mile long impoundment located in Coosa, Elmore, and Tallapoosa counties, on the Tallapoosa River, near Dadeville, in east central Alabama. Martin Dam is located approximately 60.6 miles upstream of the junction of the Tallapoosa and Coosa Rivers, which forms the Alabama River. The Lake has 700 miles of shoreline and a surface area of nearly 40,000 acres. The Basin is approximately 4,675 square miles, of which approximately 3,000 exist upstream of the Project. Approximately 15 percent of the Basin's drainage area lies in Georgia, where the River's headwaters originate (CH2MHILL, 2005). The headwaters of the Tallapoosa and Little Tallapoosa Rivers begin in the Georgia counties of Paulding and Carrol and enter Alabama in Randolph County southwest of the City of Atlanta to form the main stem of the Tallapoosa River. From this point, the Tallapoosa meanders southwesterly through four Alabama Power hydroelectric projects (R. L. Harris Dam, Martin Dam, Yates Dam, and Thurlow Dam) before joining the Coosa River to create the Alabama River (at approximately 113 feet mean sea level). The Alabama portion of the Basin drains 3,975 square miles of land.

FIGURE 4-1 LOCATION OF THE LAKE MARTIN HYDROELECTRIC PROJECT ON THE TALLAPOOSA RIVER, ALABAMA

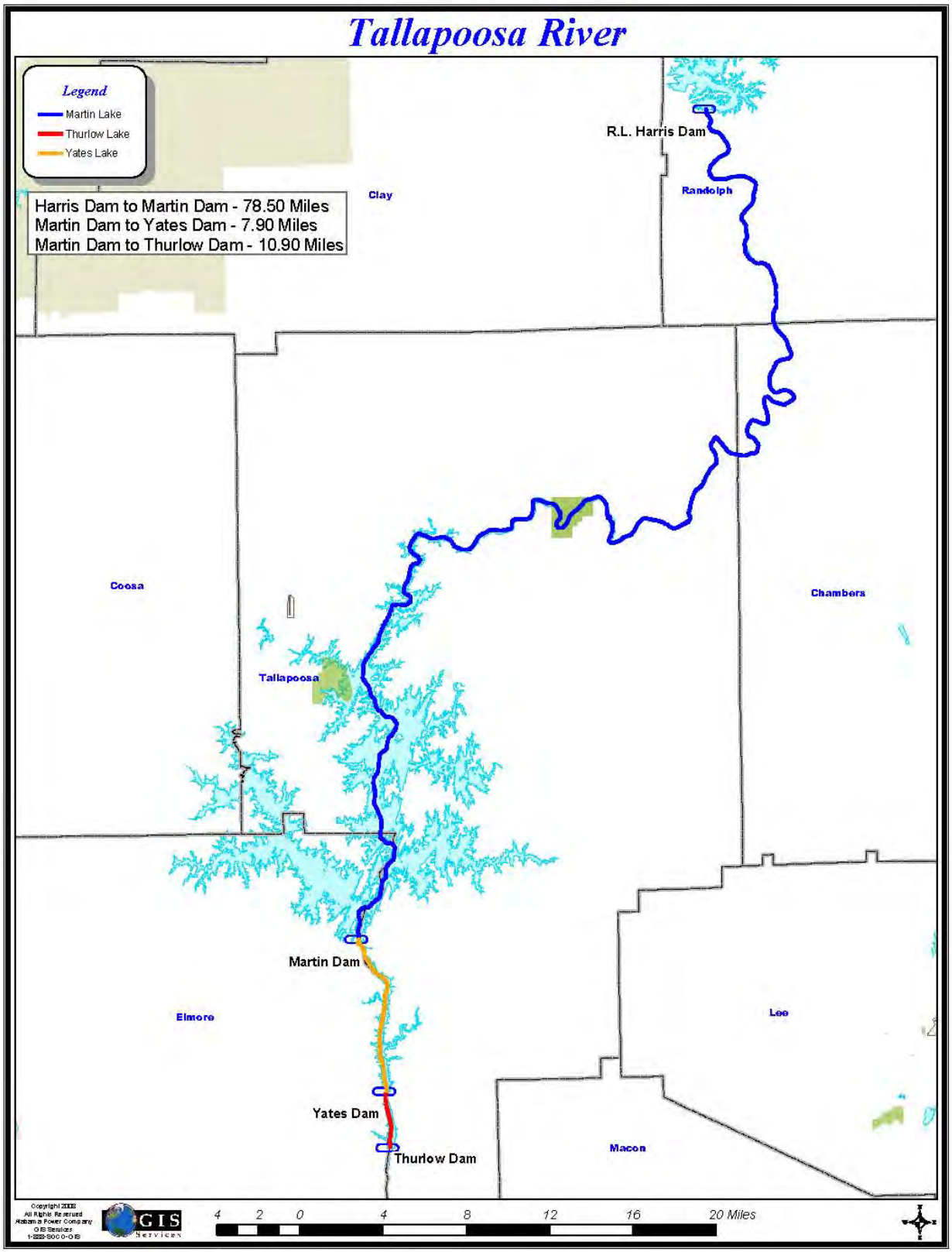
FIGURE 4-2 MAJOR CREEKS AND STREAMS IN THE PROJECT AREA



Almost 70 percent of the Basin is covered by forests, and forestry-related activities account for a major part of the Basin's economy. Agriculture is also a significant land use activity supporting a variety of animal operations and commodity production. Although the total farmland in the basin is declining, livestock and poultry production is strong. The trend is toward larger commercial-type farms with increased use of machinery. Despite a strong agricultural presence, approximately one-half of the working population is employed in manufacturing industries.

Although the nearby Alabama River is considered a critical navigation route for commercial barge traffic, the Tallapoosa River does not contain locks on any of the dams that would allow passage for motorized boats of any kind. There are no large metropolitan centers within this Basin.

FIGURE 4-3 LOCATION OF ALABAMA POWER PROJECTS ON THE TALLAPOOSA RIVER



The principal tributary streams are the Little Tallapoosa River, which has a drainage area of 605 square miles in Georgia and Alabama, and Sougahatchee, Sandy, Uphapee, and Hillabee Creeks in Alabama. The confluence of the Coosa and Tallapoosa Rivers form the Alabama River near Wetumpka, Alabama (Georgia Department of Natural Resources, 1998). Figure 4-3 shows the major tributary stream at the Project.

The Basin has a mild and uniform temperate climate with warm summers and usually mild winters. Snowfall accumulation is infrequent. During the month of July, temperatures vary between 92°F and 67°F. Although the monthly average highs in June, July, and August exceed 90°F, this temperature range generally occurs, on average, only 87 days per year. Temperatures above 100°F are unusual. The winter extremes of 32°F and lower occur on an average of 64 times per year. The frost-free season varies from 205 days in the north portion to 256 days in the south portion of the basin. Annual rainfall amounts typically range between 46 to 64 inches. The average growing season is approximately 209 days (CH2MHILL, 2005).

4.1.1 GEOGRAPHIC SCOPE OF FERC APPROVED STUDIES

The geographic scope is defined by the physical limits or boundaries of the proposed actions' effect on the resources. Defining those physical limits or boundaries is critical when developing the scope of each relicensing study. Alabama Power, in consultation with the stakeholders, developed a geographic scope for each of the 22 FERC-approved study plans for the Project. Table 4-1 provides a list of the FERC-approved studies including the geographic scope and the name of each study report. Hereinafter, the studies are referred to by the Study Plan name or the Study Report Name.

TABLE 4-1 STUDY PLANS AND GEOGRAPHIC SCOPES

STUDY PLAN		GEOGRAPHIC SCOPE	STUDY REPORT NAME
SP 1	Migratory Fish - Tallapoosa Basin Literature Review	Tallapoosa River downstream from Martin Dam to River Mile 0	Tallapoosa River Fish Passage Information Document
SP 2	Assessment of Fish Density and Species Composition Associated With Various Shoreline Types	Shoreline areas in the Blue Creek arm of Lake Martin	The Relationship Between Shoreline Development and Resident Fish Communities in Lake Martin, Alabama

STUDY PLAN	GEOGRAPHIC SCOPE	STUDY REPORT NAME
SP 3 Evaluation of Minimum Flows Downstream of Martin Dam	Martin Dam tailrace – Tallapoosa River from Thurlow Dam downstream to River Mile 12.9 Montgomery Water Works river gauge (RM 12.9)	Evaluation of Minimum Flows Downstream of Martin Dam Report
SP 4 Fish Entrainment and Turbine Mortality	Forebay and intake area of Martin Project	Fish Entrainment and Turbine Mortality Analysis
SP 5 Rare, Threatened, and Endangered Species Surveys	Lake Martin; Tallapoosa River from Thurlow Dam downstream to River Mile 12.9	Rare, Threatened, and Endangered Species Surveys
SP 6 Striped Bass Telemetry Study	Lake Martin	Adult Striped Bass Habitat Use and the Effects of Catch and Release Angling During the Summer in Lake Martin, Alabama
SP 7 Wildlife Management Program	All Alabama Power owned "Natural Undeveloped" land in Martin Project Boundary	Wildlife Management Program
SP 8 Baseline Water Quality	Lake Martin and Tailrace	Baseline Water Quality
SP 9 Location of Regulated Discharges on Lake Martin	Lake Martin, Alabama Power owned land, and significant points in tributaries[1]	Location of Permitted Discharges on Lake Martin
SP 10 Erosion and Sedimentation	Lake Martin; Tallapoosa River from Thurlow Dam downstream to River Mile 12.9	Erosion and Sedimentation Report
SP 11 Water Quantity, Water Use, and Water Withdrawals	Lake Martin	Water Quantity, Water Use, and Water Withdrawals
SP 12 (A) Rule Curve Change Modeling Analysis	Harris Dam to Martin Pool, Martin Dam and the Tallapoosa River from the Project to the Montgomery Water Works river gauge (RM 12.9)	Flood Control Guideline Change Modeling Analysis

[1] Report includes NPDES permits in the Tallapoosa Basin between Harris and Martin Dam.

STUDY PLAN	GEOGRAPHIC SCOPE	STUDY REPORT NAME
SP 12(B) Effects of a Rule Curve Change on Sedimentation Rates and Nuisance Aquatic Vegetation	Lake Martin	Effects of a Rule Curve Change on Sedimentation Rates and Nuisance Aquatic Vegetation
SP 12 (C) Effects of a Rule Curve Change on Water Quality	Lake Martin and Tailrace	Effects of a Rule Curve Change on Water Quality
SP 12 (D) Effects of a Rule Curve Change on Lake and Downstream Erosion	Lake Martin; Tallapoosa River from Thurlow Dam downstream to River Mile 12.9	Effects of a Rule Curve Change on Lake and Downstream Erosion Report
SP 12 (E) Effects of a Rule Curve Change on Federally Threatened and Endangered Species at the Martin Project and in the Tallapoosa River Below Thurlow Dam	Lake Martin; Tallapoosa River from Thurlow Dam downstream to River Mile 12.9	Effects of a Rule Curve Change on Federally Threatened and Endangered Species at the Martin Project and in the Tallapoosa River Below Thurlow Dam
SP 12(F) Effects of a Rule Curve Change on Downstream Recreation	Tallapoosa River from Thurlow Dam downstream to River Mile 12.9	Effects of a Rule Curve Change on Downstream Recreation
SP 12(G) Effects of Raising Winter Pool Level and Increasing the Duration of Summer Pool on Lake Martin Recreation Use	Lake Martin	Effects of Increasing the Duration of Summer Pool and Level of Winter Pool on Recreation Use and Selected Economic Indicators at Lake Martin, Alabama
SP 12(H) Effects of Raising Winter Pool Level and Increasing the Duration of Summer Pool on Lake Martin Economic Indicators	Lake Martin	Effects of Increasing the Duration of Summer Pool and Level of Winter Pool on Recreation Use and Selected Economic Indicators at Lake Martin, Alabama
SP 13 Shoreline Management Program	Alabama Power-owned lands within the Martin Dam FERC Project Boundary	Shoreline Management Program
SP 14 Recreation Plan	Lake Martin, its tributaries, and lands and water within the FERC Project Boundary	Recreation Plan

4.2 CUMULATIVE EFFECTS

According to the Council on Environmental Quality's regulations for implementing NEPA (40 CFR Section 1508.7), a cumulative effect is an impact on the environment resulting from the incremental impacts of the action when added to other past, present and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time, including hydropower and other land and water development activities.

In the August 5, 2008 Scoping Document, FERC identified the fishery and water resources as those resources that could be cumulatively affected by the proposed relicensing of the Martin Dam Project. For fishery resources, FERC defined the Tallapoosa River from the upstream end of the Project Boundary extending downstream to Project-affected waters below the Thurlow Development as the geographic scope. FERC chose this geographic scope because the presence and operation of the Project, along with the Yates and Thurlow hydroelectric projects could affect the movements of fish and fish populations in the Tallapoosa River. The geographic scope for water resources includes the Tallapoosa River from the Project Boundary within Lake Martin, downstream to Project-affected stream reaches affected by operational flow releases downstream from the Thurlow Dam. This geographic boundary was selected because of the direct interaction between the Project and the Yates and Thurlow Project and because of the indirect association with other water users (e.g., both consumptive and wastewater releases into Lake Martin) in the area (FERC, Scoping Document, August 5, 2008).

4.2.1 TEMPORAL SCOPE

The temporal scope of the cumulative effects analysis in FERC's environmental assessment will include a discussion of past, present, and future actions and their respective effects on each resource that could be cumulatively affected, primarily fisheries and water resources as defined by FERC (Scoping Document, August 5, 2008). Based on the potential term of a new license, the temporal scope will look 30-50 years into the future, concentrating on the effect on the resources from reasonably foreseeable future actions. The historical discussion will be limited, by necessity, to the amount of available information for each resource. Alabama Power identified

the present resource conditions based on personal observation, study results, agency/stakeholder comments, and comprehensive plans.

4.2.2 REFERENCES

CH2MHILL. 2005. Tallapoosa River Basin Management Plan. Alabama Clean Water Partnership, Montgomery, AL.

Federal Energy Regulatory Commission. 2008. Scoping Document 1. Washington, DC.

Georgia Department of Natural Resources, Environmental Protection Division. 1998. Tallapoosa River Basin Management Plan 1998. Georgia Department of Natural Resources, Environmental Protection Division, Atlanta, GA.

4.3 APPLICABLE LAWS

4.3.1 SECTION 401 OF THE CLEAN WATER ACT

Section 401 of the Clean Water Act (CWA) requires that any applicant for a federal license, that may conduct any activity which may result in any discharge into the navigable waters, provide to the licensing agency a certification from the state in which the discharge originates that the discharge will comply with state water quality standards adopted under the CWA. *See* 33. U.S.C § 1341 (a). EPA regulations implementing section 401 require that the certification issued by the state certifying agency contain a statement that there is "reasonable assurance that the activity will be conducted in a manner which will not violate applicable water quality standards." 40 C.F.R. § 121.2(a)(3).

Therefore, pursuant to section 401, Alabama Power filed an Application for a 401 Water Quality Certification to the Alabama Department of Environmental Management (ADEM) on May 10, 2010. Alabama Power intends to file with FERC, the 401 Water Quality Certification with the Final License Application, on or before June 8, 2011.

4.3.2 ENDANGERED SPECIES ACT/NATIONAL BALD EAGLE MANAGEMENT GUIDELINES

Section 7 of the Endangered Species Act (ESA), §16 U.S.C. 1536(a), requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of federally listed endangered or threatened species, or result in the destruction or adverse modification of the

critical habitat of such species. Federal agencies are required to consult with the U.S. Fish and Wildlife Service (USFWS) when a proposed action may adversely affect listed species. By letter dated August 5, 2008, FERC designated Alabama Power as the Commission's non-federal representative for carrying out informal consultation, pursuant to Section 7 of the ESA.

Surveys performed during the relicensing process found no federally listed species at any of Alabama Power's sampling sites. Bald eagle nests have been observed over several years during the annual bald eagle survey on Martin Reservoir. The locations of the currently active nests are well-documented and in the Alabama Department of Conservation and Natural Resources (ADCNR) database. Although the bald eagle was de-listed from the Federal Endangered Species List effective July 2007 (72 FR 37345 37372), it remains protected under the Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act (16 U.S.C.668-668d) (72 FR 37345-37372). None of the proposed relicensing actions are likely to result in adverse effects to such species.

4.3.3 COASTAL ZONE MANAGEMENT ACT

The Coastal Zone Management Act (CZMA) of 1972, as amended, requires review of the Project's consistency with the state's coastal management program. The State of Alabama has a Coastal Area Management Program (ACAMP) that applies to the coastal lands and waters seaward of the continuous 10-foot contour in Baldwin and Mobile Counties. Implementation of the ACAMP is shared by the ADCNR and the ADEM. Due to the location of this Project, the Coastal Zone Management Act does not apply. Concurrent with the filing of this PLP, Alabama Power is sending this PLP to the ACAMP to confirm that the Project is outside the boundaries of the ACAMP Program. Alabama Power will provide a copy of the ACAMP's determination in the Final License Application.

4.3.4 NATIONAL HISTORIC PRESERVATION ACT

Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, requires that every federal agency "take into account" how each of its undertakings could affect historic properties. Historic properties are districts, sites, buildings, structures, traditional cultural properties, and objects significant in American history, architecture, engineering, and culture that are listed in, or eligible for, inclusion in the National Register. By letter dated August 5, 2008,

FERC designated Alabama Power as the Commission's non-federal representative for carrying out informal consultation, pursuant to Section 106 of the NHPA.

As described further in Section 4.4.7, Alabama Power consulted with the Alabama State Historic Preservation Office (SHPO) and federally recognized Native American tribes from 2008 – 2010. FERC is drafting the Programmatic Agreement (PA) between the FERC and the AL SHPO as signatories and Alabama Power and other consulting entities as concurring parties. Alabama Power will file a Historic Properties Management Plan (HPMP) with the Final License Application.

4.4 PROPOSED ACTION AND ACTION ALTERNATIVES

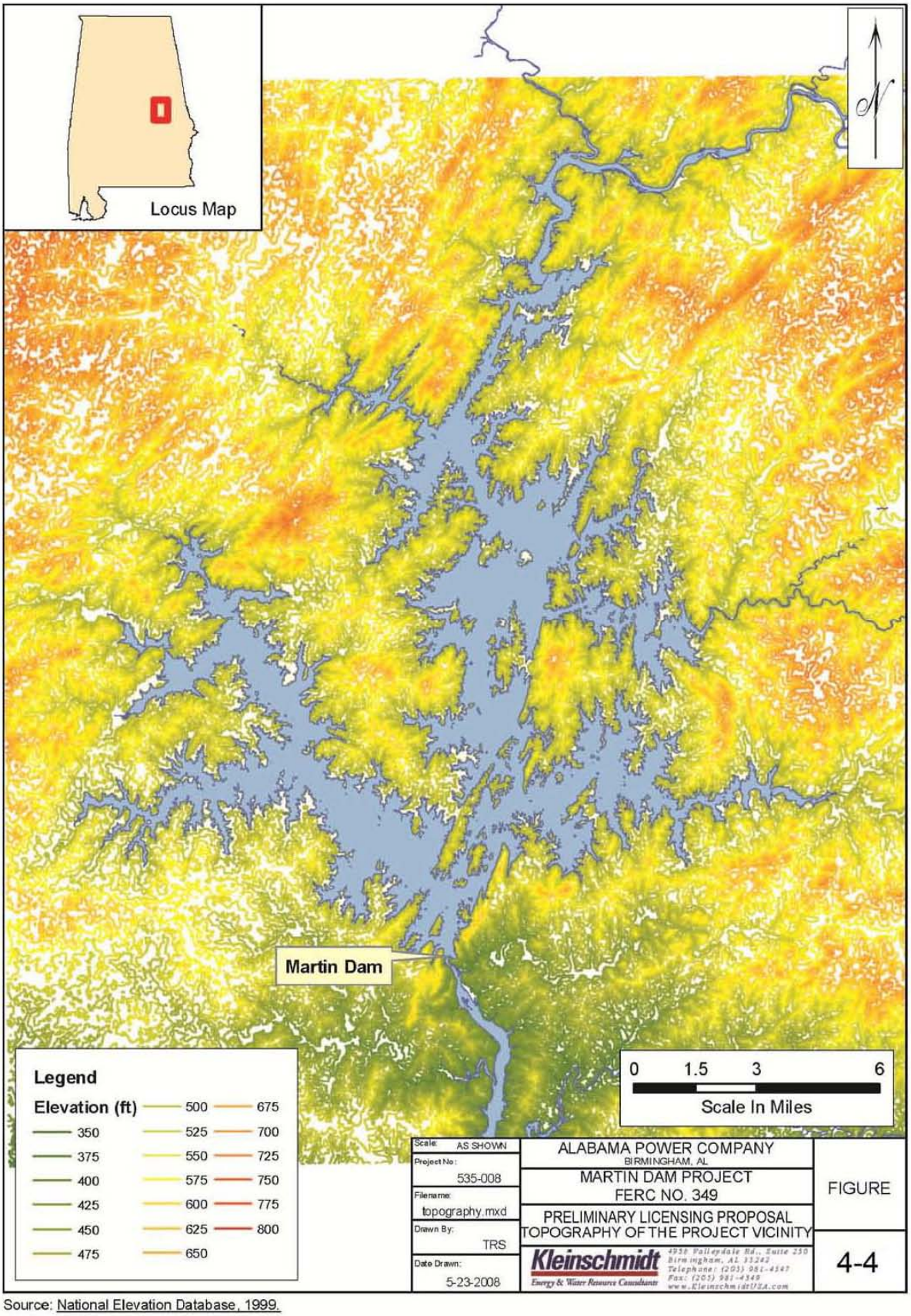
4.4.1 GEOLOGY AND SOILS

4.4.1.1 AFFECTED ENVIRONMENT

TOPOGRAPHY

Lake Martin is predominantly located in Tallapoosa County. The extreme southwestern portion is located in Elmore County and a small part of the western portion lies in Coosa County. The region is characterized by well-dissected uplands developed over metamorphic and igneous rocks. In the northern portion, elevations generally range from 500 to 1,100 feet msl. Cheaha Mountain, Alabama's highest point at 2,407 ft, is on the northeastern end of a prominent northeast-trending ridge that occurs in this district. Shoreline steepness around the reservoir varies greatly. While some areas have less than 15 percent slope, others associated with rocky outcrops have a vertical drop off of 90 percent (Figure 4-4).

FIGURE 4-4 TOPOGRAPHIC MAP OF ALABAMA



Source: National Elevation Database, 1999.

GEOLOGY

The Project is underlain by igneous and metamorphosed rocks of late Proterozoic to Paleozoic in age (570 to 240 million years ago). Lake Martin and surrounding Project lands are located within the Piedmont Upland region (Figure 4-5). Figure 4-6 shows the bedrock geology of the lands in the Project vicinity and
Table 4-2 provides the legend for the bedrock geology. The dominant features in the area, the Piedmont, are northeast-trending ridges that are underlain by resistant quartzite and quartz-rich schists. The linear ridges to the northwest and northeast of the dam site are a result of tectonic movement about 500 million years ago. Triassic dikes were intruded into the area approximately 200 million years ago and show no sign of any movement since that time. Neither the Project area nor the surrounding area has been affected by glaciations.

This region is divided into the Northern, Inner, and Southern Piedmont Upland districts. The Northern and Inner Piedmont Upland districts are separated by the Brevard zone, a narrow zone of intensely sheared rocks. The Inner Piedmont Upland district is separated from the Southern Piedmont Upland district by the Towaliga fault. The Project lands fall within the Northern and Inner Piedmont Upland districts (Sapp and Emplainment, 1975).

THE NORTHERN PIEDMONT

The region, which includes most of the western shores of the Project lands in Tallapoosa, Coosa, and Elmore counties, is separated into three sections called blocks: the Tallapoosa block, the Coosa block, and the Talladega block. The entire Project area is within the Tallapoosa block. This block includes all of Tallapoosa County and the portions of Coosa and Elmore counties that are within the Project area. The Tallapoosa block contains rocks of the Wedowee Group, the Hackneyville schist, the Cornhouse schist and the Emuckfaw Formation. The Wedowee Group consists of a wide range of sericite phyllites, feldspathic-biotite-quartz gneiss, and quartzite. The Hackneyville schist is composed of muscovite and biotite schist, and biotite quartz schist with occasional kyanite. The Cornhouse schist consists of interlayered chlorite-biotite-garnet schist and muscovite-biotite-garnet-quartz-plagioclase schist. Quartzite and layered amphibolites are also present. The Emuckfaw Formation is interlayered metagraywacke and muscovite-garnet-biotite-schist with local occurrences of quartzite and amphibolite (Sapp and Emplainment, 1975).

In addition to the regionally metamorphosed rocks of the Tallapoosa block, granitoid plutons composed of the Elkahatchee quartz diorite gneiss, the Zana granite, and Kowaliga gneiss occur in the Tallapoosa block.

THE INNER PIEDMONT

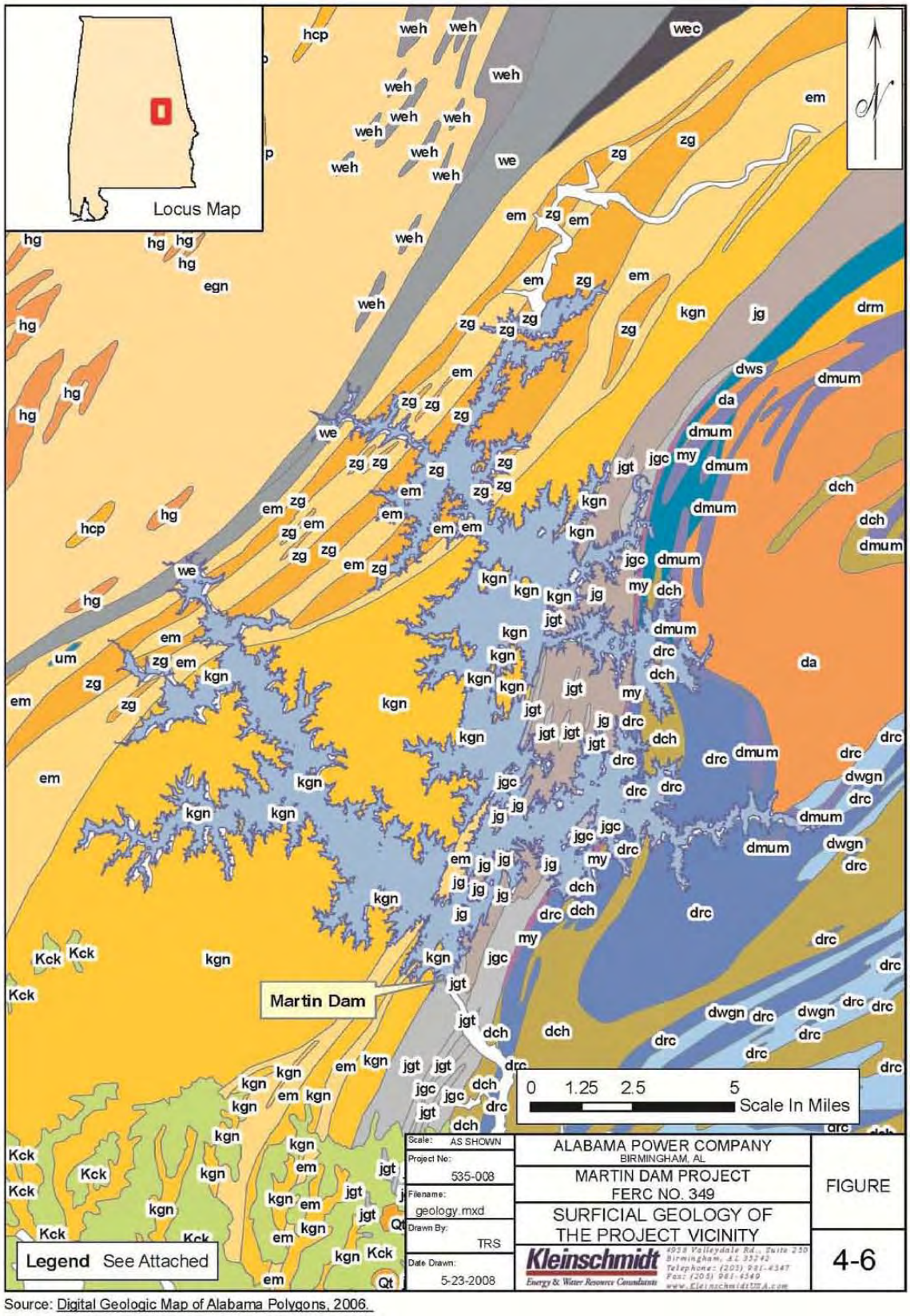
The Inner Piedmont Upland district is developed on metamorphic rock with no prominent topographic features. Tributaries of the River incise the upland surfaces (Sapp and Emplainment, 1975).

The rocks of the Inner Piedmont belong to the Dadeville Complex, a major synformal structure, which is composed of the Agricola schist, Ropes Creek amphibolite, Waresville schist, and Waverly gneiss. The mineral assemblages of the Agricola schist consist of biotite/garnet/sillimanite-feldspar quartz. Thinly bedded layers of dark brown hornblends occur throughout the schist as well as pegmatite pods and veins. The Waresville schist is a metavolcanic unit of interlayered amphibolites, chlorite-actinolite schist and actinolite-feldspathic quartzite along the southeastern border of the Brevard zone. The Ropes Creek amphibolite, the most common rock of the southern Dadeville Complex, is massive hornblend gneiss with numerous accessory minerals. The underlying Waverly gneiss is a feldspathic gneiss locally rich in manganese. Thin layers of amphibolite, calc-silicate rock, garnet quartzite and muscovite schist occur as thin layers. Mafic rocks are infolded with the Agricola schist and Ropes Creek amphibolite (Beg, 1988).

FIGURE 4-5 GENERAL PHYSIOGRAPHY OF ALABAMA

FIGURE 4-6 SURFICIAL GEOLOGY OF THE PROJECT AREA

(See Table 4-2 for key to table)



Source: Digital Geologic Map of Alabama Polygons, 2006.

TABLE 4-2 LEGEND FOR THE SURFICIAL GEOLOGY OF THE PROJECT VICINITY SHOWN IN FIGURE 4-6

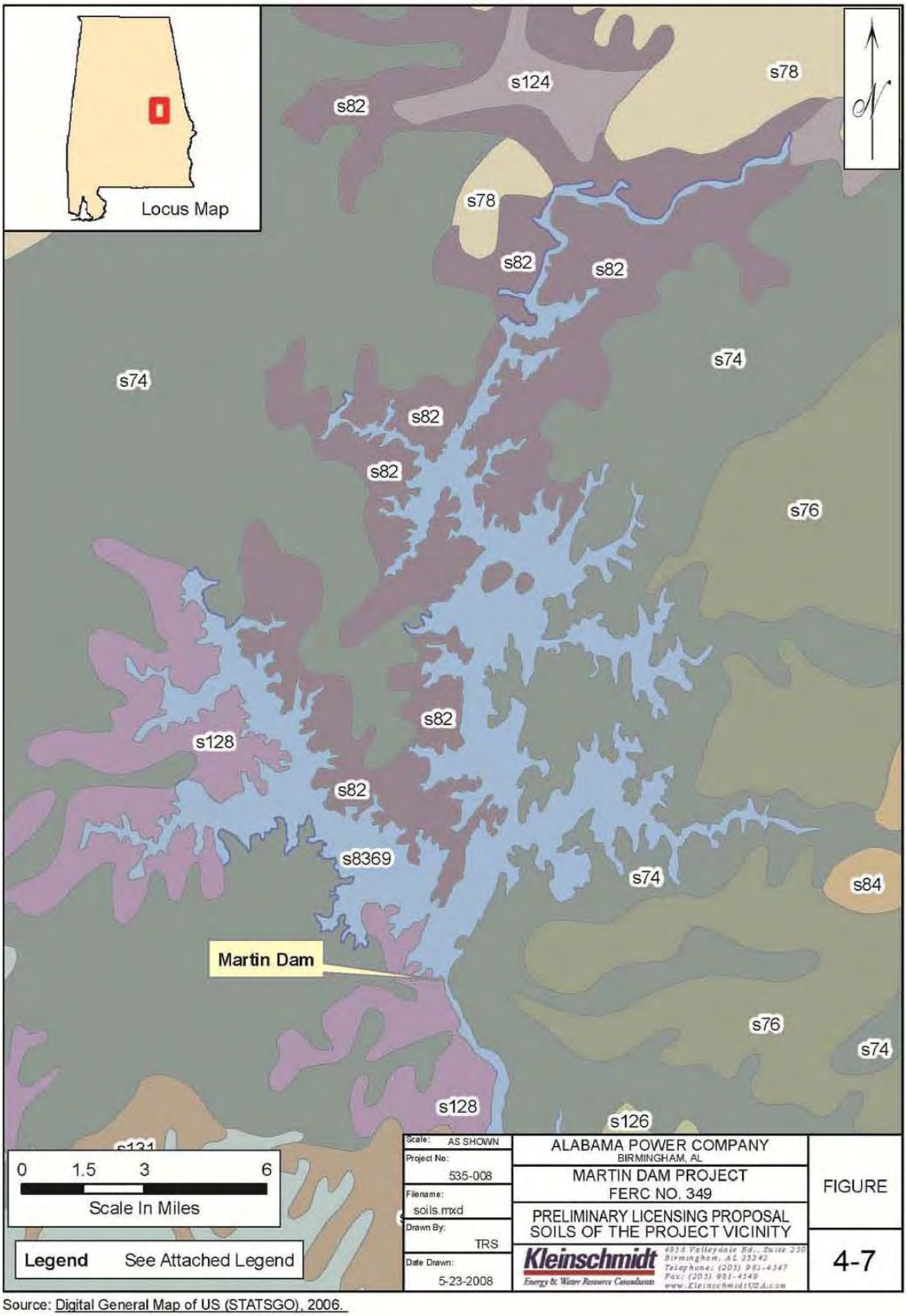
SYMBOL	NAME
da	Agricola Schist
dch	Camp Hill Granite Gneiss
dmum	Mafic and Ultramafic Rock
drc	Ropes Creek Amphibolite
dwgn	Waverly Gneiss
drm	Rock Mills Granite Gneiss
dws	Waresville Schist
egn	Elkahatchee Quartz Diorite Gneiss
em	Emuckfaw Group Undifferentiated
hcp	Pinchoulee Gneiss
hg	Hissop Granite
jg	Jackson Gap Group
jgc	Jackson Gap Group Sericite and Chlorite Phyllite Unit
jgt	Tallassee Metaquartzite
Kck	Coker Formation
Kgn	Kowaliga Gneiss
my	Mylonite and Blastomylonite
Qt	High Terrace Deposits
um	Ultramafic Rock
we	Wedowee Group Undifferentiated
wec	Cornhouse Schist
weh	Hackneyville Schist
zg	Zana Granite

SOILS

On a broad scale, soils within the Project consist of soils derived from weathered metamorphic and igneous rock including granite, schist, and gneiss (Figure 4-7). Predominant associations adjacent to the Project include Tallapoosa-Madison-Louisburg-Louisa (s128), Vance-Pacolet-Louisburg-Cecil-Appling (s74), Tallapoosa-Madison-Louisburg-Cecil (s82), and less commonly Tatum-Madison-Louisa (s78). The vast majority of the soils present within the region formed in residuum from weathered rock. Slopes are variable with textures ranging from fine (clay) to coarse (sand and gravel). In general, soil productivity has been greatly decreased over much of the area due to poor farming practices in the 1800s and early 1900s. Many areas of depleted soils have reverted to forest, but productivity is often low.

FIGURE 4-7 SOIL TYPES OF THE PROJECT VICINITY

(See Table 4-3 for key to table)



Source: Digital General Map of US (STATSGO), 2006.

TABLE 4-3 LEGEND FOR THE SOIL TYPES IN THE PROJECT VICINITY SHOWN IN FIGURE 4-7

SYMBOL	SOIL NAME
s124	Wickham-Roanoke-Congaree-Bibb
s126	Uchee-Troup-Marvyn-Luverne-Cowarts
s128	Tallapoosa-Madison-Louisburg-Louisa
s130	Marvyn-Luverne-Cowarts
s131	Lurverne-Lucedale-Jones-Boswell-Bama
s74	Vance-Pacolet-Louisburg-Cecil-Appling
s76	Tatum-Tallapoosa-Louisburg-Gwinnett-Cecil
s78	Tatum-Madison-Louisa
s82	Tallapoosa-Madison-Louisburg-Cecil
s84	Madison-Gwinnett-Cecil-Appling
s8369	Water

EROSION

Erosion in reservoirs or riverine systems falls into two broad categories: natural erosion and erosion due to human influence. The degree of natural, or typical, erosion along a riverine system is highly variable. Flood frequency, topography, and soil types are all dynamic factors that influence natural erosion. Natural erosion is typically associated with high flow events and their aftermath. Nearly all reservoirs experience some level of natural erosion. Natural erosion processes observed include bank scour and piping (Rosgen, 1996; Simons *et al.*, 1979). Although these are natural phenomena, man may accelerate these activities by land use, recreation, and hydropower operations.

In most places soil types within the Project are dominated by loamy soils, and most soils within the Project are identified as having moderate to high potential for soil erosion. Alabama Power conducted a study in May 2010 to investigate and document baseline erosion and determine the potential for erosion within the Project. The study identified 15 “hot spots” (15 sites on Lake Martin and 0 sites in the Martin tailrace) for erosion during data collection and all sites were determined to have some level of atypical erosion, although all sites appeared to exhibit conditions that would be expected on the reservoir. For all study locations, erosion appeared to be the result of wave action or land use (boating, clearing, home building, etc.). In some instances, land use was the initiating factor with other factors accelerating the process. Soil

conditions were a contributing factor at all 15 areas. While erosion was observed at the 15 study sites, atypical erosion was not widespread on the reservoir and was relatively uncommon in relation to the total shoreline of the Project (Alabama Power Company, 2010).

4.4.1.2 ENVIRONMENTAL EFFECTS

Environmental effects of the Flood Control Guide Curve alternatives and the PME measures are described in sections 2.2 and 2.2.2, respectively. The proposed PME measures that may affect geology and soil resources are described in Section 4.4.1.3.

Alabama Power studied three primary issues to examine the effects of a proposed change in the Flood Control Guide Curve: 1) erosion - Lake, tailrace, and downstream; 2) sedimentation – Lake only; and 3) aquatic vegetation – Lake only.

For erosion, Alabama Power performed Study Plan 10 Erosion and Sedimentation and Study Plan 12(d), *Effects of Rule Curve Change on Lake and Downstream Erosion*, which evaluated the potential for increased or decreased erosion on the Martin Reservoir associated with the proposed Flood Control Guide Curve changes. The results of this study are described below for each Alternative winter pool level increase. In general, shoreline erosion changes resulting solely from the change to the Flood Control Guide Curve were predicted to have negligible effect at elevations 482′, 483′, 484′, and 485′. A change to elevation 486 ft may increase erosion in approximately 30% of the sties based upon a small variation in bedrock location. Study Report 10 and 12(d) determined that boat, wave action, and land use were the biggest causes of erosion on the lake. Wave action will likely increase as the number of recreation user-days increases with a Flood Control Guide Curve change. Alabama Power used the estimated increase in boating days associated with each Flood Control Guide Curve alternatives as a way to estimate potential increases in erosion associated with a Flood Control Guide Curve change and presented this information in the MCDA. Studies 12(g) and 12(h), *Effects of Increasing Duration of Summer Pool and Level of Winter Pool on Recreation Use and Selected Economic Indicators at Lake Martin Alabama*, provide the data needed to arrive at percent increases in boating recreation days for all alternatives. The estimated number of all recreation days was multiplied by the percentage of recreation use attributable to “pleasure boating” (52.0%), “water-skiing/tubing/other tow” (9.0%), “jet skiing” (5.3%), and “fishing (from a boat)” (7.0%).

Study 12 (d) also evaluated the potential for increased or decreased erosion on the Tallapoosa River downstream of Thurlow Dam based on the proposed flood control guideline changes. Erosion downstream of Thurlow Dam is an on-going natural activity; however, it is exacerbated significantly by spill events above 18,500 dsf (day-second-feet) at Martin Dam. The potential increase in magnitude of spill events from Study Report 12(a), *Flood Control Guideline Change Modeling Analysis*, for each of the five incremental winter pool levels was quantified and presented in the report. This information was also used in the MCDA analysis. These data represent the potential increase of days with higher than historical spill for the entire 67 years of record that were run in Alabama Power's HydroBudget model. Increasing spill events would have an overall negative impact on downstream erosion.

EFFECTS ON SEDIMENTATION

Study 10, *Erosion and Sedimentation*, was performed to determine the baseline level of sedimentation occurring on Martin Reservoir; 19 sites were identified during the study. Based on the primary location of sedimentation areas, lake sedimentation is being caused predominately by off-reservoir activities; therefore, a change in Flood Control Guide Curve should not affect the rate of sedimentation. Sediment plumes will likely change in size, shape, and depth based upon any winter Flood Control Guide Curve change, but the study did not attempt to determine the exact sediment plume changes that will take place. These changes in sediment plumes will likely result in additional sediments being deposited in tributary creek mouths around the Lake. The overall effect of a higher winter pool on sedimentation in Lake Martin is negative.

EFFECTS ON AQUATIC VEGETATION

Sedimentation areas were identified in Study Report 10 and Study Report 12(b), *Effects of a Rule Curve Change on Sedimentation Rates and Nuisance Aquatic Vegetation*, reported the acres that would be inundated during the winter (less exposure of vegetation to desiccation and freezing) at the 20 identified sedimentation sites and potentially susceptible to an increase in submerged and emergent vegetation at each identified site with each one foot change in the flood control guideline. This study did not measure the total possible increase in emergent vegetation around the entire shoreline perimeter of Martin Lake. Therefore, this estimate is very conservative for evaluating "the risk" for total increases in emergent vegetation within the Lake. Study Report

12(b) states that an increase in nutrient availability and more stable water levels may lead to an increase in submerged and emergent aquatic vegetation. The overall effect of a higher winter pool is negative. Alabama Power used the increase in acres inundated during the winter as an indicator of potential increase in submerged (and in part, emergent) aquatic vegetation in the Lake. The MCDA used the total acres inundated at each of the sites were multiplied by the proposed number of days at each level to produce Acre-Days for aquatic vegetation expansion and growth for each alternative. The higher the number of Acre-Days available, the higher the chance for expansion of aquatic vegetation. Use of Acre-Days allowed Alabama Power to determine the potential for increases in aquatic vegetation with each rule curve change and the potential for changes to their current Aquatic Weed Control Program for Lake Martin. The number of Acre-Days under existing conditions (i.e., current operations) is 78,936 Acre-Days.

ALTERNATIVE 1 – 1 FOOT WINTER POOL INCREASE

Effects on Lake and Downstream Erosion

The overall effect on lake and downstream erosion, sedimentation and aquatic vegetation is negative.

Using the method described in Section 4.4.1.2, the estimated number of recreation boating days increased by 5,440 for Alternative 1. For downstream erosion, the HydroBudget model estimated the days of spill from Martin downstream would increase by 12 over the 67 years of record. Both increased recreation days and increased days of spill have the potential to increase erosion in the Lake and downstream.

Effects on Sedimentation

Overall effect is negative, but a 1 foot change in flood guide is not likely to result in much change over baseline.

Effects on Aquatic Vegetation

There were estimated 92,000 Acre-Days for Alternative 1, an increase of 13,064 Acre-Days over baseline.

ALTERNATIVE 2 – 2 FT WINTER POOL INCREASE

The overall effect on lake and downstream erosion, sedimentation and aquatic vegetation is negative.

Effects on Erosion

Under Alternative 2 the estimated number of recreation boating days increased by 13,599 and the HydroBudget model estimated the days of spill from Martin downstream would increase by 16 over the 67 years of record. Both increased recreation days and increased days of spill have the potential to increase erosion in the Lake and downstream.

Effects on Sedimentation

The overall effect of a higher winter pool on sedimentation in Lake Martin is negative.

Effects on Aquatic Vegetation

There were estimated 105,156 Acre-Days for Alternative 2, a difference of 26,220 Acre-Days over baseline.

ALTERNATIVE 3 – 3 FT WINTER POOL INCREASE

The overall effect on lake and downstream erosion, sedimentation and aquatic vegetation is negative.

Effects on Erosion

Under Alternative 3 the estimated number of recreation boating days increased by 21,758 and the HydroBudget model estimated the days of spill from Martin downstream would increase by 23 over the 67 years of record. Both increased recreation days and increased days of spill have the potential to increase erosion in the Lake and downstream.

Effects on Sedimentation

The overall effect of a higher winter pool on sedimentation in Lake Martin is negative.

Effects on Aquatic Vegetation

There were estimated 116,932 Acre-Days for Alternative 3, a difference of 37,996 Acre-Days over baseline.

ALTERNATIVE 4 – 4 FT WINTER POOL INCREASE

The overall effect on lake and downstream erosion, sedimentation and aquatic vegetation is negative.

Effects on Erosion

Under Alternative 4 the estimated number of recreation boating days increased by 24,478 and the HydroBudget model estimated the days of spill from Martin downstream would increase by 37 over the 67 years of record. Both increased recreation days and increased days of spill have the potential to increase erosion in the Lake and downstream.

Effects on Sedimentation

The overall effect of a higher winter pool on sedimentation in Lake Martin is negative.

Effects on Aquatic Vegetation

There were estimated 127,420 Acre-Days for Alternative 4, a difference of 48,484 over baseline.

ALTERNATIVE 5 – 5 FEET WINTER POOL INCREASE

The overall effect on lake and downstream erosion, sedimentation and aquatic vegetation is negative.

Effects on Erosion

Shoreline erosion changes based solely on the change to the Flood Control Guide Curve are predicted to be negligible at elevations 482', 483', 484', and 485'. A change to elevation 486' may increase erosion in approximately 30% of the sites based upon a small variation in bedrock location. Under Alternative 5 the estimated number of recreation boating days increased by

27,198 and the HydroBudget model estimated the days of spill from Martin downstream would increase by 52 over the 67 years of record. Both increased recreation days and increased days of spill have the potential to increase erosion in the Lake and downstream.

Effects on Sedimentation

The overall effect of a higher winter pool on sedimentation in Lake Martin is negative.

Effects on Aquatic Vegetation

There were estimated 136,988 Acre-Days for Alternative 5, a difference of 58,052 Acre-Days over baseline.

4.4.1.3 PROPOSED PME MEASURES

A draft PME plan is described in Section 2.2.2. Those measures that would protect, mitigate or enhance Project resources are described in this section.

Erosion of shoreline soils will continue as a result of natural processes. Implementation and enforcement of Alabama Power's proposed SMP should minimize shoreline erosion through improved shoreline protection. Policies included in the SMP relevant to erosion are education of property owners on the benefits of natural shoreline development, providing more detail in the general shoreline permitting process regarding the use of rip-rap with or without seawalls, and recommending BMPs on private property for maintaining natural shorelines and/or shoreline buffers. Finally, Alabama Power will monitor for increases in invasive aquatic vegetation on the reservoir and, as a result of monitoring, may alter or enhance the current Aquatic Nuisance Vegetation Control Management for Lake Martin.

4.4.1.4 NO ACTION

Under the No-Action Alternative, Alabama Power would continue to operate the Project in the manner it is presently operated. Alabama Power would not implement any Flood Control Guide Curve changes or proposed PME measures. Under the No Action alternative, it is likely that soil erosion and siltation levels would continue at their current levels or increase as a result of basin

activities and shoreline development. There would continue to be localized shallowing of coves and/or creek mouths with increased sedimentation and shoreline property owners would not benefit from additional education as a result of implementing a revised SMP.

4.4.1.5 CUMULATIVE EFFECTS

The FERC did not designate soils and geology as a cumulatively affected resource.

4.4.1.6 UNAVOIDABLE ADVERSE EFFECTS

Land use practices outside the Project Boundary and wave and wind action may continue to have adverse impacts on erodible soils around Lake Martin and tailrace area. Because of this, erosion and sedimentation in the Lake are unavoidable. Implementing Alabama Power's proposed measures would likely reduce the extent of these continuing adverse impacts. Sedimentation in the reservoir may be unavoidable given the complexity of the problem.

4.4.1.7 REFERENCES

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4.4.2 WATER RESOURCES

4.4.2.1 AFFECTED ENVIRONMENT

WATER QUANTITY

Lake Martin is 31 miles long with approximately 700 miles of shoreline. The reservoir's surface area is nearly 40,000 acres, with a gross storage capacity of 1,622,000 acre-feet, or nearly 530 billion gallons. Maximum depth in the reservoir is 155 feet, making it is the second deepest lake in Alabama. The flushing rate for the Lake is 194 days (pers. comm., Angie Segars, Alabama Power Company, March 26, 2008).

Alabama Power operates the Project as a peaking facility, and existing and proposed operations are described in Section 2.1. Project waters are currently used for public water supply, swimming, power production, active recreation, and to support a diverse array of aquatic and wildlife habitat as well as associated biota (see Section 4.4.5) for details on fish and wildlife resources). During the early to late spring, summer and early fall weekends, Lake Martin is used heavily for recreational fishing and boating, as well as hiking, picnicking, and various other outdoor activities (see Section 4.4.6) for details on recreational use).

Releases from the Project flow directly into the Yates development's 2,000-acre reservoir. Discharge from the Project typically ranges from dam leakage to approximately 17,900 cfs at maximum generation.

FLOW STATISTICS

The USGS operates several stream gauging stations on the River in the Project area. The closest to Lake Martin include Gage No. 02414715, located approximately five miles upstream of Lake Martin at Horseshoe Bend, and Gage No. 02419500, located downstream of Lake Martin near Milstead, Alabama. The Horseshoe Bend gage is operated by the USGS in conjunction with Alabama Power. USGS operates the Milstead gage in conjunction with the USACE; this gage records stream gage height only (USGS, 2010). Plant inflow records from the period 1984 through 2007 were used to develop annual and monthly flow duration exceedance curves for the River in the Project area. These curves are presented on the "Martin Project PLP and Supporting Documents" DVD.

Maximum monthly flow in the Tallapoosa River has historically occurred in May, while the minimum monthly flow has historically occurred in October. Mean, maximum, and minimum monthly flow statistics for the Project, as recorded at the Horseshoe Bend gage, are presented in Table 4-4. The peak instantaneous daily flow at the Horseshoe Bend gage was 132,000 cfs on May 9, 2003 (USGS, 2010).

TABLE 4-4 MEAN, MAXIMUM, AND MINIMUM MONTHLY FLOW STATISTICS FOR THE TALLAPOOSA RIVER IN THE PROJECT AREA AS REGULATED BY HARRIS DAM (Source: USGS Gage No. 02414715 – Horseshoe Bend (Period of Record: 1985-2009), 2010)

MONTH	MEAN DISCHARGE (CFS)	MAXIMUM DISCHARGE (CFS)	MINIMUM DISCHARGE (CFS)
January	3,980	8,191	550.7
February	5,160	12,880	2,270
March	6,090	16,230	1,785
April	3,500	7,210	800.2
May	3,130	16,870	549.4
June	2,420	6,704	545.5
July	2,480	8,755	600.4
August	1,620	3,886	427.9
September	1,440	3,636	377.6
October	1,610	7,270	266.2
November	2,630	7,601	216.4
December	2,970	7,959	349.5

WATER RIGHTS AND WITHDRAWALS

The State of Alabama experiences problems with lack of water storage to collect and hold water for periods of low water availability. The State operates under the principles of the Riparian Rights doctrine, whereby riparian landowners have the right to make reasonable use, with respect to the requirements of all other riparian owners, of available water (stream or lake) for domestic use and irrigation (U.S. Department of Agriculture (USDA), 2006). As the riparian landowner at the Project, Alabama Power is responsible for allowing reasonable use. Many entities rely on Alabama Power's reservoirs, including Lake Martin, to supply their water needs.

To manage the increasing water demand, Alabama Power established a water withdrawal permitting policy with respect to non-project uses of its federally-licensed project lands and waters. Article 13 of the existing FERC license for the Project states that Alabama Power will permit reasonable use of its reservoir upon request by any person, state, federal, corporation, or municipality (FERC, 1978). Per the Project license's Standard Land Use article, Alabama Power has the authority to permit water withdrawals up to 1 million gallons per day (mgd) without prior FERC approval, which must be obtained for withdrawals in excess of 1 mgd.

In 2010, Alabama Power produced a detailed report on the water withdrawal policy that contained: current known municipal, commercial, industrial, and agricultural water withdrawals from the Martin Project; ecological and navigational flow requirements in the Tallapoosa River basin that affect the Project; and drought considerations at the Martin Project (Study Plan 11).

Currently, Alabama Power has approved withdrawal of approximately 36 mgd (Alabama Power Company, 2010a). Of this amount, just over an average 18 mgd is actually withdrawn from Lake Martin. Table 4-5 shows the approved and actual water withdrawals from Lake Martin.

TABLE 4-5 APPROVED WATER WITHDRAWALS FROM LAKE MARTIN, TALLAPOOSA RIVER (Alabama Power Company, 2010a)

OWNER	FACILITY NAME	SOURCE	AVERAGE DAILY WITHDRAWAL (MGD)	APC PERMIT (MGD)
Russell Lands, Inc.	Willow Point Golf & Country Club	Lake Martin	0.85	<1
City of Alexander City	Adams Water Treatment Plant	Lake Martin	10.6	24
Central Elmore Water and Sewer Authority	CEW&SA Water Treatment Plant	Lake Martin	6.7	10
Still Waters Resort	Beaver Lake Replenishment Pump Station	Lake Martin	<0.1	<1

INTAKE VELOCITIES

Intake designs for Martin Dam reflect the engineering standards of the 1920s, and are generally conservative by modern standards. The intake design originally included a large trash rack structure that produced low intake velocities; estimated velocities would range between 1.0 - 2.0 ft/sec.

WATER QUALITY

Federally-Approved Water Quality Standards

Water quality standards for the State of Alabama are guided through implementation of the Federal Clean Water Act (CWA), which directs individual states to monitor and report on the condition of their water resources. Protection and management of Alabama's water quality consists of three components: an anti-degradation policy, designated uses, and numeric and narrative criteria (Alabama Department of Environmental Management (ADEM, 2010). The State's antidegradation policy, defined in Alabama State Code 335-6-10-.04, provides for the prevention of further exacerbation of water quality issues in State waters.

Alabama employs a designated use classification system to identify the best uses of individual waterways. Best uses generally include recreation, municipal and industrial water supply, and

habitat for fish and wildlife. Best uses for Lake Martin are swimming (S), and fish and wildlife (F&W) (Ala. Admin Code r. 335-6-11-.02(11)). Upstream of the U.S. Highway 280 crossing and in Little Kowaliga Creek, Lake Martin has the additional classification of public water supply (PWS). The Martin tailrace is classified as PWS, S, and F&W.

Alabama's assessment and listing methodology establishes a process to assess the status of surface waters relative to their designated uses. Pursuant to Section 305(b) of the CWA, the State of Alabama provides biennial reports to Congress on the condition and status of statewide water quality. The Alabama Integrated Water Quality Monitoring and Assessment Report is developed biennially and includes a list of water bodies, per CWA section 303(d), that fail to attain set standards. Impaired waters are placed in a program to develop mitigative actions and achieve total maximum daily loads (TMDLs) to bring water quality to within set criteria. The most recent Integrated Report is dated 2010 and covers monitoring conducted between 2008 and 2009 (ADEM, 2010). A summary of the Integrated Report is provided below.

Numerical water quality standards and criteria are established in the Alabama State Code 335-6-10-.09, and form the basis for determining if water bodies meet their intended uses or are impaired. Numeric criteria applicable to the Project are illustrated in Table 4-6. Criteria for metal concentrations can be calculated using formulas provided by the State of Alabama (Alabama State Code 335-6-10-.09, *Specific Water Quality Criteria*).

TABLE 4-6 SPECIFIC WATER QUALITY CRITERIA FOR STATE OF ALABAMA WATERS WITH DESIGNATION AS PUBLIC WATER SUPPLY, FISH AND WILDLIFE/SWIMMING APPLICABLE TO THE MARTIN PROJECT*
(Source: ADEM, 2010)

VARIABLE	STANDARD FOR FISH, WILDLIFE, AND SWIMMING	STANDARD FOR PUBLIC WATER SUPPLY
pH	Between 6.5 and 8.5	Between 6.0 and 8.5
Dissolved Oxygen (DO)	Not less than 5.0 mg/l at a depth of 5 ft. Not less than 4.0 mg/l for hydroelectric turbine discharges.	Not less than 5.0 mg/l at a depth of 5 ft. Not less than 4.0 mg/l for hydroelectric turbine discharges.
Water Temperature	Not greater than 90º F	Not greater than 90º F
Turbidity	Not greater than 50 NTUs	Not greater than 50 NTUs

VARIABLE	STANDARD FOR FISH, WILDLIFE, AND SWIMMING	STANDARD FOR PUBLIC WATER SUPPLY
Bacteria	Not more than 1,000 colonies/100 ml (for fish & wildlife) or 200 colonies/100 ml (for swimming)	Not more than 1,000 colonies/100 ml
Chlorophyll-a	Not greater than 5 ug/l	Not greater than 5 ug/l

*specific metal standards are calculated through various concentration formulas as specified by Alabama State Code (see ADEM, 2010).

Section 314(a)(2) of the CWA requires states to assess the water quality of publicly-owned lakes and report the findings as part of the biennial 305(b) report to Congress. The State of Alabama classifies publicly-owned lakes (including reservoirs) as water bodies that are managed for multiple uses, are publicly accessible, and exhibit physical and chemical characteristics typical of impounded waters (ADEM, 2010). To assess lake water quality, ADEM uses Carlson's trophic state index (TSI) to classify the trophic status of Alabama lakes. The TSI uses chlorophyll-*a* concentrations during the summer, when phytoplankton is the dominant plant community, as an estimate of the biotic response of lakes to nutrient enrichment. Values for TSI are low for nutrient deficient systems and increase as nutrient levels increase. Alabama uses the following categories of TSI values to classify lake conditions: <40 = oligotrophic; 40 to 50 = mesotrophic; 50 to 70 eutrophic; >70 = hyper-eutrophic and in need of regulatory action. Historical data depicts lakes in the Tallapoosa River Basin, including Lake Martin, as naturally oligotrophic-mesotrophic (ADEM, 2010).

National Pollutant Discharge Elimination System (NPDES)

The CWA authorizes the State of Alabama, via ADEM, to implement the NPDES permit program, which regulates point and nonpoint sources of discharge to waters of the United States in order to control water pollution. Point discharges originate at a discrete point, such as a pipe. Non-point source pollution occurs when precipitation captures pollutants such as pesticides, fertilizers, and chemicals, and transports them to receiving waters, for example, Lake Martin. There are numerous active point and non-point NPDES permits at and near the Project. Alabama Power has secured the NPDES permit required for continued operation of the Project, which covers the ten existing point discharges at the powerhouse - four cooling water discharges, two sumps and two drains, one uncontaminated stormwater source, and one wastewater source resulting from maintenance and repair activities (Alabama Power Company, 2010b).

Concern about additional discharges into Lake Martin has spurred collaborative investigation into both point and non-point source pollution in the Tallapoosa basin that may affect Lake Martin. In support of Project relicensing, Study Plan 9 was completed by Alabama Power which included data from the Alabama Department of Environmental Management (ADEM) and the Alabama Department of Health.

Results of the study identified 1,112 active NPDES permits in the Tallapoosa Basin between Harris and Martin Dams that include general, mining, storm water, and animal feeding permits. A map and spreadsheet with permit locations and other details is included SP 9 – Final Report – "Location of Permitted Discharges on Lake Martin" on the "Martin Project PLP and Supporting Documents" DVD.

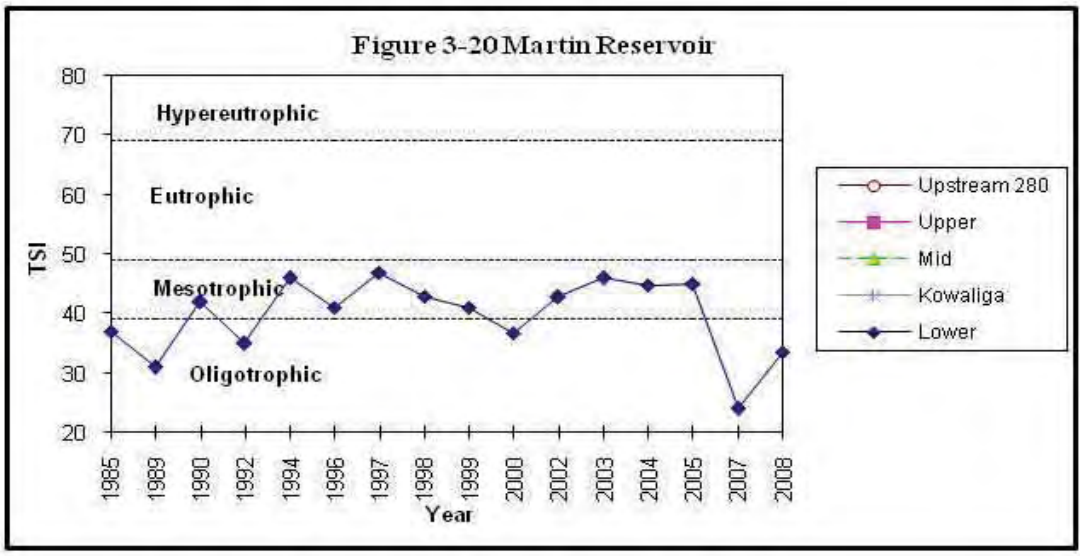
305(b)/303(d) Water Quality Assessment Integrated Report

Alabama's 2010 303(d) list does not include Lake Martin or any waters in the sub-basin as impaired (ADEM, 2010). The Tallapoosa River from the Yates Dam to the Martin Dam is listed under Category 2B, which indicates that available data does not satisfy minimum data requirements but that there is a low potential for use impairment based on the limited data.

According to the 2010 305(b) report, long-term monitoring of Lake Martin reflects mesotrophic conditions although a reduction in TSI occurred from 2007 to 2008 reflecting oligotrophic conditions at Lake Martin (Figure 4-8) (ADEM, 2010). Mesotrophic and oligotrophic classifications indicate that excessive nutrient loading is not an issue in the reservoir. In support of Project relicensing, additional information was gathered on nutrient levels in Lake Martin, as described in the following section.

FIGURE 4-8 CARLSONS TSI INDICES FOR LAKE MARTIN

(Source ADEM, 2010)



EXISTING WATER QUALITY DATA

In 2010, Alabama Power conducted a Baseline Water Quality Study (Study Plan 8) designed to compile and synthesize all available historic and current data to characterize water quality at the Project. In addition to Alabama Power, ADEM, Montgomery Water Works and Sanitary Sewer Board, and Alabama Water Watch have collected water quality data at the Project. Results of the Water Quality Study are summarized here and the full report is included on the "Martin Project PLP and Supporting Documents" DVD.

To demonstrate compliance with State of Alabama standards, Alabama Power has performed extensive water quality monitoring of Lake Martin and the Project tailrace since the early1990s. Table 4-7 and Table 4-8 summarize Alabama Power's DO and temperature sampling, and chemical measurements collected from 1993-2009.

TABLE 4-7 SUMMARY OF WATER TEMPERATURE AND DISSOLVED OXYGEN DATA (AT DEPTH OF 5-FEET) AT THE PROJECT, 1993-2009

(Source: Alabama Power Company, 2010b)

DISSOLVED OXYGEN (MG/L)				
LOCATION	**COUNT**	**MINIMUM**	**MAXIMUM**	**AVERAGE**
Martin Forebay	140	3.8[1]	10.7	7.83
4 Mi. Upstream	11	7.0	10.9	8.75
12 Mi. Upstream	12	7.0	11.6	8.91
16 Mi. Upstream	12	7.2	11.4	9.05
20 Mi. Upstream	12	7.0	10.5	8.67
24 Mi. Upstream	12	7.2	10.8	8.80

TEMPERATURE (°C)				
LOCATION	**COUNT**	**MINIMUM**	**MAXIMUM**	**AVERAGE**
Martin Forebay	140	10.5	31.6	25.57
4 Mi. Upstream	11	10.5	29.1	20.58
12 Mi. Upstream	12	10.2	29.0	20.61
16 Mi. Upstream	11	10.4	27.8	19.86
20 Mi. Upstream	12	10.7	29.2	19.74
24 Mi. Upstream	12	10.8	28.5	19.22

[1] There was only 1 day in which the dissolved oxygen concentration was less than 5.3 mg/l and it occurred on September 22, 2004.

TABLE 4-8 SUMMARY DATA FOR WATER CHEMISTRY VARIABLES MEASURED AT THE PROJECT DURING THE PERIOD 1993-2009 BY ALABAMA POWER COMPANY*

(Source: Alabama Power Company, 2010b)

VARIABLE TESTED	COUNT	MINIMUM	MAXIMUM	AVERAGE
Alkalinity, Bicarbonate (as CaCO3)	316	1.50	83.9	24.93
Alkalinity, Carbonate (as CaCO3)	316	0.00	3.6	0.07
Alkalinity, Hydroxide (as CaCO3)	316	0.00	0.3	0.01
Alkalinity, Total (as CaCO3)	332	1.51	84.2	24.78
Aluminum, Total	332	0.00	2.20	0.37
Arsenic, Total	332	0.00	0.07	0.00
Barium, Total	332	0.00	4.49	0.03
Biochemical Oxygen Demand, 5 Day	55	0.00	2.00	0.22
Cadmium, Total	332	0.00	0.01	0.00
Calcium, Total	332	0.00	22.6	2.81
Carbon Dioxide, Free	316	0.10	91.4	5.06
Carbon Dioxide, Total	316	1.6	109.8	27.02
Chloride, Total	332	1.67	21.48	3.54
Chromium, Total	332	0.00	1.00	0.00
Color	53	1.00	38.0	8.97
Conductivity	383	5.00	242	48.59
Copper, Total	332	0.00	0.02	0.00
Field pH	304	5.66	8.37	6.81
Fluoride	332	0.00	0.53	0.03

VARIABLE TESTED	COUNT	MINIMUM	MAXIMUM	AVERAGE
Hardness, Total (as CACO3)	332	0.00	83.9	12.62
Iron, Total	332	0.00	18.70	0.70
Lead, Total	332	0.00	0.02	0.00
Magnesium, Total	332	0.00	6.67	1.34
Manganese, Total	332	0.00	1.33	0.10
Mercury, Total	53	0.00	0.00	0.00
Nickel, Total	332	0.00	0.09	0.00
Nitrogen, Ammonia	332	0.00	0.16	0.05
Nitrogen, Nitrate	332	0.00	0.60	0.16
Nitrogen, Nitrite	332	0.00	0.4	0.01
Nitrogen, Total Kjeldahl	289	0.00	3.00	0.35
Oil and Grease	28	0	11.1	2.45
Organic Carbon, Total	332	0.00	3.47	1.92
Oxygen, Dissolved	69	4.1	11.1	7.29
pH	243	6.10	8.74	7.11
Phosphate, Ortho (as P)	332	0.00	0.20	0.01
Phosphorus, Total	318	0.00	0.15	0.02
Potassium, Total	332	0.00	2.43	1.06
Selenium, Total	332	0.00	0.01	0.00
Silicon, Total	274	1.65	6.39	4.55
Sodium, Total	332	0.28	19.30	3.13
Solids, Total	332	0.00	123.0	43.93
Solids, Total Dissolved	26	23.00	56.0	35.70
Solids, Total Suspended	332	0.00	29.0	5.66
Sulfate	332	0.00	14.40	2.48
Temperature	70	12.3	31.90	22.20
Turbidity	332	0.50	20.00	4.86
Vanadium, Total	332	0.00	0.01	0.00
Zinc, Total	332	0.00	0.10	0.00

*Measurements were taken at a depth of 5-ft at seven stations in the Project Area, including the tailrace, forebay, and in locations 4, 12, 16, 20, and 24 mi. upstream of the Project Dam

To demonstrate compliance with water quality standards prior and subsequent to issuance of the 401 water quality certification for the Martin Project, Alabama Power performed extensive monitoring of the water quality of the Martin reservoir and tailrace. As part of this monitoring program, from 2002-2005 (June 1 through October 31 of each year), Alabama Power collected 30-minute dissolved oxygen (DO) and temperature data in the tailrace. On two occasions, the DO dropped below 4.0 mg/l. On October 28, 2002, when Unit 4 experienced a scheduled outage to dry out the generator, the deviation from the state standard lasted 2.5 hours. On July 8, 2005, DO dropped below 4.0 mg/l during a flood event, which raised tailrace levels such that the instrument reading DO levels was not representative of actual levels of DO in the discharge. In 2006, FERC issued, with ADEM's concurrence, a long-term water quality monitoring plan order

for the Martin project. Since that time, Alabama Power has collected hourly dissolved oxygen and temperature values in the tailrace during generation from June 1st through October 31st of each year. DO has been maintained above 4.0 mg/l 100% of the time with an average of 5.72 mg/l (Alabama Power Company, 2010b) (see Table 4-9).

TABLE 4-9 SUMMARY OF TAILRACE SAMPLING DATA CONDUCTED BY ALABAMA POWER (Source: Alabama Power Company, 2010b)

SAMPLING PERIOD	TEMPERATURE (°C)		DO	
	2002-2005	2006-2009	2002-2005	2006-2009
Min	12.06	12.7	3.46	4.17
Max	25.44	31.1	9.78	9.54
Average	19.11	18.05	5.91	5.72
# Points	7795	2529	7795	2529
% time > 4 mg/L	n/a	n/a	99.9	100

In addition to tailrace sampling, Alabama Power has collected DO and temperature profiles at multiple locations throughout the reservoir. Forebay profiles have been collected from 1990 continuing to the present, mostly during the critical summer months. In 1995, Alabama Power in conjunction with ADCNR collected water quality profiles at two locations in Kowaliga Creek and seven locations on the Tallapoosa River upstream of Martin Dam as part of a special fisheries study. For one year from 2004 to 2005, water quality profiles were collected throughout the reservoir and 4 miles, 12 miles, 16 miles, 20 miles and 24 miles upstream of Martin Dam.

Long-term monitoring of profile data show Lake Martin experiences seasonal stratification. Figure 4-9 and Figure 4-10 depict water quality profiles collected in the Project forebay between 1993 and 2009. During the summer months, Lake Martin undergoes thermal stratification that creates a top layer of well-mixed, warm, higher-DO water and a bottom layer consisting of cold, dense, low-DO water. Separating the two is a zone called the thermocline where temperature drops off rapidly with depth. As seen in figures below, Lake Martin typically stratifies in late June or early July and turns over in the fall, usually in late October or November.

FIGURE 4-9 WATER QUALITY PROFILES COLLECTED AT MARTIN FOREBAY (MAY THROUGH JULY, 1993-2009)

(Source: Alabama Power Company, 2010b)

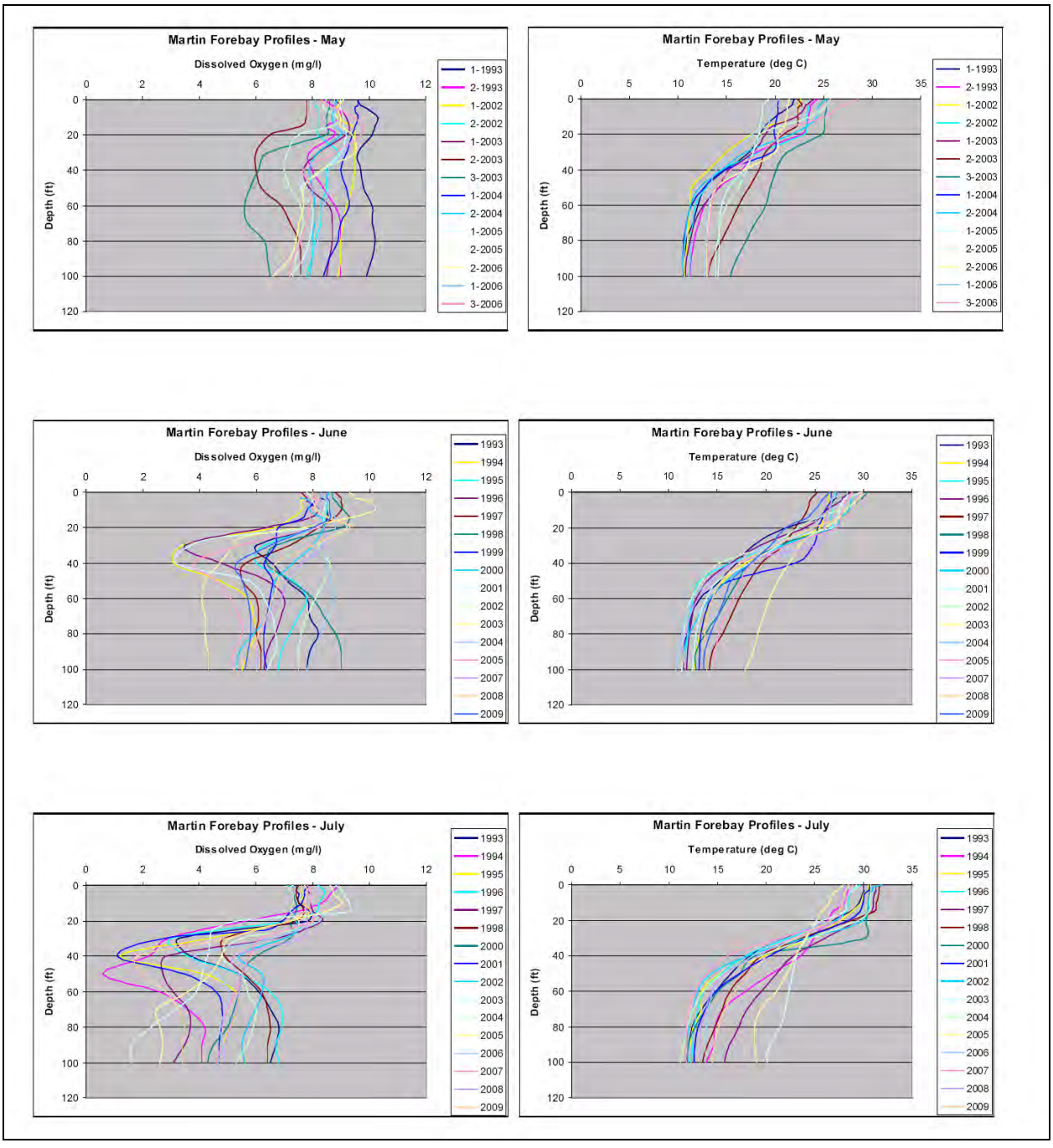
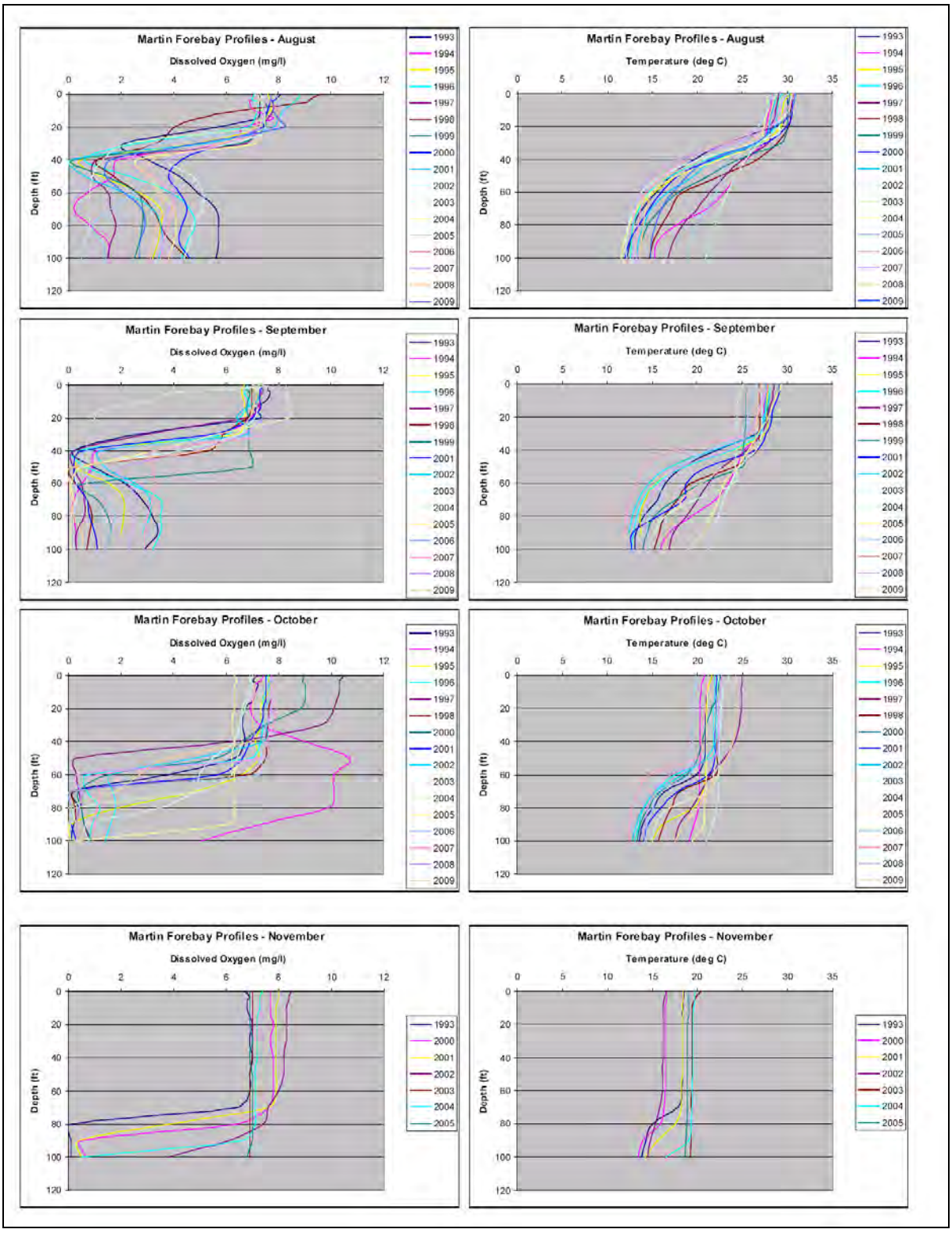


FIGURE 4-10 WATER QUALITY PROFILES COLLECTED AT MARTIN FOREBAY (AUGUST THROUGH NOVEMBER, 1993-2009)

(Source: Alabama Power Company, 2010b)



In October 2007, Alabama Power requested a variance from FERC to temporarily change the operating rule curve at Lake Martin that would allow for filling of the reservoir to begin earlier and a higher winter pool level. This was done in an attempt to mitigate the effects of the extreme drought that began in 2006. In conjunction with the temporary variance, from late 2007 through early 2008, Alabama Power conducted a study to evaluate the impact of changes to the reservoir operating rule curve on water quality. Sample sites historically used by ADEM were used in the 2007-2008 study.

TABLE 4-10 SUMMARY OF WATER TEMPERATURE AND DO RESERVOIR PROFILE DATA COLLECTED AT A DEPTH OF 5-FEET BY ALABAMA POWER DURING THE PERIOD 2007-2008

(Source: Alabama Power Company, 2010b)

DISSOLVED OXYGEN (MG/L)				
STATION ID*	**COUNT**	**MINIMUM**	**MAXIMUM**	**AVERAGE**
MARE-1	9	8.50	10.40	9.39
MARE-2	9	8.30	10.20	9.32
MARE-3	9	8.40	10.50	9.47
MARE-4	9	7.60	10.30	9.12
MARE-5A	9	7.30	11.50	9.10
MARE-7	9	6.80	11.70	8.43
MARE-8	9	8.00	10.90	9.38
MARE-10	9	8.40	10.30	9.38
MARE-11	9	8.30	10.20	9.33
WATER TEMPERATURE (C)				
STATION ID*	**COUNT**	**MINIMUM**	**MAXIMUM**	**AVERAGE**
MARE-1	9	10.70	26.10	16.83
MARE-2	9	10.60	26.40	17.06
MARE-3	9	10.20	26.90	17.08
MARE-4	9	9.80	26.80	17.17
MARE-5A	9	6.00	26.70	16.43
MARE-7	9	11.20	26.80	19.13
MARE-8	9	9.20	27.20	17.40
MARE-10	9	10.50	27.00	17.29
MARE-11	9	10.40	26.60	17.07

* Monitoring Stations: MARE1 = lower reservoir; MARE2 = mid reservoir, immediately upstream of the Blue Creek embayment; MARE3 = immediately upstream of Alabama Highway 63 bridge; MARE4 = upstream of Wind Creek State Park; MARE5 = 0.5 miles upstream of Coley Creek embayment; MARE6 = 0.5 miles upstream of the lake confluence in the Hillabee Creek embayment; MARE7 = 0.5 miles upstream of the lake confluence in the Coley Creek embayment; MARE8 = 0.5 miles of the Elkahatchee/Sugar Creek confluence; MARE9 = 1.0 mile upstream of the lake confluence and Manoy Creek embayment; MARE10 =1.0 mile upstream of the lake confluence in the Sandy Creek embayment; and MARE11 = 2.0 miles upstream in Blue Creek embayment.

TABLE 4-11 SUMMARY DATA FOR WATER CHEMISTRY VARIABLES AS MEASURED BY ALABAMA POWER DURING THE PERIOD 2007-2008 IN THE PROJECT AREA (Source: Alabama Power Company, 2010b)

VARIABLE	MINIMUM	MAXIMUM	AVERAGE
Chlorophyll a (ug/l)	0.50	55.00	5.00
Dissolved Reactive Phosphorus (DRP) (mg/l)	0.00	0.00	0.00
Nitrite + Nitrate (NO2+NO3 – N) (mg/l)	0.00	0.30	0.10
Nitrogen, Ammonia (mg/l)	0.00	0.10	0.00
Nitrogen, Total Kjeldahl (mg/l)	0.00	0.5	0.20
pH	6.90	8.80	7.51
Phosphorus	0.00	0.20	0.00
Photic zone (ft)	5.50	49.9	24.8
Secchi (ft)	1.50	16.00	8.50
Solids, Total Dissolved (mg/l)	1.00	60.00	33.00
Solids, Total Suspended	1.00	19.00	4.30
Turbidity (NTU)	0.90	27.10	3.80

As mentioned previously, the Water Quality Report (SP 8) included on the "Martin Project PLP and Supporting Documents" DVD contains more information on the above-referenced study efforts, including maps, sampling locations, and datasets.

ADEM AND OTHER PROJECT RELATED MONITORING DATA

In addition to the monitoring done by Alabama Power, water quality information in the Project Area has been collected by ADEM and Alabama Water Watch. ADEM collected data from 1994 through 2008 including DO and water temperature point sampling and profiles, and water chemistry analyses (Table 4-12) (Alabama Power Company, 2010b). ADEM monitored five stations in Lake Martin and six in Lake Martin tributary waters (Hillabee Creek, Coley Creek, Elkahatchee Creek, Manoy Creek, Sandy Creek, and Blue Creek).

In general, ADEM's data shows that the water temperature in the Martin forebay ranged from 15.8°C to 32.0°C during the monitoring period. DO levels varied throughout the year, principally between 6.03 mg/l and 10.03 mg/l at the five-foot depth in the forebay and between 6.03 mg/l and 13.13 mg/l in the reservoir. The DO averaged 8.07 mg/l at the five-foot depth in the forebay, and 8.47 mg/l throughout the reservoir. The pH of the water in the Martin forebay ranges from

6.14 to 8.20, typically averaging approximately 7.18. The sample frequencies associated with ADEM's monitoring program, along with a statistical analysis of the water quality and water chemistry data collected, is presented in SP 8 – Final Report – "Baseline Water Quality" on the "Martin Project PLP and Supporting Documents" DVD".

TABLE 4-12 SUMMARY OF WATER TEMPERATURE AND DO RESERVOIR PROFILE DATA COLLECTED AT A DEPTH OF 5-FEET BY ADEM DURING THE PERIOD 1994-2008 (Source: Alabama Power Company, 2010)

DISSOLVED OXYGEN (MG/L)				
STATION ID*	**COUNT**	**MINIMUM**	**MAXIMUM**	**AVERAGE**
MARE-1	53	6.03	10.03	8.07
MARE-2	58	6.70	11.18	8.26
MARE-3	50	6.65	9.61	8.04
MARE-4	49	6.20	10.61	8.46
MARE-5	36	6.41	9.93	8.07
MARE-6	10	6.13	9.83	7.76
MARE-7	9	7.17	13.13	9.82
MARE-8	9	7.00	12.14	9.63
MARE-9	9	6.04	10.71	8.57
MARE-10	9	6.51	9.95	8.25
MARE-11	10	6.56	9.98	8.19
WATER TEMPERATURE (C)				
STATION ID*	**COUNT**	**MINIMUM**	**MAXIMUM**	**AVERAGE**
MARE-1	53	15.83	32.01	26.05
MARE-2	58	17.61	31.70	26.37
MARE-3	50	16.76	31.64	26.36
MARE-4	49	17.18	31.53	26.24
MARE-5	36	14.79	31.45	24.75
MARE-6	10	13.91	29.03	22.30
MARE-7	9	15.10	29.94	23.95
MARE-8	9	18.26	31.36	26.18
MARE-9	9	18.67	31.78	26.38
MARE-10	9	19.47	31.58	27.37
MARE-11	10	18.10	31.37	26.31

* Monitoring Stations: MARE1 = lower reservoir; MARE2 = mid reservoir, immediately upstream of the Blue Creek embayment; MARE3 = immediately upstream of Alabama Highway 63 bridge; MARE4 = upstream of Wind Creek State Park; MARE5 = 0.5 miles upstream of Coley Creek embayment; MARE6 = 0.5 miles upstream of the lake confluence in the Hillabee Creek embayment; MARE7 = 0.5 miles upstream of the lake confluence in the Coley Creek embayment; MARE8 = 0.5 miles of the Elkahatchee/Sugar Creek confluence; MARE9 = 1.0 mile upstream of the lake confluence and Manoy Creek embayment; MARE10 =1.0 mile upstream of the lake confluence in the Sandy Creek embayment; and MARE11 = 2.0 miles upstream in Blue Creek embayment.

TABLE 4-13 SUMMARY DATA FOR WATER CHEMISTRY VARIABLES AS MEASURED BY ADEM DURING THE PERIOD 1994-2005 IN THE PROJECT AREA (Source: Alabama Power Company, 2010)

VARIABLE	MINIMUM	MAXIMUM	AVERAGE
Alkalinity (mg/l)	2.00	90.20	14.76
Chlorophyll a (ug/l)	0.05	98.41	8.52
Coliform per 100 ml	1.00	33.00	4.09
Dissolved Reactive Phosphorus (DRP) (mg/l)	0.00	0.09	0.01
Hardness, Total (as CACO3) (mg/l)	5.08	47.00	10.81
Nitrite + Nitrate (NO2+NO3 – N) (mg/l)	0.00	0.63	0.08
Nitrogen, Ammonia (mg/l)	0.02	0.56	0.03
Nitrogen, Total Kjeldahl (mg/l)	0.00	1.30	0.23
Organic Carbon, Total (mg/l)	0.40	27.77	2.59
pH	6.80	8.24	7.43
Phosphorus	0.01	1.77	0.04
Photic zone (m)	1.60	17.86	6.45
Secchi (m)	0.68	44.05	3.00
Solids, Total Dissolved (mg/l)	4.00	504.00	52.46
Solids, Total Suspended	1.00	61.00	7.24
Specific Conductance (mS/cm)	0.03	0.13	0.05
Trophic State Index (TSI)	1.00	68.00	44.23
Turbidity (NTU)	0.88	31.10	5.09

NUTRIENT STUDY (ADDENDUM TO STUDY PLAN 8)

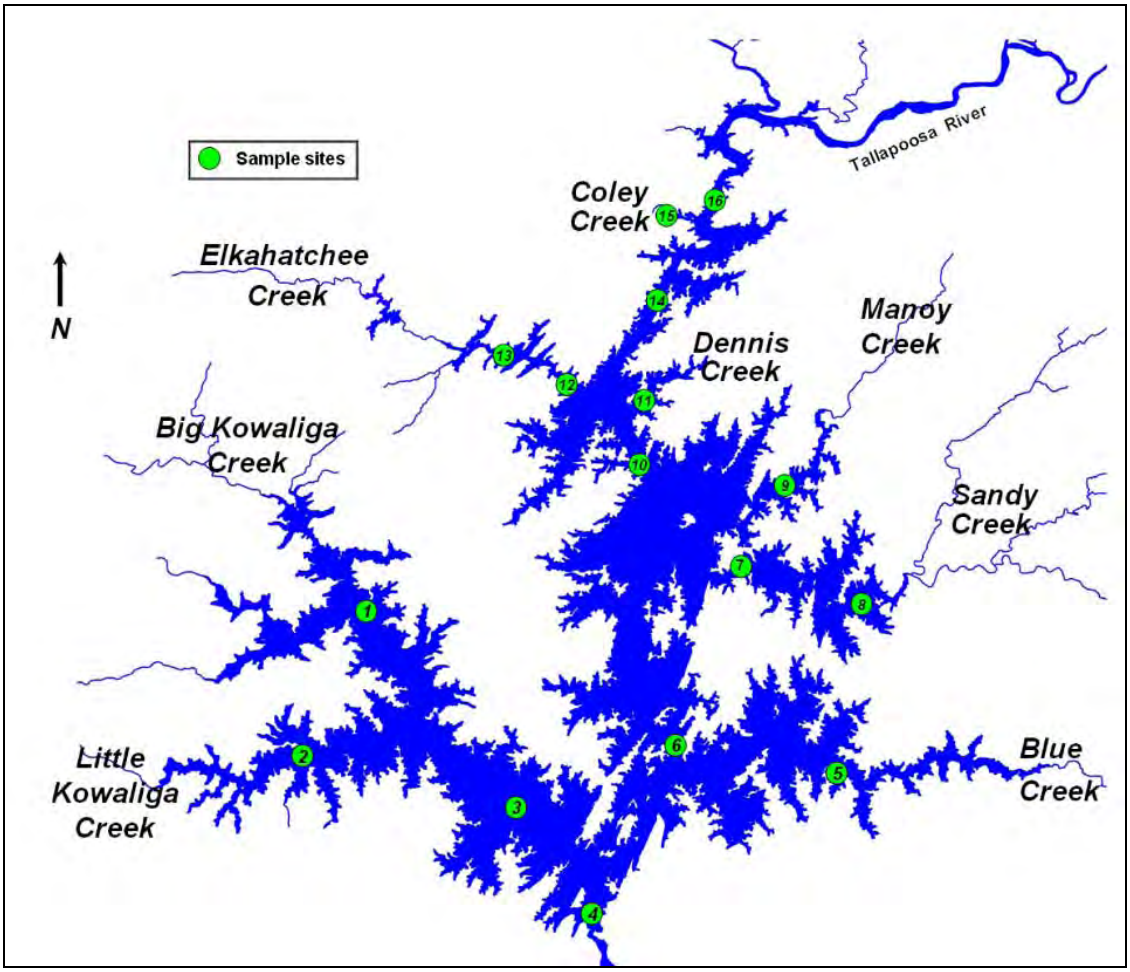
As mentioned previously, nutrient data has been collected over the last several years by Lake Watch of Lake Martin and is available through the Alabama Water Watch Program. Data suggests nutrient levels in portions of the lake and embayments may be increasing, particularly Coley Creek, Sandy Creek, Elkahatchee Creek, Upper Blue Creek, and the Upper Tallapoosa near Irwin Shoals. Data collected during the Alabama Power 2007-2008 Rule Curve Variance water quality study, mentioned previously, suggested that Lake phytoplankton productivity does not cease with the onset of the fall and winter months, as chlorophyll *a* values were relatively high in several embayments during the winter months.

To develop a better understanding of existing nutrient levels and to assess potential impacts of a Flood Control Guide Curve change (i.e., winter pool elevation) at the Project, Alabama Power

coordinated with partners to conduct a nutrient study. Study partners included Auburn University, Department of Fisheries and Allied Aquacultures, Lake Watch of Lake Martin and Alabama Water Watch. Nutrient and basic water quality parameters were collected monthly at 16 sites from April 2009 to October 2009, and at 8 stations during the winter months from November 2009 to March 2010, to capture all four seasons. The intent was to collect baseline water quality/nutrient data for Lake Martin in areas where historic sampling efforts have been less intensive, particularly at tributary inlets. Figure 4-11 shows monitoring locations for the 2009-2010 nutrient study. A copy of the Final Report is included as an Addendum to the Water Quality Report SP 8 – Baseline Water Quality, on the "Martin Project PLP and Supporting Documents" DVD.

FIGURE 4-11 WATER QUALITY SAMPLING LOCATIONS FOR NUTRIENT STUDY (APRIL 2009-MARCH 2010)

(Source Alabama Power Company 2010b)



The nutrient study documented differences in water quality between up-stream and downstream sites. Mean chlorophyll *a* values measured during the 2009 growing season were lowest in the Kowaliga Creek arm, which was the most nutrient poor arm. Chlorophyll *a* values were highest in the Coley Creek arm, which showed significant nutrient enrichment. The most elevated chlorophyll *a* values occurred in the embayments, particularly at station 15 on Coley Creek; however, a mean value of 7.5 ug/l was also calculated from station 14, the main stem Coley Creek station at the Highway 280 bridge. Elkahatchee Creek embayment (station 13) also exhibited nutrient enrichment. Statistically, Stations 14 and 15 (Coley Creek) and Station 13 (Elkahatchee Creek) showed significantly higher chlorophyll *a* levels than other stations. Additionally, station 15 had statistically higher total phosphorus values than other sites.

Comparison between the 2004 and 2009 growing seasons revealed an increase in TSI in 2009 at all stations except at station 10, although the differences were not tested for statistical significance. Most values in the lower end of the reservoir (stations 1-6) fell within the oligotrophic range during both years; however, stations 7-12 moved into the mesotrophic range for both growing seasons. TSI values above 50 for stations 13, 14 (2009) and 15 reflect eutrophic conditions at these sites. Station 16 had a TSI in the mesotrophic range for 2009 only.

The 2009-2010 data also detected differences in nutrient loading during the winter versus the summer. During the winter, loading was higher and there was phytoplankton production at all stations. Mean chlorophyll *a* values measured during the winter were not higher than during the growing season for each station; however, some stations had winter mean values that exceeded growing season means at other stations. Embayment stations 9, 11, 13 and 15 had winter season means that exceeded growing season mean values at stations 1-6. A potential explanation for this is that the embayment stations may retain more nutrients due to quieter waters, and experience higher mean temperatures during the winter months than the mainstem stations.

4.4.2.2 ENVIRONMENTAL EFFECTS

Environmental effects of the Flood Control Guide Curve alternatives and the PME measures are described in sections 2.2 and 2.2.2, respectively. The proposed PME measures that may affect water quality and water quantity are described in Section 4.4.2.2.

EFFECTS ON WATER QUANTITY

Demand for water in the Southeastern United States has significantly increased in the past three decades and should be expected to continue to do so. Several entities responsible for water management in Alabama are pursuing short and long-term solutions to growing water supply and demand concerns. In response to this growing water demand, there are several processes in place to resolve long-term water concerns. The outcome of these efforts and negotiations are unknown, but are certain to impact water management, not only in Alabama, but throughout the entire Southeastern United States.

With very little industrial and agricultural use in the Lake Martin area, most of the demand for water comes from municipal use. There are currently two municipal withdrawers on Lake Martin; the currently permitted withdrawal amounts should address much of any increasing need due to growth projections. However, there is the possibility that an increase in withdrawal amounts could be requested to help meet any new demand. Estimated water withdrawal rates will be incorporated into future operating procedures.

EFFECTS ON WATER QUALITY

As part of Study Report 12(c), *Effects of Rule Curve Change on Water Quality*, Alabama Power conducted a Water Quality Panel Discussion on July 27, 2010 to consider possible changes in water quality as a result of any flood control guideline change. The Panel determined that while the early spring fill and fall extension alternatives may have some detrimental effect on water quality, the Flood Control Guide Curve change alternatives should have relatively overall little effect on water quality. Several panel members mentioned the possibility of an increase in nutrient concentrations if aquatic vegetation becomes more established in the reservoir associated with an extended growing season (spring and fall). An increase in aquatic vegetation from the extended growing season (spring and fall) could also increase nutrient concentrations. Aquatic vegetation is addressed in more detail in Section 4.4.1.2. The panel determined that there would be little change in the temperature on Lake Martin and little to no change in dissolved oxygen (DO) concentrations with any of the proposed flood control guideline change alternatives. Although Alabama Power does not anticipate any significant changes to water quality, they are proposing to monitor water quality parameters (DO, nutrient levels, and temperature) in the reservoir and tailrace. Alabama Power will work with ADEM to determine

the extent of monitoring. Alabama Power is required by ADEM to meet state water quality standards (4.0 mg/l from turbine discharges) and will continue to do so.

ALTERNATIVES 1 FT TO 5 FT - WINTER POOL INCREASE

For each of the Flood Control Guide Curve Alternatives, there should be minimal impacts to availability of water or to water quality in the Lake or downstream in the Project tailrace. Estimated water withdrawal rates will be incorporated into future operating procedures and would not likely be impacted by a change in the Flood Control Guide Curve. While some members of the Water Quality Expert Panel expressed concern that a four or five foot change in the winter pool level may potentially have a limited negative effect on water quality in Lake Martin, there was not total agreement on this issue and therefore this conclusion was excluded from the MCDA analysis.

4.4.2.3 PROPOSED PME MEASURES

To address any potential effects on water quality as a result of any of the five alternatives, Alabama Power proposes to consult with ADEM to develop a water quality monitoring plan. In addition, by continuing to implement the Water Withdrawal Policy that contains a permitting process and fee structure for water withdrawals, Alabama Power will continue to promote conservation of the resource and maintain adequate water supply for the existing and future withdrawals. Also, Alabama Power proposes to implement the Shoreline Management Program including BMPs around the Lake which could result in less stormwater runoff and some limited improvement of water quality.

4.4.2.4 NO ACTION ALTERNATIVE

Under the No-Action Alternative, Alabama Power would continue to operate the Project in the manner it is operated presently. Alabama Power would not implement any Flood Control Guide Curve changes or PME measures and existing water quality conditions would be maintained. Alabama Power would continue to meet applicable state standards in the Martin Project tailrace. Water withdrawals would continue under the existing policy and procedures that Alabama Power has implemented since 1989, with modifications in 2002. Under the No Action alternative, it is likely that there would continue to be localized, limited negative effects on water quality due to

nutrient loading, based on the results of Study Plan 8 and the Nutrient Study Addendum. The Project would still continue, however, to meet the state water quality standards in the 401 water quality certificate.

4.4.2.5 CUMULATIVE EFFECTS

Continued operation of the Project, as proposed by Alabama Power, would meet state water quality standards in the Project's reservoir and tailwater. Thus, waters released from the Project would be of good quality and not cumulatively add to any collective reduction in water quality downstream on the Tallapoosa River. The Project would provide an overall beneficial cumulative effect on water quality.

4.4.2.6 UNAVOIDABLE ADVERSE EFFECTS

Any of the proposed operating alternatives could result in some unavoidable adverse effects on water resources by potentially increasing nutrients in the Lake. There is the potential that inflows to the Project will not always be able to meet both Project and downstream water demands such as during drought periods. Management under these conditions may require reductions in adjusted lake levels to meet downstream water needs. The proposed PME measures would not likely have any adverse impacts to water quality.

4.4.2.7 REFERENCES

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4.4.3 FISH AND AQUATIC RESOURCES

4.4.3.1 AFFECTED ENVIRONMENT

HABITAT

Lake Martin is a monomictic lake located in the Tallapoosa River Basin. Monomictic lakes typically do not drop below 39.2°F (4°C) during the winter, circulate freely at or above 39.2°F, and stratify directly during the warmer summer months. As discussed in Section 4.4.2, Water Resources, the waters of the lake are very clear and low in productivity. Due to the deep nature (maximum depth of 155 ft) and relatively long retention time of the Lake, thermal and chemical stratification occur annually. The majority of Lake substrates are composed of clays and exposed rock except for the areas where tributaries enter the Lake, where sediments of sand and clay have collected.

An interesting feature of the Lake is its dendritic shape and extensive length of shoreline, approximately 700 miles. There are three major arms of the lake: the Kowaliga arm located on the southwest side of the Lake, the Blue Creek arm located on the southeast side of the Lake, and the Tallapoosa main channel, which extends northward from the dam. These arms were created when the original creeks and valleys were inundated during construction of the Project. The extensive amount of shoreline and creek mouth areas provide excellent habitat for warmwater species such as bass and sunfish. The deep open water areas of the Lake also provide excellent habitat for pelagic species such as striped bass and shad (Greene *et al.*, 2005).

A study performed by Auburn University (2010a) during 2009 and 2010 as part of relicensing studies noted that the aquatic habitat on Lake Martin is impacted by shoreline development using seawalls and rip-rap shoreline stabilization. This study indicated that areas with rip-rap have higher densities of fish while natural shorelines typically result in higher diversity of fish species.

More detailed information on shoreline development impacts is included in the Martin Study Report 2- "The Relationship Between Shoreline Development and Resident Fish Communities in Lake Martin, AL, presented on the "Martin Project PLP and Supporting Documents" DVD.

Releases from the Project dam flow directly into the Yates Development. The releases are relatively cool (hypolimnetic discharge) and infertile, which result in slow growth for the downstream fishery. The banks of the tailrace area are naturally armored with exposed bedrock and lined with riprap in several areas to prevent erosion. The tailrace provides habitat for both warmwater and cool water species. There is no bypassed reach associated with the Project (ADCNR, 2006).

LAKE MARTIN FISHERY RESOURCES AND FISHERIES MANAGEMENT

A diverse community of fish species populates Lake Martin. The documented species, native and non-native, present within the Project are presented in Table 4-14. Although Lake Martin has low fertility and relatively low levels of nutrients, the fishery resources are healthy and extremely popular with anglers. Dominant recreational fish species include spotted and largemouth bass, striped bass, white bass, black crappie, and bluegill (Greene *et al.*, 2004). Fish surveys conducted by Alabama Power in the tributaries of Lake Martin during 2009 and 2010 also noted additional species (Alabama Power 2010a). There are currently no fish consumption advisories for Lake Martin or the tailrace area (ADPH, 2006).

The black bass fishery is comprised of both largemouth and spotted bass. Collection of black bass by ADCNR during 2004, 2005, and 2008 indicated that spotted bass are more abundant than largemouth bass. Analysis of bass collected on the lake indicates good reproduction and survival but slow growth. The slower growth experienced on Lake Martin is related to its nutrient-poor water. Black crappie populations in the Lake have increased in recent years, and continue to provide excellent fishing opportunities. Annual mortality for black crappie remains high and is related to heavy exploitation by anglers and a short life span. Collections of bluegill indicate a good population dominated by small individuals. Striped bass collections were relatively low and fish collected exhibited low growth rates. However, ADCNR continues to stock striped bass in the lake at a rate of three fish per acre to maintain this recreational fishery. White bass collected were in excellent condition and numerous, with some of the highest catch rates ever recorded for the Lake. These parameters indicate an excellent and stable white bass fishery. Gizzard and

threadfin shad collections indicate a good forage base for the fishery (Greene *et al.*, 2004; Greene *et al.*, 2005; Greene *et.al*., 2008).

The ADCNR regulates the recreational fishery on the Lake using fish stocking and fishing regulations (number of fish harvested, length limits, and slot limits) that are adjusted periodically to enhance the fishery. The ADCNR has periodically stocked Florida strain largemouth bass in the Lake since 1983. A nine-inch statewide minimum length limit on crappie was instituted by the ADCNR to guard against over harvest by anglers and to improve the population size structure of crappie within the lake. A slot limit for black bass was implemented in 2004 to improve the number of larger bass, but was recommended to be dropped in 2008 (Greene *et al.*, 2004; Greene *et al.*, 2008).

The "Gulf-strain" striped bass population in Lake Martin was established through stocking efforts by the ADCNR beginning in 1980. During the summer when Lake stratification occurs, striped bass are restricted to the cooler water deeper in the Lake. Due to low levels of dissolved oxygen in these deep water levels, fish kills of striped bass have been observed by ADCNR periodically during the late summer. A water quality study was performed by ADCNR and Alabama Power during 1995 to better understand this phenomenon but to date, no specific measures to address this phenomenon have been identified or implemented. Hybrid striped bass were also stocked in the Lake from 1982 through 1988 (Greene *et al.*, 2004; Greene *et al.*, 2008; McHugh *et al.*, 1996).

Auburn University performed a striped bass telemetry study during 2009 and 2010 as part of the Lake Martin relicensing effort (Auburn University, 2010b). The study utilized radio tagged fish to monitor their movements during the spring, summer, and fall periods of each year as "quality habitat" diminished with seasonal lake warming and reduction in dissolved oxygen levels in the hypolimnion. The study determined that striped bass move to different areas of the lake to find the best water quality available during the late summer and early fall until lake turnover (during the fall) restores abundant "quality habitat". The study also noted that a reduction in "quality habitat" stresses striped bass. A secondary part of the study involved a "hooking mortality" study, which determined that adult striped bass angled during the summer and fall stressful periods exhibited high mortalities. Additional information on the impacts to striped bass are presented in SP 6 – "Adult Striped Bass Habitat Use and the Effects of Catch and Release

Angling During the Summer in Lake Martin, Alabama", on the "Martin Project PLP and Supporting Documents" DVD.

Alabama Power performed a fish entrainment and turbine mortality study at Martin Dam during 2009 and part of 2010 as part of relicensing Lake Martin (Alabama Power 2010b). The study utilized results from fish entrainment from similar hydroelectric projects and onsite hydroacoustics collections to determine the magnitude of fish entrainment that potentially occurs at the Project. The historic entrainment information predicted that the Project would entrain approximately 626,000 fish annually. The hydroacoustic data estimated that approximately 7.4 million targets entered into the penstock area during the year. The year studied was a very high hydrologic flow year and not typical for the Project. Therefore, the study results were used to adjust the entrainment estimate to approximately 3.6 million fish, which would be more representative of a normal hydrologic year. Highest entrainment rates were observed during the winter and fall and 90% of the fish targets observed indicated fish less than 10 inches long. The report also stated that the high entrainment rates observed during the winter were likely due to entrainment of shad that experienced cold lethargy during the very cold winter. Turbine mortality rates were estimated based on field studies of similar hydroelectric turbines. Rates varied from 2.6% to 34% based on fish species and size. More detailed information on fish entrainment and turbine mortality are presented in SP 4 – "Fish Entrainment and Turbine Mortality Analysis" on the "Martin Project PLP and Supporting Documents" DVD.

TABLE 4-14 FISHES KNOWN OR EXPECTED TO OCCUR IN THE IMMEDIATE VICINITY OF THE PROJECT

(Source: Boschung and Mayden, 2004; Mettee *et al.*, 1996; Alabama Power, 2010c)

FAMILY	*SCIENTIFIC NAME*	COMMON NAME	NOTES
Petromyzontidae (Lampreys)	*Ichthyomyzon castaneus*	chestnut lamprey	
	Ichthyomyzon gagei	southern brook lamprey	
Clupeidae (Herrings and Shads)	*Dorosoma cepedianum*	gizzard shad	
	Dorosoma petenense	threadfin shad	probably non-native to Tallapoosa drainage
Cyprinidae (Minnows and	*Campostoma oligolepis*	largescale stoneroller	
	Cyprinella callistia	Alabama shiner	

FAMILY	*SCIENTIFIC NAME*	COMMON NAME	NOTES
Carps)	*Cyprinella gibbsi*	Tallapoosa shiner	
	Cyprinella venusta	blacktail shiner	
	Cyprinus carpio	common carp	introduced/non-native
	Ericymba buccata	silverjaw minnow	also called *Notropis buccatus*
	Hybopsis lineapunctata	lined chub	
	Luxilus chrysocephalus	striped shiner	
	Lythrurus bellus	pretty shiner	
	Macrhybopsis sp. cf. M. aestivalis	Coosa chub	
	Nocomis leptocephalus	bluehead chub	
	Notemigonus crysoleucas	golden shiner	
	Notropis ammophilus	orangefin shiner	
	Notropis asperifrons	burrhead shiner	
	Notropis atherinoides	emerald shiner	
	Notropis baileyi	rough shiner	
	Notropis stilbius	silverstripe shiner	
	Notropis texanus	weed shiner	
	Notropis xaenocephalus	Coosa shiner	
	Opsopoeodus emiliae	pugnose minnow	
	Phenacobius catostomus	riffle minnow	
	Pimephales vigilax	bullhead minnow	
	Semotilus atromaculatus	creek chub	
Catostomidae (Suckers)	*Erimyzon oblongus*	creek chubsucker	
	Hypentelium etowanum	Alabama hogsucker	
	Ictiobus bubalus	smallmouth buffalo	
	Minytrema melanops	spotted sucker	
	Moxostoma carinatum	river redhorse	
	Moxostoma duquesnei	black redhorse	

FAMILY	*SCIENTIFIC NAME*	COMMON NAME	NOTES
	Moxostoma erythrurum	golden redhorse	
	Moxostoma poecilurum	blacktail redhorse	
Ictaluridae (Catfishes)	*Ameiurus catus*	white catfish	introduced/non-native
	Ameiurus melas	black bullhead	
	Ameiurus natalis	yellow bullhead	
	Ameiurus nebulosus	brown bullhead	
	Ictalurus furcatus	blue catfish	
	Ictalurus punctatus	channel catfish	
	Noturus funebris	black madtom	
	Noturus leptacanthus	speckled madtom	
	Pylodictis olivaris	flathead catfish	
Esocidae (Pikes and Pickerels)	*Esox niger*	chain pickerel	
Fundulidae (Topminnows and Killifishes)	*Fundulus bifax*	stippled studfish	
	Fundulus olivaceus	blackspotted topminnow	
Poeciliidae (Livebearers)	*Gambusia affinis*	western mosquitofish	
Cottidae (Sculpins)	*Cottus sp. cf. C. bairdi*	Tallapoosa sculpin	
Moronidae (Temperate Basses)	*Morone chrysops*	white bass	introduced/non-native
	Morone saxatilis	striped bass	
	Morone chrysops x saxatilis	palmetto bass	also called hybrid bass; introduced
Centrarchidae (Sunfishes)	*Ambloplites ariommus*	shadow bass	
	Lepomis auritus	redbreast sunfish	
	Lepomis cyanellus	green sunfish	
	Lepomis gulosus	Warmouth	
	Lepomis macrochirus	Bluegill	
	Lepomis megalotis	longear sunfish	
	Lepomis microlophus	redear sunfish	
	Lepomis miniatus	redspotted sunfish	

FAMILY	*SCIENTIFIC NAME*	COMMON NAME	NOTES
	Micropterus coosae	redeye bass	
	Micropterus punctulatus	spotted bass	
	Micropterus salmoides	largemouth bass	
	Pomoxis annularis	white crappie	
	Pomoxis nigromaculatus	black crappie	
Percidae (Perches)	*Etheostoma chuckwachatte*	lipstick darter	
	Etheostoma stigmaeum	speckled darter	
	Etheostoma swaini	gulf darter	
	Etheostoma tallapoosae	Tallapoosa darter	
	Percina kathae	Mobile logperch	
	Percina sp. cf. P. macrocephala	muscadine bridled darter	
	Percina nigrofasciata	blackbanded darter	
	Percina Palmaris	bronze darter	
	Perca flavescens	yellow perch	introduced/non-native
Elassomatidae (Pygmy Sunfishes)	*Elassoma zonatum*	banded pygmy sunfish	

TAILRACE FISHERY RESOURCES

The Project tailrace is the headwaters of the Yates Reservoir. The fishery immediately downstream of the Martin Dam includes spotted and largemouth bass, striped bass, white bass, black crappie, bluegill, redear sunfish, channel catfish and yellow perch. The cool water associated with the tailrace area often attracts striped bass exceeding 40 pounds (ADCNR, 2006). Fish species collected in the immediate tailrace during 2009 by Alabama Power (2010a) are presented in Table 4-15.

TABLE 4-15 FISH COLLECTED IN THE MARTIN TAILRACE DURING SURVEYS IN 2009 (ADCNR, 2006; Alabama Power, 2010a)

SPECIES COLLECTED	NUMBER COLLECTED
Clupeidae	
Dorosoma cepedianum (gizzard shad)	1
Dorosoma petenense (threadfin shad)	76
Cyprinidae	
Cyprinus carpio (common carp)	2
Hybopsis lineapunctata (lined chub)	4
Notropis atherinoides (emerald shiner)	1
Notropis texanus (weed shiner)	1
Catostomidae	
Minytrema melanops (spotted sucker)	1
Moxostoma duquesnei (black redhorse)	7
Moxostoma poecilurum (blacktail redhorse)	15
Cottidae	
Cottus sp. cf. *C. bairdii* ("Tallapoosa sculpin")	1
Moronidae	
Morone saxatilis (striped bass)	5
Centrarchidae	
Lepomis auritus (redbreast sunfish)	7
Lepomis cyanellus (green sunfish)	18
Lepomis gulosus (warmouth)	1
Lepomis macrochirus (bluegill)	66
Lepomis microlophus (redear sunfish)	3
Micropterus punctulatus (spotted bass)	11
Micropterus salmoides (largemouth bass)	9
TOTAL SPECIES	**18**
TOTAL INDIVIDUALS	**229**

TALLAPOOSA RIVER FISHERY DOWNSTREAM OF THURLOW DAM

The fishery in the Tallapoosa downstream of Thurlow Dam has been monitored periodically from 1993 to 2009 as part of the Yates and Thurlow license and the implementation of a 1,200 cfs minimum flow downstream of Thurlow Dam. Species collected by Alabama Power in the Tallapoosa River downstream of Thurlow Dam are presented in Table 4-16 (Alabama Power, 2010d).

Of these species, paddlefish has been of specific concern to the ADCNR and was addressed specifically in the Martin Study Report 3 (Alabama Power, 2010d). The review of existing paddlefish information identified that paddlefish spawn in the Tallapoosa River downstream of

Thurlow dam during March and April of each year. Spawning is linked to an increase in water temperature and then spawning is triggered by higher flow events. Studies performed by Alabama Power indicated that river flows above 6,000 cfs may be significant in triggering spawning events.

TABLE 4-16 SPECIES COLLECTED BY ALABAMA POWER IN THE TALLAPOOSA RIVER DOWNSTREAM OF THURLOW DAM (Alabama Power, 2010d)

SCIENTIFIC NAME	COMMON NAME
Ichthyomyzon gagei	southern brook lamprey
Polyodon spathula	Paddlefish
Lepisosteus oculatus	spotted gar
Lepisosteus osseus	longnose gar
Amia calva	Bowfin
Anguilla rostrata	American eel
Alosa chrysochloris	skipjack herring
Dorosoma cepedianum	gizzard shad
Dorosoma petenense	threadfin shad
Hiodon tergisus	Mooneye
Esox americanus	redfin pickerel
Esox niger	chain pickerel
Campostoma oligolepis	largescale stoneroller
Ctenopharyngodon idella	grass carp
Cyprinella venusta	blacktail shiner
Cyprinus carpio	common carp
Hybopsis winchelli	clear chub
Macrhybopsis aestivalis	speckled chub
Macrhybopsis storeriana	silver chub
Notropis ammophilus	orangefin shiner
Notropis atherinoides	emerald shiner
Notropis buccatus	silverjaw minnow
Notropis edwardraneyi	fluvial shiner
Notropis texanus	weed shiner
Notropis uranoscopus	skygazer shiner
Notropis volucellus	mimic shiner
Pimephales vigilax	bullhead minnow
Carpiodes cyprinus	Quillback
Carpiodes velifer	highfin carpsucker
Cycleptus meridionalis	southeastern blue sucker
Hypentelium etowanum	Alabama hog sucker

SCIENTIFIC NAME	COMMON NAME
Ictiobus bubalus	smallmouth buffalo
Minytrema melanops	spotted sucker
Moxostoma carinatum	river redhorse
Moxostoma duquesnei	black redhorse
Moxostoma poecilurum	blacktail redhorse
Ictalurus furcatus	blue catfish
Ictalurus punctatus	channel catfish
Noturus leptacanthus	speckled madtom
Pylodictis olivaris	flathead catfish
Fundulus olivaceus	blackspotted topminnow
Gambusia affinis	western mosquitofish
Cottus carolinae	banded sculpin
Morone chrysops	white bass
Morone saxatilis	striped bass
Morone chrysops/saxatilis	palmetto bass
Ambloplites ariommus	shadow bass
Lepomis auritus	redbreast sunfish
Lepomis cyanellus	green sunfish
Lepomis gulosus	Warmouth
Lepomis macrochirus	Bluegill
Lepomis megalotis	longear sunfish
Lepomis microlophus	redear sunfish
Micropterus punctulatus	spotted bass
Micropterus salmoides	largemouth bass
Pomoxis annularis	white crappie
Pomoxis nigromaculatus	black crappie
Ammocrypta beani	naked sand darter
Crystallaria asprella	crystal darter
Etheostoma jordani	greenbreast darter
Etheostoma stigmaeum	speckled darter
Perca flavescens	yellow perch
Percina nigrofasciata	blackbanded darter
Percina shumardi	river darter
Percina vigil	saddleback darter
Aplodinotus grunniens	freshwater drum

ANADROMOUS FISH

Anadromous fish are species that upon maturity migrate from the ocean into freshwater environments to spawn. Historically, there were several species that migrated from Gulf Coast waters to inland Alabama rivers (including the Tallapoosa River) to spawn. Currently, no

anadromous species occur in the Tallapoosa River immediately downstream of the Martin Project dam, as upstream passage to this area is blocked by the downstream Yates and Thurlow Dams. Two anadromous species, the Alabama shad and striped bass are thought to occur downstream of Thurlow Dam. The Alabama shad has not been documented by Alabama Power during sampling conducted from 1990 through 2009 as part of studies for the Thurlow license (Alabama Power, 2010c). Striped bass may be present downstream of Thurlow but it is not clear whether these fish are a result of upstream striped bass stocking or are fish that have migrated successfully upstream from the Gulf Coast.

Additional information regarding the status of migratory fish, including anadromous species, downstream of the Project is provided in the Tallapoosa River Fish Passage Information Document (Alabama Power, 2010c), which was developed by Alabama Power in support of relicensing and is included in SP 1 – "Tallapoosa River Fish Passage Information Document" on the "Martin Project PLP and Supporting Documents" DVD".

CATADROMOUS FISH

Catadromous fish are species that live most of their lives in freshwater environments and, upon reaching sexual maturity, migrate to the ocean to spawn. The juvenile offspring of catadromous fish migrate through the ocean to the mouths of rivers and move upstream to various habitats to live until adulthood. The American eel (*Anguilla rostrata*) is the only catadromous species native to the Tallapoosa River system (Mettee *et al.*, 1996). American eel have not been documented immediately downstream of the Martin Dam (i.e., the Project tailrace), but have been documented downstream of the Thurlow Dam (Alabama Power, 2010c).

Additional detail regarding catadromous species in the Project vicinity is provided in the Tallapoosa River Fish Passage Information Document (Alabama Power, 2010c), which was developed by Alabama Power in support of relicensing and is included is included in SP 1 on the "Martin Project PLP and Supporting Documents" DVD.

FRESHWATER MOLLUSKS (MUSSELS AND SNAILS)

Alabama Power performed extensive surveys between 2006 and 2010 in support of relicensing to determine the status of mollusk populations (freshwater mussels and snails) in the Project vicinity. Surveys focused on Lake Martin, its tributaries, the Project tailrace and the Tallapoosa River downstream of Thurlow Dam (Alabama Power Company, 2006; 2010).

A total of six taxa of freshwater mussels were observed during surveys in Lake Martin and its tributaries. Mussel material was found at three tributary sites above the reservoir summer pool elevation (Oakachoy, Elkahatchee, and Wind creeks); numbers were extremely low at all sites. The only species encountered in these areas was *Villosa lienosa* (little spectaclecase), a common, hardy species that is known to occur in Martin Reservoir. Deepwater surveys of the Manoy, Blue, and Sandy creek areas of Lake Martin yielded five additional native freshwater mussel species: *Anodonta suborbiculata* (flat floater), *Pyganodon grandis* (giant floater), *Lampsilis teres* (yellow sandshell), *Utterbackia imbecillis* (paper pondshell) and *Leptodea fragilis* (fragile papershell). The non-native Asiatic clam (*Corbicula* sp.) was commonly collected at most tributary sites within and upstream of the reservoir pool, as well as in the Project tailrace. No unionid mussels were found in the Martin tailrace area. Each of the taxa collected during the surveys occur commonly in Alabama, and all are listed as being of low conservation concern by Mirarchi et al. (2004).

Sampling in the lower Tallapoosa River downstream of Thurlow Dam resulted in the collection of nine species of unionid mussels, either as live or freshly dead individuals or as older, relict shell material. The most commonly encountered mussel species was *Quadrula asperata* (Alabama orb), which was present and common both as juvenile and adult individuals. Other species collected as living or freshly dead individuals included *Lampsilis ornata* (southern pocketbook), *Lasmigona alabamensis* (Alabama heelsplitter), *Obliquaria reflexa* (threehorn wartyback), *Potamilus purpuratus* (bleufer), and *Quadrula verrucosa* (pistolgrip). Relict shell material provided evidence of the presence of *Lampsilis teres*, *Leptodea fragilis*, and *Pyganodon grandis* in the area. All the above species are common throughout their range.

In addition to freshwater mussels, five species of freshwater snails were collected during the surveys. The most commonly encountered snail in Lake Martin or its tributaries was the pleurocerid *Elimia flava* (yellow elimia), which occurred at most survey sites and was very common at several. In addition, live specimens of *Campeloma regulare* (cylinder campeloma) were documented at three Lake Martin tributaries (Elkahatchee Creek, Sandy Creek, and Irwin Shoals), and shell material was found at several other sites. Five species of snails were collected in the Project tailrace: *Elimia flava, Campeloma regulare, Physella* sp., *Planorbella trivolvis* (marsh rams-horn), and *Helisoma anceps* (two-ridge rams-horn). All taxa of freshwater snails detected during these surveys are listed as common and of low conservation concern in Alabama by Mirarchi et al. (2004).

No freshwater snails were collected directly below Thurlow during sampling conducted in support of relicensing. However, sampling conducted by Alabama Power over the past ten years in support of minimum flow requirements at Thurlow have documented the presence of *Somatogyrus pilsbryanus* (Tallapoosa pebblesnail) at a site approximately 0.5 miles downstream of the dam. This Tallapoosa Basin endemic is listed as being of Moderate Conservation Concern in Mirarchi et al. (2004).

Additional detail regarding mollusk surveys conducted during relicensing is provided in the Study Plan (SP) 5 (Rare, Threatened and Endangered Species Surveys) Report, which is included on the "Martin Project PLP and Supporting Documents" DVD.

Benthic Macroinvertebrate Species Communities

Studies conducted by Bayne et al. (1995) in Lake Martin tend to support the premise that macroinvertebrate populations found in storage reservoirs are typically composed largely of taxa that are tolerant of numerous impoundment-associated factors, including water level fluctuations, reduced hypolimnetic dissolved oxygen levels, flow reduction, and siltation; these taxa tend to be habitat and trophic "generalists." Benthic macroinvertebrates were collected at four sites in the upstream portion of Lake Martin between May and October 1994. Sampling methods employed included both petite ponar dredge samples (to sample the inhabitants of the benthic sediments) and Hester-Dendy multiplate samplers (to sample the "aufwuchs" community, those organisms that colonize various hard substrates such as logs, rocks, etc.).

A total of 43 taxa were collected from the dredge samples. The benthic community was dominated by aquatic midge larvae (Diptera:Chironomidae, 24 taxa), with fewer numbers of mayflies (Ephemeroptera, one taxa), caddisflies (Trichoptera, one taxa), and dragonflies (Odonata, one taxa). Fifteen non-insect taxa were also collected including snails, water mites, and aquatic worms. The samples were usually dominated numerically by larvae of the phantom midge, *Chaoborus*, which is a common inhabitant of lakes and is often collected in dredge samples. Community structure and diversity tended to be similar among all sites, and the community was dominated functionally by "predators".

A total of 52 taxa were collected from the multiplate samples, with aquatic midge larvae (22 taxa) also dominating the aufwuchs community. Other insect groups represented included mayflies (five taxa); caddisflies (six taxa); aquatic beetles (Coleoptera, one taxa); alderflies/dobsonflies (Megaloptera, one taxa); and dragonflies (one taxa). Additionally, 14 non-insect taxa were collected; these consisted mainly of snails and aquatic worms. The midge community collected from the plate samplers was dominated by genera tolerant of some organic enrichment, such as *Dicrotendipes* and *Glyptotendipes*. Most of the taxa occurring on the multi-plate samplers were functionally "filtering collectors" or "collector-gatherers." Diversity values were similar among all sites. Collections performed by Auburn University (2010a) are support the findings of the survey information collected during the 1990's.

The aquatic macroinvertebrate fauna of Lake Martin (dominated by tolerant taxa such as midge larvae, snails, and aquatic worms, and with lower numbers of less tolerant groups such as mayflies and caddisflies) is typical of a storage reservoir in the southeastern United States.

ESSENTIAL FISH HABITAT AS DEFINED UNDER MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

Alabama Power is not aware of any essential fish habitat in the vicinity of the Project and did not locate any current records of federally managed fish habitat within the Project Area. Alabama Power has invited the National Marine Fisheries Service (NMFS) to participate in the relicensing effort and has continued to provide meeting notes and project reports. Alabama Power will continue to consult with NMFS as required by its 1999 Fish Habitat Conservation Mandate (NMFS, 2000).

4.4.3.2 ENVIRONMENTAL EFFECTS

Environmental effects of the Proposed Action include both a modification to the Flood Control Guide Curve and PME measures described in Sections 2.2 and 2.2.2, respectively. The PME measures that may affect the fishery resources are listed below.

- Prepare and implement a Shoreline Management Plan (SMP):
  - Provide more detail in Alabama Power's general shoreline permitting program regarding the use of rip-rap with or without seawalls.
  - Include Best Management Practices (BMP) for maintaining natural shorelines and/or shoreline buffers.
  - Educate private property owners on the benefits of maintaining natural shoreline as part of shoreline development.
  - Continue to retain a 30-foot Control Strip on any Project lands removed from the Project and encourage private land owners to establish or maintain a 30-foot buffer on privately owned shoreline lands.
  - Implement measures to protect sensitive resources in the Project Boundary – specifically wetlands areas, cultural resources, and rare, threatened and endangered species (RTE) habitat.

- Monitor potential increases in invasive aquatic vegetation in the Lake as part of a change in the Flood Control Guide Curve
- Monitor specific environmental water quality parameters based on consultation with ADEM, as necessary to evaluate the impacts from a Flood Control Guide Curve change
- Provide periodic winter draw-downs to 481 msl (original Flood Control Guide Curve) once every 5 years that would be dependent on hydrologic conditions allowing it

ALTERNATIVE 1 – 1 FT WINTER POOL INCREASE

A 1-ft change in the Flood Control Guide Curve should have minimal effects on the fishery. The MCDA analysis identified an increase of 142 acres that would be subject to increased aquatic plant growth on Lake Martin. An increase in aquatic vegetation could have a positive effect on the Lake Martin fishery as has been observed in other studies (Durocher 1984; Betolli *et.al*. 2003). This change should have little to no effect on lake or downstream water quality (Alabama Power 2010f). The increase in the Flood Control Guide Curve of 1 ft could also have a positive impact on paddlefish spawning by increasing the number of days of flow above 6,000 cfs by 4 days (over 15 years) during March and April, as described in Study Report 3.

ALTERNATIVE 2 – 2 FT WINTER POOL INCREASE

A 2-ft change in the Flood Control Guide Curve should also have minimal effects on the fishery. The MCDA analysis identified an increase of 285 acres that would be subject to increased aquatic plant growth on the lake. An increase in aquatic vegetation could have a positive effect on the Lake Martin fishery as has been observed in other studies (Durocher 1984; Betolli *et.al*. 2003). This change should have little to no effect on lake or downstream water quality (Alabama Power 2010f). The increase in the Flood Control Guide Curve could also have a positive impact on paddlefish spawning by increasing the number of days of flow above 6,000 cfs by 5 days (over 15 years) during March and April.

ALTERNATIVE 3 – 3 FT WINTER POOL INCREASE

A 3-ft change in the Flood Control Guide Curve should have minimal effects on the fishery. The MCDA analysis identified an increase of 413 acres that would be subject to increased aquatic plant growth on the lake. An increase in aquatic vegetation could have a positive effect on the Lake Martin fishery as has been observed in other studies (Durocher 1984; Betolli *et.al*. 2003). This change should have little to no effect on lake or downstream water quality (Alabama Power 2010f). The increase in the Flood Control Guide Curve could also have a positive impact on paddlefish spawning by increasing the number of days of flow above 6,000 cfs by 5 days (over 15 years) during March and April.

ALTERNATIVE 4 - 4 FT WINTER POOL INCREASE

A 4-ft change in the Flood Control Guide Curve should have minimal effects on the fishery. The MCDA analysis identified an increase of 527 acres that would be subject to increased aquatic plant growth on the lake. An increase in aquatic vegetation could have a positive effect on the Lake Martin fishery as has been observed in other studies (Durocher 1984; Betolli *et.al*. 2003). This change should have little to no effect on lake or downstream water quality (Alabama Power 2010f). The increase in the Flood Control Guide Curve could also have a positive impact of paddlefish spawning by increasing the number of days of flow above 6,000 cfs by 19 days (over 15 years) during March and April.

ALTERNATIVE 5 – 5 FEET WINTER POOL INCREASE

A 5-ft change in the Flood Control Guide Curve should have minimal effects on the fishery. The MCDA analysis identified an increase of 632 acres that would be subject to increased aquatic plant growth on the lake. An increase in aquatic vegetation could have a positive effect on the Lake Martin fishery as has been observed in other studies (Durocher 1984; Betolli *et.al*. 2003). This change should have little to no effect on lake or downstream water quality (Alabama Power 2010f). The increase in the Flood Control Guide Curve could also have a positive impact on paddlefish spawning by increasing the number of days of flow above 6,000 cfs by 53 days (over 15 years) during March and April.

4.4.3.3 PROPOSED PME MEASURES

The proposed PME measures should have positive effects on the fishery resources. Education of local homeowners on the value of natural shorelines may decrease shoreline modification, which should have a positive impact on the fishery. Including more specific details on the use of rip-rap in areas that are developed should be a better alternative for the fishery resource than the exclusive use of seawalls for stabilizing shorelines. The use of BMPs on shoreline property may also improve the overall condition of the shoreline riparian area and benefit the fishery resource on Lake Martin. Educating anglers on the impacts of catch and release of striped bass during the summer and fall seasons would likely have a positive effect on the striped bass fishery by helping to reduce hooking mortalities. Monitoring of water quality would not likely have a direct effect on the fishery, but may have an indirect effect through avoiding degraded water quality.

4.4.3.4 NO ACTION ALTERNATIVE

Under the No-Action Alternative, Alabama Power would continue to operate the Project in the manner it is presently operated. Alabama Power would not implement any Flood Control Guide Curve changes or proposed PME measures. Hooking mortality for striped bass may continue and possibly increase without angler education.

4.4.3.5 CUMULATIVE EFFECTS

The continued operation of the Project would have little effect on fishery resources beyond what currently occurs. Alabama Power's proposal to ensure that the Project's tailwaters meet state

water quality standards would benefit fish and aquatic resources. Overall, there would be negligible cumulative effects on fish and aquatic resources in the Tallapoosa River.

4.4.3.6 UNAVOIDABLE ADVERSE IMPACTS

Under any of the proposed operating alternatives, including existing operations (No Action), there would continue to be some level of entrainment and potential mortality as a result of entrainment during Project operation. There is also the risk that continued shoreline development could adversely affect fishery habitat.

4.4.3.7 REFERENCES

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4.4.4 TERRESTRIAL RESOURCES

4.4.4.1 AFFECTED ENVIRONMENT

UPLAND BOTANICAL COMMUNITIES

Potential natural vegetation for the Project area of Alabama is Oak – Hickory forests which dominate along dry-mesic ridges and slopes. First terraces have potential natural vegetation of mixed hardwoods. Land use for agriculture (primarily forestry, cattle, and row crops), as well as for homes and businesses, has resulted in removal of most original vegetation, resulting in a patchwork of mostly second growth forests, cleared land, and various stages of ecologic succession from primary to climax communities. Table 4-17, which presents general forest composition based on Alabama Power's timber stand data, demonstrates the patchwork nature of natural vegetation and silvicultural areas on Project lands. Few old growth stages are present within the Project area. Botanical species typical of the Project area, including their common and scientific names, are listed in on the "Martin Project PLP and Supporting Documents" DVD.

TABLE 4-17 TIMBER STAND COMPOSITION ON MARTIN PROJECT LANDS
(Source: Alabama Power Timber Stand Data)

STAND TYPE	PERCENT COVER	ACREAGE
Mixed Pine-Hardwood	53	3965
Natural Longleaf Pine	12	896
Natural Pine	10	768
Upland Hardwood	17	1277
Planted Pines	7	548
TOTAL	**100**	**7454**

Tree canopy in the older second-growth forests in the Project area is dominated by upland oaks, hickories, and pines (Whetstone, 2009). Oaks commonly abundant in this area include white, black, southern red, rock chestnut, post, scarlet, blackjack, and willow oaks. Hickories tend to be less important, though sand and mockernut hickories are frequently found. Loblolly, scrub, shortleaf, and longleaf pines are also common. Other canopy and subcanopy species that are locally important include sweetgum, black cherry, blackgum, persimmon, sourwood, black locust, hop hornbeam, hornbeam, hackberry, cucumber magnolia, sassafras, possum haw, box elder, hawthorn, crabapple, flowering dogwood, sumac, chalk maple, devil's walking stick, and

fringe-tree. Among the primary components of the shrub/small tree stratum are lowbush blueberry, sparkleberry, deerberry, mountain laurel, St. John's-wort, wax myrtle, sweet shrub, oakleaf hydrangea, witch-hazel, and blackberry. Lianas in these sites are variable though poison ivy, catbrier, Virginia creeper, muscadine, fox grape, yellow jessamine, cross vine, and cow-itch vine are common. Herbs common to the area are extensive. Along ridges and upper slopes, bracken fern, Christmas fern, resurrection fern, needle grass, spike grass, fragrant goldenrod, goldenrod, sweet Betsy, and other aster species are abundant among a host of other taxa that also may have locally extensive populations. There are no known species in the Project area that are of cultural significance. The managed pine forests are of commercial value through periodic harvest.

More detailed information regarding the botanical resources occurring on the Project is provided in the Lake Martin Vegetation Report (Whetstone, 2009), which is included in the "Martin Appendices on the "Martin Project PLP and Supporting Documents" DVD.

Noxious Weeds and Invasive Plants

Whetstone (2006) identified seven species as being the primary invasive flora potentially occurring in the Project area: silk tree (mimosa), Japanese honeysuckle, kudzu, Chinese privet, giant cut grass (millet), torpedo grass, and golden bamboo. Giant cutgrass has proven especially invasive in littoral habitats in the upper portion of Lake Martin, primarily in cove backwaters between Hillabee Creek and the reservoir headwaters (Photo 4-1). Control measures have been undertaken to control these populations as part of Alabama Power's Aquatic Plant Management Program. Additional detail regarding these species, including scientific and common names and invasive characteristics, is provided in Table 4-18.

PHOTO 4-1 GIANT CUT GRASS (MILLET) ON THE SHORELINE OF LAKE MARTIN

TABLE 4-18 NOXIOUS WEEDS AND INVASIVE PLANT SPECIES POTENTIALLY OCCURRING IN THE PROJECT AREA

(Source: Whetstone, 2006)

COMMON NAME	*SCIENTIFIC NAME*	GROWTH PATTERN	HABITAT/INVASIVE CHARACTERISTICS
Silk Tree/Mimosa	*Albizia julibrissin*	Small tree	Invasive in an array of disturbed habitats including old fields, stream banks, roadsides, flower gardens, rail yards, abandoned home sites, and rights-of-way; mostly occurs in full sunlight but widely dispersed in shaded areas; is difficult to control once established due to the aggressive suckering and long-lived seeds.
Chinese privet	*Ligustrum sinense*	Shrub/small tree	Forms dense thickets along roadsides, fence rows, fields, rights-of-way, and in bottomland forests; high fruit productivity and aggressive suckering often results in elimination of the herb layer in multi-storied communities.
Japanese honeysuckle	*Lonicera japonica*	Vine	Primarily occurs in disturbed habitats such as fence rows, old home sites, roadsides, and abandoned fields; may persist for long periods in mature forests, invading rapidly after disturbances (*i.e.*, windstorms, logging) through fruit dispersal as well as aggressive growth in the herb layer and on small shrubs and trees.

COMMON NAME	*SCIENTIFIC NAME*	GROWTH PATTERN	HABITAT/INVASIVE CHARACTERISTICS
Torpedo grass	*Panicum repens*	Perennial herb	Occurs in ditches, along marshy shores and canals, and other poorly drained habitats; occurs in water up to 6 ft deep forming a thick dense floating mat; cold-intolerant and thus is killed back to the ground by frost; once established, is difficult to eradicate due to rhizomatous growth.
Golden bamboo	*Phyllostachys aurea*	Bamboo	Forms dense, nearly impenetrable stands from underground rhizomes; mostly occupies old home sites and was widely planted for fishing canes.
Kudzu	*Pueraria lobata*	Vine	Ornamental use is suggested by the large number of abandoned home sites that are overgrown with this aggressive species. The USDA and other agencies used the species for erosion control. Few species can tolerate the competition by kudzu. Forms a dense blanket of leaves and stems that limits light penetration below. Limited spread by seeds means most infestations result from persistence rather than new introductions.
Giant cut grass	*Zizaniopsis miliacea*	Large emergent or terrestrial grass	Native grass that grows to about 9 ft, typically in fresh or brackish shallow water of ponds, sloughs, and ditches; reproduction occurs from rhizomes, grains, and from aerial stems that fall over and root at the nodes; forms dense, nearly impenetrable colonies that limit other native species through competition; is frequently controlled to protect habitat or to enhance recreation and/or navigation.

WETLANDS

There are approximately 444 ac of wetlands within the Project Boundary, which can be broadly classified into palustrine, lacustrine, and riverine wetland types (Alabama Power Company, 2006) (Table 4-19). The dominant wetland types within the Project Boundary are palustrine forest, lacustrine littoral unconsolidated shore, and palustrine emergent wetlands, which account for approximately 45.3 percent, 27.3 percent, and 10.3 percent, respectively, of the total wetland acreage The remaining 75.9 acres are composed of a mix of various palustrine, lacustrine and riverine wetland types accounting for approximately 9.6 percent, 7.1 percent and 0.4 percent, respectively (Table 4-19). Seasonal changes in reservoir elevation likely result in little variability

in the quantity of wetlands surrounding the Project due to the steeply-banked nature of the Project area.

Palustrine forested wetlands, which account for almost half of Project wetlands, encompass what are commonly referred to as "hardwood bottomlands" (Cowardin *et al.*, 1979). These bottomlands likely represent the most diverse and productive wildlife habitat on the Project, harboring a wide range of species including barred owl, red-shouldered hawk, white-tailed deer, fox squirrel, and red and gray fox (Mirarchi *et al.*, 2004). Bottomlands are of particularly value as stopover habitat for warblers and other migrating songbirds and for cavity nesting species such as prothanatory warbler, wood duck, and red-bellied woodpecker. The emergent and lacustrine littoral habitats provide important amphibian breeding areas; spawning and rearing habitat for fish; habitat for semi-aquatic mammals such as river otter, mink, and beaver; and refuge and feeding areas for resident and migratory waterfowl and wading birds including mallard, hooded merganser, common loon, great blue heron, green heron, and great egret.

TABLE 4-19 ACRES AND PERCENTAGES OF WETLAND TYPES IN THE PROJECT AREA[1]

WETLAND TYPE	ACRES	PERCENT OF TOTAL
Lacustrine Littoral Rock Bottom	30.7	6.9%
Lacustrine Littoral Rocky Shore	0.7	0.2%
Lacustrine Littoral Unconsolidated Shore	121.6	27.3%
Palustrine Emergent	45.9	10.3%
Palustrine Forest	201.4	45.3%
Palustrine Scrub-Shrub	42.5	9.6%
Palustrine Unconsolidated Bottom	0.2	0.04%
Riverine Lower Perennial Rock Bottom	1.8	0.4%
TOTAL:	**444.7**	**100.0%**
Lacustrine	153.0	34.4%
Palustrine	289.9	65.2%
Riverine	1.8	0.4%
TOTAL:	**444.7**	**100.0%**

[1] Based on National Wetlands Inventory data for the following USGS 1:24,000 Quadrangles: Brassell, AL; La Place, AL; Shorter, AL; Tallassee, AL; Willow Springs, AL; Red Hill, AL; Alexander City, AL; Buchanan, GA; Buttson, AL; Dadeville, AL; Draketown, GA; Dudleyville, AL; Fruithurst, AL; Hightower, AL; Jacksons Gap, AL; Micaville, AL; Our Town, AL; Ofelia, AL; Ponders, AL; Rockmart South, GA; Ross Mountain, AL; Tallapoosa North, GA; Tallapoosa South, GA; Wadley North, AL; Wadley South, AL.

RIPARIAN AND LITTORAL HABITATS

Riparian zone and lowland vegetation include representatives of the upland forests as well as more wet-mesic to hydric taxa (Whetstone, 2006). Trees that are locally abundant in these habitats are elderberry, catalpa, black willow, alder, river birch, sycamore, and winterberry. Common shrubs include sweetspire, button bush, lead plant, swamp dogwood, silverbell, and blueberry. Frequently encountered lianas along the riparian zones and other lowlands are pepper-vine, American buckwheat vine, rattan-vine, and moonseed, among other taxa. In littoral areas, emergent grasses, such as giant cut grass and torpedo grass, as well as woody species, such as button bush, are common. Riparian and littoral vegetative species known to occur in the Project area are listed on the "Martin Project PLP and Supporting Documents" DVD.

WILDLIFE RESOURCES

The Project lies within the Piedmont physiographic region of Alabama, an area with less wildlife diversity than some of the other physiographic regions of Alabama, such as the Coastal Plain and Lower Coastal Plain (Causey, 2006). The Project impoundment and surrounding woodland, agricultural, and residential areas nonetheless provide high quality habitat for a variety of upland and semi-aquatic wildlife species.

In addition to typical southeastern species, such as gray fox, white-tailed deer, Virginia opossum, and gray squirrel, the area supports species characteristic of the Piedmont region, such as the wood frog and copperhead (Skeen *et al.*, 1993). Birdlife typical of Project uplands includes game species such as bobwhite quail, wild turkey, and mourning dove. Resident songbirds include downy woodpecker, American robin, eastern bluebird, and eastern meadowlark. An abundance of Neotropical migrants including numerous warblers, vireos, and hummingbirds also occur in the Project area (Mirarchi *et al.*, 2004; Causey, 2006). Raptors known to occur in the Project area include osprey, American kestrel, broad-winged and red-tail hawks, bald eagle, and barred, great horned, and screech owls. Typical small mammals of Project uplands include least and short-tailed shrews, southern flying squirrel, eastern woodrat, and eastern red and big brown bats (Mirarchi *et al.*, 2004; Causey, 2006). Reptiles and amphibians found on Project uplands include American and eastern spadefoot toads, marbled and slimy salamanders, green anole, southern fence lizard, five-lined and broad-headed skinks, copperhead, black racer, gray ratsnake, and eastern box turtle (Causey, 2006). Representative wildlife species (mammals, birds, amphibians,

reptiles, and exotic/invasive species) found in the Project area, including their common and scientific names, are listed on the "Martin Project PLP and Supporting Documents" DVD.

Although limited, Lake Martin's littoral zone provides habitat for river otter, mink, muskrat, and beaver, as well as seasonal and year-round habitat for a number of waterfowl and wading birds including mallard, gadwall, wood duck, hooded merganser, common loon, great blue heron, green heron, and great egret (Mirarchi *et al.*, 2004; Causey, 2006). Birds such as ring-billed gull, osprey, purple martin, and belted kingfisher are also common in areas of open water. Littoral areas also provide potential breeding habitat for a number of aquatic and semi-aquatic amphibian species including red-spotted and central newts, northern red and northern dusky salamanders, bullfrog, southern cricket frog, spring peeper, and southern leopard frog (Causey, 2006). Reptile species typical of the littoral zone include eastern cottonmouth and red- and yellow-bellied water snakes, snapping turtle, Alabama map turtle, river cooter, and red-eared pond slider. Species represented in the littoral zone are found on the "Martin Project PLP and Supporting Documents" DVD.

A number of exotic wildlife species are known to occur in the Project area. These include bird species such as rock pigeon, Eurasian collared-dove, European starling, and house sparrow. Exotic mammals including Norway rat, black rat, house mouse, and wild hog (feral swine) also occur (Causey, 2006). Most of these are habitat generalists, and thus would be expected to occur throughout the Project area where suitable habitat occurs.

4.4.4.2 ENVIRONMENTAL EFFECTS

Environmental effects of the Flood Control Guide Curve alternatives and the PME measures are described in sections 2.2 and 2.2.2, respectively. The proposed PME measures that may affect terrestrial resources are listed below.

- Prepare and implement a Shoreline Management Plan (SMP):
  - Include Best Management Practices (BMP) for maintaining natural shorelines and/or shoreline buffers.
    - Educate private property owners on the benefits of natural shoreline development.
    - Continue to retain a 30-foot Control Strip on any Project lands removed from the Project and encourage private land owners to establish or maintain a 30-foot buffer on privately owned shoreline lands.
- Implement a Wildlife Management Plan for Project lands.

Terrestrial vegetative communities, as well as terrestrial wildlife and their habitats, would likely not be measurably affected by any of the winter pool level increases associated with the proposed Martin Flood Control Guide Curve alternatives. Littoral zones of the Lake will potentially experience increases in occurrence and/or abundance of invasive aquatic species due to reduced exposure of mudflats to freezing temperatures during drawdown periods with higher lake levels. Conversely, a few native riparian and littoral species could potentially experience enhanced growth due to greater water availability associated with the higher lake levels. However, this will likely be of minimal benefit since the higher pool levels will occur primarily during the winter months (i.e., the non-growing season).

Higher winter pools may result in increased availability of shallow littoral habitats in coves and sloughs, which in turn may result in increased availability of cover and feeding sites for overwintering resident and migratory waterfowl. Higher winter pools may similarly increase winter foraging habitat for wading birds. Finally, increased wetted area in coves and sloughs during the winter months may likely result in marginal increases in availability of shallow breeding sites for early-spring breeding amphibians, such as southern leopard frog, bullfrog and spotted salamander.

4.4.4.3 PROPOSED PME MEASURES

Alabama Power's proposed PME measures should have a measurable effect on terrestrial resources in the Project area. Implementation of a SMP that encourages natural shorelines and BMPs that minimize effects on shoreline areas will have positive impacts on the wildlife species that inhabit the Project shoreline areas. The proposed Wildlife Management Program on Project lands, which was developed in consultation with ADCNR and USFWS during relicensing, designates two management areas on Project lands: a longleaf pine "Core Management Area" along the eastern shore of Lake Martin and a "Secondary Management Area" near the Lake Martin headwaters. Wildlife management activities would occur primarily on the Core Management Area, an approximately 900 acre tract that contains the majority of longleaf pine-dominated forestlands on the Project. Under the proposed program, the Core Management Area would be managed towards a desired forest condition consistent with the "good quality foraging habitat" for the federally endangered red-cockaded woodpecker (RCW). Although there are

currently no RCWs on Project lands, the RCW "good quality foraging habitat" criteria were identified by ADCNR and USFWS staff during relicensing as being representative of a healthy longleaf pine ecosystem. The proposed program includes a number of measures aimed at enhancing longleaf pine ecosystems on the Core Management Area, including:

- Controlled burns on approximately 300 acres annually (1/3 of the area), resulting in a three year burn rotation;
- Selected harvest to reduce basal area to the open, park-like conditions preferred by RCW; and
- An increase in rotation age for longleaf pine to 80 years.

The proposed implementation of a controlled burning regime on the Core Management Area should result in significant enhancements to the longleaf pine ecosystems on Project lands. Removal of excess forest duff will result in exposure of seeds and insects on the forest floor, enhancing wildlife food sources. Fire will promote germination and flowering of grasses, legumes and other herbaceous species, providing food sources for species such as bobwhite quail, wild turkey and songbirds. In addition, burning releases nutrients and generally lowers soil acidity, making nitrogen fixing legumes more abundant. Burning will also aid in controlling hardwood midstory intrusion as well as other species that compete with longleaf pine and other desirable species. Finally, the lush cover that grows following controlled burns will enhance cover for small mammals, young turkey, and bobwhite quail.

Transition to a timber rotation age of 80 years for longleaf pines on the Core Management Area will enhance potential nesting habitat for RCW. Specifically, transition to older age structure will increase the number of trees large enough for cavity excavation, and in particular trees old enough to have been infested with fungal heart rot. Presence of heart rot has been shown to enhance RCW nesting by making living trees easier to excavate and preventing excess resin in nest cavities (USFWS, 2003). Finally, reduction in basal area for smaller pines will reduce midstory intrusion, which has been shown to cause RCW cluster abandonment (USFWS, 2003).

Implementation of the measures proposed in the Wildlife Management Program should significantly enhance longleaf pine ecosystems on Project lands, as well as provide potential habitat for the RCW and other longleaf-associated species, such as pine snake, fox squirrel,

bobwhite quail and wild turkey. No negative effects to terrestrial resources from implementation of the proposed Wildlife Management Program were identified during relicensing.

4.4.4.4 NO ACTION ALTERNATIVE

Under the No-Action Alternative, Alabama Power would continue to operate the Project in the manner it is operated presently. Alabama Power would not implement any Flood Control Guide Curve changes or proposed PME measures. The existing habitat types appear to be stable under the existing operations (Flood Control Guide Curve) and would not be expected to change.

There would be no revised Shoreline Management Program or Revised Wildlife Management Program, reducing the potential beneficial effects discussed above.

4.4.4.5 UNAVOIDABLE ADVERSE IMPACTS

Shoreline development will likely continue to fragment the terrestrial habitats around the Project and result in impacts to the wildlife resources in the area. The proposed SMP may mitigate some of the impacts through public education and recommending the use of BMPs on private shoreline property.

4.4.4.6 REFERENCES

Alabama Power Company. 2006. Draft Wetlands Report. Alabama Power Company, Birmingham, AL.

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Mirarchi, R. E., M. A. Bailey, T. M. Haggerty, and T. L. Best, (eds). 2004. Alabama Wildlife. Volume Three. Imperiled Amphibians, Reptiles, Birds, and Mammals. The University of Alabama Press: Tuscaloosa, AL. 225 pp.

Skeen, J. N., P. D. Doerr, and D. H. Van Lear. 1993. Oak Hickory Pine Forests. In Biodiversity of the Southeastern United States: Upland Terrestrial Communities, edited by Martin, W. H., S. G. Boyce and A. C. Echternacht. John Wiley & Sons: New York. p. 133.

Whetstone, D. 2006. Plants And Plant Communities Of The Lake Martin Area. Whetstone Consulting, Inc.

Whetstone, R.D. 2009. Lake Martin Vegetation Report Understory and Herbaceous Species Information for the Martin Wildlife Management Plan. Whetstone Consulting Inc., Anniston, AL. 71 pp.

4.4.5 RARE, THREATENED, AND ENDANGERED SPECIES

4.4.5.1 AFFECTED ENVIRONMENT

Alabama Power conducted extensive surveys for federally listed and State Priority species in support of relicensing. Target species for these surveys were identified in consultation with the USFWS and ADCNR (Table 4-20), as were desired sampling locations and methods. Surveys found no federally listed species at any of the sampling sites. One State Priority fish species of interest, *Etheostoma chuckwachatte* (lipstick darter) was collected at two sites (Little Kowaliga and Timbergut creeks) (Whetstone 2006; Whetstone 2009).

Bald eagle nests have been observed over several years during the annual bald eagle survey on Martin Reservoir; the locations of the currently active nests are well-documented and in the ADCNR database. Although the bald eagle was de-listed from the Federal Endangered Species List effective July 2007 (72 FR 37345 37372), it remains protected under the Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act (16 U.S.C.668-668d) (72 FR 37345-37372).

Additional information regarding the life history and methods used to survey for rare, threatened and endangered species can be found on the “Martin Project PLP and Supporting Documents” DVD.

TABLE 4-20 THREATENED, ENDANGERED AND STATE PRIORITY SPECIES OF INTEREST

(Source: U.S. Fish and Wildlife Service, personal communication, Feb. 17, 2009)

	COMMON NAME	SCIENTIFIC NAME	STATUS
Mussels	delicate spike	*Elliptio arctata*	P1
	ovate clubshell	*Pleurobema perovatum*	P1, E
	rayed creekshell	*Anodontoides radiatus*	N/A
	finelined pocketbook	*Hamiota altilis*	P2, E
	black sandshell	*Ligumia recta*	P2
	southern clubshell	*Pleurobema decisum*	P2, E
	Alabama heelsplitter	*Lasmigona alabamensis*	P2
	Alabama creekmussel	*Strophitus connasaugaensis*	P2
	Alabama spike	*Elliptio arca*	P1
	Alabama moccasinshell	*Medionidus acutissimus*	P2, T
Crayfish	Tallapoosa crayfish	*Cambarus englishi*	P2
	slackwater crayfish	*Cambarus halli*	P2
	Chattahoochee crayfish	*Cambarus cracens*	P2
Fish	Alabama sturgeon	*Scaphirhynchus suttkusi*	P1
	Gulf sturgeon	*Acipenser oxyrinchus desotoi*	P2
	Alabama shad	*Alosa alabamae*	P2
	lipstick darter	*Etheostoma chuckwachatte*	P2
Reptiles	alligator snapping turtle	*Chelydra serpentina*	P2
Plants	little amphianthus (pool sprite)	*Amphianthus pusillus*	T
	Alabama canebrake pitcher plant	*Sarracenia rubra alabamensis*	E
	Georgia rockcress	*Arabis georgiana*	T
Birds	red-cockaded woodpecker	*Picoides borealis*	T
	bald eagle	*Haliaeetus leucocephalus*	N/A

P1: Priority 1 – Highest Conservation Concern
P2: Priority 2 – High Conservation Concern
T: Federally listed as Threatened
E: Federally listed as Endangered

4.4.5.2 ENVIRONMENTAL EFFECTS

Environmental effects of the Flood Control Guide Curve alternatives and the PME measures are described in sections 2.2 and 2.2.2, respectively. The proposed PME measures that may affect terrestrial resources are described in Section 4.4.5.3. Surveys conducted in support of relicensing documented no federally listed species in the Project area; therefore none of Flood Control Guide Curve alternatives are likely to result in any adverse effects to RTE species.

4.4.5.3 PROPOSED PME MEASURES

Alabama Power has proposed to implement a Wildlife Management Program on Project lands, which could result in positive impacts for the federally endangered red-cockaded woodpecker (RCW). Under the proposed program, an approximately 900 ac tract identified as the "Core Management Area" would be managed towards a desired forest condition consistent with the "good quality foraging habitat" for RCW. Although there are currently no RCWs on Project lands, the RCW "good quality foraging habitat" criteria were identified by ADCNR and USFWS staff during relicensing as being representative of a healthy longleaf pine ecosystem. The proposed program includes a number of measures aimed at enhancing longleaf pine ecosystems on the Core Management Area, including:

- Controlled burns on approximately 300 ac;
- Selected harvest to significantly reduce basal area of small pines; and
- An increase in rotation age for longleaf pine to 80 years.

Implementation of these measures will likely result in increased availability of suitable RCW habitat in the Core Management Area and could result in recruitment of the species onto Project lands.

As previously noted, nesting bald eagles are periodically observed along the Lake Martin shoreline. The proposed Wildlife Management Program also includes a provision to manage active bald eagle nests occurring within the Project area in accordance with the National Bald Eagle Management Guidelines (USFWS, 2007). While restrictions vary according to the type of disturbance, the guidelines generally prohibit potential "disturbance" within 660 ft of an active nest during the nesting season (September through May) and 330 ft during the non-nesting season. Inclusion of the Bald Eagle Management guidelines in the Wildlife Management Program will assist in adherence to the Bald and Golden Eagle Protection Act.

4.4.5.4 NO ACTION ALTERNATIVE

Under the No-Action Alternative, Alabama Power would continue to operate the Project in the manner it is operated presently. Alabama Power would not implement any Flood Control Guide Curve changes or proposed PME measures. The Project would continue to operate under existing

license conditions with no anticipated adverse impacts to bald eagles. Alabama Power will continue to manage the pine forests for timbering only and there would be no addition of hunting lands and no modifications to the SMP. Alabama Power would not specifically manage timber to support the long leaf pine and would not realize the potential benefits to the red cockaded woodpecker.

4.4.5.5 UNAVOIDABLE ADVERSE IMPACTS

Development of the Lake will continue and conversion of shoreline property in the Project area may result in a loss of species' habitats. Implementation of the Wildlife Management Program and SMP should make mitigate any adverse impacts.

4.4.5.6 REFERENCES

Mirarchi, R. E., M. A. Bailey, T. M. Haggerty, and T. L. Best, (eds). 2004. Alabama Wildlife. Volume Three. Imperiled Amphibians, Reptiles, Birds, and Mammals. The University of Alabama Press: Tuscaloosa, AL. 225 pp.

United States Fish and Wildlife Service (USFWS). 2007. National Bald Eagle Management Guidelines. May 2007, 23 pp.

4.4.6 RECREATION RESOURCES

4.4.6.1 AFFECTED ENVIRONMENT

The outline of Lake Martin is very distinguished, showing many arms that have differing characteristics so that the lake as a whole seems to comprise several unique bodies of water. This adds to its interest and provides a great variety of recreation experiences and landscapes.

EXISTING RECREATION SITES

Recreation opportunities at the Project are numerous and varied. Alabama Power estimates there are currently 58 sites along the Project shorelines providing public, private, and commercial access to Project lands and waters. Of these, 21 locations are open to the public as recreation sites and 14 are operated as public marinas, while the remainder are considered quasi-public or private.

Twenty-six sites are located partially or entirely within the Project Boundary and are Project-related (Table 4-21 and Table 4-22). These sites support boat access to Lake Martin through launches and docking areas and also include land-based facilities that support swimming, picnicking, and camping (Table 4-23).

TABLE 4-21 NUMBER OF RECREATION SITES WITHIN THE MARTIN PROJECT BOUNDARY AND NEARBY

LOCATION	PUBLIC	QUASI PUBLIC	COMMERCIAL	PRIVATE	TOTAL
Entirely or partially within Project Boundary	12	6	5	3	26
Outside Project Boundary	9	0	9	14	32
TOTAL	**21**	**6**	**14**	**17**	**58**

Source: Kleinschmidt (2010)

TABLE 4-22 RECREATION SITES ASSOCIATED WITH THE MARTIN PROJECT

RECREATION SITE	FACILITY TYPE	OWNER	OPERATOR
PUBLIC			
Bakers Bottom Landing	day use	Alabama Power	Unmanaged
DARE Boat Landing	day use	Alabama Power	Alabama Power and State of Alabama
DARE Power Park	day use	Alabama Power	Alabama Power
General Public Use Area #2		Alabama Power	Unmanaged
Jaybird Landing	day use	Alabama Power	Unmanaged
Johnson Creek Boat Ramp	day use	Right-of-way	Unmanaged
Pace Point Ramp	day use	Alabama Power	Alabama Power and State of Alabama
Paces Trail	camping and day use	Alabama Power	Alabama Power
Scenic Overlook	day use	Alabama Power	Alabama Power and Cherokee Ridge Alpine Trail Assoc.
Sturdivant Creek Ramp	day use	Alabama Power	Unmanaged
Timbergut Landing	day use	Alabama Power	Unmanaged
Union Ramp	day use	Alabama Power	Alabama Power
QUASI-PUBLIC			
Camp Alamisco	camping	Alabama Power	Gulf States Conference of Seventh Day Adventist
Camp ASCCA (Dadeville Campus)	camping	Alabama Power	Alabama's Special Camp for Children and Adults
Camp ASCCA (Easter Seal)	camping	Camp ASCCA	Alabama's Special Camp for Children and Adults
Kamp Kiwanis	camping	Alabama Power	Girl Scouts of Southern Alabama
Lake View Park	day use	Alabama Power	Lake View Park
Maxwell Gunter AFB Recreation Area	camping	Alabama Power	U.S. Department of Defense
COMMERCIAL			
Anchor Bay Marina	day use	Alabama Power	Vinings Marine Group
Harbor Pointe Marina	day use	Harbor Pointe, LLC	Harbor Pointe Marina, LLC
Parker Creek Marina	day use	Alabama Power	Singleton Marine Group

RECREATION SITE	FACILITY TYPE	OWNER	OPERATOR
Pleasure Point Park and Marina	camping	Alabama Power	Pleasure Point Park and Marina, Inc.
Real Island Marina and Campground	day use	Alabama Power	Russell Marine
PRIVATE			
Central Elmore Water and Sewer Authority	day use	Elizabeth Faircloth	Central Alabama Water and Sewer Authority
Emerald Shores Boat Ramp	day use	Emerald Shores Homeowner's Assoc.	Emerald Shores Homeowner's Assoc.
Shady Bay	day use	Shady Bay Subdivision Assoc.	Shady Bay Subdivision Assoc.

Source: Kleinschmidt (2010)

TABLE 4-23 RECREATION FACILITIES SUPPORTED AT RECREATION SITES AROUND LAKE MARTIN

	NUMBER OF FACILITIES		
	ENTIRELY OR PARTIALLY WITHIN PROJECT BOUNDARY	OUTSIDE PROJECT BOUNDARY	TOTAL
PICNIC FACILITIES			
picnic tables	195	863	1,058
grills	110	858	968
fire pits	27	851	878
Swimming areas	6	6	12
BOAT SLIPS			
wet slips	208	482	690
dry storage slips	819	1,674	2,493
jet-ski pads	30	24	54
BOAT LAUNCHES			
hard surface launches	17	31	48
hard surface lanes	24	41	65
gravel / carry-in	2	4	6
CAMPSITES			
RV sites	120	745	865
cabins	40	4	44
tent sites	23	6	29
primitive sites	6	-	6

Source: Kleinschmidt (2010)

In order to assess the effects of possible changes in the flood control guide curve, recreation sites were identified on the Tallapoosa River downstream of Martin Dam. These sites, with their respective river mile, are identified in Table 4-24. All these sites are outside Martin Project Boundary. Three sites provide access to Yates Reservoir, one site to Thurlow Reservoir, and two sites provide access to the Tallapoosa River downstream of Thurlow Dam.

The 1.5 mile stretch of the Tallapoosa River below Thurlow Dam contains whitewater boating opportunities; thus, changes in river flow below Thurlow Dam were estimated to determine the effect on whitewater boating. The full methodology and results are contained in Study 12(f): Effects of a Rule Curve Change on Downstream Recreation. A summary of the results is provided in Section 4.4.6.2.

TABLE 4-24 PUBLIC RECREATION ACCESS SITES ON THE TALLAPOOSA RIVER BELOW MARTIN DAM

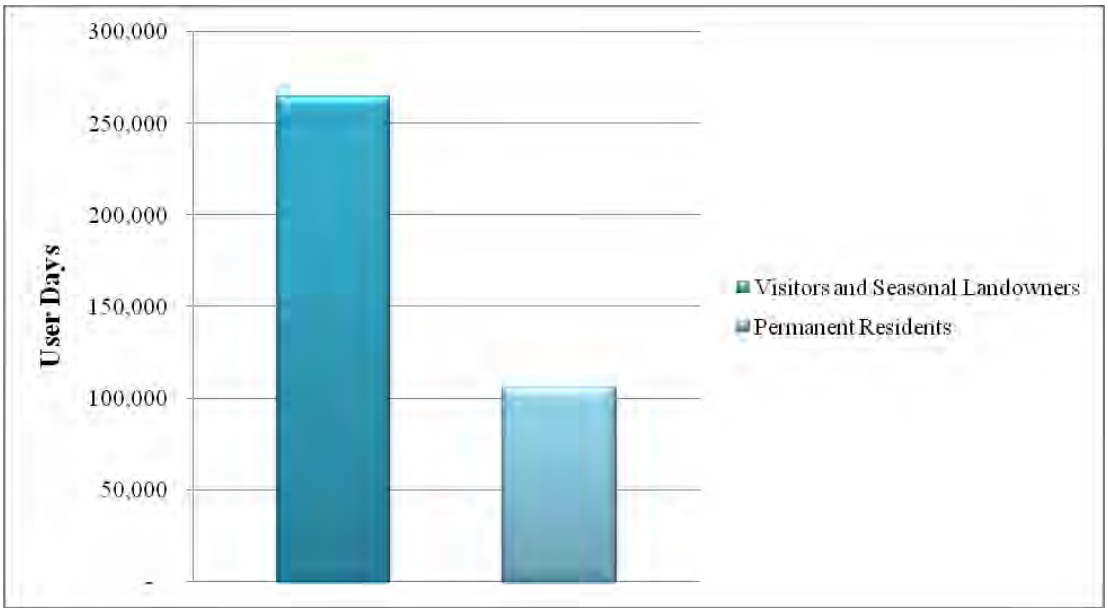
NAME OF SITE	LOCATION	RIVER MILE
Gold Mine Road (Martin tailrace)	Yates Reservoir	59.5
Coon Creek Ramp	Yates Reservoir	53.7
Yates Dam Boat Ramp	Yates Reservoir	52.4
Tallassee Park	Thurlow Reservoir	50.2
Thurlow Dam Put-in	Tallapoosa River	49.5
Tallapoosa Take Out	Tallapoosa River	48.0

RECREATION USE

Recreational use at the Project occurs both on the water and on land. On-water activity includes power boating, sailing, fishing, jet skiing, waterskiing, swimming, and tubing. Selected areas of the Lake are popular with power boaters, who "raft" together for social events; special occasions periodically draw large crowds of boaters and anglers for fishing tournaments, concerts, sailing regattas, holiday events (e.g., Independence Day boat parades), and river cleanups. Land based activity tends to occur around the shoreline at private residences and public access areas. Popular land based activities include hiking, camping, and picnicking.

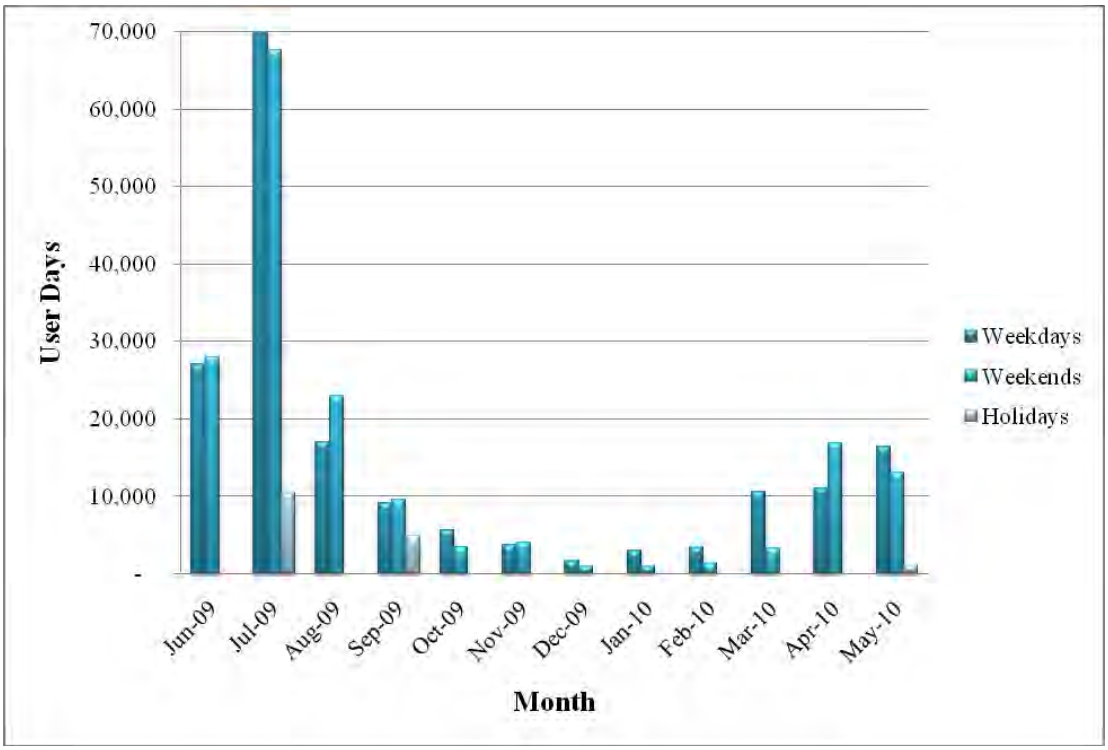
Southwick Associates (2010) estimated recreational use of the lake during the 12-month period from June 2009 through May 2010 at 370,359 user days, with close to two-thirds of estimated use being attributed to lake visitors and seasonal property owners, and the remainder attributed to year-round residents (Figure 4-12). This includes activity on the Lake and on the shore in close proximity to the Lake. Most activity occurred during the warmer months of April through August, with a significant spike in use observed during July (Figure 4-13). The volume of use on weekdays and weekends is roughly equal, in total, with a majority of people observed power boating (Figure 4-13 and Figure 4-14).

FIGURE 4-12 RECREATIONAL USE OF LAKE MARTIN BY RESIDENCY OF USERS



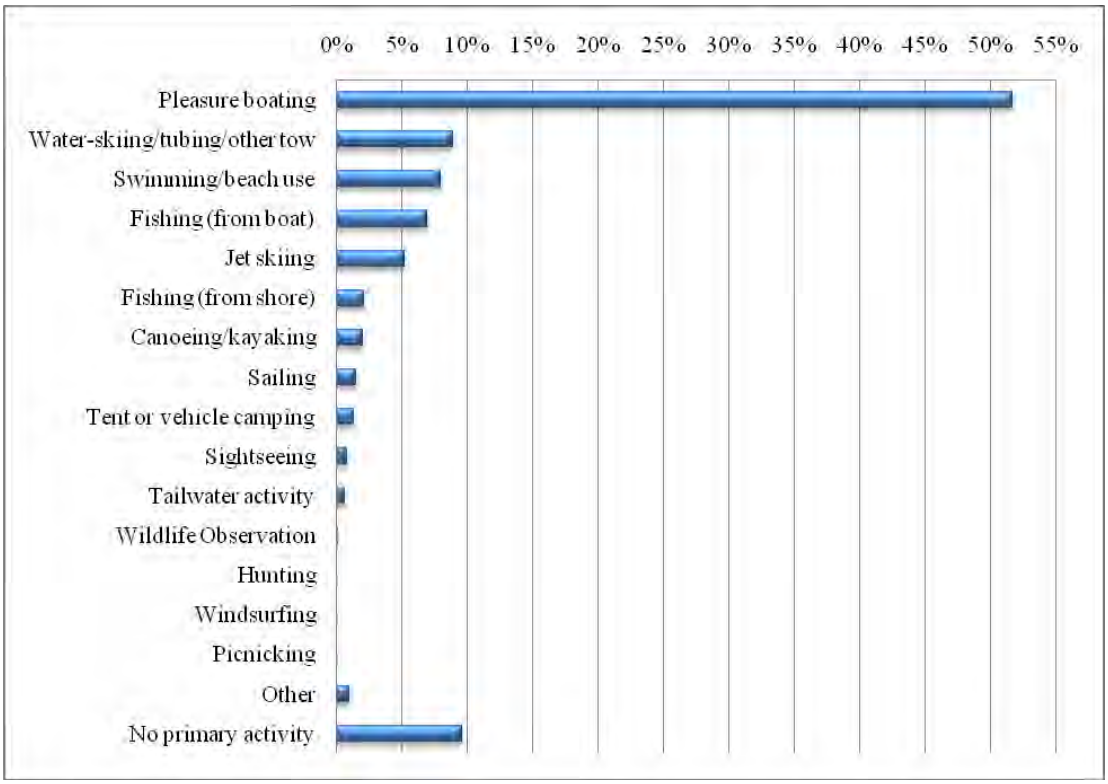
Source: Southwick Associates (2010), as modified by Kleinschmidt

FIGURE 4-13 RECREATIONAL USE OF LAKE MARTIN BY MONTH AND DAY TYPE



Source: Southwick Associates (2010), as modified by Kleinschmidt

FIGURE 4-14 ACTIVITIES OBSERVED AT LAKE MARTIN (JUNE 2009 THROUGH MAY 2010)



Source: Southwick Associates (2010), as modified by Kleinschmidt

ALABAMA SCORP

The Alabama Statewide Comprehensive Outdoor Recreation Plan (SCORP) was last completed for the period of 2008 through 2012. The SCORP breaks down the state into distinct planning regions; Lake Martin falls on the border between Region 4 (East Alabama Regional Planning and Development Commission) and Region 9 (Central Alabama Regional Planning and Development Commission). The majority of residents in these two regions (78% and 74%, respectively) identified the value of recreation as "Very Important" or "Important". In Region 4 and Region 9, "walking for pleasure" was the most participated in recreation activity, followed by "freshwater beach" in Region 4 and "pool swimming" in Region 9. The SCORP also reports the public's perceived needs for outdoor recreation activities. Region 4 respondents identified "parks" as the number one greatest need in their region, followed by "picnic areas/tables", "playgrounds", "soccer fields", and "softball fields." Region 9 respondents identified "parks" as the number one greatest need in their region, followed by "walking/jogging trails", "swimming pools", "playgrounds", and "softball fields." Finally, the SCORP identifies the following priorities for 2008 to 2012:

- explore Alabama's outdoor resources;
- provide quality of life opportunities;
- promote healthy lifestyles;
- develop active and passive recreational facilities;
- ensure accessibility of outdoor recreation facilities to all citizens; and
- recognize and promote the economic impact of recreation in Alabama.

4.4.6.2 ENVIRONMENTAL EFFECTS

Environmental effects of the Flood Control Guide Curve alternatives and the PME measures are described in sections 2.2 and 2.2.2, respectively. The proposed PME measures that may affect recreational resources are described in section 4.4.6.3.

In accordance with the FERC approved methodology for Study 12(g), Southwick Associates (2010) estimated changes in recreation use associated with a change in the Martin Flood Control Guide Curve. Their analysis included estimated changes in recreation use for a 1-foot, 3-foot, and 5-foot increase in winter pool level as well as recreation access from private residences (i.e., boat docks). The following is a general analysis of effects associated with changes in winter pool elevations followed by a specific analysis of the 1 foot through five foot changes in winter pool level.

Changes in the Flood Control Guide Curve that govern the current management of lake elevations on Lake Martin over the course of the year are likely to affect the use of the Lake for recreation. The effects are largely driven by overall use of the Lake, as measured by user days; therefore, the greatest effects are likely to be associated with the Flood Control Guide Curve alternatives that affect the greatest number of recreational lake users. However, some lake users are likely to experience unique impacts. For example, most shoreline property owners maintain docks on their waterfronts and the Flood Control Guide Curve alternatives could have different effects on the usability of their docks for mooring boats. These impacts are examined below.

Under baseline conditions, it becomes impractical for almost half of shoreline property owners to moor their boats at their particular dock during the late fall/early winter at a lake level of roughly 485 ft msl. When water levels normally begin to decline in September, approximately 8% of property owners find it impractical to moor their boats at their dock by the end of the month

(approximately 487 ft msl, on average). By the end of October (approximately 485 ft msl, on average), the number of property owners that find it impractical to moor their boats rises substantially to over one-half (56%) of property owners (Table 4-25).

TABLE 4-25 WATER-LEVEL WHEN IT BECOMES IMPRACTICAL FOR SHORELINE PROPERTY OWNERS TO MOOR THEIR BOAT(S) AT THEIR DOCK

WATER LEVEL (FEET MSL)	%	CUMULATIVE % THAT CAN MOOR BOAT(S)
491	0%	100%
488	4%	96%
487	4%	92%
486	16%	76%
485	32%	44%
484	15%	29%
483	11%	18%
482	9%	9%
481	1%	8%
<481	8%	5%
MEDIAN (FEET MSL)	**485**	

Source: Southwick Associates (2010)

Shoreline property owners were also asked when and at what water level the lake has receded to the point that their dock is completely out of the water. Again, under baseline conditions, most residents' docks are out of water in late fall/early winter. By the end of November (approximately 483 ft msl, on average), 41% of lake users have docks that are no longer in water (Table 4-26).

TABLE 4-26 MONTH AND WATER-LEVEL WHEN SHORELINE PROPERTY OWNERS' DOCK IS COMPLETELY OUT OF THE WATER

WATER LEVEL (FEET MSL)	%	CUMULATIVE % OF DOCKS IN THE WATER
491	0%	100%
488	1%	99%
487	1%	98%
486	5%	93%
485	8%	85%
484	12%	73%
483	14%	59%
482	15%	44%
481	11%	33%
<481	33%	28%
MEDIAN (FEET MSL)	**482**	

Source: Southwick Associates (2010)

Changes in recreational use of Lake Martin under each of the Flood Control Guide Curve alternatives were estimated using FERC approved methodology described in Southwick Associates (2010). The estimated changes compared to current use are shown in Table 4-27. The changes were estimated separately for visitors (including non-landowners and seasonal landowners) and permanent residents of the region.

TABLE 4-27 ESTIMATED PERCENT CHANGES IN ANNUAL RECREATION DAYS AT LAKE MARTIN UNDER ALTERNATIVE WATER LEVEL MANAGEMENT SCENARIOS

MANAGEMENT SCENARIO	VISITORS* (% CHANGE IN TRIPS)	PERMANENT RESIDENTS** (% IN DAYS)	WEIGHTED AVERAGE % CHANGE FOR ALL USERS
1-foot Higher Winter Pool Level	1%	6%	2.4%
3-foot Higher Winter Pool Level	9%	6%	8.1%
5-foot Higher Winter Pool Level	11%	8%	10.1%

*Includes non-property owner visitors, and seasonal and weekend property owner visitors.
**Includes only permanent residents residing in one of the three counties adjacent to Lake Martin.
Source: Southwick Associates (2010)

Table 4-28 presents the projected levels of recreation use under each of the water management scenarios, which is equivalent to Alternatives 1, 3 and 5. The estimated changes in lake use shown in Table 4-27 are the projected percentage increases in use compared with current lake management operations. Therefore, the use estimates in Table 4-28 were calculated by applying the estimated percentage increase in recreational use to the baseline level of recreation days.

TABLE 4-28 TOTAL ESTIMATED RECREATION DAYS AT LAKE MARTIN UNDER BASELINE AND ALTERNATIVE WATER LEVEL SCENARIOS

	VISITORS*	PERMANENT RESIDENTS**	ALL USERS
SCENARIO	RECREATION DAYS		
BASELINE	**264,750**	**105,789**	**370,539**
1-foot Higher Winter Pool Level	267,398	112,136	379,534
3-foot Higher Winter Pool Level	288,578	112,136	400,714
5-foot Higher Winter Pool Level	293,873	114,252	408,125

*Includes non-property owner visitors, and seasonal and weekend property owner visitors.
**Includes only permanent residents residing in one of the three counties adjacent to Lake Martin.
Source: Southwick Associates (2010)

ALTERNATIVE 1 – 1 FT WINTER POOL INCREASE

Under Alternative 1, recreation use would be expected to increase by 2.4 percent over baseline, or an increase of approximately 9,000 recreation days. In addition, an additional 1 percent of shoreline property owners would be able to moor their boat at their dock year round.

Alternative 1 would not affect accessibility (i.e., no increases in flooding that would cause the site to become unusable) at any of the recreation sites identified in Table 4-24.

Alternative 1 would have some effects on the preferred flow ranges for whitewater boating by reducing the number of days in the preferred flow range of 5,000 cfs to 18,000 cfs. However, these effects would occur in the winter months when recreation use on the Tallapoosa River below Thurlow Dam is likely low.

ALTERNATIVE 2 – 2 FT WINTER POOL INCREASE

Although Southwick Associates (2010) did not directly estimate changes in recreation use associated with a 2 foot increase in winter pool elevations, Study 12(g) indicates a 2 foot increase can be "estimated by simple interpolation from the projected increases of the study scenarios", or in other words averaging the expected increased from a 1 foot and 3 foot change in winter pool levels. Therefore, under Alternative 2, recreation use would be expected to increase by 5.3 percent over baseline, or an increase of approximately 19,000 recreation days. In addition, an additional 10 percent of shoreline property owners would be able to moor their boat at their dock year round.

Alternative 2 would not affect accessibility (i.e., no increases in flooding that would cause the site to become unusable) at any of the recreation sites identified in Table 4-24.

Alternative 2 would have some effects on the preferred flow ranges for whitewater boating by reducing the number of days in the preferred flow range of 5,000 cfs to 18,000 cfs. However, these effects would occur in the winter months when recreation use on the Tallapoosa River below Thurlow Dam is likely low.

ALTERNATIVE 3 – 3 FT WINTER POOL INCREASE

Under Alternative 3, recreation use would be expected to increase by 8.1 percent over baseline, or an increase of approximately 30,000 recreation days. In addition, an additional 21 percent of shoreline property owners would be able to moor their boat at their dock year round.

Alternative 3 would not affect accessibility (i.e., no increases in flooding that would cause the site to become unusable) at 4 of the recreation sites identified in Table 4-24. At two sites (Gold Mine Road and Coon Creek Ramp), there would be an additional 2 days (over the 67 year period of record used in the analysis) that these 2 sites would be inaccessible.

Alternative 3 would have some effects on the preferred flow ranges for whitewater boating by reducing the number of days in the preferred flow range of 5,000 cfs to 18,000 cfs. However, these effects would occur in the winter months when recreation use on the Tallapoosa River below Thurlow Dam is likely low.

ALTERNATIVE 4 - 4 FT WINTER POOL INCREASE

Although Southwick Associates (2010) did not directly estimate changes in recreation use associated with a 4 foot increase in winter pool elevations, Study 12(g) indicates a 4 foot increase can be "estimated by simple interpolation from the projected increases of the study scenarios", or in other words averaging the expected increased from a 3 foot and 5 foot change in winter pool levels. Therefore, under Alternative 4, recreation use would be expected to increase by 9.1 percent over baseline, or an increase of approximately 34,000 recreation days. In addition, an additional 36 percent of shoreline property owners would be able to moor their boat at their dock year round.

Alternative 4 would not affect accessibility (i.e., no increases in flooding that would cause the site to become unusable) at 4 of the recreation sites identified in Table 4-24. At two sites (Gold Mine Road and Coon Creek Ramp), there would be an additional 2 days (over the 67 year period of record used in the analysis) that these 2 sites would be inaccessible.

Alternative 4 would have some effects on the preferred flow ranges for whitewater boating by reducing the number of days in the preferred flow range of 5,000 cfs to 18,000 cfs. However, these effects would occur in the winter months when recreation use on the Tallapoosa River below Thurlow Dam is likely low.

ALTERNATIVE 5 – 5 FT WINTER POOL INCREASE

Under Alternative 5, recreation use would be expected to increase by 10.1 percent over baseline, or an increase of approximately 38,000 recreation days. In addition, an additional 68 percent of shoreline property owners would be able to moor their boat at their dock year round.

Alternative 5 would not affect accessibility (i.e., no increases in flooding that would cause the site to become unusable) at 3 of the recreation sites identified in Table 4-24. At one site (Gold Mine Road), there would be an additional 3 days (over the 67 year period of record used in the analysis) that this site would be inaccessible. At one site (Coon Creek Ramp), there would be an additional 2 days (over the 67 year period of record used in the analysis) that this site would be inaccessible. At one site (Thurlow Dam Put-in), there would be an additional 1 day (over the 67 year period of record used in the analysis) that this site would be inaccessible.

Alternative 5 would have some effects on the preferred flow ranges for whitewater boating by reducing the number of days in the preferred flow range of 5,000 cfs to 18,000 cfs. However, these effects would occur in the winter months when recreation use on the Tallapoosa River below Thurlow Dam is likely low.

4.4.6.3 PROPOSED PME MEASURES

Items from the proposed action that may affect recreation resources include:

- Implement the Martin Project Recreation Plan

With regard to the proposed Flood Control Guide Curve change, there likely would be no negative effects to recreation resources directly resulting from the Flood Control Guide Curve change. However, the environmental effects described in other sections that may occur may decrease the recreation benefits reported in Section 4.4.6. Furthermore, there may be some

indirect social impacts due to increased use of the reservoir by putting additional strain on the social resources (e.g., transportation infrastructure, health care infrastructure, etc.) in the surrounding region.

Currently, in the draft Recreation Plan, Alabama Power proposes the following on Project recreation sites:

- **Martin Dam Portage Trail** – Alabama Power is investigating the potential for a portage trail for canoes/kayaks in the vicinity of Martin Dam. Alabama Power will consult with the ADCNR and Alabama Scenic River Trail in the development of the trail. If a suitable site is not located at Martin Dam, Alabama Power will inform MIG 5 members as to why the trail could not be developed.
- **Jaybird Landing** – Alabama Power will improve the boat ramp at Jaybird Landing for small trailered boats. Alabama Power will create two bank fishing sites on the south side of the Tallapoosa River in the vicinity of the boat ramp at Jaybird Landing.
- **Union Ramp** – Alabama Power will replace the courtesy dock at Union Ramp. Alabama Power is also correcting a mapping error on the Martin Dam Project Exhibit G (Project Boundary) in the vicinity of Union Ramp to include the entire facility within the Project Boundary.
- **Martin Wildlife Management Area** – Alabama Power will designate approximately 500 acres as a "small game hunting area" on Natural/Undeveloped Lands in the upper portion of the Project. The exact location of the small game hunting area is still being developed.
- **Ponder Camp** – Alabama Power proposes to reclassify the property at Ponder Camp from Natural/Undeveloped Lands to Recreation. This property will be held as a future location for a recreation facility as need demands.

In addition, Alabama Power has agreed to the following action to be taken at non-Project recreation sites that are in the vicinity of Project lands or waters:

- **Camp ASCCA Hunting Area (Barrier Free Accessible Hunting)** – Alabama Power will construct and maintain a barrier free accessible hunting area near Camp ASCCA. Alabama Power will construct barrier free shooting houses, food plots, and access to the shooting houses. Alabama Power will maintain the facility with Camp ASCCA organizing hunting activities.
- **Kowaliga (Hwy. 63) Launch** – Alabama Power is investigating the possibility of expanding the parking lot and constructing an additional boat ramp at this location.
- **Wind Creek Valley Hiking Trails** – The Cherokee Ridge Alpine Trail Association (CRATA) requested property located on the east/southeast side of Martin Dam. Alabama Power currently owns the property but it is outside the Project Boundary. Alabama Power is investigating the feasibility of leasing this land to CRATA.

Alabama Power is still in the process of negotiating a (1) schedule for these actions and (2) a process for updating the Recreation Plan during the life of the license.

These actions will generally provide adequate public access to Project lands and waters over the life of the license and should help alleviate congestion at the most heavily used boat ramps. The Martin Dam Portage Trail will provide canoeists the opportunity to access the downstream Yates Reservoir and provide a safe passage around the Martin Dam. The replacement of the boat launch and addition of bank fishing sites at Jaybird Landing will give better access for fishing in the upper reaches of the Project. The replacement of the courtesy dock at Union Ramp will make it easier to launch boats at this site. The creation of the Martin Dam Wildlife Management Area will provide hunting opportunities on Project lands where currently none exists. Reclassifying the property at Ponder Camp will allow Alabama Power to install an additional boat ramp in the Blue Creek area of the Martin Reservoir, which should give the growing population of this area additional public access and alleviate minor capacity issues at Union Ramp. The creation of the Camp ASCCA Hunting Area will provide additional public opportunities for hunters with disabilities albeit outside of the Project Boundary. Expansion of the Kowaliga (Hwy. 63) Launch will alleviate congestion at the most used boat ramp at Lake Martin.

Although these actions will improve recreation access in the short term, long term planning of recreation access is difficult given the unknown, but estimated, effects of increasing population growth around the Project and increased use of the Lake due to alternative water level management scenarios. The process that Alabama Power will develop for the final Recreation Plan will account for the difficulty of long term recreation planning by allowing future recreation use estimates and actual population growth to be considered in future recreation planning. The process will ensure recreation access at the Project is adequate for the life of the license.

4.4.6.4 NO ACTION ALTERNATIVE

Under the No-Action Alternative, Alabama Power would continue to operate the Project in the manner it is operated presently. Alabama Power would not implement any Flood Control Guide Curve changes or proposed PME measures. None of the recreation benefits associated with a higher winter pool elevation would occur. While recreation would continue to occur at the Project, the increase in available recreation opportunities associated with higher water levels

would not be realized. In addition, the no action alternative would maintain recreation sites in their existing condition and under their current maintenance schedules. There would most likely be no short-term effects of implementing this alternative; however, over the long-term, recreation resources may deteriorate, which could lead to an increase in crowding pressures, creating user conflicts between boaters and non-boaters, and parking and vehicle congestion and traffic. Long-term effects of maintaining these sites in their existing condition could result in an increase in erosion and siltation, a decrease in overall water quality, a reduction in the quality of shoreline terrestrial and aquatic habitats, and an overall decline in the recreation experience.

4.4.6.5 UNAVOIDABLE ADVERSE IMPACTS

During any ground disturbing activities associated with additional facilities and access, there is the possibility of an increase in erosion and water turbidity during development. These issues can be addressed in Alabama Power's SMP and permitting program. In addition, some noise from recreational users may impact terrestrial species and bald eagles. Implementing the recreation plan with appropriate environmental oversight will assist in mitigating any potential issues.

4.4.6.6 REFERENCES

Kleinschmidt. 2010. Martin Dam Project Recreation Plan (Draft). Alabama Power Company, Birmingham, AL.

Southwick Associates. 2010. Effects of Increasing Duration of Summer Pool and Level of Winter Pool on Recreation Use and Selected Economic Indicators at Lake Martin, Alabama. Kleinschmidt Associates, Birmingham AL.

4.4.7 CULTURAL RESOURCES

4.4.7.1 AFFECTED ENVIRONMENT

PREHISTORIC OVERVIEW

The area surrounding the Project has been subject to dramatic shifts in climate over the past 15,000 years that have affected the nature and presence of aboriginal peoples; in particular, the climate has become gradually warmer and wetter in the past 10,000 years (Southerlin *et al.*, 1998).

The Project lies in the Tallapoosa River Valley in eastern Alabama, near the border with Georgia. Archaeological evidence suggests that humans have occupied the area for approximately 10,000 years, since the late Paleoindian stage of prehistory. The following summary of the prehistory and history of the River Basin is drawn largely from Alabama Power Company (2006).

The earliest stage of human history in the southeastern United States is identified as the Paleoindian stage, which began in approximately 10,000 B.C. While there are several early Paleoindian sites within the Tennessee Valley Region of northern Alabama, currently there is no evidence of early Paleoindian occupation in the River Basin. Based on current records, prehistoric populations did not reach the Basin until the middle Paleoindian stage, with only one site identified as having a Cumberland component. The archaeological record thus far indicates a larger influx of prehistoric peoples to the River Basin during the late Paleoindian period (c. 8,500-8,000 B.C.).

During the Archaic stage (c. 8,000-1,200 B.C.), climate trends progressively transitioned toward that of modern weather patterns. Hunting and gathering remained the primary subsistence strategy throughout the Archaic stage. The early Archaic period toolkit expanded to include knives, adzes, end scrapers, and celts, while the invention of the atlatl (spear thrower) was an important technological advancement during this period. There is also evidence of woven fiber used to make baskets and netting during this period. Archaeological research on the Middle Archaic suggests increased sedentism and greater exploitation of riverine environments during this period. While most middle Archaic sites are smaller camp sites, many larger riverine sites contain hearths, storage pits, and large shell middens. Technological advances during the middle Archaic period include ground and polished stone, such as atlatl weights, grooved axes, and net-sinker weights; and tools made of bone and shell such as awls, needles, atlatl hooks, and more. Late Archaic sites occur with greater frequency and have a wider physiographic dispersion than earlier periods. Sedentism also appears to increase, as flood plain base camps grow in size, and archaeological excavations of late Archaic sites encounter house floors, hearths, and pit features in higher densities. Extensive trade networks of raw materials appear, yet late Archaic artifacts demonstrate increasing regional variation of stylistic and technologic traits. Burial mounds, exotic ornamental grave goods, commodity trading of raw materials, and increasingly specialized craftsmanship indicate a growing social hierarchy.

Spanning from c. 1,200 B.C. to 300 B.C., the Gulf Formational stage is contemporaneous with the early Woodland period in other parts of North America. Early fired clay pottery was tempered with organic fibers as a strengthening agent. Few recorded sites within the River Basin are associated with the Gulf Formational stage.

The Woodland stage (c. 300 B.C.- A.D. 1,200) is typically associated with an increased reliance on agriculture for subsistence. The introduction of the bow and arrow occurred during this stage, as reflected in the discovery of smaller triangular projectile points. Populations continued to grow, as did the size of village sites. Decorative techniques and patterns for ceramics grew increasingly complex and distinctive to a particular time and space, as diagnostic pottery replaced projectile points as cultural markers in the archaeological record.

The Mississippian stage (c. AD 1000-1450) represents the height of Native American culture up until contact with the first European settlers. Mississippian societies were based on an agrarian economy and were densely populated in fertile river valleys. Mississippian settlements include large village sites, many of which contain large earthen mounds. These mound sites are considered to have been cultural hubs with extensive political, religious, and socio-economic influence. Mississippian cultures witnessed a high degree of social stratification with evidence of a ruling elite, extensive trade networks for exotic goods, specialized craftsmen, and artisans. Mississippian sites are not particularly well represented in the River Basin.

HISTORIC OVERVIEW

The Spanish explorers of the early sixteenth century were the first Europeans to contact the Native Americans in present day Alabama, and Hernando de Soto's entrance through the southeast was the most prominent Spanish presence in Alabama during this time. The French were the first Europeans to establish long-term contact with native groups of the area. After settling at what is now Biloxi in 1699, the French, in 1717, established Fort Toulouse at the point where the Coosa and Tallapoosa Rivers meet to form the Alabama River. By the early eighteenth century, English traders had established a presence in the region. The Creek presence in the interior of Alabama slowed the advance of settlers but despite this, American settlers continued to venture into the area after the Treaty of Paris in 1783.

The new American government established the Mississippi Territory in 1798 under the provisions of the Northwest Ordinance. The strong presence of native Creeks in the interior of Alabama slowed American expansion into the area. The newly formed Mississippi Territory became unstable after the creation of a Federal Road from Washington D.C. to New Orleans brought new American settlers to the region. In 1813, a series of attacks and counterattacks between Americans and Creeks blossomed into a war throughout the territory, including the Lake Martin area. The war came to a formal, and violent, end in 1814 when Andrew Jackson defeated the Creeks at Horseshoe Bend on the River. This forced the secession of all Creek land east of the Mississippi River, including Lake Martin and surrounding areas (Southerlin *et al.*, 1998). American settlers then quickly settled the area after the Native Americans were sent to Oklahoma on the Trail of Tears.

Early American settlers in the new Alabama Territory rapidly developed the area, as the power of small streams was harnessed for the machinery that operated grist, flour, and saw mills. The east central part of Alabama saw relatively slow development, however, through the outbreak of the Civil War in 1861. Stagnation of industry and agriculture existed throughout the state of Alabama until 1885. After 1885, the coal, iron, steel, and textile industries experienced rapid growth. The area around Lake Martin remained primarily agricultural.

Throughout the nineteenth century, power development in Alabama was confined almost entirely to streams. By the early twentieth century, however, prospective water power sites along the River began to attract the attention of hydraulic engineers. In 1907, the founding president of Alabama Power, Captain William Patrick Lay, received congressional approval to construct the company's first dam and electric generating plant on the Coosa River (Lay Hydroelectric Development, now a part of the Coosa River Project). Construction of this dam was initiated in 1910 and was completed in April 1914.

Interest in development of a dam at Cherokee Bluffs on the River continued until construction was initiated on July 24, 1923 and was completed on December 31, 1926. First known as Cherokee Bluffs, the dam was dedicated in 1926 in honor of Thomas Martin, president of Alabama Power from 1920 to 1949 and chief executive officer from 1949 to 1963. Martin was instrumental in the development of Alabama Power and a pioneer in the development of the electric system throughout Alabama and the Southeast. The Project was one of four dams

constructed on the River. Three generating units were installed initially, while a fourth unit was installed in 1952.

HISTORIC PROPERTIES

No systematic cultural resources survey of the entire Project has occurred. However, a recent review of the Alabama Archaeological Site Files identified eighteen sites within the Martin Project boundaries (The University of Alabama, 2006). In 1995, Alabama Power contracted for Phase I and Phase II archaeological surveys of eight areas that were the sites of proposed new recreation areas (Alabama Power Company, 1996). The University of Alabama – Museum of Natural History – Office of Archaeological Research (OAR) conducted the surveys in 1995 and 1996, and identified eleven archaeological sites. The eligibility for two of these sites, in terms of inclusion on the National Register of Historic Places (NRHP), is undetermined at this time (Sites 1CS152 and 1CS153). Site 1TP35, Smith Mountain Fire Tower Complex, was determined to be eligible for inclusion on the NRHP, but it not within the Martin Project Boundary.

In addition to eleven sites identified by the University of Alabama survey, the OAR (2006) indicates that seven other sites have been identified within the Martin Project Boundary. Six are archaeological sites (1CS93, 1EE33, 1TP3, 1TP4, 1TP38, and 1TP86) whose NRHP eligibility is undetermined at this time. The seventh (1TP125) is the Umphress Family Cemetery. According to information presented in the 2006 OAR report and subsequent follow up, this cemetery was relocated in anticipation of a construction project.

The Project facilities, including the powerhouse, dam, and appurtenant facilities were built in 1926, representing an important engineering development for the State of Alabama at that time.

Despite the lack of a comprehensive cultural resources survey, eight potentially eligible archaeological sites are known to exist at the Project. In addition, the Project facilities, although not yet evaluated, are likely eligible for the NRHP.

4.4.7.2 ENVIRONMENTAL EFFECTS

Environmental effects of the Flood Control Guide Curve alternatives and the PME measures are described in sections 2.2 and 2.2.2, respectively. The proposed PME measures that may affect

cultural resources are described in Section 4.4.7.3. Effects on historic properties within the Area of Potential Effect (APE) can result from Project-related activities such as reservoir operations and Project-related ground-disturbing activities. Effects also can result from other forces such as wind and water erosion, recreational activities, and vandalism. The type and level of effects on cultural resources can vary widely, depending upon the setting, size, and visibility of the resource, as well as whether there is public knowledge about the location of the resource. See Section 4.4.1 for additional information on the nature and causes of erosion.

ALTERNATIVE 1 – 1 FOOT WINTER POOL INCREASE

Alabama Power's proposal to change the Flood Control Guide Curve above 481ft msl would leave otherwise exposed historic properties and archeological sites inundated and less susceptible to wind and water erosion, recreational activities, and looting (vandalism).

ALTERNATIVE 2 – 2 FT WINTER POOL INCREASE

The overall effect of a higher winter pool as a result of the Flood Control Guide Curve would be positive and slightly better than a 1 ft increase.

ALTERNATIVE 3 – 3 FT WINTER POOL INCREASE

The overall effect of a higher winter pool as a result of the Flood Control Guide Curve would be positive and slightly better than a 2 ft increase.

ALTERNATIVE 4 – 4 FT WINTER POOL INCREASE

The overall effect of a higher winter pool as a result of the Flood Control Guide Curve would be positive and slightly better than a 3 ft increase.

ALTERNATIVE 5 – 5 FT WINTER POOL INCREASE

The overall effect of a higher winter pool as a result of the Flood Control Guide Curve would be positive and slightly better than a 4 ft increase.

4.4.7.3 PROPOSED PME MEASURES

Erosion of shoreline soils will continue as a result of natural processes. Implementation and enforcement of the SMP should minimize shoreline erosion through improved shoreline

protection. Policies included in the SMP relevant to erosion are education of property owners on the benefits of natural shoreline development, providing more detail in the general shoreline permitting regarding the use of rip-rap with or without seawalls, and including BMPs for maintaining natural shorelines and/or shoreline buffers.

In addition, FERC is preparing the PA to manage properties eligible, or potentially eligible, for inclusion on the NHRP and will distribute to the Alabama SHPO for signature. Alabama Power also proposes to develop and implement a HPMP. The HPMP would govern management of significant cultural resources in the Project's APE over the term of a new license. Alabama Power has consulted with the Alabama SHPO, and the appropriate federally recognized Native American tribes (Poarch Band of Creek Indians, Choctaw Nation of Oklahoma, Thlopthlocco Tribal Town, Alabama-Coushatta Tribe of Texas, and the Alabama-Quassarte Tribal Town) pursuant to Section 106 of the National Historic Preservation Act (see Table 4-29 for Consultation Record). The HPMP would be developed in consultation with the Alabama SHPO in accordance with the FERC's guidelines for HPMPs. The HPMP would contain policies and procedures for identifying effects of Project operations, over the term of the license, on historic properties, and for development and implementation, in consultation with the Alabama SHPO, of measures to avoid, minimize or mitigate any adverse effects. The HPMP will also discuss areas to be surveyed for the presence of cultural resources that were identified in consultation with the Alabama SHPO and appropriate federally recognized Native American tribes. The HPMP would also provide for additional cultural resources investigations in the event that Alabama Power plans any ground-disturbing activities in sensitive areas of the Project that are known to contain or have a high probability of having prehistoric archaeological and historic resources.

Section 3.1 contains a list of all MIG 6 (cultural resources) meetings to date. A list of the meeting dates is also presented in Table 4-29.

TABLE 4-29 CULTURAL RESOURCES CONSULTATION RECORD

May 21, 2008	October 22, 2009
March 12, 2009	May 6, 2010
April 22, 2009	October 13, 2010
June 16, 2009	November 16, 2010
July 23, 2009	

Development and implementation of an HPMP in consultation with the SHPO will ensure that adverse effects on historic properties arising from Project operations or Project-related activities over the term of the new license would be avoided or satisfactorily resolved. The HPMP will include specific measures to resolve any potential adverse effects arising from license requirements.

4.4.7.4 NO ACTION ALTERNATIVE

Under the No-Action Alternative, Alabama Power would continue to operate the Project in the manner it is presently operated. Alabama Power would not implement any Flood Control Guide Curve changes or proposed PME measures. Under the no-action alternative, no additional protection or enhancement would occur to cultural resources. Cultural resources sites would continue to be protected under existing agreements. An HPMP would not be implemented. Additionally, minor erosion could potentially threaten cultural resources sites along the shoreline. Furthermore, those sites located along the shoreline would not receive the additional protection of being classified as “Sensitive Resource Lands” under the SMP. Finally, the Flood Control Guide Curve would not change and Lake Martin would be drawn down to el. 481 msl each winter, potentially exposing cultural resources sites.

4.4.7.5 UNAVOIDABLE ADVERSE EFFECTS

Even with the proposed measures to protect archaeological resources, some properties may still be exposed to looting and erosion. The HPMP addresses these issues but does not assure that adverse impacts to eligible or potentially eligible properties will not occur.

4.4.7.6 REFERENCES

Alabama Power Company. 1996. Cultural Resources Summary Report for Alabama Power Company's Martin Project. Alabama Power Company, Birmingham, AL. 20 pp.

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The University of Alabama, Office of Archaeological Research. 2006. Alabama Power Company Martin Project Recorded Sites (Alabama State Site File). The University of Alabama, Tuscaloosa, AL.

4.4.8 LAND USE AND AESTHETIC RESOURCES

4.4.8.1 AFFECTED ENVIRONMENT

LAND USE RESOURCES

Land uses within the Lake Martin watershed can affect Project resources including water quality, recreational access, and fish and wildlife populations. While generally Alabama Power does not control land use outside the Project Boundary, an understanding of these land uses is important for identifying the nature of development around the Lake. The portion of the Tallapoosa River basin in Alabama is primarily forested (Alabama Department of Environmental Management, Water Quality Branch, Water Division, 2002), with a very small percentage (<1.0 percent) classified as developed. The next highest land use percentages are for pasture/hay and row crops. These are also the three highest percentages of land use types in the portion of the basin in Georgia (Georgia Department of Natural Resources, Environmental Protection Division, 1998).

The three counties surrounding Lake Martin are predominantly rural in nature. According to the 2000 Census, the percentage of the population living in a rural area was 97 percent in Coosa County, 62 percent in Elmore County, and 75 percent in Tallapoosa County. All three counties are sparsely developed and have predominantly forested upland land cover, followed by planted/cultivated land. The land use percentages presented in Table 4-30 are based on satellite images taken from 1999 to 2001 and were calculated based on a resolution of 30 meters. Therefore, only major land use categories are presented.

TABLE 4-30 PERCENTAGE OF LAND USE CLASSIFICATIONS IN THE COUNTIES SURROUNDING LAKE MARTIN

DESCRIPTION[1]	COOSA COUNTY (%)	ELMORE COUNTY (%)	TALLAPOOSA COUNTY (%)
Open Water	2.2	5.8	6.4
Developed, Open Space	4.1	4.7	4.8
Developed, Low Intensity	0.2	0.8	0.6
Developed, Medium Intensity	0.0	0.3	0.2
Developed, High Intensity [2]	0.0	0.0	0.0
Barren Land (Rock/Sand/Clay)	1.6	0.3	1.2
Deciduous Forest	42.4	27.6	36.3
Evergreen Forest	33.5	16.0	29.2
Mixed Forest	1.1	10.2	1.4
Shrub/Scrub	1.6	8.2	2.1
Grassland/Herbaceous	8.3	2.4	8.7
Pasture/Hay	3.8	13.2	7.4
Cultivated Crops	0.1	7.0	0.3
Woody Wetlands	1.2	3.6	1.5
Emergent Herbaceous Wetlands [2]	0.0	0.0	0.0

[1] For a description of land cover types, see http://www.mrlc.gov/nlcd_definitions.asp
[2] Although present, these areas represent less than 0.1%.
(Source: Multi-Resolution Land Characteristics Consortium, 2001, as modified by Kleinschmidt)

Alabama Power's Comprehensive Recreation Plan (CRP), or Exhibit R of the current license, originally approved by the FERC in 1979, determines land uses within the Project Boundary. Alabama Power controls the entire length of the shoreline to the 491 ft msl contour; however, they do not control privately owned lands above the 491 ft msl contour.

Currently, Project lands are categorized into seven classifications:

- **Prohibited Access** – Areas where visitors are not allowed in order to protect them from hazardous areas and to prevent damage to operational facilities.
- **General Public Use** – Areas reserved for the development of parks, boat ramps, concessionaires' facilities and other recreational facilities open to the public.
- **Natural Undeveloped** – Areas remaining in an undeveloped state to serve as buffer zones around public recreational areas, to protect environmentally sensitive shoreline areas, to prevent overcrowding of partially developed shoreline areas, to maintain the natural aesthetic qualities of certain highly visible areas, for nature study trails, and for primitive camping activities.
- **Potential Residential** – Areas where lots for cottage construction can be developed by Alabama Power and made available to the public under highly restrictive lease provisions.

- **Quasi-Public Recreation** – Lands leased to quasi-public organizations (e.g., Camp ASCCA, the U.S. Department of Defense [Maxwell Gunter AFB Recreation Area], Camp Alamisco, and Kamp Kiwanis [Girl Scouts]) as needed for public use facilities.
- **Existing Commercial Recreation** – Existing concessionaire-operated public marinas and recreational areas that provide a wide variety of recreational services to the public on a fee basis.
- **30 ft. Buffer** – A control strip of land along the shoreline in certain areas of the reservoir. These buffers are located on properties once owned by Alabama Power. When sold, Alabama Power retained a 30-foot control strip to act as a buffer and prohibits certain activities (e.g., habitable structures) within this classification.

The acreage and percentage of Project lands in respective shoreline classifications are shown in Table 4-31.

TABLE 4-31 ACREAGE AND SHORELINE MILES OF MARTIN PROJECT LANDS BY SHORELINE CLASSIFICATION

SHORELINE CLASSIFICATION	SHORELINE	
	ACREAGE	MILES
Prohibited Access	277	3
General Public Use	784	18
Natural Undeveloped	6,586	117
Potential Residential	366	19
Quasi-Public Recreation	271	6
Existing Commercial Recreation	70	4
30 ft. Buffer	452	126
Unclassified	N/A[1]	407
TOTAL	8,806	700

[1] There is no acreage associated with unclassified lands as this category represents the number of shoreline miles where Alabama Power has no Project lands above the 491 ft msl contour.

SHORELINE PERMITTING PROGRAM

Alabama Power's Shoreline Permitting Program is separate from the CRP but integral to shoreline management. Lands adjacent to the Lake are subject to permitting by Alabama Power. Alabama Power maintains a Shoreline Permitting Program to manage all shoreline property within the Project Boundary. The program provides a proactive, ongoing plan for shoreline development by private property owners, commercial developers, and local, state, and federal agencies who want to construct piers, boat ramps, seawalls, boathouses, boat slips, or other structures on lands within the Project Boundary. Alabama Power provides private and commercial owners with a copy of the general guidelines for recreational development and a copy of the permitting program and permit application. Alabama Power schedules on-site

meetings with the property owner to review the placement of structures and specific issues that must be addressed prior to approval. The property owner gives Alabama Power a detailed drawing of the proposed structure, a copy of the deed to the property, and any other necessary permits or approvals from the appropriate state or local agency, where applicable. Commercial property owners must follow a more detailed procedure that includes review by Alabama Power's departments of Corporate Real Estate, Hydropower Licensing, and Environmental Affairs, as well as state and federal agencies, before final review and approval by FERC. The USACE has given Alabama Power the authority to manage certain permitting on the Lake that ordinarily would be subject to USACE permitting. The objective of this management approach is to control all development activities and monitor the shoreline areas on a regular basis to preserve the scenic, recreational, and environmental attributes of the Lake. This management approach allows Alabama Power to quickly respond to shoreline owner permitting requests.

Upon FERC approval, Alabama Power issues a permit and monitors the construction of the project for compliance with the terms of the permit. The construction of the project must be completed within one year of issuance of the permit. After completion, Alabama Power marks the structures with metal tags depicting the Alabama Power permit number. These tags are displayed for Alabama Power's reference during regular field inspections. Alabama Power maintains permit records and copies are sent to the USACE where applicable.

AESTHETIC RESOURCES

The area surrounding the Project is predominantly rural in nature and has characteristics similar to other rural areas in the state. The typical character of the area includes large areas of forest and agricultural land interspersed with single-family residences and small towns. Alexander City is typical of many small Alabama towns and includes basic amenities one would expect to find in a city such as restaurants, businesses, hospitals, and manufacturing sectors.

Although development is somewhat sparse, there is typical development along the shoreline including single-family houses, condominiums, marinas, and recreation areas. The natural/undeveloped areas of the Lake provide breathtaking views and the contiguity of these

lands adds to the natural characteristics of the Lake. There are many overlooks and high bluffs along the shoreline.

Perhaps the most spectacular views at the Project are of the dam and powerhouse (see Photo 4-2, Photo 4-3, Photo 4-4, and Photo 4-5). General Public Use Area #6 (Scenic Overlook) provides outstanding views of Lake Martin in the vicinity of the dam (Photo 4-6). During scheduled tours of the dam, the view downstream is equally stunning.

PHOTO 4-2 AERIAL VIEW OF MARTIN DAM AND POWERHOUSE

PHOTO 4-3 DOWNSTREAM VIEW OF MARTIN DAM

PHOTO 4-4 MARTIN POWERHOUSE, AS VIEWED FROM EAST SIDE OF DAM

PHOTO 4-5 DOWNSTREAM VIEW OF TAILRACE

PHOTO 4-6 VIEW OF LAKE MARTIN FROM SCENIC OVERLOOK

4.4.8.2 ENVIRONMENTAL EFFECTS

Environmental effects of the Flood Control Guide Curve alternatives and the PME measures are described in sections 2.2 and 2.2.2, respectively. The proposed PME measures that may affect land use resources are described in Section 4.4.8.3.

EFFECTS OF A CHANGE IN THE MARTIN FLOOD CONTROL GUIDE CURVE

Any changes to the Martin Flood Control Guide Curve will have a variety of effects on land use and aesthetic resources; however, these effects were not quantified during the ILP study process. Generally, the higher winter level is expected to increase recreational use of the Project and shoreline property values (see Section 4.4.6.2). These expected changes in recreation use and shoreline property values may have both positive and negative effects on land use and aesthetic resources. Increased recreation use may lead to increased access both from private and public entities. Increased shoreline property values may lead to more development, changing the land use patterns outside the Project Boundary. A higher Flood Control Guide Curve should have a generally positive effect on aesthetic resources by narrowing the "ring" around the reservoir when it is in drawdown condition.

4.4.8.3 PROPOSED PME MEASURES

Items from the proposed action that may affect land use and aesthetic resources include:

- Implement the Revised Shoreline Management Program.

These effects are analyzed below.

The Shoreline Management Program will replace the current CRP. Within the proposed Shoreline Management Program there are a number of actions that will generally have a positive effect on land use and aesthetic resources at the Martin Project.

First, the implementation of shoreline management policies, including shoreline conservation, bank stabilization, dredging, channelization, water withdrawal, and causeways, should allow Alabama Power to better manage shoreline resources by providing guidance to shoreline management personnel in their decision making on shoreline modifications.

Second, a revised shoreline classification system will allow Alabama Power to be consistent with classification schemes with their other FERC projects (Coosa Project [FERC No. 2146] and Warrior Project [FERC No. 2165]). The revised classification scheme is outlined below (Table 4-32) followed by a definition of the new classifications.

TABLE 4-32 EXISTING AND PROPOSED SHORELINE CLASSIFICATIONS

EXISTING CLASSIFICATION NUMBER	EXISTING CLASSIFICATION	PROPOSED CLASSIFICATION NUMBER	PROPOSED CLASSIFICATION
1	Prohibited Access	1	APC Project Operations
2	General Public Use	2	Recreation
3	Natural Undeveloped	5	Natural / Undeveloped Lands
4	Potential Residential [a]		
5	Quasi-Public Recreation	2	Recreation
6	Existing Commercial Recreation	2	Recreation
7	30 ft. Buffer	3	30 ft. Control Strip
		4	Sensitive Resources Lands

[a] Alabama Power is proposing to remove this classification from the Martin Project.

APC Project Operations (New Class 1): Project lands reserved for current and potential future operational activities. This includes all Project lands used for hydroelectric generation, switchyards, transmission facilities, rights-of-way areas, security lands, and other operational uses. These lands are owned by Alabama Power in fee title.

Recreation (New Class 2): Project lands managed by Alabama Power for existing and/or potential future concentrated recreational activities. This includes land that is developed for commercial recreation with provisions for adequate public access, public recreation, open space, water access, and future recreational development. These lands typically are owned by Alabama Power in fee title, but may be operated under a lease agreement with APC.

30-foot Control Strip (New Class 3): A control strip of land along the shoreline in certain areas of the reservoir. These control strips are located on properties once owned by Alabama Power. When sold, Alabama Power retained a 30-foot control strip to act as a buffer and prohibits certain activities (e.g., habitable structures) within this classification.

Sensitive Resources Lands (New Class 4): Project lands managed for protection and enhancement of sensitive resources. Sensitive resources include resources protected by state and/or federal law, executive order, and other natural features considered important to the area or natural environment. This includes archaeological resources, sites/structures listed on or eligible for listing on the National Register of Historic Places, wetlands, floodplains, Rare, Threatened and Endangered (RTE) habitat protection areas, significant scenic areas, and other sensitive ecological areas. Permitted activities, if applicable, in these areas will be highly restrictive to avoid potential impacts to sensitive resources and will trigger an environmental review by Alabama Power's environmental department prior to permitting. The treatment of Sensitive Resources may be modified to ensure consistency of sensitive resources in the Coosa and Warrior Projects SMPs.

Natural/Undeveloped Lands (New Class 5): Project lands to remain in an undeveloped state for specific project purposes including: to protect environmentally sensitive areas; to maintain natural aesthetic qualities; to serve as buffer zones around public recreation areas; and to provide a means for preventing overcrowding of partially developed shoreline areas. This classification allows for public hiking trails, nature studies, primitive camping, wildlife management (excluding hunting), and normal forestry management practices. These Project lands are typically owned in fee by APC and are managed for effective protection of associated resource values.

Martin Wildlife Management Area: This 500 acre tract of land in the vicinity of Jaybird Landing will be available for small game hunting. The final details regarding this property/classification will be contained in the Final License Application (FLA).

In addition to revising the classification scheme at the Martin Project, Alabama Power is proposing to either add, remove, or reclassify a total of 38 tracts of property either currently in the Martin Project or adjacent to Martin Project lands. In general, the addition, removal, or reclassification of Project lands will increase the acreage and shoreline miles within the FERC Project Boundary. Many of the reclassifications result in larger tracts of Natural/Undeveloped land by adding acreage or reclassifying shoreline property from Potential Residential to Natural/Undeveloped to be consistent with the property surrounding the reclassified tract. The removal of certain Project lands will allow consistent uses of Project property by taking those

properties planned for private development (i.e., Potential Residential) out of the Project. Alabama Power will maintain the 30-foot Control Strip on these properties which should have a positive effect on aesthetic resources by restricting habitable structures near the shoreline in these areas. The results of this process are summarized in Table 4-33.

TABLE 4-33 ACREAGE AND SHORELINE MILES OF MARTIN PROJECT LANDS BY PROPOSED SHORELINE CLASSIFICATION

SHORELINE CLASSIFICATION	SHORELINE	
	ACREAGE	MILES
APC Project Operations	277	3
Recreation	581	15
30-foot Control Strip	502	144
Sensitive Resource Lands	*	*
Natural/Undeveloped	7,584	133
Unclassified	N/A[2]	405
TOTAL	8,944	700

[*] Alabama Power is still assessing lands to be classified as Sensitive Resources and will provide the final proposal in the FLA.

[2] There is no acreage associated with unclassified lands as this category represents the number of shoreline miles where Alabama Power has no Project lands above the 491 ft msl contour.

Third, the education on, and implementation of, shoreline best management practices will contribute to the overall health of the Lake Martin shoreline. While Alabama Power is not able to control land use practices on privately owned property outside the Project Boundary, these BMPs, if implemented by the property owner, should generally have a positive effect on Project shorelines by providing guidance on property development. The commitment by Alabama Power to implement BMPs on Alabama Power owned Project Lands will help with this effort.

4.4.8.4 NO ACTION ALTERNATIVE

Under the No-Action Alternative, Alabama Power would continue to operate the Project in the manner it is presently operated. Alabama Power would not implement any Flood Control Guide Curve changes or proposed PME measures. Alabama Power would not implement new land use categories or include the proposed 500 ac hunting area.

4.4.8.5 UNAVOIDABLE ADVERSE IMPACTS

There are some unavoidable adverse impacts associated with the scenic view of Lake Martin during the winter months since under any operating alternative, there is some level of water drawdown, exposing land that is usually inundated. These impacts are minor and the proposed change in the Flood Control Guide Curve would improve aesthetic values in the winter months over baseline conditions.

4.4.8.6 REFERENCES

Alabama Department of Environmental Management, Water Quality Branch, Water Division. 2002. Final TMDL Development for Tallapoosa River, AL/Tallapoosa R_1: Low Dissolved Oxygen/Organic Loading. Alabama Department of Environmental Management, Montgomery, AL.

Georgia Department of Natural Resources, Environmental Protection Division. 1998. Tallapoosa River Basin Management Plan 1998. Georgia Department of Natural Resources, Environmental Protection Division, Atlanta, GA.

Multi-Resolution Land Characteristics Consortium. 2001. National Land Cover Database 2001 (NLCD 2001). [Online] URL: http://www.mrlc.gov/mrlc2k_nlcd.asp. Accessed November 28, 2006.

4.4.9 SOCIOECONOMIC RESOURCES

4.4.9.1 AFFECTED ENVIRONMENT

The affected environment for socioeconomic resources is the tri-county area surrounding Lake Martin (Coosa, Elmore and Tallapoosa counties). The following summary of demographic information for these counties is provided from the U.S. Census Bureau (2010). Additional information on the Lake Martin economy is provided from the results of Southwick Associates (2010).

Patterns of population growth differ substantially within the three counties encompassing the Project. In 2009, there were an estimated 10,556 people living in Coosa County, 79,233 in Elmore County, and 41,008 in Tallapoosa County (Table 4-34). Between 2000 and 2009, the populations of Coosa and Elmore counties fluctuated rather dramatically. While Coosa County's population shrank by 11 percent, Elmore County's population increased by just over 20 percent. In contrast, the population of Tallapoosa County increased by a modest 2 percent over the same time period.

TABLE 4-34 POPULATION BY COUNTY, 2000 AND 2009

	POPULATION			LAND (SQ. MILES)	PEOPLE PER SQUARE MILE (2000)
	2000	2009	PERCENT CHANGE		
Alabama	4,447,382	4,708,708	5.9%	50,744.00	87.6
Coosa County	11,855	10,556	-11.0%	652.44	18.2
Elmore County	65,874	79,233	20.3%	621.26	106.0
Tallapoosa County	41,824	41,008	-2.0%	717.93	58.3

Source: U.S. Census Bureau, 2010

The most recent information available showing population density within each county is for 2000. At that time, records showed 18.7, 106.1, and 57.8 persons per square mile, respectively, for Coosa, Elmore, and Tallapoosa counties, respectively. Interestingly, while Coosa and Elmore counties encompass roughly the same volume of land (652 and 621 square miles, respectively), their populations differ substantially, with Elmore County having a much greater population base than Coosa County in both 2000 and 2009.

Given the change in population between 2000 and 2009, it is probable that the population density for Coosa County has decreased since 2000, and has increased for Elmore and Tallapoosa counties.

In 2000, there were 4,682 households in Coosa County, 22,737 households in Elmore County, and 16,656 households in Tallapoosa County (Table 4-35). Each county had around 2.5 persons

per household, which is approximately the national average. The median household income, in 2008, was $36,050, $53,296, and $35,293, respectively.

TABLE 4-35 HOUSEHOLD CHARACTERISTICS

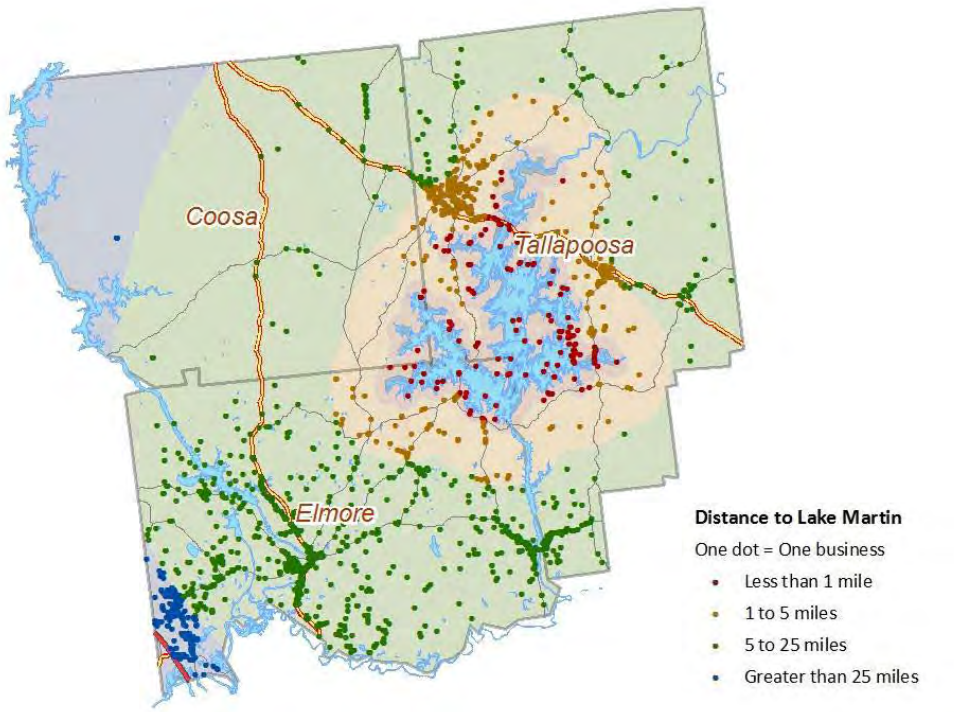
	NUMBER OF HOUSEHOLDS (2000)	PEOPLE PER HOUSEHOLD (2000)	MEDIAN HOUSEHOLD INCOME (2008)
Alabama	1,737,080	2.49	$42,586
Coosa County	4,682	2.52	$36,050
Elmore County	22,737	2.66	$53,296
Tallapoosa	16,656	2.44	$35,293

Source: U.S. Census Bureau, 2010

PROFILE OF THE LAKE MARTIN ECONOMY

As previously stated, Elmore County is the most populous with 79,233 residents in 2009, followed by Tallapoosa County (41,008 residents) and Coosa County (10,556 residents). The largest portion of Lake Martin is located within Tallapoosa County and the population centers and businesses of Elmore County are generally located further from the Lake than are those in Tallapoosa County. Over three thousand businesses are located within the Lake Martin region (Coosa, Elmore, and Tallapoosa Counties) (n=3,266; Figure 4-15). The majority of businesses are located north of Lake Martin in Tallapoosa County and within Elmore County. However, most of the businesses in Elmore County are located a considerable distance from the lake. Although businesses anywhere in the region might have a connection to lake-related recreation spending (e.g., boating equipment sold in department stores in Elmore County; gasoline purchased in Coosa County for a trip to the lake), the map puts into perspective the large number of businesses in the region that likely have no connection to the lake.

FIGURE 4-15 LOCATION OF ALL BUSINESSES IN THE LAKE MARTIN REGION



Source: Southwick Associates (2010)

Table 4-36 shows the number of business in each county, by size of business. In each county, at least 65% of businesses employ fewer than five individuals. Seventy-four percent of businesses in Coosa County employ fewer than five individuals. One percent of all businesses in each of Elmore and Tallapoosa counties employ more than 100 individuals, while no businesses in Coosa County have more than 100 employees. On average, businesses in the Lake Martin region have 9.9 employees. Tallapoosa County businesses employ an average of 13.1 individuals, while Elmore and Coosa County businesses have considerably fewer employees on average (8.2 and 5.7 employees, respectively).

TABLE 4-36 NUMBER OF BUSINESSES IN THE LAKE MARTIN REGION, BY NUMBER OF EMPLOYEES

	COOSA		ELMORE		TALLAPOOSA		TOTAL	
	#	%	#	%	#	%	#	%
1 to 4	99	73.9%	1235	64.9%	806	65.6%	2140	65.5%
5 to 9	21	15.7%	357	18.8%	234	19.0%	612	18.7%
10 to 19	5	3.7%	188	9.9%	99	8.1%	292	8.9%
20 to 49	7	5.2%	75	3.9%	50	4.1%	132	4.0%

	Coosa		Elmore		Tallapoosa		Total	
	#	%	#	%	#	%	#	%
50 to 99	2	1.5%	23	1.2%	23	1.9%	48	1.5%
100 to 249	0	.0%	15	.8%	9	.7%	24	.7%
250 to 499	0	.0%	4	.2%	3	.2%	7	.2%
500 to 999	0	.0%	0	.0%	1	.1%	1	.0%
1000 to 4999	0	.0%	1	.1%	2	.2%	3	.1%
Unknown	0	.0%	5	.3%	2	.2%	7	.2%
Total	**134**	**100.0%**	**1903**	**100.0%**	**1229**	**100.0%**	**3266**	**100.0%**
Average Employees per Business	5.7		8.2		13.1		9.9	

Source: Southwick Associates (2010)

In addition to having the highest average employment, Tallapoosa County has the highest average annual sales per business in the Lake Martin Region at nearly $3.3 million (Table 4-37). Approximately 40% of businesses in Elmore and Tallapoosa Counties have annual sales of less than $500,000. Seventy-three percent of the Lake Martin Region's businesses have annual sales totaling less than $2.5 million.

Table 4-37 Number of Businesses in the Lake Martin Region, by Sales Volume

Sales	Coosa		Elmore		Tallapoosa		Total	
	#	%	#	%	#	%	#	%
Under $0.5 Million	38	28.4%	764	40.1%	504	41.0%	1306	40.0%
$0.5 - 1 Million	23	17.2%	358	18.8%	230	18.7%	611	18.7%
$1 - 2.5 Million	19	14.2%	276	14.5%	176	14.3%	471	14.4%
$2.5 - 5 Million	8	6.0%	93	4.9%	65	5.3%	166	5.1%
$5 - 10 Million	4	3.0%	37	1.9%	23	1.9%	64	2.0%
$10 - 20 Million	2	1.5%	20	1.1%	16	1.3%	38	1.2%
$20 - 50 Million	0	.0%	22	1.2%	8	.7%	30	.9%
$50 - 100 Million	0	.0%	6	.3%	3	.2%	9	.3%
$100 - 500 Million	0	.0%	3	.2%	3	.2%	5	.2%
Unknown	40	29.9%	324	17.0%	201	16.4%	565	17.3%
Total	**134**	**100.0%**	**1903**	**100.0%**	**1229**	**100.0%**	**3266**	**100.0%**
Average Annual Sales per Business	**$1,427,053**		**$2,048,210**		**$3,296,087**		**$2,501,534**	

Source: Southwick Associates (2010)

The largest sector, by sales, is retail and wholesale which account for approximately 40% of all sales in the region. The second largest sector is services (not including restaurants and lodging), with one-fourth of total sales. Across the entire region, restaurants and lodging make up only slightly more than 1% of total sales (Table 4-38).

TABLE 4-38 DISTRIBUTION OF SALES IN THE LAKE MARTIN REGION, BY COUNTY AND BY INDUSTRY

INDUSTRY	COUNTY			TOTAL
	COOSA	ELMORE	TALLAPOOSA	
Agriculture, Forestry, & Fishing	0.7%	0.5%	0.6%	0.6%
Mining & Construction	7.9%	7.8%	6.6%	7.4%
Manufacturing	21.8%	7.9%	17.5%	12.1%
Transportation & Utilities	6.5%	4.3%	2.2%	3.6%
Wholesale & Retail Trades	35.5%	47.0%	29.4%	39.9%
Restaurants & Lodging	0.2%	1.2%	1.5%	1.2%
Services	25.5%	23.6%	28.1%	25.3%
Finance, Insurance, & Real Estate	1.7%	7.4%	14.0%	9.5%
Public Administration	0.2%	0.4%	0.2%	0.3%
TOTAL	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: Southwick Associates (2010)

Only 16% of businesses in the Lake Martin region have been in business more than 25 years. Over one-third of business are less than five years old and more than one-half (52.2%) are less than 10 years old (Table 4-39).

TABLE 4-39 NUMBER OF BUSINESSES IN THE LAKE MARTIN REGION, BY AGE OF BUSINESS

AGE	COOSA		ELMORE		TALLAPOOSA		TOTAL	
	#	%	#	%	#	%	#	%
Less than 5 years	43	32.1%	743	39.0%	401	32.6%	1187	36.3%
5 - 9 years	26	19.4%	312	16.4%	182	14.8%	520	15.9%
10 - 14 years	21	15.7%	249	13.1%	169	13.8%	439	13.4%
15 - 19 years	12	9.0%	187	9.8%	118	9.6%	317	9.7%
20 - 24 years	18	13.4%	135	7.1%	125	10.2%	278	8.5%
25+ years	14	10.4%	277	14.6%	234	19.0%	525	16.1%
TOTAL	**134**	**100.0%**	**1903**	**100.0%**	**1229**	**100.0%**	**3266**	**100.0%**

Source: Southwick Associates (2010)

While Lake Martin is a principal driver of outdoor recreation activity and associated spending in the region, the three-county region is home to a large number of non-recreation businesses across a variety of industries. Table 4-40 shows the volume of sales for each county in the region, by

broad industry sector. Elmore County has the largest business base with nearly $4.0 billion of sales in 2009, followed by Tallapoosa County with $2.5 billion of sales. Coosa County has the smallest business base with only $364.9 million of sales. As in most of the country, the largest volume of sales comes from the business in the services sector of the economy, followed by sales in the wholesale and retail trade.

TABLE 4-40 TOTAL SALES IN THE LAKE MARTIN REGION, BY INDUSTRY SECTOR

INDUSTRY SECTOR	COUNTY			TOTAL
	COOSA	ELMORE	TALLAPOOSA	
	$ MILLIONS			
Agriculture, Forestry, And Fishing	2.5	21.5	14.9	38.9
Mining	4.1	3.7	8.7	16.5
Construction	24.8	307.7	155.5	488.0
Manufacturing	79.6	315.3	437.7	832.6
Transportation & Utilities	23.8	170.7	55.4	249.9
Wholesale Trade	81.5	946.9	266.7	1,295.0
Retail Trade	48.3	927.9	469.2	1,445.4
Finance, Insurance, And Real Estate	6.2	295.0	350.1	651.3
Services	94.0	986.9	740.8	1,821.7
TOTAL	**364.9**	**3,975.6**	**2,498.9**	**6,839.4**

Source: Southwick Associates (2010)

EXPENDITURES RELATED TO LAKE MARTIN

A particular focus of Study 12(h) was an estimation of spending in the region that is tied directly to use of Lake Martin. Expenditure information was collected from lake users in three main categories: 1) trip-related spending; 2) spending for recreational equipment; and, 3) real estate and related spending. The specific methods used to calculate the estimated spending in each category are explained in Southwick Associates (2010).

Table 4-41 presents the estimated expenditures per user-day for five major trip-related spending categories for visitors and permanent residents. The largest category of spending for both types of users is transportation, which includes fuel, oil and repairs for automobiles, boats or other vehicles associated with using Lake Martin for recreation. The second largest category is food and beverages, which includes food and drink purchased at restaurants, prepared foods purchased for consumption off premises, and groceries. Permanent residents were not asked to report lodging expenses since it is expected that they stay overnight in their own homes.

TABLE 4-41 TRIP-RELATED EXPENDITURES PER PERSON, PER DAY

EXPENDITURE CATEGORY	VISITORS		PERMANENT RESIDENTS	
	N	MEAN	N	MEAN
Transportation	617	$11.17	271	$14.08
Food & beverages	617	$8.76	270	$12.04
Trip-related gear and services	617	$1.18	270	$1.42
Lodging	621	$2.39		N/A
Miscellaneous	617	$1.35	270	$2.52
TOTAL	**617**	**$24.86**	**270**	**$30.06**

Source: Southwick Associates (2010)

The estimates of average spending per recreation day in Table 4-41 were applied to the estimates of total recreation days (Section 4.4.6) to arrive at the total estimated trip-related spending estimates in Table 4-42. It is estimated that recreationists spent $9.8 million on trip-related purchases associated with their recreational use of Lake Martin during the 12-month study period. Visitors and seasonal residents account for approximately two-thirds of trip-related spending.

TABLE 4-42 ANNUAL TRIP-RELATED EXPENDITURES IN THE LAKE MARTIN REGION, BY RESIDENCY

EXPENDITURE CATEGORY	VISITORS/SEASONAL RESIDENTS	PERMANENT RESIDENTS	ALL USERS
Transportation	$2,958,537	$1,489,476	$4,448,013
Food & beverages	$2,319,597	$1,273,960	$3,593,558
Trip-related gear and services	$311,829	$149,763	$461,592
Lodging	$632,323	N/A	$632,323
Miscellaneous	$356,573	$266,609	$623,182
TOTAL	**$6,578,859**	**$3,179,808**	**$9,758,667**

Source: Southwick Associates (2010)

Expenditures for recreation-related equipment and real estate are shown in Table 4-43 and Table 4-44. By far the largest category of equipment expenditures is for boats and trailers ($27.9 million), which accounts for 84% of all equipment spending. Visitors and seasonal residents dominate the spending for equipment. While they account for approximately two-thirds of trip-related spending, they are responsible for 82% of all equipment expenditures (Table 4-43).

TABLE 4-43 ANNUAL EXPENDITURES IN THE LAKE MARTIN REGION FOR RECREATIONAL EQUIPMENT

EXPENDITURE CATEGORY	VISITORS/SEASONAL RESIDENTS	PERMANENT RESIDENTS	ALL USERS
Boats & trailers	$23,507,132	$4,374,588	$27,881,720
Boating accessories & repairs	$3,252,893	$1,078,535	$4,331,428
Fishing equipment	$491,244	$367,617	$858,862
TOTAL	**$27,251,270**	**$5,820,740**	**$33,072,010**

Source: Southwick Associates (2010)

Real estate and related spending includes purchases of land and buildings in the region, plus any expenditure for construction, maintenance, or improvement of homes, docks, or boat houses. Altogether, it is estimated that $258.6 million was spent on these items tied to recreation at Lake Martin, and three-fourths of the spending comes from visitors and seasonal residents (Table 4-44). Visitors and seasonal residents account for over 71% of recreational use of Lake Martin, although non-landowner visitors likely spend little on real estate and related items. However, nearly 65% of all shoreline property owners are seasonal and approximately one-half of all recreational lake users who own land in the region are seasonal visitors.

TABLE 4-44 ANNUAL EXPENDITURES IN THE LAKE MARTIN REGION FOR REAL ESTATE AND RELATED ITEMS

EXPENDITURE CATEGORY	VISITORS/SEASONAL RESIDENTS	PERMANENT RESIDENTS	ALL USERS
Real estate	$81,215,209	$36,967,130	$118,182,338
House and building construction	$52,696,166	$14,018,986	$66,715,152
Boat docks and boathouses	$4,774,004	$1,246,337	$6,020,341
Other equipment	$1,323,068	$245,897	$1,568,966
TOTAL	**$194,510,987**	**$64,119,829**	**$258,630,816**

Source: Southwick Associates (2010)

ECONOMIC IMPACTS OF LAKE MARTIN ON THE LOCAL ECONOMY

Spending in the Lake Martin region for trip-related goods and services, equipment and real estate ripples beyond the initial expenditure to generate economic activity for other businesses in the region. The mechanism by which this occurs and the definitions of terms used in impact analysis are explained in Southwick Associates (2010). Reported here are the total economic contributions that occur in the Lake Martin economy.

Combined expenditures[2] in the Lake Martin region generated $123.0 million of direct output by businesses in the local economy (Table 4-45). Direct output includes only the retail margin for goods purchased through local retailers, and commissions and costs associated with purchases of real estate. It does not include manufacturing output for any goods produced outside of the region. Output is a measure of total economic activity that is captured in the local economy. Income is a component of output and those numbers should not be summed together.

Including the multiplier effects, expenditures associated with Lake Martin resulted in:

- $155.1 million of total output;
- $38.1 million of wages, salaries and proprietors' income; and
- support for 1,277 full- and part-time jobs.

TABLE 4-45 CURRENT ECONOMIC CONTRIBUTIONS OF COMBINED TRIP, EQUIPMENT, AND REAL ESTATE SPENDING TO THE LOCAL LAKE MARTIN ECONOMY

BASELINE	ECONOMIC EFFECTS OF COMBINED TRIP, EQUIPMENT AND REAL ESTATE EXPENDITURES			
	DIRECT	INDIRECT	INDUCED	TOTAL
VISITORS/SEASONAL RESIDENTS				
Output	$96,765,288	$13,785,957	$11,403,248	$121,954,493
Income	$21,952,294	$4,698,358	$3,326,748	$29,977,400
Employment	733	148	120	1,000
PERMANENT RESIDENTS				
Output	$26,263,957	$3,761,593	$3,077,743	$33,103,293
Income	$5,913,172	$1,278,739	$897,849	$8,089,760
Employment	205	40	32	277
TOTAL				
OUTPUT	**$123,029,245**	**$17,547,550**	**$14,480,991**	**$155,057,786**
INCOME	**$27,865,466**	**$5,977,097**	**$4,224,597**	**$38,067,160**
EMPLOYMENT	**937**	**188**	**152**	**1,277**

Source: Southwick Associates (2010)

In addition to the contributions to private businesses and households in the Lake Martin region, expenditures related to Lake Martin generate tax and fee revenues for local, state, and federal governments. Altogether, this spending generated $4.7 million in taxes and fees for local and state governments and $7.6 million in federal taxes (Table 4-46).

[2] Combined expenditures include trip-related, equipment and real estate spending.

TABLE 4-46 CURRENT ESTIMATED STATE/LOCAL AND FEDERAL TAX REVENUES ASSOCIATED WITH COMBINED TRIP, EQUIPMENT, AND REAL ESTATE SPENDING IN THE LAKE MARTIN REGION ECONOMY

	STATE AND LOCAL TAX REVENUES	FEDERAL TAX REVENUES	TOTAL TAX REVENUES
TRIP-RELATED SPENDING			
Visitors/Seasonal Residents	$372,664	$330,224	$702,888
Permanent Residents	$171,160	$146,428	$317,588
EQUIPMENT SPENDING			
Visitors/Seasonal Residents	$910,279	$767,525	$1,677,804
Permanent Residents	$196,463	$166,454	$362,917
REAL ESTATE SPENDING			
Visitors/Seasonal Residents	$2,390,005	$4,848,574	$7,238,579
Permanent Residents	$659,154	$1,301,579	$1,960,733
ALL RECREATIONAL SPENDING	**$4,699,725**	**$7,560,784**	**$12,260,509**

Source: Southwick Associates (2010)

4.4.9.2 ENVIRONMENTAL EFFECTS

Environmental effects of the Flood Control Guide Curve alternatives and the PME measures are described in sections 2.2 and 2.2.2, respectively. The proposed PME measures that may affect socioeconomic resources are described in Section 4.4.9.3. In accordance with the FERC approved methodology for Study 12(h), Southwick Associates (2010) estimated changes in the Lake Martin economy associated with a change in the Martin Flood Control Guide Curve. Their analysis included estimated changes in the Lake Martin economy for a 1-foot, 3-foot, and 5-foot increase in winter pool level. Below is a general analysis of effects associated with changes in winter pool elevations followed by a specific analysis of the 1 foot through five foot changes in winter pool level.

EFFECTS OF A CHANGE IN THE MARTIN FLOOD CONTROL GUIDE CURVE

Total trip related expenditures under each of the winter pool levels are presented in Table 4-47. These estimates are based on the estimated spending reported in Section 4.4.9.1 and the estimated changes in lake use shown earlier (Table 4-28). All winter pool levels are estimated to generate additional spending related to increased recreation use of the lake.

TABLE 4-47 TRIP-RELATED EXPENDITURES IN THE LAKE MARTIN REGION UNDER ALTERNATIVE WATER MANAGEMENT SCENARIOS

SCENARIO	VISITORS/SEASONAL RESIDENTS	PERMANENT RESIDENTS	ALL USERS
Baseline	$6,578,859	$3,179,808	$9,758,667
1-foot Higher Winter Pool Level	$6,644,648	$3,370,596	$10,015,244
3-foot Higher Winter Pool Level	$7,170,957	$3,370,596	$10,541,553
5-foot Higher Winter Pool Level	$7,302,534	$3,434,192	$10,736,726

Source: Southwick Associates (2010)

Table 4-48 (visitors and seasonal landowners) and Table 4-49 (permanent residents) show the percent change in equipment and real estate expenditures under alternative winter pool levels. Almost no respondents reported that their spending would decrease under any of the scenarios.

Although not directly comparable, the results for the visitors' equipment expenditures (Table 4-48) display a similar response to trip-related spending under the various scenarios (Table 4-47). In most of the equipment and real estate expenditure categories, respondents were most likely to increase spending under the 5-foot higher winter pool level.

TABLE 4-48 PERCENT OF VISITORS AND SEASONAL LANDOWNERS WHO EXPECTED TO DECREASE, INCREASE, OR NOT CHANGE THEIR EQUIPMENT EXPENDITURES UNDER A HIGHER WINTER POOL LEVEL

	1-FOOT HIGHER WINTER POOL LEVEL	3-FOOT HIGHER WINTER POOL LEVEL	5-FOOT HIGHER WINTER POOL LEVEL
BOAT EXPENDITURES	%	%	%
Decrease	0.0	2.8	0.0
No change	76.7	80.6	54.6
Increase	23.3	16.7	45.5
BOAT ACCESSORY EXPENDITURES			
Decrease	0.0	2.8	0.0
No change	80.0	66.7	66.7
Increase	20.0	30.6	33.3
FISHING EQUIPMENT EXPENDITURES			
Decrease	0.0	0.0	0.0
No change	73.3	80.6	66.7
Increase	26.7	19.5	33.3

	1-FOOT HIGHER WINTER POOL LEVEL	3-FOOT HIGHER WINTER POOL LEVEL	5-FOOT HIGHER WINTER POOL LEVEL
REAL ESTATE EXPENDITURES			
Decrease	0.0	0.0	0.0
No change	90.0	100.0	100.0
Increase	10.0	0.0	0.0
CONSTRUCTION EXPENDITURES			
Decrease	0.0	0.0	0.0
No change	80.0	72.2	63.6
Increase	20.0	27.8	36.4
DOCK & BOAT HOUSE EXPENDITURES			
Decrease	0.0	5.4	0.0
No change	76.7	75.7	57.6
Increase	23.3	18.9	42.4
OTHER EQUIPMENT EXPENDITURES			
Decrease	0.0	2.8	0.0
No change	93.3	88.9	84.9
Increase	6.7	8.3	15.2

Source: Southwick Associates (2010)

Unlike visitor's expected changes in spending for equipment and real estate, permanent residents did not respond with any consistency that clearly favored any scenario over the others (Table 4-49). Instead, the scenarios with the highest percentage of permanent residents who would increase their spending vary across the separate expenditure categories.

TABLE 4-49 PERCENT OF PERMANENT RESIDENTS WHO REPORTED A DECREASE, INCREASE OR NO CHANGE IN EQUIPMENT EXPENDITURES UNDER A HIGHER WINTER POOL LEVEL

	1-FOOT HIGHER WINTER POOL LEVEL	3-FOOT HIGHER WINTER POOL LEVEL	5-FOOT HIGHER WINTER POOL LEVEL
Boat Expenditures	%	%	%
Decrease	0.0	4.4	0.0
No change	82.4	73.9	70.0
Increase	17.6	21.7	30.0
BOAT ACCESSORY EXPENDITURES			
Decrease	0.0	0.0	0.0
No change	88.2	65.2	73.7
Increase	11.8	34.8	26.3
FISHING EQUIPMENT EXPENDITURES			
Decrease	0.0	0.0	0.0
No change	82.4	65.2	70.0
Increase	17.6	34.8	30.0

	1-FOOT HIGHER WINTER POOL LEVEL	3-FOOT HIGHER WINTER POOL LEVEL	5-FOOT HIGHER WINTER POOL LEVEL
REAL ESTATE EXPENDITURES			
Decrease	0.0	0.0	0.0
No change	100.0	95.7	90.0
Increase	0.0	4.4	10.0
CONSTRUCTION EXPENDITURES			
Decrease	0.0	0.0	0.0
No change	76.5	82.6	85.0
Increase	23.5	17.4	15.0
DOCK & BOAT HOUSE EXPENDITURES			
Decrease	0.0	0.0	0.0
No change	64.7	82.6	80.0
Increase	35.3	17.4	20.0
OTHER EQUIPMENT EXPENDITURES			
Decrease	0.0	0.0	0.0
No change	94.1	95.7	90.0
Increase	5.9	4.4	10.0

Source: Southwick Associates (2010)

Southwick Associates (2010) indicated it was not possible to generate reliable estimates of how equipment and real estate spending might change under each of the alternative scenarios. Therefore, an analysis of the economic contributions to the local economy from equipment and real estate spending under each scenario was not completed.

Table 4-50, Table 4-51, Table 4-52, and Table 4-53 present the economic contributions to the Lake Martin economy associated only with trip-related spending under each scenario. These numbers represent the economic contributions from all trip-related spending under each scenario and not only the increase over current spending.

TABLE 4-50 ECONOMIC CONTRIBUTIONS OF CURRENT TRIP-RELATED EXPENDITURES IN THE LAKE MARTIN REGION ON THE LOCAL ECONOMY

BASELINE	ECONOMIC EFFECTS OF TRIP-RELATED EXPENDITURES			
	DIRECT	INDIRECT	INDUCED	TOTAL
VISITORS/SEASONAL RESIDENTS				
Output	$5,035,716	$567,527	$566,437	$6,169,680
Income	$1,148,708	$185,915	$165,663	$1,500,286
Employment	$60.4	$5.7	$5.9	$72.0
PERMANENT RESIDENTS				
Output	$2,344,298	$241,231	$252,032	$2,837,561
Income	$516,387	$77,267	$73,704	$667,358
Employment	$28.0	$2.3	$2.6	$32.9
TOTAL OUTPUT	$7,380,014	$808,758	$818,469	$9,007,241
INCOME	$1,665,095	$263,182	$239,367	$2,167,644
EMPLOYMENT	$88	$8	$9	$105

Source: Southwick Associates (2010)

TABLE 4-51 ECONOMIC CONTRIBUTIONS OF ALL TRIP-RELATED SPENDING IN THE LOCAL LAKE MARTIN ECONOMY UNDER WINTER POOL ALTERNATIVE 1

1-FOOT HIGHER WINTER POOL LEVEL	ECONOMIC EFFECTS OF TRIP-RELATED EXPENDITURES			
	DIRECT	INDIRECT	INDUCED	TOTAL
VISITORS/SEASONAL RESIDENTS				
Output	$5,086,082	$573,204	$572,102	$6,231,388
Income	$1,160,197	$187,775	$164,320	$1,512,292
Employment	61.0	5.7	6.0	72.7
PERMANENT RESIDENTS				
Output	$2,484,948	$255,704	$267,153	$3,007,805
Income	$547,369	$81,903	$78,126	$707,398
Employment	29.6	2.5	2.8	34.9
TOTAL OUTPUT	$7,571,030	$828,908	$839,255	$9,239,193
INCOME	$1,707,566	$269,678	$242,446	$2,219,690
EMPLOYMENT	90.6	8.2	8.8	107.6

Source: Southwick Associates (2010)

TABLE 4-52 ECONOMIC CONTRIBUTIONS OF ALL TRIP-RELATED SPENDING IN THE LOCAL LAKE MARTIN ECONOMY UNDER WINTER POOL ALTERNATIVE 2

3-FOOT HIGHER WINTER POOL LEVEL	ECONOMIC EFFECTS OF TRIP-RELATED EXPENDITURES			
	DIRECT	INDIRECT	INDUCED	TOTAL
VISITORS/SEASONAL RESIDENTS				
Output	$5,488,939	$618,606	$617,417	$6,724,962
Income	$1,252,094	$202,648	$180,573	$1,635,315
Employment	65.8	6.2	6.5	78.5
PERMANENT RESIDENTS				
Output	$2,484,948	$255,704	$267,153	$3,007,805
Income	$547,369	$81,903	$78,126	$707,398
Employment	29.6	2.5	2.8	34.9
TOTAL OUTPUT	$7,973,887	$874,310	$884,570	$9,732,767
INCOME	$1,799,463	$284,551	$258,699	$2,342,713
EMPLOYMENT	95.4	8.7	9.3	113.4

Source: Southwick Associates (2010)

TABLE 4-53 ECONOMIC CONTRIBUTIONS OF ALL TRIP-RELATED SPENDING IN THE LOCAL LAKE MARTIN ECONOMY UNDER WINTER POOL ALTERNATIVE 3

5-FOOT HIGHER WINTER POOL LEVEL	ECONOMIC EFFECTS OF TRIP-RELATED EXPENDITURES			
	DIRECT	INDIRECT	INDUCED	TOTAL
VISITORS/SEASONAL RESIDENTS				
Output	$5,589,654	$629,957	$628,746	$6,848,357
Income	$1,275,068	$206,366	$183,886	$1,665,320
Employment	67.0	6.3	6.6	79.9
PERMANENT RESIDENTS				
Output	$2,531,839	$260,529	$272,194	$3,064,562
Income	$557,698	$83,448	$79,600	$720,746
Employment	30.2	2.5	2.8	35.5
TOTAL OUTPUT	$8,121,493	$890,486	$900,940	$9,912,919
INCOME	$1,832,766	$289,814	$263,486	$2,386,066
EMPLOYMENT	97.2	8.8	9.4	115.4

Source: Southwick Associates (2010)

SHORELINE PROPERTY VALUES

Southwick Associates (2010) report the current market values of shoreline properties, and how much property value would change (increase or decrease) under one of the alternative water management scenarios (Table 4-54). The results were expanded to all developed shoreline properties to estimate the total lake-wide change in property values under each of the alternative scenarios. Privately owned property (including improved and unimproved parcels) on the Lake Martin shoreline had a total market value of $2.87 billion (Table 4-55). Based on the expected

changes in property value under each of the water level scenarios, total property value would be greatest with a 5-foot higher winter pool level ($3.23 billion).

TABLE 4-54 PROJECTED CHANGES IN SHORELINE PROPERTY VALUES UNDER SIX WATER LEVEL SCENARIOS

LAKE MANAGEMENT SCENARIOS	% CHANGE		
	PERMANENT RESIDENTS	SEASONAL / OCCASIONAL	ALL PROPERTY OWNERS
1-foot Higher Winter Pool Level	7.9%	7.6%	7.7%
3-foot Higher Winter Pool Level	11.0%	8.7%	9.8%
5-foot Higher Winter Pool Level	9.2%	15.9%	12.6%

Source: Southwick Associates (2010)

TABLE 4-55 TOTAL ESTIMATED SHORELINE PROPERTY VALUES UNDER SIX ALTERNATIVE WATER LEVEL SCENARIOS

LAKE MANAGEMENT SCENARIOS	TOTAL PROPERTY VALUE ($ BILLION)
Baseline	$2.87
1-foot Higher Winter Pool Level	$3.09
3-foot Higher Winter Pool Level	$3.15
5-foot Higher Winter Pool Level	$3.23

Source: Southwick Associates (2010)

ALTERNATIVE 1 – 1 FT. WINTER POOL INCREASE

Estimated spending under Alternative 1 is expected to increase as a result of the expected increase in number of recreation visits to Lake Martin. Therefore, the estimated trip-related expenditures shown in Table 4-47 reflect the percent change in lake use reported in Section 4.4.6. Under Alternative 1, expected increases in trip-related expenditures would total approximately $300,000. Generally, the majority of visitor and permanent residents reported they would not increase their expenditures in the various categories shown in Table 4-48 and Table 4-49 under Alternative 1. Alternative 1 would be expected to increase the economic effects of trip related spending, resulting in an increase in approximately $200,000 in total output, $100,000 in income and generate an additional three jobs.

Property values would be expected to increase approximately 7.7 percent over baseline under Alternative 1, resulting in a total increase in property value of approximately $221 million.

ALTERNATIVE 2 – 2 FT. WINTER POOL INCREASE

Estimated spending under Alternative 2 is expected to increase as a result of the expected increase in number of recreation visits to Lake Martin. Therefore, the estimated trip-related expenditures shown in Table 4-47 reflect the percent change in lake use reported in Section 4.4.6. Under Alternative 2, expected increases in trip-related expenditures would total somewhere between the $300,000 under Alternative 1 and the $800,000 under Alternative 3. Southwick Associates (2010) was not able to generate reliable estimates of how equipment and real estate spending might change under alternative scenarios; therefore, an estimate of the increase expenditures in the various categories shown in Table 4-48 and Table 4-49 are not possible under Alternative 2. Alternative 2 would be expected to increase the economic effects of trip related spending somewhere between the economic effects of Alternative 1 and Alternative 3.

Although Southwick Associates (2010) did not directly estimate changes in property values associated with a 2 foot increase in winter pool elevations, Study 12(h) indicates a 2 foot increase could be estimated using a regression model, so percent increases for the 2 ft higher winter pool were estimated using linear regression (least squares method). Therefore, under Alternative 2, property values would be expected to increase by 8.8 percent over baseline, or an increase of approximately $253 million.

ALTERNATIVE 3 – 3 FT. WINTER POOL INCREASE

Estimated spending under Alternative 3 is expected to increase as a result of the expected increase in number of recreation visits to Lake Martin. Therefore, the estimated trip-related expenditures shown in Table 4-47 reflect the percent change in lake use reported in Section 4.4.6. Under Alternative 3, expected increases in trip-related expenditures would total approximately $800,000. Generally, the majority of visitor and permanent residents reported they would not increase their expenditures in the various categories shown in Table 4-48 and Table 4-49 under Alternative 3. Alternative 3 would be expected to increase the economic effects of trip related spending, resulting in an increase in approximately $700,000 in total output, $200,000 in income and generate an additional 8 jobs.

Property values would be expected to increase approximately 9.8 percent over baseline under Alternative 1, resulting in a total increase in property value of approximately $281 million.

ALTERNATIVE 4 - 4 FT. WINTER POOL INCREASE

Estimated spending under Alternative 4 is expected to increase as a result of the expected increase in number of recreation visits to Lake Martin. Therefore, the estimated trip-related expenditures shown in Table 4-47 reflect the percent change in lake use reported in Section 4.4.6. Under Alternative 4, expected increases in trip-related expenditures would total somewhere between the $800,000 under Alternative 3 and the $1,000,000 under Alternative 5. Southwick Associates (2010) was not able to generate reliable estimates of how equipment and real estate spending might change under alternative scenarios; therefore, an estimate of the increase expenditures in the various categories shown in Table 4-48 and Table 4-49 are not possible under Alternative 4. Alternative 4 would be expected to increase the economic effects of trip related spending somewhere between the economic effects of Alternative 3 and Alternative 5.

Although Southwick Associates (2010) did not directly estimate changes in property values associated with a 4 foot increase in winter pool elevations, Study 12(h) indicates a 4 foot increase could be estimated using a regression model, so percent increases for the 4 ft higher winter pool were estimated using linear regression (least squares method).Therefore, under Alternative 4, property values would be expected to increase by 11.3 percent over baseline, or an increase of approximately $323 million.

ALTERNATIVE 5 – 5 FT. WINTER POOL INCREASE

Estimated spending under Alternative 5 is expected to increase as a result of the expected increase in number of recreation visits to Lake Martin. Therefore, the estimated trip-related expenditures shown in Table 4-47 reflect the percent change in lake use reported in Section 4.4.6. Under Alternative 5, expected increases in trip-related expenditures would total approximately $1,000,000. Generally, the majority of visitor and permanent residents reported they would not increase their expenditures in the various categories shown in Table 4-48 and Table 4-49 under Alternative 5. Alternative 5 would be expected to increase the economic effects

of trip related spending, resulting in an increase in approximately $900,000 in total output, $200,000 in income and generate an additional 10 jobs.

Property values would be expected to increase approximately 12.6 percent over baseline under Alternative 5, resulting in a total increase in property value of approximately $361 million.

4.4.9.3 PROPOSED PME MEASURES

Items from the proposed action that may affect socioeconomic resources include the following and effects are analyzed below:

- Implement the Revised Shoreline Management Program; and
- Implement the Martin Project Recreation Plan

With regard to the proposed Flood Control Guide Curve change, there would likely be no negative impacts to socioeconomic resources directly resulting from the Flood Control Guide Curve change. However, the environmental effects described in other sections that may occur may decrease the socioeconomic benefits reported in Section 4.4.9 above. Furthermore, there may be some indirect social impacts due to increased use of the reservoir by putting additional strain on the social resources (e.g., transportation infrastructure, health care infrastructure, etc.) in the surrounding region.

The Revised Shoreline Management Program should generally help protect the shorelines of the Martin Project by educating property owners on the best practices to develop and/or maintain their property. Many of the BMPs that Alabama Power recommends in the SMP should maintain the integrity of a natural shoreline and help maintain the good water quality in Lake Martin. These effects should generally be positive by making shoreline property more appealing and environmentally friendly.

The Martin Project Recreation Plan will provide some short term benefits for the local economy in the way of construction dollars for improving the various recreation sites. In the long term, the improvements and expansion of public access to the reservoir should help the area absorb the increased recreation use associated with the proposed Flood Control Guide Curve change. This will help prevent crowding of key recreation sites that may occur due to heavier recreation use.

4.4.9.4 NO ACTION ALTERNATIVE

Under the No-Action Alternative, Alabama Power would continue to operate the Project in the manner it is presently operated. Alabama Power would not implement any Flood Control Guide Curve changes or proposed PME measures. The Project would not likely experience the socioeconomic and recreational benefits that would likely occur with change in the Flood Control Guide Curve. Also, the PME measures described above in Section 4.4.9.4, and their associated benefits, would not occur.

4.4.9.5 UNAVOIDABLE ADVERSE IMPACTS

No unavoidable adverse impacts were identified for socioeconomic resources.

4.4.9.6 REFERENCES

Southwick Associates. 2010. Effects of Increasing Duration of Summer Pool and Level of Winter Pool on Recreation Use and Selected Economic Indicators at Lake Martin, Alabama. Kleinschmidt Associates, Birmingham, AL.

United States Census Bureau. 2010. State and County QuickFacts. [Online] URL: http://quickfacts.census.gov/qfd/index.html. Accessed August 16, 2010.

5.0 CONSISTENCY WITH COMPREHENSIVE PLANS

Section 10(a)(2) of the FPA requires the Applicant to review applicable federal and state comprehensive plans, and to consider the extent to which a Project is consistent with the federal or state plans for improving, developing, or conserving a waterway or waterways affected by the Project. A list of existing FERC-approved State of Alabama and federal comprehensive plans was obtains from the July 2010 List of Comprehensive Plans published by FERC. Of those listed, Alabama Power identified and reviewed plans that are relevant to the Project. These plans are listed below. No inconsistencies were found.

ALABAMA

Alabama Department of Conservation and Natural Resources. 1986. Alabama statewide comprehensive outdoor recreation plan (SCORP). Montgomery, Alabama. December 1986.

Alabama Department of Conservation and Natural Resources. 1990. Wildlife lands needed for Alabama. Montgomery, Alabama. October 1990.

U.S. Fish and Wildlife Service. 2000. Recovery plan for the Mobile River Basin aquatic ecosystem. Department of the Interior. Daphne, Alabama. November 17, 2000.

U.S. Fish and Wildlife Service. Undated. Aquatic resources management plan for the Alabama River Basin. Department of the Interior. Daphne, Alabama.

UNITED STATES

Gulf States Marine Fisheries Commission. 2006. The striped bass fishery of the Gulf of Mexico, United States: a regional management plan. Ocean Springs, Mississippi. March 2006.

National Marine Fisheries Service. 1995. Gulf sturgeon (*Acipenser oxyrhynchus desotoi) r*ecovery/management plan. Prepared by the gulf sturgeon recovery/management task team. September 1995.

National Marine Fisheries Service. 1999. Fishery Management Report No. 35 of the Atlantic States Marine Fisheries Commission: shad and river herring [includes alewife (*Alosa pseudoharengus*), blueback herring (*Alosa aestivalis*), Alabama shad (*Alosa alabamae*), American shad (*Alosa sapidissima*), and hickory shad (*Alosa mediocris*)] – Amendment 1 to the interstate fishery management plan for shad and river herring. April 1999.

National Marine Fisheries Service. 2000. Fishery Management Report No. 36 of the Atlantic States Marine Fisheries Commission: Interstate Fishery Management Plan for American eel (*Anguilla rostrata*). Prepared by the American eel plan development team. April 2000.

National Marine Fisheries Service. 2000. Technical addendum 1 to Amendment 1 of the Interstate Fishery Management Plan for shad and river herring. February 9, 2000.

National Park Service. 1982. The nationwide rivers inventory. Department of the Interior. Washington, D.C. January 1982.

U.S. Fish and Wildlife Service and Gulf States Marine Fisheries Commission. 1995. Gulf sturgeon recovery/management plan. Atlanta, Georgia, September 15, 1995.

U.S. Fish and Wildlife Service. 1990. North American waterfowl management plan. Gulf coast joint venture plan. Department of the Interior. June 1990.

U.S. Fish and Wildlife Service. Canadian Wildlife Service. 1986. North American waterfowl management plan. Department of the Interior. Environment Canada. May 1986.

U.S. Fish and Wildlife Service. Undated. Fisheries USA: the recreational fisheries policy of the U.S. Fish and Wildlife Service. Washington, D.C.