FERC/DEIS-0243

DRAFT ENVIRONMENTAL IMPACT STATEMENT

FOR HYDROPOWER LICENSE

Martin Dam Hydroelectric Project—FERC Project No. 349-173

Alabama

Federal Energy Regulatory Commission
Office of Energy Projects
Division of Hydropower Licensing
888 First Street, NE
Washington, D.C. 20426

June 2013

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FEDERAL ENERGY REGULATORY COMMISSION

WASHINGTON, D.C. 20426

OFFICE OF ENERGY PROJECTS

To the Agency or Individual Addressed:

Reference: Draft Environmental Impact Statement

Attached is the draft environmental impact statement (EIS) on the proposed relicensing of the Martin Dam Hydroelectric Project (No. 349-173), located on the Tallapoosa River in Tallapoosa, Coosa, and Elmore Counties, Alabama.

This draft EIS documents the views of governmental agencies, non-governmental organizations, affected Indian tribes, the public, the license applicant, and Federal Energy Regulatory Commission (Commission) staff. It contains staff evaluations of the applicant's proposal and the alternatives for relicensing the Martin Dam Project.

Before the Commission makes a licensing decision, it will take into account all concerns relevant to the public interest. The draft EIS will be part of the record from which the Commission will make its decision. The draft EIS was sent to the U.S. Environmental Protection Agency and made available to the public on or about June 6, 2013.

Copies of the draft EIS are available for review in the Commission's Public Reference Branch, Room 2A, located at 888 First Street, N.E., Washington, D.C. 20426. The draft EIS also may be viewed on the Internet at www.ferc.gov/docs-filing/elibrary.asp. Please call (202) 502-8222 for assistance.

Any comments should be filed within 60 days from the date of this notice. Comments may be filed electronically via the Internet. See 18 C.F.R. 385.2001(a)(1)(iii) and the instructions on the Commission's website http://www.ferc.gov/docs-filing/efiling.asp. Commenters can submit brief comments up to 6,000 characters, without prior registration, using the eComment system at http://www.ferc.gov/docs-filing/ecomment.asp. You must include your name and contact information at the end of your comments. For assistance, please contact FERC Online Support. Although the Commission strongly encourages electronic filing, documents may also be paper-filed. To paper-file, mail an original and five copies to: Kimberly D. Bose, Secretary, Federal Energy Regulatory Commission, 888 First Street, N.E., Washington, D.C. 20426. Please affix Project No.349-173 to all comments.

Attachment: Draft Environmental Impact Statement

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COVER SHEET

a. Title: Relicensing the Martin Dam Hydroelectric Project, FERC Project No. 349-173.

b. Subject: Draft Environmental Impact Statement (EIS)

c. Lead Agency: Federal Energy Regulatory Commission

d. Abstract: On June 8, 2011, Alabama Power Company (Alabama Power) filed an application to relicense the existing Martin Dam Hydroelectric Project, located on the Tallapoosa River in Tallapoosa, Coosa, and Elmore Counties, Alabama. The project consists of Martin Dam, which impounds about 31 miles of the Tallapoosa River, forming Lake Martin (or Martin reservoir), a 41,150-acre reservoir. The project has a current installed capacity of 182.5 megawatts and occupies 1.39 acres of federal lands. Currently, the project is operated as a multi-purpose facility for hydropower generation, limited flood control, municipal and industrial water supply, aquatic flow maintenance, and navigation flow support.

Alabama Power proposes to relicense the project and continue to operate in a peaking mode, while implementing certain reservoir operational changes in the fall and winter, and various protection, mitigation, and enhancement measures related to water quality, fisheries, wildlife, nuisance aquatic vegetation control, recreation, and cultural resources.

The staff's recommendation is to relicense the project as it currently operates, with most of the protection, mitigation, and enhancement measures proposed by Alabama Power and certain modifications and additional measures recommended by the agencies and staff.

e. Contact: Stephen Bowler
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f. Transmittal: This draft EIS to relicense the existing Martin Dam Hydroelectric Project is being made available for public comment on or about June 6, 2013, as required by the National Environmental Policy Act of 1969[1] and the Commission's Regulations Implementing the National Environmental Policy Act (18 C.F.R., Part 380).

[1] National Environmental Policy Act of 1969, as amended (Pub. L. 91-190. 42 United States Code [U.S.C.] 4321-4347, January 1, 1970, as amended by Pub. L. 94-52, July 3, 1975, Pub. L. 94-83, August 9, 1975, and Pub. L. 97-258, §4(b), September 13, 1982).

FOREWORD

The Federal Energy Regulatory Commission (Commission), pursuant to the Federal Power Act (FPA)[2] and the U.S. Department of Energy (DOE) Organization Act[3] is authorized to issue licenses for up to 50 years for the construction and operation of non-federal hydroelectric developments subject to its jurisdiction, on the necessary conditions:

That the project adopted…shall be such as in the judgment of the Commission will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for the use or benefit of interstate or foreign commerce, for the improvement and utilization of water power development, for the adequate protection, mitigation, and enhancement of fish and wildlife (including related spawning grounds and habitat), and for other beneficial public uses, including irrigation, flood control, water supply, and recreational and other purposes referred to in Section 4(e)…[4]

The Commission may require such other conditions not inconsistent with the FPA as may be found necessary to provide for the various public interests to be served by the project.[5] Compliance with such conditions during the licensing period is required. The Commission's Rules of Practice and Procedure allow any person objecting to a licensee's compliance or noncompliance with such conditions to file a complaint noting the basis for such objection for the Commission's consideration.[6]

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[2] 16 U.S.C. §791(a)-825r, as amended by the Electric Consumers Protection Act of 1986, Public Law 99-495 (1986), the Energy Policy Act of 1992, Pub. L. 102-486 (1992), and the Energy Policy Act of 2005, Pub. L. 109-58 (2005).

[3] Pub. L. 95-91, 91 Stat. 556 (1977).

[4] 16 U.S.C. § 803(a).

[5] 16 U.S.C. § 803(g).

[6] 18 C.F.R. § 385.206 (2012).

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LIST OF FIGURES

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ACRONYMS AND ABBREVIATIONS

ACT Basin	Alabama-Coosa-Tallapoosa River Basin
Alabama DCNR	Alabama Department of Conservation and Natural Resources
Alabama DEM	Alabama Department of Environmental Management
Alabama DROP	Alabama Drought Response Operating Proposal
Alabama Power	Alabama Power Company
APE	area of potential effects
BA	biological assessment
BLM	U.S. Bureau of Land Management
BMP	best management practices
ºC	degrees Celsius
C.F.R.	Code of Federal Regulations
cfs	cubic feet per second
Commission	Federal Energy Regulatory Commission
Corps	U.S. Army Corps of Engineers
CRWG	Cultural Resources Work Group
CZMA	Coastal Zone Management Act
dbh	diameter at breast height
DO	dissolved oxygen
EA	environmental assessment
EIS	environmental impact statement
ESA	Endangered Species Act
ºF	degrees Fahrenheit
FERC	Federal Energy Regulatory Commission
FIMS	Fishery Information Management Systems
FPA	Federal Power Act
FWS	U.S. Fish and Wildlife Service
Georgia EPD	Georgia Environmental Protection Division
HPMP	Historic Properties Management Plan
HSI	habitat suitability index
Interior	U.S. Department of Interior
kW	kilowatt
Lake Martin HOBO	Lake Martin Home Owners & Boat Owners Association
Lake Martin RA	Lake Martin Resource Association, Inc.
LIDAR	light detection and ranging
ug/L	micrograms per liter
mg/L	milligrams per liter
mgd	million gallons per day
ml	milliliters
msl	mean sea level
MW	megawatt
MWh	megawatt-hour

National Register	National Register of Historic Places
NERC	North American Electric Reliability Council
NTU	nephelometric turbidity unit
NWS	National Weather Service
O&M	operation and maintenance
PA	Programmatic Agreement
RM	river mile
SERC-SE	southeastern subregion of the SERC Reliability Corporation region of the NERC
SERFC	Southeast River Forecast Center
SHPO	State Historic Preservation Officer
SMP	Shoreline Management Plan
U.S.C.	U.S. Code
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
WMP	Wildlife Management Program
WQC	water quality certification

EXECUTIVE SUMMARY

Proposed Action

On June 8, 2011, Alabama Power Company (Alabama Power) filed an application for new license to operate and maintain its 182.5-megawatt (MW) Martin Dam Hydroelectric Project, located at river mile 60.6 on the Tallapoosa River near the cities of Alexander City and Dadeville, Alabama, in Tallapoosa, Elmore, and Coosa Counties. The project occupies 1.39 acres of federal land administered by the U.S. Bureau of Land Management. Alabama Power proposes no new capacity and no new construction.

Project Description

The existing project consists of: (1) the Lake Martin reservoir, with a surface area of 40,000 acres at a normal full pool elevation of 491 feet mean sea level (msl); (2) a 2,000-foot-long concrete gravity dam and earth dike section that includes (a) a 720-foot-long gated spillway section with twenty, 30-foot-long by 16-foot-high vertical lift spillway gates, (b) a 280-foot-long concrete gravity intake structure, (c) a 255-foot-long concrete gravity non-overflow section on the right abutment, and (d) an approximately 1,000-foot-long earth embankment on the left abutment; (3) headworks containing four steel penstocks and 12, 9-foot-wide by 24-foot-high intake gates fitted with trashracks; (4) a 307-foot-long, 58-foot-wide, and 99-foot-high brick and concrete, steel-frame powerhouse; (5) four vertical Francis turbines that power four generating units, with installed capacities of 45.8 MW, 41.0 MW, 40.5 MW, and 55.2 MW, for a total installed capacity of 182.5 MW; (6) two, 450-foot-long transmission lines leading from the powerhouse to the Martin switchyard; and (7) appurtenant facilities. The project generates about 375,614 megawatt-hours (MWh) per year.

The Martin Dam Project operates as a peaking project and typically operates to maintain elevations in Lake Martin between the bounds of a flood control curve and an operating curve. On a seasonal basis, water levels in Lake Martin fluctuate by as much as 11 feet between elevations 480 and 491 feet msl. Project benefits include hydroelectric power; limited seasonal flood control during the winter when the reservoir is in drawdown condition; recreation, municipal, and industrial water supply; aquatic flow maintenance; and navigation flow support.

Proposed Facilities

Alabama Power does not propose any changes to project structures or to the project's generating capacity.

Proposed Environmental Measures

Alabama Power proposes to continue to operate the project in a peaking mode; however, the following modifications to project operation are proposed: (1) to help ensure that Lake Martin reaches its summer pool level by the end of May each year, raise the winter flood pool by 3 feet, and raise the operating curve and drought curve

proportionately during the same timeframe; (2) to help minimize downstream flooding, revise operation for flood control by reducing outflow from Martin dam during certain conditions when the reservoir elevation is decreasing; (3) to provide higher reservoir levels for recreation during the fall, implement a conditional fall extension of the flood control curve to elevation 491 feet from September 1 to October 15; and (4) to facilitate seawall and boat dock maintenance, and/or construction, upon Federal Energy Regulatory Commission (Commission) approval of the proposed 3-foot increase of the winter pool elevation, lower the reservoir elevation during the winter months to 481 feet every 6 years. In addition, Alabama Power proposes measures for operation during low flow or drought conditions.

Alabama Power also proposes the following non-operational environmental measures to protect or enhance aquatic, terrestrial, recreation, and cultural resources:

- implement the measures of the 401 water quality certification, which requires maintaining the state standard for dissolved oxygen (DO) when the project is generating, and monitoring water temperature and DO in the tailrace;
- develop a reservoir water quality monitoring plan in consultation with Alabama Department of Environmental Management prior to implementing the proposed 3-foot increase in the winter flood pool;
- finalize and implement a study of the distribution and abundance of American eels in the Tallapoosa River from the project tailrace to the mouth of the river;
- implement a Wildlife Management Program (WMP) for project lands;
- implement a Nuisance Aquatic Vegetation and Vector Control Management Program, and prepare a plan to monitor potential increases in nuisance aquatic vegetation in Lake Martin resulting from the proposed 3-foot increase in winter pool;
- implement a proposed Shoreline Management Program (SMP);
- implement a proposed Recreation Plan;
- modify the project boundary to: add 991.4 acres that include existing project recreation facilities, correct a mapping error, and include the Martin Small Game Hunting Area; and remove 499.2 acres of project land, resulting in an increase of 492.2 acres of land;[7]
- develop and implement a Public Education and Outreach Plan to inform shoreline landowners and the public about shoreline management and the requirements of the Shoreline Permitting Program; and

[7] The area within the project boundary would be modified from 8,602 acres to 9,094 acres.

- develop and implement a Historic Properties Management Plan (HPMP) in accordance with a Programmatic Agreement (PA).

Alternatives Considered

This draft environmental impact statement (EIS) considers the following alternatives: (1) Alabama Power's proposal, as outlined above; (2) no action, meaning that Alabama Power would continue to operate the project with no changes; and (3) staff's alternative, which includes existing operations and most of Alabama Power's proposed environmental measures with some staff modifications.

Under the staff alternative, the project would continue to operate as it does under the existing license. The staff alternative does not include Alabama Power's proposed 3-foot winter increase in the lake level, conditional fall extension of the flood curve, lowering the lake level every 6 years for maintenance and/or construction of structures (e.g., docks), and water quality monitoring in Lake Martin. These operation changes are not recommended because the higher winter pool levels would increase flooding on residential and commercial structures and roads. Because the higher winter pool levels are not recommended, lowering the lake levels every 6 years to maintain structures and water quality monitoring in Lake Martin would not be needed.

The staff alternative does include Alabama Power's remaining proposed measures with some modifications as described below. Staff's recommended modifications and additional environmental measures include, or are based on, recommendations made by federal and state resource agencies that have an interest in resources that may be affected by operation of the proposed project.

The staff alternative includes: (1) developing a drought management plan to define drought response actions specific to the Martin Dam Project; (2) trapping eels in the Tallapoosa River immediately below Martin dam instead of sampling the eel distribution from the project tailrace to the mouth of the river to determine when eel passage may needed; (3) revising the proposed Nuisance Aquatic Vegetation and Vector Control Management Program to include more specific information on Alabama Power's protocol for conducting lake-wide surveys and controlling nuisance aquatic vegetation; (4) revising the Recreation Plan to require (a) a description of the 19 project recreation sites, (b) a map or maps that identify the project recreation sites located within the modified project boundary, (c) the number and location of the proposed bank fishing areas, and (d) a periodic update of the plan; and (5) revising the SMP to reflect the project boundary modifications.

Under the no-action alternative, the project would continue to operate under the terms and conditions of the existing license, and no new environmental protection, mitigation, or enhancement measures would be implemented.

Public Involvement and Areas of Concern

Before filing its license application, Alabama Power conducted pre-filing consultation under the Commission's Integrated Licensing Process. The intent of the Commission's pre-filing process is to initiate public involvement early in the project planning process and to encourage citizens, governmental entities, tribes, and other interested parties to identify and resolve issues prior to an application being formally filed with the Commission.

Before preparing this draft EIS, staff conducted scoping to determine what issues and alternatives should be addressed. On August 5, 2008, staff distributed a scoping document to interested parties, soliciting comments, recommendations, and information on the project. Staff conducted a site visit on September 10, 2008. Based on discussions during the site visit and written comments filed with the Commission, staff issued a revised scoping document on November 14, 2008. On February 8, 2012, staff issued a notice that the application was ready for environmental analysis and requested conditions and recommendations.

The primary issues associated with relicensing the Martin Dam Project are regulation of the reservoir elevation, downstream flooding, drought releases, downstream paddlefish spawning, invasive species control, recreational opportunities, shoreline management, and protection of cultural resources. Below we summarize the environmental effects associated with staff's alternative.

Staff Alternative

Geology and Soils

Implementing the provisions of the proposed SMP would reduce and control erosion and sedimentation at Lake Martin by promoting the use of best management practices and land management measures to protect the shoreline.

Aquatic Resources

The proposed water quality monitoring in the project tailrace would ensure that project releases continue to meet state water quality standards. Conducting staff's regular American eel trapping in the Tallapoosa River immediately downstream of Martin dam would document the occurrence of the eel downstream of the project to indicate the need for any measures that would be required at the project for protection of the American eel.

Terrestrial Resources

Implementing a proposed Nuisance Aquatic Vegetation and Vector Control Management Program would establish a monitoring effort for increases in nuisance aquatic vegetation and define specific protocols for controlling nuisance aquatic vegetation. Implementing the final WMP would enhance habitat for longleaf pine-

dependent species, develop opportunities for public hunting, protect bald eagles, and provide a buffer zone for water quality protection and wildlife habitat.

Threatened and Endangered Species

No federally listed threatened or endangered species are known to occur within the project affected area. However, the applicant's proposed habitat enhancement for longleaf pine-dependent species as part of the WMP could benefit red-cockaded woodpeckers by providing more suitable habitat in the project area.

Recreation Resources and Land Use

Implementing a revised Recreation Plan with the additional detail recommended by staff would enhance recreational opportunities at Lake Martin by improving amenities at 12 existing project recreation sites, and meeting a need for future recreational use by adding six recreation sites and reserving one site, Ponder Camp (Stillwaters Area Boat Ramp), for future recreation development. Of the six recreation sites, Madwind Creek Ramp and Smith Landing are not located within the project boundary, and therefore, should be made project facilities and brought into the project boundary. Revising the project boundary would ensure that these facilities and associated public access are maintained by Alabama Power over the term of a new license.

Implementing a proposed SMP would protect project and non-project lands and waters by guiding the type and extent of development that occurs along the shoreline. Further, unpermitted structures on project lands and waters would be addressed.

Cultural Resources

Implementing the provisions of the HPMP in accordance with the PA would ensure protection of cultural resources.

No-action Alternative

Under the no-action alternative, Alabama Power would continue to operate the project as it currently does. Environmental conditions would remain the same, and no enhancement of environmental resources would occur.

Conclusions

Based on our analysis, we recommend relicensing the project with the environmental, recreation, and cultural resource measures proposed by Alabama Power with staff modifications and additional measures, but without a 3-foot increase in the Lake Martin winter pool (from elevation 481 feet to elevation 484 feet) or the conditional fall extension (in which the flood control curve would be maintained at elevation 491 feet from September 1 through October 15).

In section 4.2 of the EIS, staff estimated the likely cost of alternative power for each of the three alternatives identified above. Staff's analysis shows that, under the

no-action alternative, project power would cost about $45,056,220, or about $119.95 per MWh, less than the likely alternative cost of power. Under the proposed action alternative, project power would cost about $41,044,970, or about $108.83/MWh, less than the likely alternative cost of power. Under the staff alternative, project power would cost about $41,258,940, or about $109.84/MWh, less than the likely alternative cost of power.

The staff alternative is the preferred alternative because: (1) the project would provide a dependable source of electrical energy for the region (375,614 MWh annually); (2) the 182.5 MW of electric capacity comes from a renewable resource that does not contribute to atmospheric pollution, including greenhouse gases; and (3) the recommended environmental measures proposed by Alabama Power, as modified by staff, would adequately protect and enhance environmental resources affected by the project.

DRAFT ENVIRONMENTAL IMPACT STATEMENT

Federal Energy Regulatory Commission
Office of Energy Projects
Division of Hydropower Licensing
Washington, D.C.

Martin Dam Hydroelectric Project
FERC Project No. 349-173--Alabama

1.0 INTRODUCTION

1.1 APPLICATION

On June 8, 2011, Alabama Power Company (Alabama Power) filed an application for new license for the existing Martin Dam Hydroelectric Project with the Federal Energy Regulatory Commission (Commission or FERC). The 182.5-megawatt (MW) project is located at river mile (RM) 60.6 on the Tallapoosa River near the cities of Alexander City and Dadeville, Alabama, in Tallapoosa, Elmore, and Coosa Counties (figure 1-1). The project occupies 1.39 acres of federal land administered by the U.S. Bureau of Land Management (BLM) and generates an average of about 375,614 megawatt-hours (MWh) of energy annually. Alabama Power proposes no new capacity and no new construction.

1.2 PURPOSE OF ACTION AND NEED FOR POWER

1.2.1 Purpose of Action

The purpose of the Martin Dam Project is to continue to provide a source of hydroelectric power. Therefore, under the provisions of the Federal Power Act (FPA), the Commission must decide whether to issue a license to Alabama Power for the Martin Dam Project and what conditions should be placed on any license issued. In deciding whether to issue a license for a hydroelectric project, the Commission must determine that the project will be best adapted to a comprehensive plan for improving or developing a waterway. In addition to the power and developmental purposes for which licenses are issued (such as flood control, irrigation, or water supply), the Commission must give equal consideration to the purposes of: (1) energy conservation; (2) the protection of, mitigation of damage to, and enhancement of fish and wildlife resources; (3) the protection of recreational opportunities; and (4) the preservation of other aspects of environmental quality.

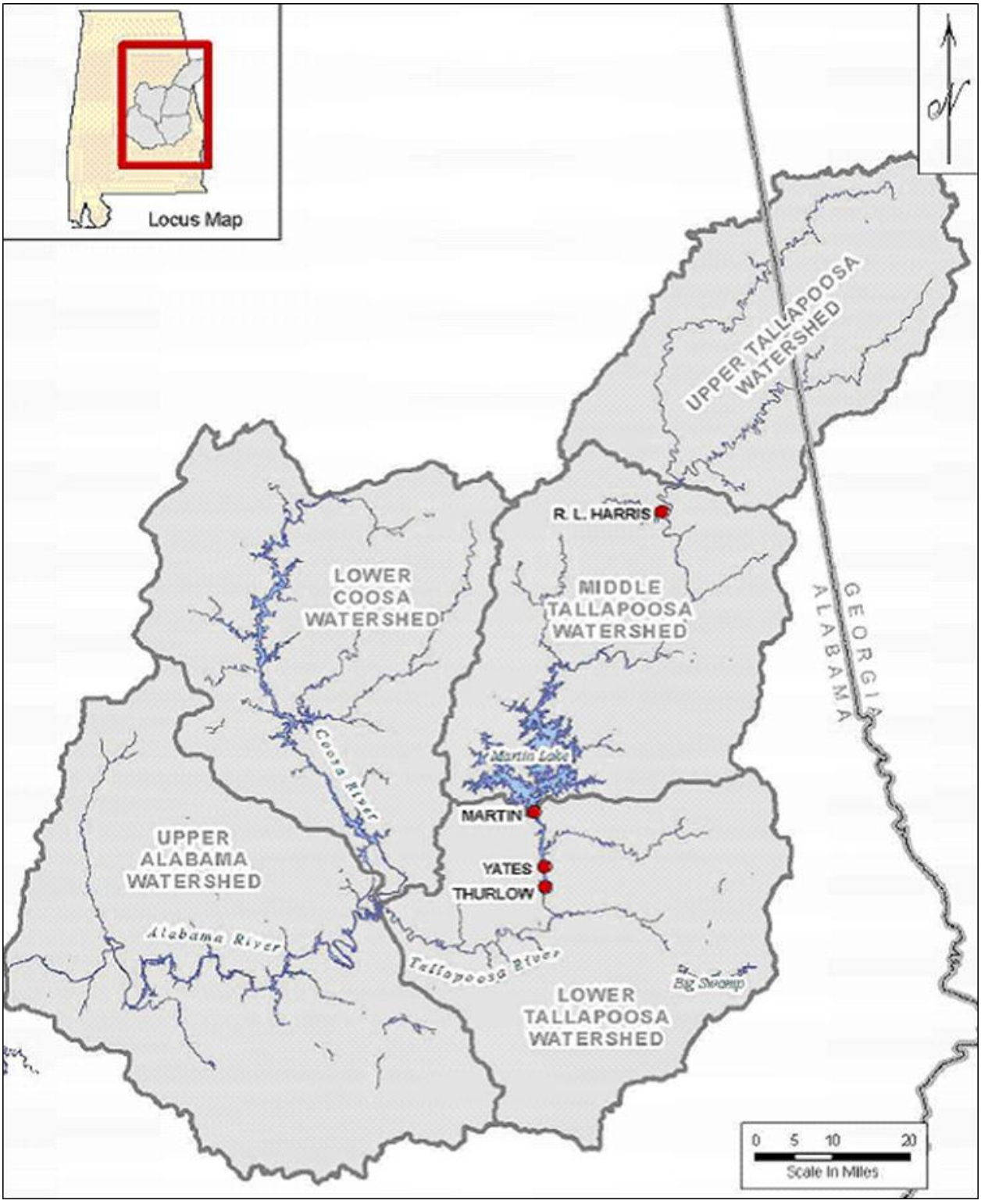

Figure 1-1. Location of Martin Dam Hydroelectric Project (Source: Alabama Power, 2008, as modified by staff).

Issuing a new license for the Martin Dam Project would allow Alabama Power to generate electricity for the term of a new license, making electrical power from a renewable resource available to its customers.

This draft environmental impact statement (EIS) assesses the effects associated with operation of the project and alternatives to the proposed project. It also includes recommendations to the Commission on whether to issue a new license, and if so, recommends terms and conditions to become a part of any license issued.

In this draft EIS staff assesses the environmental and economic effects of continuing to operate the project: (1) as proposed by the applicant, and (2) with our recommended measures. We also consider the effects of the no-action alternative. Important issues that are addressed include water quality, reservoir operations, downstream flow releases, fish passage, terrestrial resources, federally listed species, recreation resources, and cultural resources.

1.2.2 Need for Power

The Martin Dam Project provides hydroelectric generation to meet part of Alabama's power requirements, resource diversity, and capacity needs. The project has an installed capacity of 182.5 MW and generates about 375,614 MWh per year.

The North American Electric Reliability Corporation (NERC) annually forecasts electrical supply and demand nationally and regionally for a 10-year period. The Martin Dam Project is located in the southeastern subregion of the SERC Reliability Corporation region of the NERC (SERC-SE). According to the NERC's 2012 forecast, annual total demand for the SERC-SE subregion is projected to grow at an annual rate of 1.42 percent from 2013 through 2022 (NERC, 2012). NERC projects resource capacity margins (generating capacity in excess of demand) will remain above targets over the 10-year period 2013-2022.

We conclude that power from the Martin Dam Project would help meet a need for power in the SERC-SE subregion, both short and long term. The project provides low-cost power that displaces generation from non-renewable sources. Displacing the operation of non-renewable facilities may avoid some power plant emissions, thus creating an environmental benefit.

1.3 STATUTORY AND REGULATORY REQUIREMENTS

A license for the Martin Dam Project is subject to numerous requirements under the FPA and other applicable statutes. The major regulatory requirements are summarized in table 1-1 and described below.

Table 1-1. Major statutory and regulatory requirements for the Martin Dam Hydroelectric Project (Source: staff).

Requirement	Agency	Status
Section 18 of the FPA (fishway prescriptions)	U.S. Department of the Interior (Interior)	By letter filed April 6, 2012, Interior reserved its authority to prescribe fishways during the term of any license issued for the project.
Section 10(j) of the FPA	Interior	Interior provided section 10(j) recommendations on April 5, 2012.
Clean Water Act—water quality certification	Alabama Department of Environmental Management (Alabama DEM)	Alabama DEM issued water quality certification on May 9, 2011.
Endangered Species Act Consultation	U.S. Fish and Wildlife Service	By letter dated April 5, 2012, Interior stated that no federally listed species are known to occur within in the project affected area. However, the applicant proposes to enhance habitat for longleaf pine-dependent species as part of the WMP, which could benefit the red-cockaded woodpecker by providing more suitable habitat in the project area.
Coastal Zone Management Act Consistency	Alabama Coastal Area Management Program	By letter dated February 10, 2011, Alabama DEM concluded that the Martin Dam Project is outside of Alabama's coastal zone and is therefore not subject to coastal zone

Requirement	Agency	Status
		review.
National Historic Preservation Act	Advisory Council on Historic Preservation; Alabama State Historic Preservation Officer	A final Programmatic Agreement was executed by Commission staff and the Alabama SHPO on June 12, 2012. Alabama Power, the Poarch Band of Creek Indians, and the Alabama-Coushatta Tribe of Texas concurred.

1.3.1 Federal Power Act

1.3.1.1 Section 18 Fishway Prescriptions

Section 18 of the FPA states that the Commission is to require construction, operation, and maintenance by a licensee of such fishways as may be prescribed by the Secretaries of Commerce or Interior. Interior, by letter dated April 5, 2012, requests that a reservation of authority to prescribe fishways under section 18 be included in any license issued for the project.

1.3.1.2 Section 10(j) Recommendations

Under section 10(j) of the FPA, each hydroelectric license issued by the Commission must include conditions based on recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, or enhancement of fish and wildlife resources affected by the project. The Commission is required to include these conditions unless it determines that they are inconsistent with the purposes and requirements of the FPA or other applicable law. Before rejecting or modifying an agency recommendation, the Commission is required to attempt to resolve any such inconsistency with the agency, giving due weight to the recommendations, expertise, and statutory responsibilities of such agency.

Interior timely filed, on April 6, 2012, recommendations under section 10(j), as summarized in table 5-2, in section 5.4, *Fish and Wildlife Agency Recommendations*. In section 5.4, we also discuss how we address the agency recommendations and compliance with section 10(j).

1.3.2 Clean Water Act

Under section 401 of the Clean Water Act, a license applicant must obtain certification from the appropriate state pollution control agency verifying compliance with the Clean Water Act. On May 10, 2010, Alabama Power applied to Alabama Department of Environmental Management (DEM) for 401 water quality certification (WQC) for the Martin Dam Project. Alabama DEM received this request on May 11, 2010. Alabama DEM timely issued the section 401 WQC on May 9, 2011 (letter from G.L. Dean, Chief, Water Division, Alabama DEM, Montgomery, Alabama, to M. Godfrey, Manager, Environmental Compliance, Alabama Power, Birmingham, Alabama, May 9, 2011). The conditions of the certification are described under section 2.2.4, *Modifications to Applicant's Proposal—Mandatory Conditions*.

1.3.3 Endangered Species Act

Section 7 of the Endangered Species Act (ESA) requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of the critical habitat of such species. In addition to the federally protected bald eagle, four mussel species, two fish species, two plant species, and one avian species listed as threatened, endangered, or candidate species under the ESA could potentially occur within the project affected area. This includes the Alabama moccasinshell, ovate clubshell, finelined pocketbook, and southern clubshell; the Gulf sturgeon and the Alabama sturgeon; little amphianthus and Georgia Rockcress; and the red-cockaded woodpecker. No federally listed species or candidate species are known to occur within the project boundary of the Martin Dam Project (letter from J. Stanley, Regional Environmental Protection Assistant, Office of the Secretary, U.S. Department of the Interior, Atlanta, Georgia, to Kimberly D. Bose, Secretary, Federal Energy Regulatory Commission, Washington, D.C., April 6, 2012). Although no occupied habitat currently occurs within the project boundary, the applicant proposes to enhance existing habitat for the federally listed, endangered red-cockaded woodpecker, which could benefit the species. Our analyses of project effects on threatened and endangered species are presented in section 3.3.4, *Threatened and Endangered Species*, and our analysis of project effects on the federally protected bald eagle are presented in section 3.3.3, *Terrestrial Resources*. Our recommendations are presented in section 5.2, *Comprehensive Development and Recommended Alternative*.

We conclude that relicensing of the Martin Dam Project, as proposed with staff-recommended measures, would have no effect on the Alabama moccasinshell, the ovate clubshell, finelined pocketbook, southern clubshell, the Gulf sturgeon, and the Alabama sturgeon, little amphianthus, and Georgia Rockcress because these species are not known to be located in the area affected by project operation. We conclude that relicensing of the Martin Dam Project, as proposed with staff-recommended measures, is not likely to adversely affect the federally listed endangered red-cockaded woodpecker.

1.3.4 Coastal Zone Management Act

Under section 307(c)(3)(A) of the Coastal Zone Management Act (CZMA), 16 U.S.C. § 1456(3)(A), the Commission cannot issue a license for a project within or affecting a state's coastal zone unless the state CZMA agency concurs with the license applicant's certification of consistency with the state's CZMA program, or the agency's concurrence is conclusively presumed by its failure to act within 180 days of its receipt of the applicant's certification.

The project is not located within the state-designated Coastal Management Zone, which extends inland to the continuous 10-foot elevation contour in Baldwin and Mobile Counties. The project is located more than 160 miles inland from this zone, and it would not affect Alabama's coastal resources. Therefore, the project is not subject to Alabama's coastal zone program review, and no consistency certification is needed for the action. By letter dated February 10, 2011, Alabama DEM concurred with this determination.

1.3.5 National Historic Preservation Act

Section 106 of the National Historic Preservation Act 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 eligible for inclusion in the National Register of Historic Places (National Register).

To meet the requirements of section 106, the Commission staff executed a Programmatic Agreement (PA) with the Alabama State Historic Preservation Officer (SHPO) on June 12, 2012, and invited Alabama Power, the Poarch Band of Creek Indians, Alabama-Coushatta Tribe of Texas, Alabama-Quassarte Tribal Town, Kialegee Tribal Town of the Muscogee (Creek) Nation, Thlopthlocco Tribal Town, and BLM to concur with the stipulations of the PA. Alabama Power, the Poarch Band of Creek Indians, and Alabama-Coushatta Tribe of Texas concurred. The terms of the PA ensure that Alabama Power addresses and treats all historic properties identified within the project's area of potential effects (APE) through development and implementation of a Historic Properties Management Plan (HPMP).

1.4 PUBLIC REVIEW AND COMMENT

The Commission's regulations (18 Code of Federal Regulations [C.F.R.] sections 5.1–5.16) require that applicants consult with appropriate resource agencies, tribes, and other entities before filing an application for a license. This consultation is the first step in complying with the Fish and Wildlife Coordination Act, the ESA, the National Historic Preservation Act, and other federal statutes. Pre-filing consultation must be complete and documented according to the Commission's regulations.

1.4.1 Scoping

Before preparing this draft EIS, staff conducted scoping to determine what issues and alternatives should be addressed. A scoping document was distributed to interested agencies and others on August 5, 2008. It was noticed in the Federal Register on August 11, 2008. Two scoping meetings, both advertised in the *Montgomery Advertiser* (August 14, 2008), were held on September 11, 2008, in Alexander City, Alabama, to request oral comments on the project. A court reporter recorded all comments and statements made at the scoping meetings, and these are part of the Commission's public record for the project. In addition to comments provided at the scoping meetings, the following entities provided written comments:

Commenting Entity	Date Filed
American Rivers and Alabama Rivers Alliance	October 10, 2008
World Wildlife Fund, Inc.	October 13, 2008
Lake Martin Home Owners & Boat Owners Association	October 13, 2008
Lake Martin Resource Association, Inc.	October 13, 2008
James K. Lanier	October 14, 2008
State of Georgia	October 10, 2008
Alabama Department of Conservation and Natural Resources	October 10, 2008, and October 1, 2008
U.S. Department of the Interior	October 2, 2008
Lake Wedowee Property Owners Association	October 10, 2008

A revised scoping document, addressing these comments, was issued on November 14, 2008.

1.4.2 Interventions

On February 8, 2012, the Commission issued a notice that Alabama Power had filed an application to relicense the Martin Dam Project. This notice set April 9, 2012, as the deadline for filing protests and motions to intervene. In response to the notice, the following entities filed motions to intervene:

Intervenor	Date Filed
U.S. Department of the Interior	March 15, 2012
Alabama Department of Conservation and Natural Resources	April 6, 2012
Alabama Rivers Alliance	April 6, 2012
American Rivers[a]	April 6, 2012
Downstream Landowners[8]	April 6, 2012
Lake Martin Resource Association, Inc.	April 6, 2012
World Wildlife Fund, Inc.	April 6, 2012
Atlanta Regional Commission[a]	April 9, 2012
Georgia Environmental Protection Division	April 9, 2012
Lake Martin Home Owners & Boat Owners Association	April 9, 2012

[a] Intervention in opposition.

1.4.3 Comments on the Application

A notice requesting conditions and recommendations was issued on February 8, 2012. The following entities commented:

Commenting Agency and Other Entity	Date Filed
Alabama-Coushatta Tribe of Texas	March 29, 2012
U.S. Department of the Interior	March 30, 2012 and April 6, 2012
Alabama Rivers Alliance	April 6, 2012
American Rivers	April 6, 2012
Downstream Landowners	April 6, 2012

[8] The Downstream Landowners include the following 19 landowners, farmers, and businesses: Euel A. Screws, Jr.; W. Thomas Dozier III; W. T. Dozier Farm, Inc.; Parmer G. Jenkins; R. Shepherd Morris, Sr.; Morris & Morris Farms, Inc.; Daniel G. Taylor; Mark B. Taylor; Carl E. Taylor; Milstead Farm Group, Inc.; Dale M. Taylor; Jimmy M. Dozier; Judy P. Bryan; Auttossee Plantation; L. A. Wisener; Howard T. Weir, III; Anne Weir; Charles E. Herron, Jr.; and Rock Springs Land & Timber, Inc.

Commenting Agency and Other Entity	Date Filed
World Wildlife Fund, Inc.	April 6, 2012
Atlanta Regional Commission	April 9, 2012
Georgia Environmental Protection Division	April 9, 2012
Lake Martin Home Owners & Boat Owners Association	April 9, 2012
Lake Martin Resource Association, Inc.	April 9, 2012
U.S. Army Corps of Engineers	April 9, 2012
Coosa River Paddling Club	May 10, 2012
State of Alabama Office of Water Resources	May 23, 2012
Lake Martin Resource Association, Inc.	May 24, 2012
Alabama Rivers Alliance and American Rivers	June 6, 2012

The applicant filed reply comments on May 23, 2012.

2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 NO-ACTION ALTERNATIVE

The no-action alternative is the baseline from which to compare the proposed action and all action alternatives that are assessed in the environmental document. Under the no-action alternative, the project would continue to operate under the terms and conditions of the current license. Thus, the no-action alternative would include the existing facilities and current project operation.

2.1.1 Existing Project Facilities

Martin dam impounds about 31 miles of the Tallapoosa River, forming Lake Martin reservoir (Lake Martin), a 40,000-acre reservoir when at a normal full pool elevation of 491 feet mean sea level (msl)[9] with: (1) 880 miles of shoreline; (2) a gross storage capacity of 1,622,000 acre-feet; and (3) active storage of 1,381,077 acre-feet at 45.5 feet of drawdown.

The existing project consists of: (1) Lake Martin reservoir; (2) a 2,000-foot-long concrete gravity dam and earth dike section that includes (a) a 720-foot-long gated spillway section with twenty, 30-foot-wide by 16-foot-high vertical lift spillway gates, (b) a 280-foot-long concrete gravity intake structure, (c) a 255-foot-long concrete gravity non-overflow section on the right abutment, and (d) an approximately 1,000-foot-long earth embankment on the left abutment; (3) headworks containing four steel penstocks and twelve, 9-foot-wide by 24-foot-high intake gates fitted with trashracks; (4) a 307-foot-long, 58-foot-wide, and 99-foot-high brick and concrete, steel-frame powerhouse; (5) four vertical Francis turbines that power four generating units, with installed capacities of 45.8 MW, 41.0 MW, 40.5 MW, and 55.2 MW, for a total installed capacity of 182.5 MW; (6) two, 450-foot-long transmission lines leading from the powerhouse to the Martin switchyard; and (7) appurtenant facilities. The project generates about 375,614 MWh per year.

The project boundary, which includes about 49,752 acres of land,[10] generally follows the 491-foot msl elevation contour line around the reservoir. In addition to the reservoir, the project boundary encompasses the project dam, powerhouse, switchyard, transmission lines, and 12 existing project recreation sites: Anchor Bay Marina, Camp Alamisco, Camp ASCCA, DARE Boat Landing, DARE Power Park, Kamp Kiwanis, Maxwell Gunter AFB Recreation Area, Parker Creek Marina, Pleasure Point Park and

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[9] For consistency throughout this draft EIS, elevations are provided in msl. In some documents associated with the license application, however, elevations are given in Martin Datum, which is 1 foot lower than msl.

[10] Out of 49,752 acres of land within the project boundary, 41,150 acres are inundated by the reservoir.

Marina, Real Island Marina and Campground, Scenic Overlook, and Union Ramp. Alabama Power has flood easements for the entire length of the shoreline up to the 491-foot contour. However, it does not own lands above that elevation.

2.1.2 Project Safety

The project has been operating for more than 85 years under the existing and previous licenses. During this time, Commission staff has conducted operational inspections focusing on the continued safety of the structures, identification of unauthorized modifications, efficiency and safety of operations, compliance with the terms of the license, and proper maintenance. In addition, the project has been inspected and evaluated every 5 years by an independent consultant, and a consultant's safety report has been submitted for Commission review.

As part of the relicensing process, the Commission staff would evaluate the continued adequacy of the proposed project facilities under a new license. Special articles addressing project safety would be included in any license issued, as appropriate. Commission staff would continue to inspect the project during the new license term to ensure continued adherence to Commission-approved plans and specifications, special license articles relating to construction (if any), operation and maintenance (O&M), and accepted engineering practices and procedures.

2.1.3 Existing Project Operation[11]

The Martin Dam Project operates as a peaking project using a multi-purpose storage reservoir (Lake Martin). On a seasonal basis, water levels in Lake Martin fluctuate by as much as 11 feet between elevations 480 and 491 feet. Project benefits, as identified in the original project license, include hydroelectric power, limited seasonal flood control when the reservoir is in drawdown condition, recreation, municipal and industrial water supply, aquatic flow maintenance, and navigation flow support.

The project typically generates power Monday through Saturday to meet peak power demands. During generation, the four turbines release a flow of up to 17,900 cubic feet per second (cfs). Hours of generation each day depend principally on reservoir inflows that can vary substantially between wet and dry periods of the year. During the wetter periods (normally December through April), the project usually generates 8 to 12 hours daily on weekdays and 5 to 7 hours on Saturday. The project does not typically generate on Sunday. During the drier periods (normally May through November), daily generation is typically reduced to 4 to 6 hours Monday through Saturday with little or no generation on Sundays.

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[11] This section identifies operation measures that are currently being implemented by Alabama Power and does not necessarily describe measures required by the current license.

Releases from the Martin Dam Project are made directly into the 2,000-acre reservoir of the Yates development.[12] The 45.5-MW Yates powerhouse has a hydraulic capacity of about 12,400 cfs. Releases from Yates pass directly into the 574-acre reservoir of the Thurlow development. The 85.0-MW Thurlow powerhouse has a hydraulic capacity of about 13,200 cfs. Thus, the entire river from the Martin Dam Project to Thurlow dam is impounded. Downstream of Thurlow dam, the Tallapoosa River flows 49.7 miles before reaching the confluence with the Coosa River to form the Alabama River.

Alabama Power uses three guide curves to guide operations for the Martin Dam Project (figure 2-1): (1) a flood control curve, (2) an operating curve, and (3) a drought curve.[13] Details of these curves are provided below.

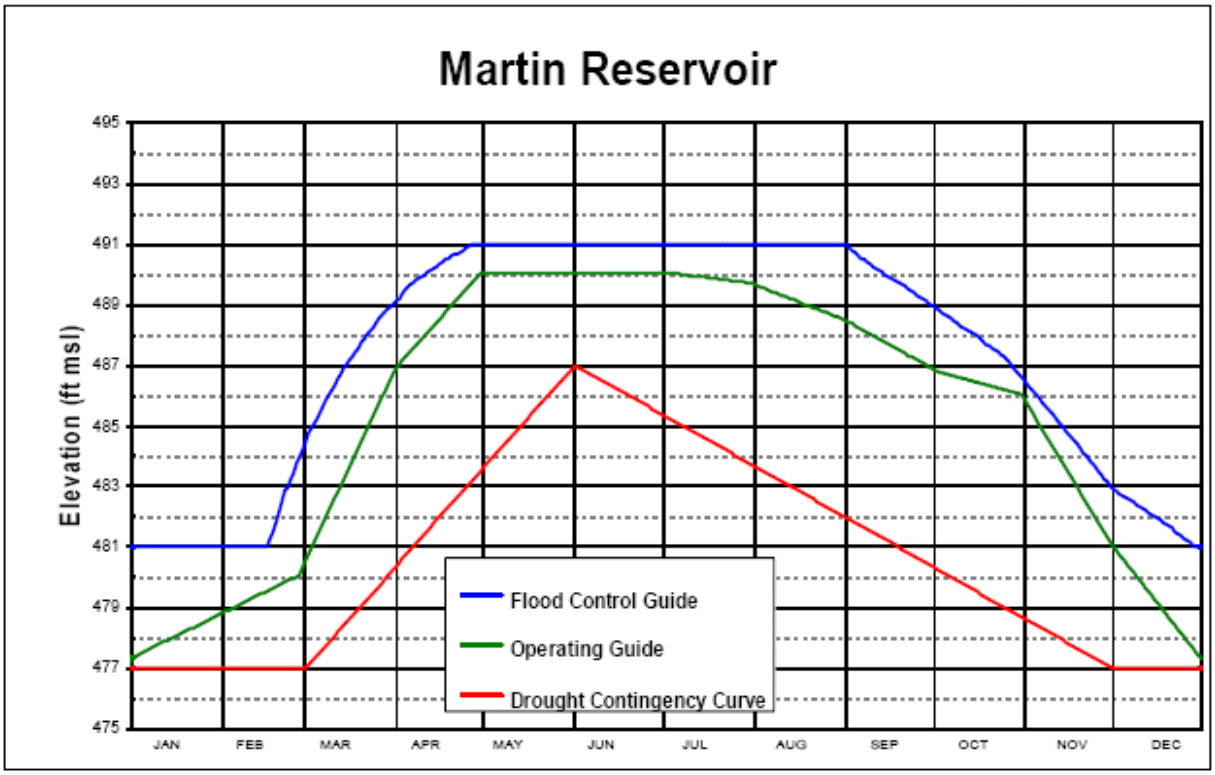

Figure 2-1. Existing guide curves for the Martin Dam Project (Source: Alabama Power, 2008).

[12] The Yates and Thurlow developments are licensed to Alabama Power as Project No. 2407. 66 FERC ¶ 62,068 (1994).

[13] Both the flood control and operating curves are included in the current license for the project. The drought curve is not a current license requirement, but has been voluntarily followed to address recent drought concerns.

Flood Control Operation

The flood control curve (upper curve in figure 2-1) reflects the maximum elevation at which the lake is normally maintained in the interest of flood control. During the winter months, a 10-foot-drawdown (from 491 feet to 481 feet) provides storage capacity in the reservoir to be used to control floods. On January 1, the curve is at elevation 481 feet and remains at this elevation until February 17. On this date, the curve rises until it reaches elevation 491 feet on April 28. The curve remains at this elevation until August 30, and is gradually lowered 10 feet to elevation 481 feet by December 31. It remains at that elevation until filling begins on February 17.

Alabama Power has easements on the reservoir up to elevation 491 feet; thus the project is operated to never exceed elevation 491 feet. At times when the reservoir is below elevation 491 feet, Alabama Power has the ability to store floodwater to help control high river flow events. After flood flows recede, Alabama Power lowers the lake elevation to, or below, the flood curve elevation.

The current license states that flood control operations are set forth in Alabama Power's revised Exhibit H dated January 12, 1973, as amended November 16, 1978. As described in Exhibit H, when the inflow to the reservoir causes the Lake Martin elevation to exceed the flood curve, the plant is operated in the following manner:

1. Between elevations 481 and 486 feet, the turbines at Martin dam are operated to provide a continuous outflow from Thurlow dam of a volume at least equal to the hydraulic capacity of the turbines at Yates dam.
2. Between elevations 486 and 489 feet, the turbines at Martin dam are operated to provide continuous outflow from Thurlow dam of a volume at least equal to the plant hydraulic capacity at Thurlow dam.
3. Above elevation 489 feet, the turbines at Martin dam are operated as in #2 above and further, if required to avoid the water level rising above elevation 491 feet, the turbines are operated to provide a volume of outflow from Martin dam at least equal to the discharge from all available turbine units operating at full gate (17,900 cfs). In addition, gates are raised so that the reservoir does not exceed elevation 491 feet, although the reservoir level may increase after all gates are raised if inflow exceeds the gate capacity. At elevation 491 feet, the spillway has a discharge capacity of 133,000 cfs.

Exhibit H further requires coordination with the U.S. Army Corps of Engineers (Corps). Exhibit H states,

> "During flood periods, communications will be maintained with the Weather Bureau's River Forecast Center, Atlanta, Georgia, and the Corps of Engineers, and if greater flood control benefits can be attained through increased coordination of operations at Tallapoosa and Coosa River dams, and increased coordination with the Corps of Engineers' downstream Alabama River dams than would be attained through use of the above flood

control procedures, then these procedures will be modified as mutually agreed to verbally by the Corps of Engineers and Alabama Power Company."

Normal Flow Operation

The middle curve shown in figure 2-1 is the operating curve.[14] The area between the flood curve and the operating curve represents the range in which Alabama Power operates the Martin Dam Project under normal flow conditions. Alabama Power tries to maintain water levels at or near the upper end of this operating range[15] to optimize project benefits and to maintain a higher likelihood of being able to refill the lake to near full pool (i.e., 491 feet) each summer.

Exhibit H requires Alabama Power to submit a report to the Commission and Lake Martin Resource Association, Inc. (Lake Martin RA) when the reservoir is at or below 487 feet for 7 days, June 1 through Labor Day, and 2 feet below the operating curve for 7 days, Labor Day through May 31. During such an event, 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.

Low Flow Operations

The lower curve on figure 2-1 is the drought curve, which provides an indication of impending hydrologic drought conditions. During the 1990s, Alabama Power developed drought curves for each of its hydroelectric projects, including the Martin Dam

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[14] The operating 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 license issued in 1923, Alabama Power often operated the project in a manner that lowered the lake 20 or more feet below elevation 491 feet. During relicensing in the 1970s (the license was issued in 1975, with an amendment in 1978), Alabama Power and certain stakeholders agreed to change the operation of the project so that a higher pool elevation could be maintained during normal project operations.

[15] During a recent court case before the Supreme Court of Alabama, brought by the Downstream Landowners (2009 WL 153932 [Ala.]), an Alabama Power representative testified that, beginning in 1989, Alabama Power has been maintaining Lake Martin at 0.5 foot below the full-pool level (490.5 feet) during the summer months, to provide 0.5 foot of storage for flood control and other purposes. This mode of operation, however, has been voluntary and is not a requirement of the current license.

Project.[16] The intent of the curves is to provide notification when the reservoirs are in drought conditions, rather than to dictate operations. The drought curve is used as one of several factors in evaluating drought reservoir operations. The curve was developed based on drought conditions that occurred in 1986 and in 1988.

In the recent droughts of 2000 and 2007, reservoir operations (i.e., releases from the project) did not change immediately when Lake Martin fell below the drought curve, but the drought curve was one of several factors used in planning reservoir operations in coordination with Alabama Power's other reservoirs in the Alabama-Coosa-Tallapoosa River Basin (ACT Basin). In addition, Alabama Power has modified the flood curve and releases, after temporary amendments to its license, in response to drought conditions. Specifically, Alabama Power filed for, and was granted by the Commission, three temporary amendments to its flood curve to operate Lake Martin at a 3-foot-higher winter pool from November 20 to January 15, with refilling of the reservoir to begin on January 15 instead of February 17, due to drought conditions.[17] These variances occurred in the winter of 2007, 2009, and 2011. The temporary amendments also granted Alabama Power permission to reduce the minimum flow downstream of Thurlow dam, from 1,200 cfs to as low as 350 cfs, depending on flows in the downstream Alabama River.

2.1.4 Additional Operation Measures for the Martin Dam Project

Minimum Flows

The current license for the Martin Dam Project has no minimum flow requirement. However, the project is operated in a manner to provide flows necessary to meet minimum flow requirements at the Thurlow development of Alabama Power's downstream Yates and Thurlow Project No. 2407. Flows immediately downstream of the Martin Dam Project typically range from leakage[18] to about 17,900 cfs. Alabama Power

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[16] The development of drought curves for Alabama Power's projects was prompted by a comprehensive study of the ACT Basin, 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 the Corps' and Alabama Power's 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 curves for Alabama Power's projects as part of this modeling effort.

[17] *See Alabama Power Company*, Order Granting Temporary Amendment to Rule Curve, 121 FERC ¶ 62,129, November 20, 2007; Order Granting Temporary Amendment to Rule Curve, 126 FERC ¶ 62,104, issued February 11, 2009; and Order Granting Temporary Amendment to Rule Curve, 134 FERC ¶ 62,067, January 24, 2011.

[18] The amount of leakage is difficult to estimate because the Yates impoundment is immediately downstream of Martin dam.

operates the Yates and Thurlow developments as run-of-river, with limited re-regulating capacity for the peaking releases from Martin dam,[19] thus flows downstream of Yates and Thurlow largely reflect the releases from Martin dam. Article 401 of the 1994 license for the Yates and Thurlow Project, requires Alabama Power to provide a continuous 1,200-cfs minimum flow release from the Thurlow powerhouse, as measured immediately downstream of Thurlow dam. The minimum flow protects aquatic resources including water quality and aquatic habitat in the downstream riverine reach. Releases from Martin dam are necessary to meet the 1,200-cfs minimum flow requirement at the Thurlow development, except during periods of high local inflow. There are procedures in the Yates and Thurlow license that allow reduction of the minimum flow requirement at Thurlow dam whenever inflows to the Yates and Thurlow Project (i.e., releases from Martin dam) are abnormally low. Alabama Power has generally met the 1,200-cfs minimum flow requirement. However, during periods of extreme drought, such as in 2007, 2009, and 2011, the minimum flow was reduced to as little as 350 cfs for a portion of those years, after variances were approved by the Commission.

Navigation Flows

Standard article 12 of the current license for the Martin Dam Project requires Alabama Power to release water from the project reservoir as the Corps may prescribe in the interest of navigation. In addition, article 44 of the current license for the Martin Dam Project required Alabama Power to enter into an agreement with the Corps to protect Federal navigational interests downstream of the Martin Dam Project. As a result, Alabama Power entered into an agreement with the Corps on April 18, 1972. The agreement specifies flows needed from both the Tallapoosa River and Coosa River to provide for navigation on the Alabama River. The navigation flow in the agreement is based on the estimated 7Q10 flow for the Alabama River in the Montgomery area. The navigation release is measured at the Montgomery flow gage and provides a 9-foot navigation channel depth and an 8,500 cfs flow below the Claiborne lock and dam on the Alabama River, about 240 miles downstream of the confluence of the Coosa and Tallapoosa Rivers. Specifically, the 1972 agreement requires a combined release from Bouldin/Jordan and Thurlow dams as follows:[20]

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[19] Impoundment fluctuations in the Yates and Thurlow impoundments are limited to 3.5 feet and 1 foot, respectively. Because the impoundments are small, such fluctuations provide limited storage capacity.

[20] The 1972 agreement specifies a 7-day average release of 4,640 cfs from the combined Coosa and Tallapoosa Rivers. The agreement does not specify releases for each individual basin; however, based on a ratio of drainage areas for each basin (10,059 square miles for the Coosa River Basin and 4,680 square miles for the Tallapoosa River Basin), the Coosa River's portion of the navigation requirement would be 3,166 cfs (68 percent), and the Tallapoosa River's portion would be 1,475 cfs (32 percent).

- A continuous minimum 7-day average release of not less than 4,640 cfs, as measured at the USGS Montgomery flow gage on the Alabama River.[21]
- In January 1980, Alabama Power agreed to provide at least 2,667 cfs during any consecutive 3-day period. This would eliminate periods of little or no flow and more evenly distribute the required 7-day total flow.

Since 1972, there have been several occasions during droughts (1986, 1988, and 2007) when the 4,640-cfs navigation flow has been reduced after agreement with the Corps. A July 2007 environmental assessment (EA) prepared by the Corps concluded that the 4,640 cfs navigation flow would be adequate to protect environmental resources (and navigation), and that under extreme drought conditions, a 20-percent reduction to 3,712 cfs would result in no significant adverse environmental impact. Accordingly, a temporary reduction to 3,712 cfs was approved by the Corps and implemented by Alabama Power. The navigation release, as it applies to the Coosa and Martin Dam Projects, has also been discussed in a final EA for the Coosa Project.[22]

2.1.5 Existing Environmental Measures

Alabama Power maintains Lake Martin near full-pool levels during most of the summer recreation season (see figure 3.5). As stated previously, Alabama Power makes releases from Martin dam to meet a 1,200-cfs continuous minimum flow downstream of Thurlow dam, as required by the Yates and Thurlow Project No. 2407 license.

Other environmental measures provided by Alabama Power include:

- controlling noxious weeds and invasive plants as part of a Nuisance Aquatic Vegetation and Vector Control Management Program;
- operating and maintaining 12 existing project recreation sites, that provide boat ramps, bank fishing sites, campsites, parking areas, and picnic areas;
- implementing a Shoreline Permitting Program to guide development of the shoreline (i.e., construction of a boat dock) and protect the associated resources; and
- implementing a Public Education and Outreach Plan to inform shoreline landowners and the public about shoreline management and the requirements of the Shoreline Permitting Program.

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[21] The Montgomery flow gage is about 10 miles downstream of the confluence of the Coosa and Tallapoosa Rivers. Because there is little intervening flow, this gage approximates the combined releases from both river basins.

[22] *See* section 3.3.1.2 of the final EA for the Coosa River Hydroelectric Project No. 2146 issued December 31, 2009 (FERC and Corps, 2009).

2.2 APPLICANT'S PROPOSAL

2.2.1 Proposed Project Facilities

Alabama Power is not proposing any changes to project structures or to the project generating capacity. However, Alabama Power proposes to add 991.4 acres to, and remove 499.2 acres from, the project boundary, resulting in an increase of 492.2 acres of project land. The project boundary, therefore, would be modified from 8,602 acres to 9,094 acres.

2.2.2 Proposed Project Operation

Alabama Power proposes to continue to operate the project in a peaking mode, but with modifications to other aspects of project operations as discussed below.

Modify Flood Curve and Operating Curve

Alabama Power proposes to modify the flood curve by implementing a 3-foot increase in the winter pool (to elevation 484 feet). Alabama Power also proposes to change the operating curve and drought curve proportionately during the same timeframe (figure 2-2).

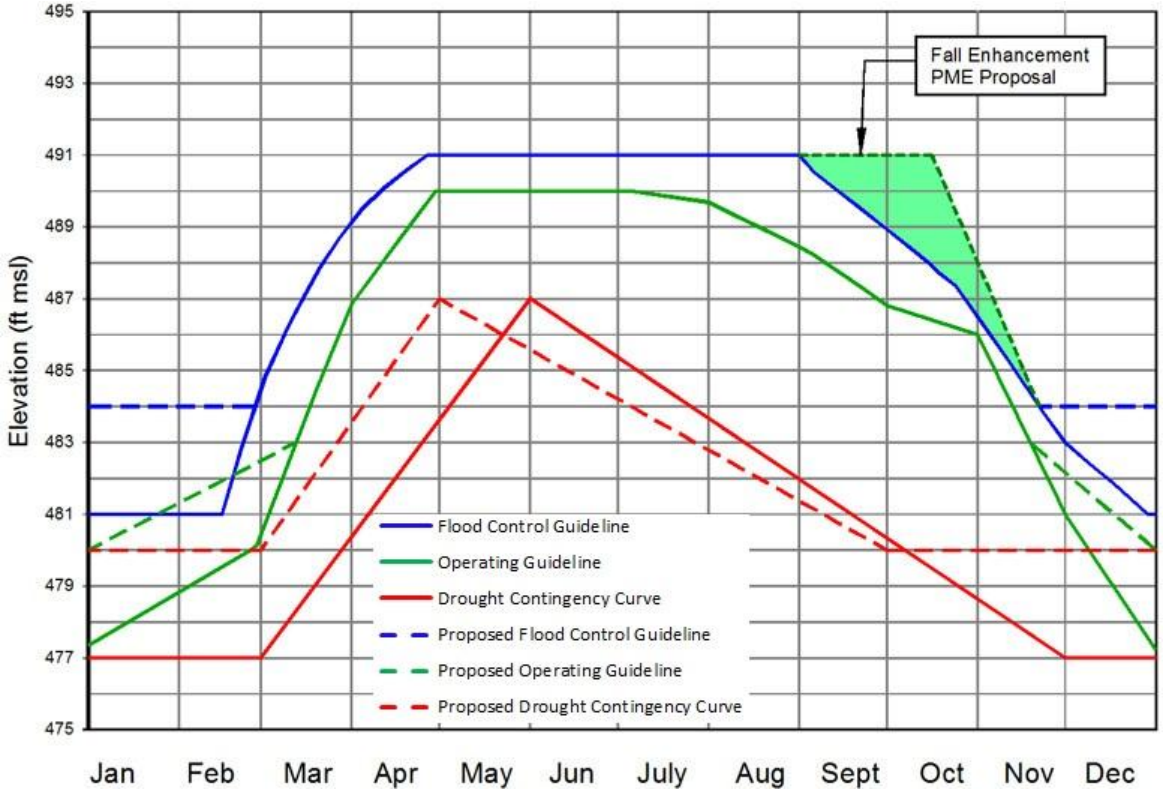

Figure 2-2. Proposed guide curves for the Martin Dam Project (Source: Alabama Power, 2011a).

Lower Reservoir for Maintenance and/or Construction of Structures

Alabama Power proposes, approximately every 6 years, to lower the reservoir elevation to at least 481 feet in the winter to facilitate non-project seawall and boat dock maintenance and/or construction and other non-project activities that could benefit from lower lake levels. This measure would only be necessary if the Commission adopts Alabama Power's proposed 3-foot increase in the winter pool noted above.

Proposed Operation for Seasonal Flood Control

Alabama Power proposes to continue operations for flood control as described in section 2.1.3, *Existing Project Operation*, but with the following changes and additions to Exhibit H noted in **bold** below:

1) When the reservoir is above the flood control curve and between elevations **484** and 486 feet, turbines at Martin dam would be operated to provide for an outflow from Thurlow dam that is at least equal to the hydraulic capacity of the turbines at Yates dam (12,400 cfs).

2) When the reservoir is above the flood control curve and between elevations 486 and 489 feet:

    a. With **increasing** inflows, turbines at Martin dam would be operated to provide for an outflow from Thurlow dam of at least equivalent to the hydraulic capacity of the turbines at **Thurlow dam (13,200 cfs)**.
    b. With **decreasing** inflows, turbines at Martin dam would be operated to provide for an outflow from Thurlow dam of at least equivalent to the hydraulic capacity of the turbines at **Yates dam (12,400 cfs)**.

3) When the reservoir is above the flood control curve and above elevation 489 feet, the turbines at Martin dam would be operated as in (2)a above, and further if required to avoid rising above elevation 491 feet, turbines would be operated to provide an outflow from Lake Martin at least equivalent to all turbine units operating at full gate (17,900 cfs), and spillway gates would be raised. An exception to this would be that the reservoir may continue to rise after all gates are raised and inflow exceeds the gate capacity**, which would be beyond the control of Alabama Power.**[23] At elevation 491 feet, the spillway would have an outflow capacity of approximately 133,000 cfs.

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[23] Provision 3 is an update to step 3 of Alabama Power's request for revised exhibit H dated November 16, 1978.

4) **During periods when inflow exceeds the total hydraulic capacity of the turbines, the 3-hour average outflow rate from the reservoir would not exceed the concurrent 3-hour average inflow rate, except to evacuate accumulated surcharge storage prior to the predicted time of peak inflow. This would ensure that the outflow from the reservoir is lower than the inflow.**

5) **Alabama Power would continue its current practice to notify the National Weather Service (NWS) when spillway gate operation is used in flood control operations and would continue to share data with the NWS' Southeast River Forecast Center (SERFC), and the Corps.**

Conditional Fall Extension

To enhance recreation uses at Lake Martin, Alabama Power proposes to modify the flood control curve during the fall months by extending the curve to elevation 491 feet from September 1 through October 15, provided that certain hydrologic and operational conditions are met. Extending the flood curve would provide an opportunity for higher reservoir elevations during this period, assuming adequate flows are available for the project's other uses. Each September, Alabama Power would conduct daily evaluations to determine the feasibility of implementing higher pool levels, based on the following conditions:

1. Lake Martin is above its operating curve during September (487 to 488.5 feet);
2. the rolling 7-day average total basin inflow[24] on the Tallapoosa River, calculated at Thurlow dam, is at or higher than the median flow[25];
3. the rolling 7-day average total basin inflow on the Coosa River, calculated at Jordan dam, is at or higher than the median flow; and
4. the elevations at the Weiss, Neely Henry, and Logan Martin developments on the Coosa River and the Harris Project on the Tallapoosa River must all be within 1 foot of their respective rule curves.

If all these conditions are met, Alabama Power would operate the project by targeting an elevation above the flood curve but no greater than elevation 491 feet for a period not to exceed October 15 (i.e., the zone shaded in green on figure 2-2), at which point drawdown would resume to meet the proposed winter pool elevation of 484 feet.

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[24] The 7-day rolling average of total basin inflow is the average of the total daily basin inflow for the previous 7 days recalculated on a daily basis for a given period of time.

[25] The "median flow" in this instance is the median of the recorded daily flows over the period of record for the particular day of interest.

Once the conditional fall extension is initiated, Alabama Power would continue to monitor the Coosa and Tallapoosa river systems to determine if any change in conditions would affect continuation of the conditional fall extension. If reservoir and hydrological conditions change after the fall extension has started, Alabama Power would suspend the fall extension. At the end of September, if all the above conditions were not met and the conditional fall extension was not implemented, Alabama Power would file results of the evaluation with the Commission. Regardless of the outcome of the evaluation, Alabama Power would provide notice to Lake Martin RA and post up-to-date status notifications to the Alabama Power lakes and recreation website (https://lakes.alabamapower.com/).

Alabama Power also proposes to abide by all downstream minimum flow and other operational requirements while implementing its proposed extension.

Drought Operations/Low Flow Management

Alabama Power is developing its own drought response plan outside the licensing process known as the Alabama Drought Response Operating Proposal (Alabama DROP). Alabama Power clearly states that Alabama DROP is not part of its current proposal for the Martin Dam Project.

Alabama DROP is the basis of a plan to manage Alabama Power's water resources within the Alabama portion of the ACT Basin during drought conditions. As described above, project releases provide support for the Thurlow Project minimum flows, as well as flows required to support navigation in the Alabama River. The Alabama DROP uses specific drought indicators to describe the magnitude, duration, severity, and extent of the drought which may affect normal operating conditions and the Martin Dam Project's ability to support the Thurlow minimum flow and/or Corps required navigation releases to the Alabama River. One of those indicators is the Lake Martin drought curve described above. When the indicators meet specified criteria, Alabama Power and the appropriate state and federal agencies would closely monitor the river system to determine when drought response measures should be triggered and how aggressive those measures should be. Each of the three levels of drought conditions identified in the Alabama DROP is tied to a compounding trigger system. As more of the criteria are met, more intense drought response measures would be triggered. When criteria triggering a more intense level of drought response are met, a reduction in expected hydro project releases to support minimum instream flows and navigation flows in the Alabama River would occur. Reducing the expectation in the Alabama River would allow a decrease in flow from the Coosa or Tallapoosa River system, or both. How changes in releases would be allocated between river systems would be dependent on the conditions within each basin and the season.

To date, Alabama Power has not identified or proposed specific operational responses to the different levels of drought identified in the Alabama DROP. Alabama Power states that they are continuing to work with various state and federal resource agencies to refine the Alabama DROP.

Recent responses to drought conditions have included temporary amendments to water level requirements and flow release requirements at Lake Martin, such as maintaining Lake Martin at a 3-foot-higher winter pool, and reductions in the minimum flow from Thurlow dam, as described in section 2.1.3, *Project Operation, Low Flow Operations*.

2.2.3 Proposed Environmental Measures

- Implement the measures of the 401 WQC, which requires maintaining the state standard for dissolved oxygen (DO) when the project is operating, and monitoring water temperature and DO in the tailrace;
- develop a reservoir water quality monitoring plan in consultation with Alabama DEM prior to implementing the proposed 3-foot increase in the winter pool elevation;
- implement a study of American eels, in consultation with the U.S. Fish and Wildlife Service (FWS), from the project tailrace to the mouth of the Tallapoosa River, to be completed by 2016;
- implement a Wildlife Management Program (WMP) for project lands;
- implement the Nuisance Aquatic Vegetation and Vector Control Management Program, and prepare a plan to monitor potential increases in nuisance aquatic vegetation in Lake Martin resulting from the proposed 3-foot increase in the winter pool elevation;
- implement the final Shoreline Management Plan (SMP), filed June 2011, which provides guidance for management actions within the project boundary; a redefined shoreline classification system; a Shoreline Permitting Program; and best management practices (BMPs) for controlling shoreline erosion and providing a buffer zone;
- implement the final Recreation Plan, filed December 9, 2011, which includes measures for a total of 19 developed and undeveloped recreation sites that provide for boat ramps, docks, parking areas, bank fishing sites, campsites, and fishing piers;
- modify the project boundary to add 991.4 acres to, and remove 499.2 acres from, the project boundary, resulting in an increase of 492.2 acres of land; and reclassify land uses on 1,294.4 acres within the project boundary to be consistent with existing land use or other project purposes[26];

[26] The project boundary would be modified from 8,602 acres to 9,094 acres.

- develop and implement a Public Education and Outreach Plan to inform shoreline landowners and the public about shoreline management and the requirements of the Shoreline Permitting Program; and
- develop and implement a final HPMP in accordance with the PA.

2.2.4 Modifications to Applicant's Proposal—Mandatory Conditions

The following mandatory conditions have been provided and are evaluated as part of the applicant's proposal.

Water Quality Certification Conditions

The conditions of the WQC are provided in appendix B and summarized below:

- Within 18 months of the effective date of a new license, begin DO monitoring in the project tailrace for a three-year period, followed by a report assessing the adequacy of the project to meet the state standard. If monitoring results do not indicate compliance with the state standard, which is 4.0 mg/L in the tailrace when the project is generating, Alabama Power would be required to develop and implement measures, through structural or operational modifications, to meet the state standard.
- The monitoring location for determining compliance with the state standard would be in an area immediately downstream of the Martin dam, at an existing monitoring station located at about latitude 32.679350N and longitude 85.911648W. The monitor would record DO and water temperature at 30-minute intervals during periods of hydroelectric generation following one continuous hour of generation beginning June 1 and extending through October 31. During flood events, the monitoring may be temporarily discontinued until tailrace elevations return to normal. The monitoring program would continue for a period of three years.
- The monitoring equipment would be appropriately operated, maintained, and calibrated.
- DO and temperature monitoring reports would be submitted annually to the Alabama DEM, within 90 days following the end of the monitoring period in electronic format compatible with Microsoft Excel and Word software. The monitoring reports would specify whether turbines were in operation at the time of the DO and temperature measurements and the discharge rate of water flow passing through each turbine.

2.3 STAFF ALTERNATIVE

Under the staff alternative, the project would continue existing operations,[27] but with the inclusion of most of Alabama Power's proposed environmental measures as described in sections 2.2.2 and 2.2.3. The staff alternative also includes all the conditions of the WQC as they relate to maintaining a minimum DO concentration of 4.0 mg/L in the project tailrace while the project is generating and monitoring the project's ability to do so.

In addition, this alternative would include the following measures:

- develop a drought management plan for the Martin Dam Project, to include a provision to review and revise the plan for consistency with the Alabama Drought Management Plan once that plan is finalized, and implement interim drought measures until a final drought management plan is approved by the Commission;
- revise, in consultation with FWS and Alabama Department of Conservation and Natural Resources (DCNR), the Nuisance Aquatic Vegetation and Vector Control Management Program, to include specific information on Alabama Power's protocol for conducting lake-wide surveys, including: (1) methods (i.e., the frequency, timing, and locations of surveys) for identifying areas where nuisance aquatic vegetation could create a public health hazard, affect power generation facilities, restrict recreational use, or pose a threat to the ecological balance of the reservoir; (2) methods for monitoring increases in nuisance aquatic vegetation; (3) methods for controlling nuisance aquatic vegetation; and (4) schedules for implementation of control measures and monitoring;
- revise the study of the American eel population and distribution in the Tallapoosa River from the project tailrace to the mouth of the river to a program to regularly trap American eels immediately below Martin dam to detect their arrival and indicate the need to consider passage;
- revise the Recreation Plan to include: (1) a description of the 19 project recreation sites, as identified in appendix D of Alabama Power's final Recreation Plan, and a map or maps identifying the project recreation sites within the modified project boundary; (2) a discussion of the number and location of the proposed additional bank fishing areas; and (3) periodic updates to the revised Recreation Plan; and

[27] Alabama Power proposes a modification to the existing operating plan to be implemented during floods, when the reservoir exceeds the flood curve. Alabama Power proposes that when the reservoir is between 486 feet and 489 feet and inflows are decreasing, the outflow from Thurlow dam be equivalent to the hydraulic capacity of the Yates development, and not the Thurlow development. Under these conditions, outflows from the Martin project would be reduced from about 13,200 cfs to12,400 cfs. For purpose of this EIS, staff considered this a minor modification of the existing operation.

- revise the SMP to include: (1) a discussion of the project boundary modifications; (2) a provision to limit construction of a new seawall to instances where riprap and vegetation are not sufficient to protect land and property from erosion; (3) a discussion of the Dredging Permit Program; (4) a discussion of the Shoreline Permitting Program specific to the Martin Dam Project; and (5) a provision to address unpermitted structures on project lands and waters.

2.4 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

We considered several alternatives to the applicant's proposal, but eliminated them from further analysis because they are not reasonable in the circumstances of this project. They are: (1) issuing a non-power license; (2) federal government takeover of the project; and (3) retiring the project.

2.4.1 Issuing a Non-Power License

A non-power license is a temporary license that the Commission will terminate when it determines that another governmental agency will assume regulatory authority and supervision over the lands and facilities covered by the non-power license. At this point, no agency has suggested a willingness or ability to do so. No party has sought a non-power license, and we have no basis for concluding that the project should no longer be used to produce power. Thus, we do not consider issuing a non-power license a realistic alternative to relicensing in this circumstance.

2.4.2 Federal Government Takeover of the Project

We do not consider federal takeover to be a reasonable alternative. Federal takeover and operation of the project would require Congressional approval. While that fact alone would not preclude further consideration of this alternative, there is no evidence to indicate that federal takeover should be recommended to Congress. No party has suggested federal takeover would be appropriate, and no federal agency has expressed an interest in operating the project.

2.4.3 Retiring the Project

Project retirement could be accomplished with or without dam removal. Either alternative would involve denial of the relicense application and surrender or termination of the existing license with appropriate conditions. No participant has suggested that dam removal would be appropriate in this case, and we have no basis for recommending it. Dam removal is considered unreasonable because the reservoir serves other important purposes, including recreation, municipal water supply, and flood control, regardless of whether power is produced. Thus, dam removal is not a reasonable alternative to relicensing the project with appropriate protection, mitigation, and enhancement measures.

The second project retirement alternative would involve retaining the dam and disabling or removing equipment used to generate power. Project works would remain in place and could be used for historic or other purposes. This would require us to identify another government agency with authority to assume regulatory control and supervision of the remaining facilities. No agency has stepped forward, and no participant has advocated this alternative. Nor have we any basis for recommending it. Because the power supplied by the project is needed, a source of replacement power would have to be identified. In these circumstances, we do not consider removal of the electric generating equipment to be a reasonable alternative.

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3.0 ENVIRONMENTAL ANALYSIS

In this section, we present: (1) a general description of the project vicinity; (2) an explanation of the scope of our cumulative effects analysis; and (3) our analysis of the proposed action and other recommended environmental measures.[28] Sections are organized by resource area (aquatic, recreation, etc.). Under each resource area, current conditions are described first. The existing condition is the baseline against which the environmental effects of the proposed action and alternatives are compared, including an assessment of the effects of proposed mitigation, protection, and enhancement measures, and any potential cumulative effects of the proposed action and alternatives. Staff conclusions and recommended measures are discussed in section 5.2, *Comprehensive Development and Recommended Alternative*, of the draft EIS.

3.1 GENERAL DESCRIPTION OF THE RIVER BASIN

The Tallapoosa River drains about 4,675 square miles of east central Alabama and a part of western Georgia and joins the Coosa River downstream of Jordan dam creating the Alabama River. The Alabama River then flows into Mobile Bay. The headwaters of the Tallapoosa and Little Tallapoosa Rivers begin in Paulding and Carroll Counties, Georgia, and enter Alabama in Randolph County southwest of Atlanta to form the main stem of the Tallapoosa River. From this point, the Tallapoosa meanders southwesterly through four Alabama Power hydroelectric developments (R.L. Harris, Martin, Yates, and Thurlow). The Tallapoosa River watershed includes the Little Tallapoosa River, which has a drainage area of 605 square miles in Georgia and Alabama. Other major tributaries include the Sougahatchee, Sandy, Uphapee, and Hillabee Creeks in Alabama.

The Tallapoosa River Basin includes narrow valleys, rolling hills, flat plateaus, meandering flood plains, and gently rolling terrain. Almost 70 percent of the basin is covered by forests, and forestry-related activities account for part of the river basin's economy. The primary land use is agriculture, including livestock rearing and production of other agricultural products.

The climate of the Tallapoosa River Basin is moist and temperate, characterized by long, warm, and humid summers with relatively short winters. Precipitation is highest in the spring, but otherwise is generally evenly distributed throughout the year with average annual precipitation ranges between about 46 and 64 inches. Natural river flow normally peaks during the winter and early spring with flood events recorded at different times throughout the year but most common in the winter and spring.

Average monthly temperatures within the basin vary from 40 degrees Fahrenheit (ºF) to 55ºF in January and from 75º to 80ºF in July. Winter temperatures occasionally

[28] Unless noted otherwise, the sources of our information are the license application (Alabama Power, 2011a), and additional information filed by Alabama Power (2011b).

fall below 32ºF and summer temperatures often exceed 90ºF with relatively high humidity.

3.2 SCOPE OF CUMULATIVE EFFECTS ANALYSIS

According to the Council on Environmental Quality's regulations for implementing National Environmental Policy Act (40 C.F.R. section 1508.7), cumulative effect is the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts 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.

The effects of other actions occurring in the river basin relative to existing project resources can be derived from the following environmental documents prepared by the Commission staff and are incorporated by reference per 40 C.F.R., section 1502.20:

- Yates and Thurlow Hydroelectric Project (FERC No. 2407), final EA issued February 3, 1994; and
- Coosa River Hydroelectric Project (FERC No. 2146), final EA issued December 31, 2009.

Based on our review of the license application and agency and public comments, we have identified aquatic and fishery resources as having the potential to be cumulatively affected by the proposed project in combination with other past, present, and future activities. Aquatic and fishery resources were selected because the operation of the Martin Dam Project, in association with other projects in the river basin, has affected and would continue to affect wastewater releases, consumptive water withdrawals, navigation, water quality, water quantity, fish habitat, fish movements, and fish production in the Tallapoosa and Alabama Rivers.

3.2.1 Geographic Scope

The geographic scope of analysis defines the physical limits or boundaries of the proposed action's effects on the resources. Because the proposed action would affect the resources differently, the geographic scope for each resource may vary.

The geographic scope for aquatic and fishery resources is the entire Alabama River and the Tallapoosa River from its mouth upstream to and including the Martin Dam Project. We chose this geographic scope because the operation of the Martin Dam Project in combination with the other Alabama Power hydropower projects and the Corps of Engineers impoundments could cumulatively affect the aquatic and fisheries resources listed above.

3.2.2 Temporal Scope

The temporal scope of analysis includes a discussion of the past, present, and reasonably foreseeable future actions and their effects on aquatic resources. Based on the term of the proposed license, we will look 30 to 50 years into the future, concentrating on the effects on aquatic resources from reasonably foreseeable future actions. The historical discussion is limited to the amount of available information. We identified the present resource conditions based on the license application, agency comments, and comprehensive plans.

3.3 PROPOSED ACTION AND ACTION ALTERNATIVES

In this section, we discuss the effect of the project alternatives on environmental resources. For each resource, we first describe the affected environment, which is the existing condition and baseline against which we measure effects. We then discuss and analyze the specific cumulative and site-specific environmental issues.

Only the resources that would be affected, or about which comments have been received, are addressed in detail in this draft EIS. Based on this, we have determined that geology and soils, aquatic, terrestrial, threatened and endangered species, recreation, and cultural resources may be affected by the proposed action and action alternatives. There are some economic issues addressed as subcomponents of other topics analyzed in this draft EIS, but there are no substantive, standalone issues associated with the proposed action. Therefore, socioeconomics are not assessed in this draft EIS. We have not identified any substantive issues related to aesthetic resources associated with the proposed action, and, therefore, aesthetic resources are not assessed in the draft EIS. Land use is addressed in the recreation section. We present our recommendations in section 5.2, *Comprehensive Development and Recommended Alternative.*

3.3.1 Geologic and Soil Resources

3.3.1.1 Affected Environment

Geography and Topography

The Tallapoosa River Basin lies within three physiographic provinces, the Valley and Ridge, Piedmont, and the Eastern Gulf Coastal Plain. Lake Martin occurs within the Piedmont Province, which is characterized by well-dissected uplands developed over metamorphic and igneous rocks. In the northern portion of the province, elevations generally range from 500 to 1,100 feet. Cheaha Mountain, the State of Alabama's highest point at 2,407 feet, is on the northeastern end of a prominent northeast-trending ridge in this province, and is located about 50 miles north of Lake Martin. Shoreline steepness around Lake Martin varies from areas with less than 15 percent slope, to vertical drops associated with rocky outcrops. 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. The dominant geographic features in the area are northeast-trending. The linear ridges to the northwest and northeast of the Martin 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.

This region is divided into the Northern, Inner, and Southern Piedmont Upland districts but there are no project lands within Southern Piedmont Upland district. Common rock types within the Northern Piedmont region, which includes most of the western shoreline of Lake Martin in Tallapoosa, Coosa, and Elmore Counties, include resistant quartzite and quartz-rich schists. The Inner Piedmont Upland district is developed on metamorphic rock (schist and gneiss). Topographic features within this area are not prominent, other than incision by tributaries.

Soils

Soils within the project area were generally derived from weathering of the metamorphic and igneous bedrock. Soil types range from fine (clay) to coarse (sand and gravel) with loamy sand being the most common soil type within the project boundary (Soil Conservation Service, 1999). In general, soil productivity has been greatly reduced over much of the area because of poor farming practices in the 1800s and early 1900s. Many areas of depleted soils have reverted to forest, but productivity is often low. The resulting loamy, depleted soils dominant within the project boundary have moderate to high potential for soil erosion.

Erosion within the Project Boundary

Alabama Power identified, mapped, and photographed erosion hot spots on Lake Martin, and made an assessment of the source of the erosion at each site (see figures 3-1 and 3-2) (Alabama Power, 2010h). The survey was conducted by boat using visual inspection. Alabama Power attributed the observed erosion to either wave action or land use (boating, shoreline clearing, home construction, etc.). In some instances, Alabama Power concluded that land use was the initiating factor of the erosion process with other factors accelerating the process. While Alabama Power observed mild to moderate erosion at many sites, the company reported that severe erosion was uncommon or "atypical" in relation to the total length of project shoreline. Using field observations and Natural Resources Conservation Service soils maps (Alabama Power, 2010h), Alabama Power observed that the bedrock underlying the loams at each erosion site began at or near an elevation of 486 feet to 486.5 feet.

Figure 3-1. An example of severe erosion from Alabama Power's study (Source: Alabama Power, 2010h).

Figure 3-2. The locations of severe erosion sites observed by Alabama Power on Lake Martin (Source: Alabama Power, 2010h).

Erosion Downstream of the Project Boundary

Similar to the land on the shoreline above the dam, the land along the Tallapoosa River downstream of Thurlow dam is dominated by loamy soils with a moderate to high potential for soil erosion. Traveling by boat, Alabama Power visually inspected the shoreline from the base of Thurlow dam south to the Highway 229 Bridge, covering the first 10 miles of shoreline along the Tallapoosa River (Alabama Power, 2010h). Alabama Power inspected erosion and surveyed three sites twice annually during 2006 and 2007 and once during 2009. An additional 14 sites were visually monitored at the same frequency. Alabama Power did not observe erosion at these sites during a period of minimum flow (1,200 cfs) up to full generation flows (17,900 cfs). Alabama Power did observe erosion at these sites in 2009 when a spill event had occurred. Alabama Power interpreted their observations to indicate that the channel is most affected by "spill events," which occur when flows rise above 17,900 cfs.

Sedimentation within the Project Boundary

Alabama Power identified 19 sedimentation sites within the project boundary using light detection and ranging (LIDAR)[29] and aerial photography, as well as visual inspection by boat (Alabama Power, 2010h). Based on the location of the sediment in deltas formed at the tributary creek mouths, Alabama Power's interpretation was that lake sedimentation was caused predominantly by sediment entering the lake in tributary stream flow and settling in the still waters of the reservoir.

3.3.1.2 Environmental Effects

Erosion within the Project Boundary

Alabama Power concludes that the effects of raising the winter flood pool on erosion within the project boundary would be negligible.[30] Alabama Power predicts that wave action would likely increase if the number of recreation user-days increased and that increased wave action could result in a modest increase in erosion. Overall, however, Alabama Power comments that the changes in shoreline erosion directly associated with the proposed 3-foot increase in the winter pool would have a negligible effect on the 15 sites identified for erosion-monitoring on Lake Martin. However, sediment plumes and depositional patterns may not change.[31] Alabama Power notes that

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[29] LIDAR is an optical remote sensing technology that measures the distance to, or other properties, by using light to illuminate a target.

[30] Issues related to localized erosion and sedimentation associated with recreational use and shoreline management are addressed in those sections.

[31] Issues related to the potential establishment of nuisance aquatic vegetation are addressed in section 3.3.3, *Terrestrial Resources*.

bedrock was present at all of the 15 erosion hot spots, presumably providing a grade control to limit the amount of erosion that could occur. Therefore, none of the proposed elevation changes would have significant erosion effects within the project boundary.[32] Based on the results of its study, Alabama Power does not propose any measures or further monitoring to address erosion within the project boundary.

Our Analysis

Staff finds that an increase in the lake levels and associated effects on erosion would not be significant in proportion to the surface area and volume of the reservoir. Alabama Power's observations of severe erosion are not widespread. Alabama Power's mapping indicates that the areas of severe erosion are almost exclusively located on northwest-facing shores with substantial open water (or fetch), which are the areas greatest potential for wind and wave action. The presence of bedrock near the elevation of the potential erosion should limit the amount erosion. Also, based on its make-up of loam and gravel and only a modest amount of clay, most of the eroded material should settle within Lake Martin rather than deposit downstream and potentially affect riverine habitat. Sedimentation from bank erosion was not identified as notable in the reservoir deposition study as was sediment deposition from tributary sources. If operations did not change, erosion patterns would continue as they do under existing conditions.

Erosion Downstream of the Project Boundary

Stating that erosion downstream of Thurlow dam is partly an ongoing natural and historical process, Alabama Power discusses the potential effect of its proposal to raise winter lake levels on erosion and sedimentation in the Tallapoosa River downstream of Thurlow dam (Alabama Power, 2010a). The potential increase in the number of days with higher than historical spill (flows above 17,900 cfs) for the entire 67 years of record was modeled.[33] Using its HydroBudget model, Alabama Power estimates that a 3-foot increase in winter pool would increase the number of days of spill by 23 days over 67 years of record (Alabama Power, 2010b). Because of the limited storage capacity of the Yates and Thurlow impoundments, the increase in the spill associated with a 3-foot increase in the winter pool would carry through the two impoundments and into the river below. Alabama Power concludes that it would expect to see increased erosion from the tailrace of Thurlow dam to the Montgomery Water Works. Alabama Power proposes no measures or monitoring to address any effect of this increase relative to background erosion rates.

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[32] Alabama Power did note that the erosion might be nominally higher at the 486 foot contour associated with a 5-foot winter pool increase because of irregularities it observed in the topography at this elevation.

[33] The hydraulic capacity of the turbines at Martin Dam is 17,900 cfs. Above 17,900 cfs, Martin dam will spill water. That spillage will convey through the Yates and Thurlow developments to the reach of the Tallapoosa River below.

World Wildlife Fund and Alabama Rivers commented on erosion occurring downstream of Thurlow dam. World Wildlife Fund notes that increasing the winter pool at Lake Martin could increase the frequency of spill events associated with erosion. World Wildlife Fund stated that increased erosion and resulting increased sediment loads could have several negative effects including reducing water quality by making the water more turbid, increasing water treatment cost, and degrading spawning habitat for fish requiring clean gravel, such as the paddlefish, which require clean gravel for spawning (Jenkins and Burkhead, 1993).

Our Analysis

Increasing the winter pool level would cause additional spill events. Increased spill could increase erosion and in turn turbidity and sedimentation downstream of Thurlow dam. However, the study indicated an increase in spill events of 23 days over the 67-year period for a 3-foot increase in winter levels, and 52 days over the 67-year period for a 5-foot increase. Those changes would equal a 0.1 percent increase in days of spill for the 3-foot increase and a 0.2 percent increase in days for the 5-foot increase. Under the existing condition spill occurs less than 1 percent of the time making an increase of 0.1 to 0.2 percent potentially substantial. Given that Alabama Power associates downstream erosion with spill events and that an increase in winter pool elevation could increase the occurrence of spill events, the raising of the winter pool could increase downstream erosion. Under the staff alternative the spill frequency would be that of the existing condition. Therefore, under the staff alternative, there would not be any change in downstream erosion and sedimentation effects.

3.3.2 Aquatic Resources

3.3.2.1 Affected Environment

Water Quantity

Tallapoosa River

The Martin Dam Project uses the waters of the Tallapoosa River to generate power at the dam. The Tallapoosa River Basin drains parts of northern Georgia and east central Alabama. The total drainage area at the project dam is about 3,000 square miles. Alabama Power operates two other hydroelectric projects on the Tallapoosa River under licenses granted by the Commission: the Harris Project and the Yates and Thurlow Project[34] (figure 3-3). Table 3-1 provides operation, drainage area, surface area, and storage volume data for all three Alabama Power hydroelectric projects on the Tallapoosa River.

[34] As its name implies, the Yates and Thurlow Project is one licensed project consisting of two developments: Yates and Thurlow.

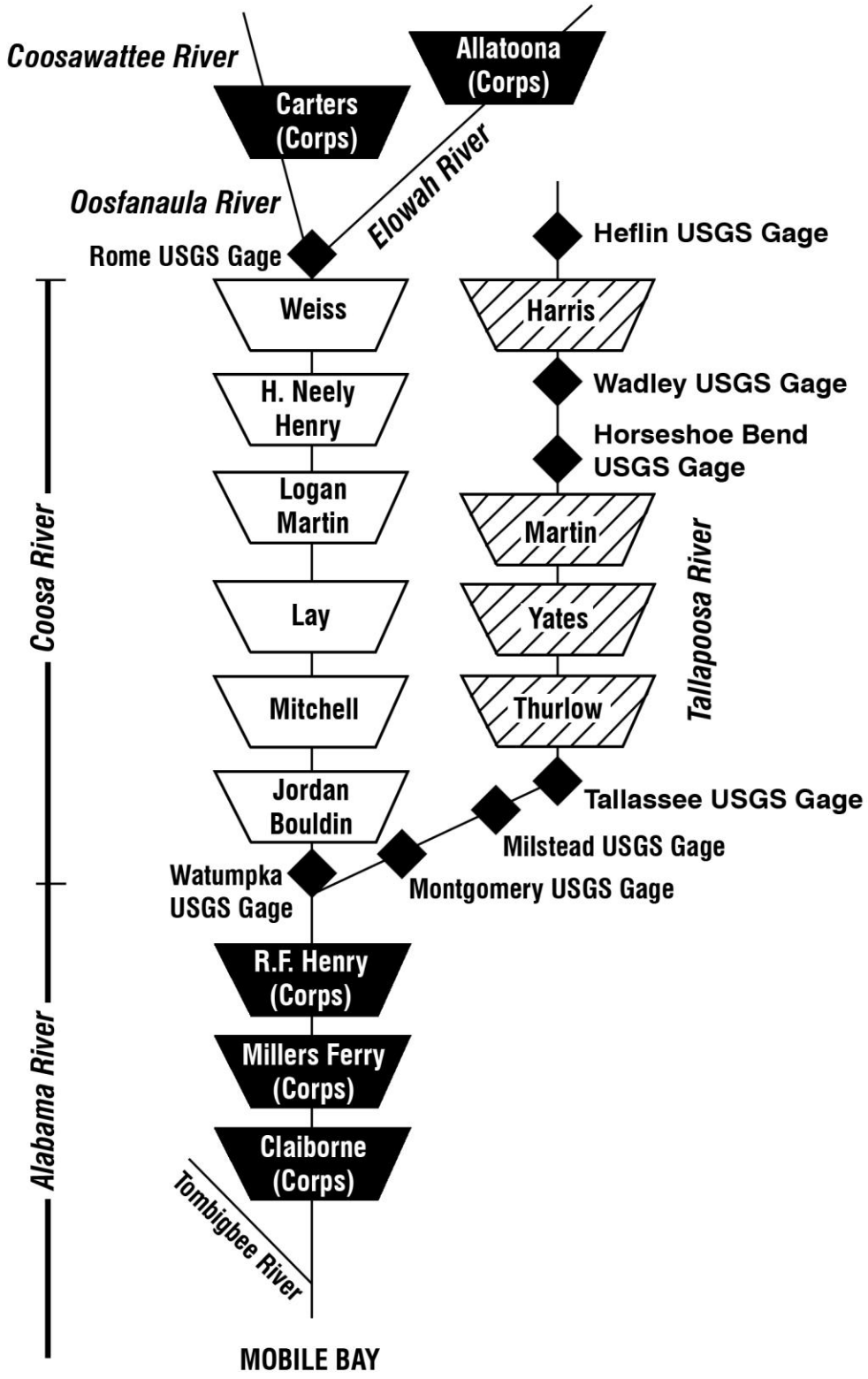

Figure 3-3. Tallapoosa River and Coosa River schematic (Source: Corps, 1998, as modified by staff).

Table 3-1. Alabama Power hydropower developments on the Tallapoosa River (Source: Corps, 2008.

Reservoir	FERC Project Number	Construction Date	River Mile	Drainage Area (square miles)	Surface Area (acres)	Total Storage (acre-feet)	Operation
Harris	P-2628	1982	139.1	1,453	10,600	425,700	Storage
Martin	P-349	1926	60.6	3,000	44,000	1,622,000	Storage
Yates	P-2407	1928	52.7	3,250	2,000	54,000	Run-of-river
Thurlow	P-2407	1930	49.7	3,300	574	18,250	Run-of-river

Note: Data in table are as reported by Corps, 2008b, and may differ slightly from data reported elsewhere in this draft EIS.

Alabama Power operates the Harris Project, about 79 miles upstream of Martin dam, as a storage facility and for hydropower generation. The Tallapoosa River upstream of Lake Martin (RM 92 to 139) is an upper-basin-type stream with steep slopes and narrow floodplains that include rapids. It also contains two currently operating U.S. Geological Survey (USGS) gage sites: Wadley and Horseshoe Bend (table 3-2 and figure 3-3). The Wadley gage has 86 years of daily flow and stage data, and Horseshoe Bend has 24 years of daily flow and stage data. The stream channel is characterized by rock outcrops and a few sand bars and is crossed by four highway bridges and two railroad bridges. The largest community along this reach of the river is the City of Wadley at RM 125.3. Data from both of these USGS gages indicate that, during low flow periods, the effects of peaking releases from Harris dam govern the flow regime at the locations of the gages (figure 3-3). The Horseshoe Bend gage, which can be used to characterize flows immediately upstream of Lake Martin, recorded a peak instantaneous daily flow of 132,000 cfs on May 9, 2003 (USGS, 2012). Table 3-3 shows monthly mean, maximum, and minimum flow statistics for this gage.

Table 3-2. USGS gages on the Tallapoosa River (Source: USGS, 2012; Alabama Power, 2011a).

Gage	Full Name	River Mile	River Mile Distance from Martin Dam
Helfin	USGS gage no. 02412000 Tallapoosa River near Heflin	186.8	126.2 (upstream)
Wadley	USGS gage no. 02414500 Tallapoosa River at Waldey	125.3	64.7 (upstream)
Horseshoe Bend	USGS gage no. 02414715 Tallapoosa River near Horseshoe Bend	95.5	34.9 (upstream)
Tallassee	USGS gage no. 02418500 Tallapoosa River below Tallassee	47.98	12.62 (downstream)
Milstead	USGS gage no. 02419500 Tallapoosa River at Milstead	39.8	20.8 (downstream)
Montgomery Water Works	USGS gage no. 02419890 Tallapoosa River near Montgomery Water Works	12.9	47.7 (downstream)
Montgomery	USGS gage no. 02419988 Alabama River downstream of the confluence of Coosa and Tallapoosa Rivers		70 (downstream)

Table 3-3. Monthly flow data for USGS gage no. 02414715 Horseshoe Bend, characterizing flows immediately upstream of Lake Martin (Source: Alabama Power, 2011a).

Month	Mean Discharge (cfs)	Maximum Discharge (cfs)	Minimum Discharge (cfs)
January	3,980	8,191	550
February	5,160	12,880	2,270
March	6,090	16,230	1,785
April	3,500	7,210	800
May	3,130	16,870	549
June	2,420	6,704	545
July	2,480	8,755	600
August	1,620	3,886	427
September	1,440	3,636	377

Month	Mean Discharge (cfs)	Maximum Discharge (cfs)	Minimum Discharge (cfs)
October	1,610	7,270	266
November	2,630	7,601	216
December	2,970	7,959	349

Note: The period of record is 1985 to 2009.

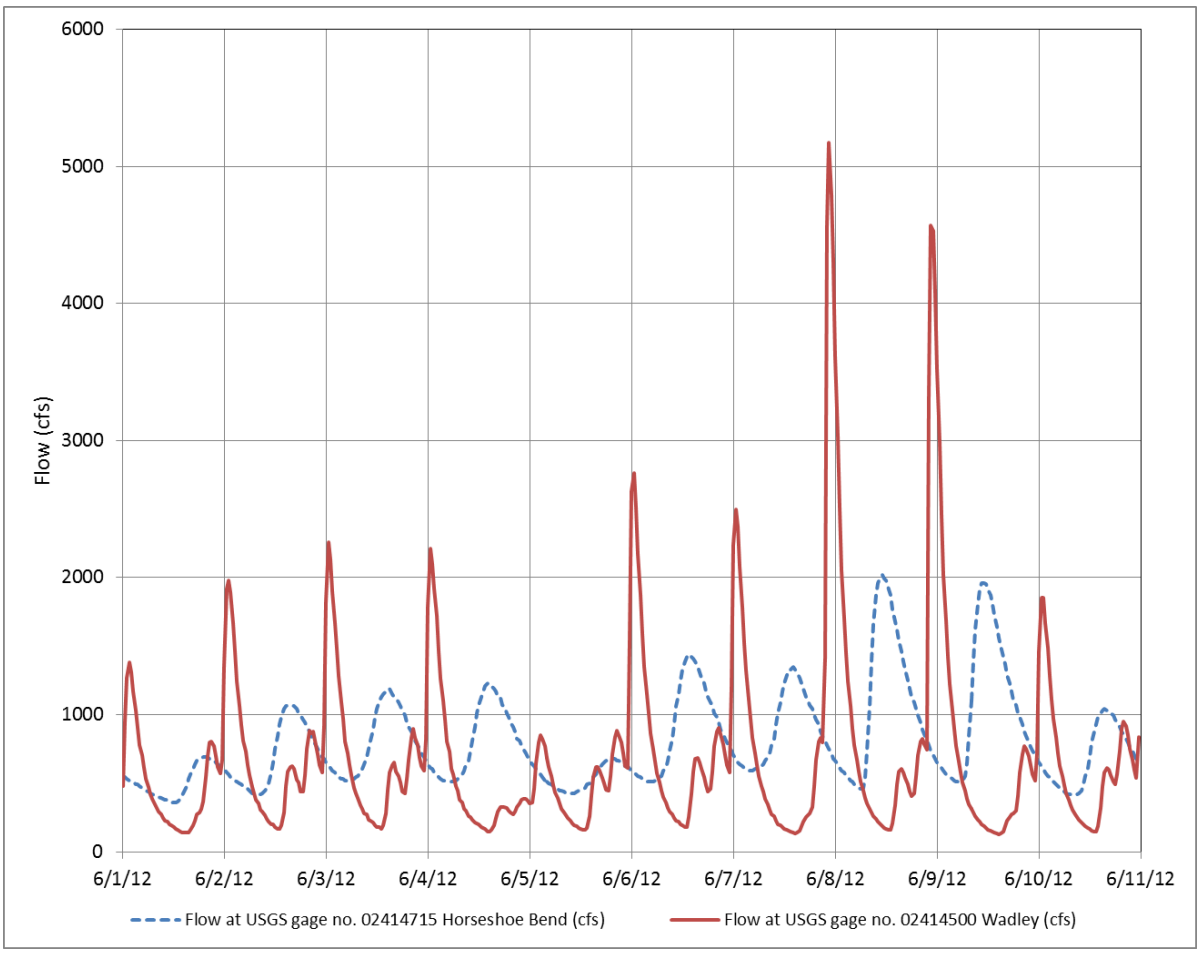

Figure 3-4. Low flow regime graphic for Tallapoosa River at the Horseshoe Bend and Wadley USGS gages, located upstream of Lake Martin (Source: USGS, 2012, as modified by staff).

Lake Martin

Lake Martin is located on the Tallapoosa River from about RM 60 to 92. Although the primary purpose of Martin dam is hydropower generation, it is also used for limited seasonal flood control, recreation, municipal and industrial water supply, aquatic flow maintenance, and navigation flow support. Alabama Power coordinates the

operation of the Martin Dam Project with its other hydropower projects on the Tallapoosa River and the Coosa River to minimize flooding. Lake Martin has a surface area of 40,000 acres at a normal full pool elevation of 491 feet and a shoreline of about 880 miles. It receives inflows from the Tallapoosa River, representing 2,131 square miles of drainage, and local inflows from an additional 853 square miles of tributaries that flow directly into the lake. The gross storage capacity of Lake Martin at maximum pool (elevation 491 feet) is 1.6 million acre-feet. Active storage in the available 45.5-foot drawdown is 1.2 million acre-feet (minimum elevation of 445.5 feet). According to Alabama Power, spill over the dam occurred less than 1 percent of the time during the period from 1940 to 2007.

Alabama Power manages the water level of Lake Martin, with an operating curve at elevation 490 feet from May 1 to September 1, decreasing to a low at elevation 477 feet on January 1 (see figure 2-1). Figure 3-5 shows historical reservoir levels for 1990 to 2011, along with the existing guide curves for Lake Martin. This figure shows that lake levels have generally been between the operating curve and the flood curve, except in the late fall to early spring period when lake levels have often exceeded the flood curve in response to high inflows, but have not exceeded elevation 491 feet. The average elevation closely matches the flood curve from late fall to spring, but then closely matches the operating curve from spring into the fall. Lake levels were reported to be below the drought curve only during the latter half of 2007 and the early part of 2008.

Outflows from Martin dam are discharged directly to the Yates reservoir. Figure 3-6 shows historic reservoir levels at Martin, Yates, and Thurlow and discharges from Martin. Discharges from Martin dam are shown to generally remain between 100 cfs and 10,000 cfs, although higher and lower flows are not uncommon. Lake Martin elevation (the top line on figure 3-6) vary more than those of the Yates and Thurlow reservoirs, reflecting the peaking operations at Martin and run-of-river operations at Yates and Thurlow.

Flooding has occasionally occurred downstream of Martin dam, including in 1979, 1990, 2003, 2009, and 2010. Based on data from Alabama Power, the maximum 1-day outflow from Martin dam was 105,884 cfs on March 17, 1990. Table 3-4 shows calculated flood frequency flows for unimpaired conditions at Martin dam,[35] and actual flood flow data at Martin dam and downstream at the Tallahassee gage. This table shows that Martin dam has been operating in a manner that has decreased the flood flows to rates lower than the unimpaired conditions. The table also demonstrates that flood flows even a short distance downstream at the Tallahassee USGS gage are influenced by tributary inflow.

[35] Unimpaired conditions means conditions without the dams in place, and no influence of storage and flow regulation.

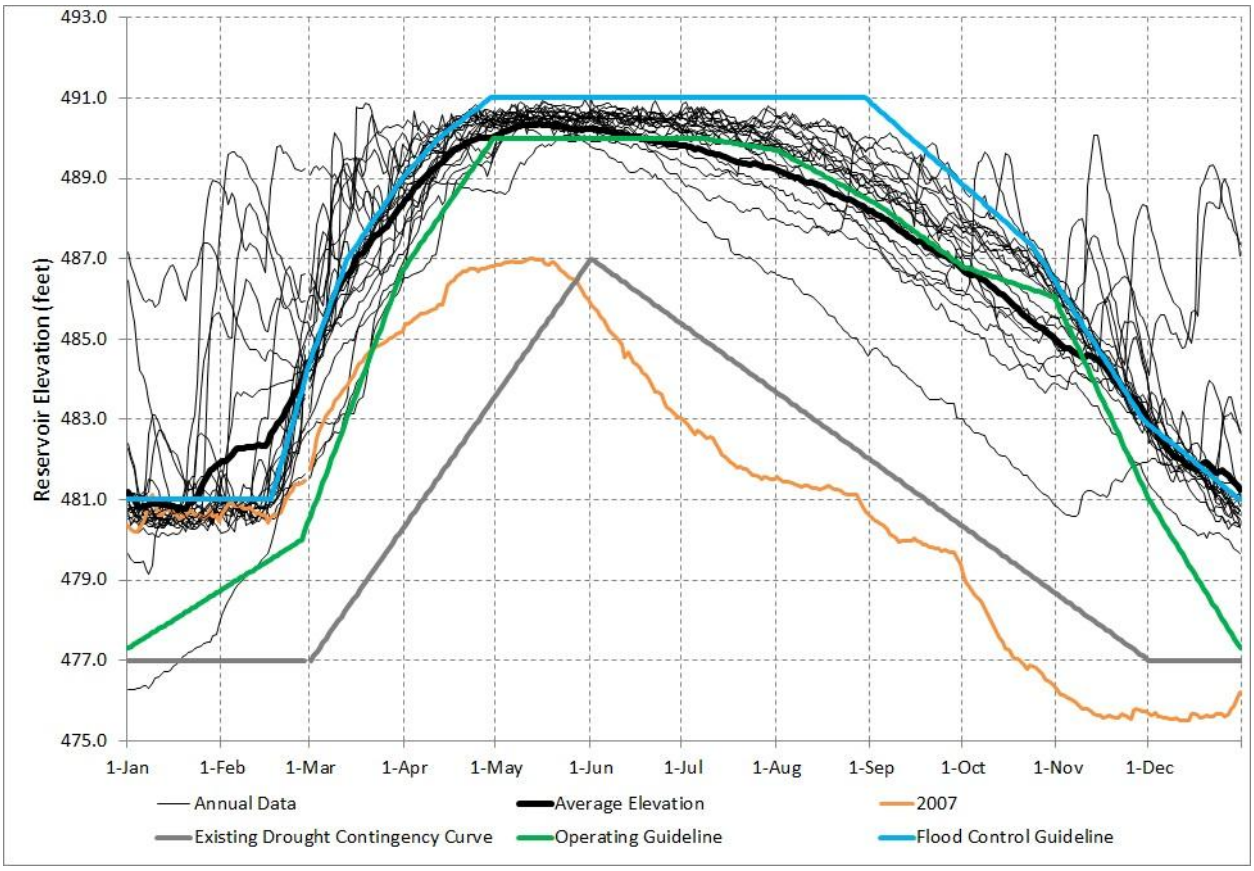

Figure 3-5. Historical reservoir levels from Lake Martin reservoir for 1990 to 2011 (Source: Alabama Power, 2011a, as modified by staff).

Table 3-4. Calculated flood frequency flows (in cfs) for Martin dam and historical flood flows (in cfs) at Martin dam and the Tallahassee gage located 12 miles downstream of Martin dam (Source: Alabama Power, 2010f; Alabama Power, 2011a; USGS, 2012).

Calculated Unimpaired Flows at Martin Dam								
Avg. Flow	2-Year	5-Year	10-Year	50-Year	100-Year	500-year	April 1979	March 1990
1-day	48,000	72,000	87,000	118,000	130,000	156,000	114,551	125,019
3-days	NA	NA	66,400	91,400	102,000	125,000	92,446	103,610
5-days	NA	NA	51,800	71,700	80,100	99,600	68,262	78,483

Historical Recorded Flows from Martin Dam			
Avg. Flow	March 1990	May 2003	July 2003
1-day	105,884	96,035	59,038
3-days	75,665	66,522	47,945
5-days	59,141	47,236	36,200

Historical Recorded Flows from the Tallahassee Gage downstream of Martin Dam				
Average Flow	April 1979	March 1990	May 2003	July 2003
1-day	110,000	125,000	94,000	68,900
3-days	76,433	85,667	62,967	51,133
5-days	59,240	66,940	45,800	39,580

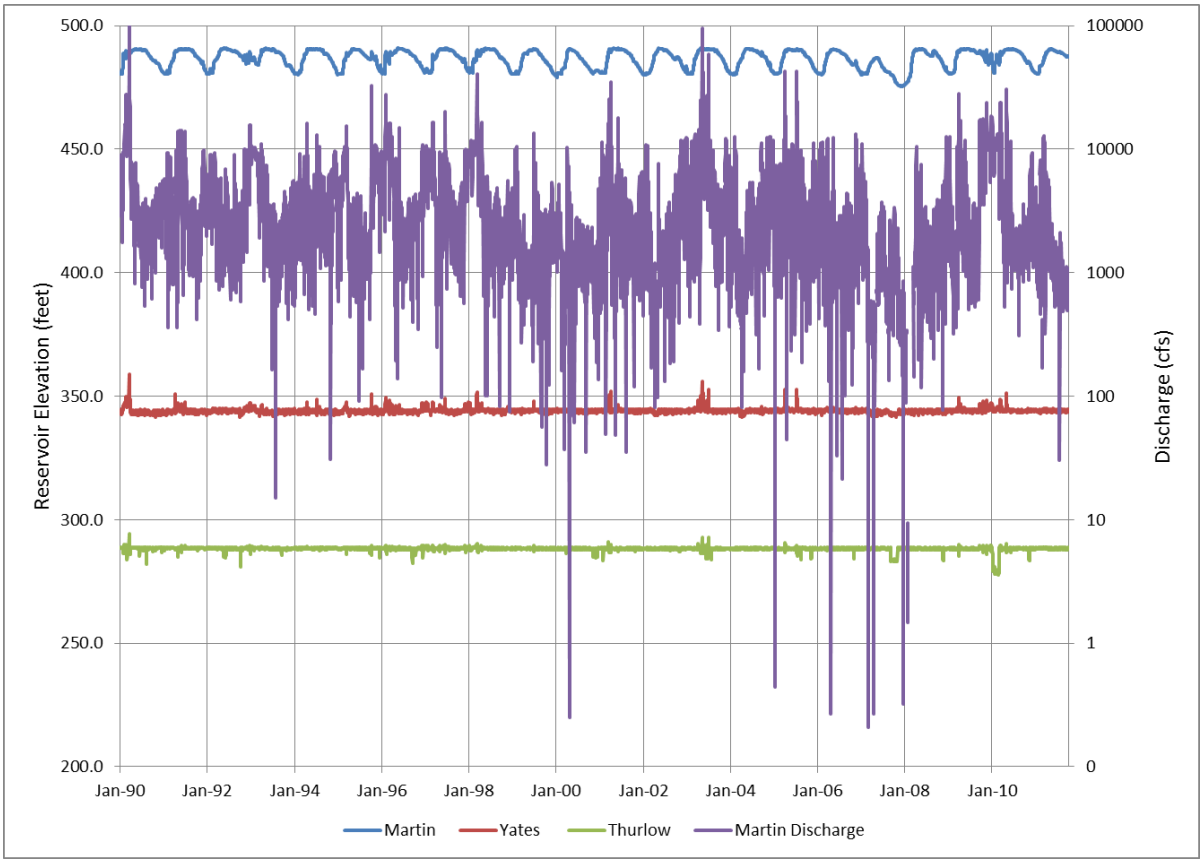

Figure 3-6. Historical reservoir levels for Martin, Yates, and Thurlow, and releases from Lake Martin reservoir for 1990 to 2011 (Source: Alabama Power, 2011b, as modified by staff).

Flows Downstream of Thurlow

The Martin Dam Project operates in a peaking mode as described in section 2.1.3, *Existing Project Operation*, but with the objective of maintaining a 1,200-cfs minimum flow from Thurlow dam. The normal operational flows below Thurlow dam range from about 1,200 to 17,900 cfs. River flows below Thurlow dam are measured at the Tallahassee USGS gage no. 02418500 on the Tallapoosa River below Tallassee, located at RM 47.98 about 2 miles downstream from Thurlow dam (table 3-5). These monthly flow data show flows lower than the 1,200-cfs minimum flow from Thurlow dam, because Alabama Power is allowed to reduce the minimum flow under drought conditions, as described in section 2.1.3.

Table 3-5. Monthly flow statistics downstream of Thurlow dam at the Tallahassee USGS gage no. 02418500, Tallapoosa River, below Tallassee, Alabama, 1992 to 2011 (Source: USGS, 2012).

	Oct	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Mean	3,370	4,965	5,726	5,401	5,594	6,274	4,042	3,806	3,187	3,449	2,570	2,583
Median	2,380	4,055	4,935	4,430	4,085	4,165	2,560	2,240	2,115	1,995	1,980	2,055
Max.	36,200	23,400	19,000	18,300	25,600	40,800	51,200	94,000	26,100	68,900	11,400	18,300
Min.	80	356	368	365	387	390	241	281	810	536	175	448
10% Exceed.	5,762	10,610	11,910	10,910	12,100	13,910	8,691	6,974	6,501	6,613	5,180	4,265
90% Exceed.	1,300	1,310	1,370	1,320	833	703	653	1,270	1,270	1,270	879	1,190

Note: Data shown in this table are for 1992 to 2011. The drainage area at this gage is 3,328 square miles.

Lower Tallapoosa River

The reach of river below Thurlow dam (the lowermost dam on the lower Tallapoosa River) has widening floodplains and much flatter slopes as compared to the reach above Lake Martin. There are recent records for two USGS gage sites in this reach in addition to the Tallassee gage:

- USGS gage no. 02419500 Tallapoosa River at Milstead at RM 39.8; and
- USGS gage no. 02419890 Tallapoosa River near the Montgomery Water Works at RM 12.9.

The Tallapoosa and Coosa Rivers merge near Montgomery to form the Alabama River. At this location, 68 percent (about 10,161 square miles) of the drainage area is

from the Coosa River and the remainder, about 4,675 square miles, is from the Tallapoosa River. Flows from the Coosa River enter the Alabama River from Alabama Power's Coosa River Project. Alabama Power supplies water for navigation on the Alabama River from the projects on both the Coosa and Tallapoosa Rivers.

Downstream of the confluence of the Coosa and Tallapoosa Rivers on the Alabama River, the Corps operates the Robert F. Henry lock and dam, Millers Ferry lock and dam, and the Claiborne lock and dam. Two are operated for navigation purposes, hydropower, and recreation, and one is operated for navigation purposes and recreation (see figure 3-3). These three facilities have small day-to-day water level fluctuations along their long and narrow impoundments. The Robert F. Henry lock and dam, which has an 82-MW hydropower generation facility, is located about 77 river miles downstream of Jordan dam and normally controls the water level upstream to the tailwater area downstream of Jordan dam. Millers Ferry lock and dam, which has a 90-MW hydropower generation facility, is located about 103 river miles downstream of the Robert F. Henry lock and dam. Claiborne lock and dam has no hydropower facility, is located about 60 miles downstream of Millers Ferry lock and dam, and about 118 miles upstream from Mobile Bay, which receives flow from the Alabama and Tombigbee Rivers. The Tombigbee River joins the Alabama River about 72 river miles downstream of Claiborne lock and dam.

Water Use

Under the current license, Alabama Power has given approval for reservoir withdrawals totaling about 36 million gallons per day (mgd) (Alabama Power, 2010c). On average about half of that, or 18 mgd, is withdrawn from Lake Martin (table 3-6).

Table 3-6. Approved water withdrawals from Lake Martin, Tallapoosa River (Source: Alabama Power, 2010c).

Owner	Facility Name	Source	Average Daily Withdrawal (mgd)	Alabama Power 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	Central Elmore Water and Sewer Authority Water Treatment Plant	Lake Martin	6.7	10
Still Waters Resort	Beaver Lake Replenishment Pump Station	Lake Martin	<0.1	<1

Water Quality

Alabama DEM classified Lake Martin as either mesotrophic or oligotrophic, meaning that nutrient levels and primary productivity are relatively low, based on long-term monitoring of the lake. Alabama DEM also classified the entire extent of Lake Martin as supporting both the swimming, and fish and wildlife classifications. The upper section of Lake Martin (upstream of U.S. Highway 280) also is classified as public water supply. The tailrace also was classified as public water supply, swimming, and fish and wildlife. All areas in Lake Martin currently meet their use classifications (table 3-7), and Alabama DEM did not include Lake Martin or any of the waters of the sub-basin in its 2010 303(d) list as impaired (EPA, 2008). The Tallapoosa River between Yates dam and Martin dam is listed under Category 2B, which indicates that although available data do not satisfy minimum data requirements, there is low potential for use impairment based on the limited data.

Table 3-7. Water quality standards applicable to the Martin Dam Project (Source: Alabama Power, 2011a).

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 milligrams per liter (mg/L) at a depth of 5 feet. Not less than 4.0 mg/L for hydroelectric turbine discharges.	Not less than 5.0 mg/L at a depth of 5 feet. Not less than 4.0 mg/L for hydroelectric turbine discharges.
Water temperature	Not greater than 90ºF (32.2 degrees Celsius [ºC])	Not greater than 90ºF
Turbidity	Not greater than 50 nephelometric turbidity units (NTUs)	Not greater than 50 NTUs
Bacteria	Not more than 1,000 colonies/100 milliliters (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 micrograms per liter (ug/L)	Not greater than 5 ug/L

Lake Martin thermally stratifies in the spring, creating a surface layer of well-mixed, warm, higher DO water (the epilimnion) and a bottom layer of colder, denser, lower DO water (the hypolimnion). Separating the two layers is a zone called the metalimnion or thermocline, where water temperature decreases rapidly with depth. Lake Martin typically stratifies in April or May, and turns over (loses its stratification) in the fall, usually in late October or November.

Alabama Power's existing water quality monitoring program has included chemical analyses of water samples (about 50 parameters) collected at the 5-foot depth at seven sites: in the Martin forebay and tailrace areas as well as at locations of 4, 12, 16, 20, and 24 miles upstream of the dam. Key parameters monitored in this program from 1993 until 2009 include DO, temperature, biochemical oxygen demand, pH, turbidity, nitrogen,[36] total phosphorus, orthophosphate, and various metals. In general, all parameters monitored were normally in compliance with the state of Alabama standards. In a data set from the Lake Martin forebay:

- temperatures ranged from 10.5°C to 31.6°C; and
- DO levels ranged between 3.8[37] and 10.7 mg/L with an average of 7.83 mg/L at all seven sites.

Alabama DEM and the Montgomery Water Works and Sanitary Board have also collected extensive water quality data throughout the Tallapoosa drainage basin including the project area. Both sets of data as summarized in the final license application indicated generally acceptable water quality in the project area. Data collected by Alabama DEM between 1994 and 2005 from Lake Martin, indicated maximum coliform levels of 33 colonies per 100 ml, substantially below the standards shown in table 3-7. Based on data collected by Alabama DEM in the same time period in Lake Martin, chlorophyll *a* averaged 8.52 ug/L, and had a maximum of 98.41 ug/L, both above the 5.0 ug/L standard shown in table 3-7.

Nutrient data in Lake Martin collected by the Lake Watch of Lake Martin indicated that nutrient levels in Lake Martin have been increasing over time. As part of the preparation of the license application, Alabama Power conducted a nutrient study during 2009 and 2010. As a part of this study, nutrient and basic water quality parameters were collected monthly at 16 sites from April to October 2009 and at 8 stations during the winter months from November 2009 to March 2010. During April to October, the average chlorophyll *a* value of the 16 sites was about 4.8 ug/L with a maximum of 31ug/L measured at the upper end of Lake Martin.

As described earlier, the flow in the Tallapoosa River downstream of Thurlow dam fluctuates based on generation flows at the Martin Dam Project, with only a small

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[36] Nitrogen ammonia, nitrogen nitrate, nitrogen nitrite, and nitrogen total kjeldahl.

[37] The second lowest reading was 5.3 mg/L.

effect caused by the limited storage capacity at the Yates and Thurlow developments. Alabama Power conducted extensive temperature and DO monitoring of the tailrace between June 1 and October 31 from 2002 through 2009. This monitoring included tailrace readings every 20 minutes in the 2002 to 2005 period and every hour in 2006 to 2009. The DO and temperature data are summarized in table 3-8. The data show that the water quality of the discharge from Lake Martin generally met or exceeded the minimum state water quality standard for DO of 4.0 mg/L for hydropower discharges.

Table 3-8. Summary of the Martin dam tailrace sampling data (Source: Alabama Power, 2011a).

	Temperature (°C)		**DO (mg/L)**	
	2002-2005	**2006-2009**	**2002-2005**	**2006-2009**
Minimum	12.06	12.7	3.46	4.17
Maximum	25.44	31.1	9.78	9.54
Average	19.11	18.05	5.91	5.72
Number of Measurements	7795	2529	7795	2529
Percent of Time > 4 mg/L	-	-	99.9	100

In the 2002 to 2005 time period, there were only two events recorded with DO below 4.0 mg/L and Alabama Power provided these explanations:

- on October 28, 2002, when Unit 4 experienced a scheduled outage to dry out the generator, resulting in a temporary shutdown of the turbine aeration system, the deviation from the state standard lasted 2.5 hours; and
- on July 8, 2005, when the DO dropped below 4.0 mg/L during a flood event and the high water level in the tailrace resulted in the DO monitor measuring DO levels not representative of discharges from the powerhouse (manual DO readings downstream of the dam during the event verified that DO levels exceeded 4.0 mg/L in project releases).

Alabama Power continues to collect hourly DO and temperature values in the tailrace during generation from June 1 through October 31 of each year as part of its long-term monitoring program required by its existing FERC license.

Fishery Resources

Lake Martin has clear, low productivity waters with generally good water quality. Because of the depth (maximum depth of 155 feet) and relatively long water retention

time of the reservoir,[38] thermal and chemical stratification occur annually. The extensive shoreline littoral zone and multiple tributaries provide excellent habitat for warmwater centrarchid species (sunfish and basses). The deeper open water areas of the reservoir also provide excellent habitat for open water (pelagic) species such as striped bass, and threadfin and gizzard shad.

Although Lake Martin has low fertility (i.e., low levels of nutrients), the fishery resources are healthy and extremely popular with anglers. At least 75 species have been reported in the project vicinity (Alabama Power, 2011a). Predominant recreational fish species include spotted and largemouth bass, striped bass, white bass, black crappie, and bluegill. Although spotted bass exhibit good production and survival, they grow more slowly, because of the lower fertility of the lake. Populations of black crappie, bluegill, and white bass remain healthy. Gizzard and threadfin shad provide the forage base for the fishery. There are currently no fish consumption advisories for Lake Martin or the area immediately downstream of the dam (Yates reservoir). Thurlow reservoir has an advisory for largemouth bass for mercury, and the lower Tallapoosa has an advisory for spotted bass, also for mercury (ADPH, 2011).[39]

Lake Martin supports a striped bass population, which Alabama DCNR supplements by stocking. Stocking has occurred annually using Gulf-strain striped bass. Though the fishery is generally stable, the population is under some stress. High water temperatures and low DO during the summer months have been reported to result in periodic deaths of adult striped bass. Radiotelemetry studies have shown that striped bass move to different parts of the lake, likely trying to find water with suitable temperatures and DO levels.

Studies have been conducted to determine the amount of total striped bass habitat (area where the water temperature is less than 25°C and the DO concentration is greater than 1.6 mg/L) and quality striped bass habitat (area the water temperature is less than 21°C and the DO concentration is greater than 3.2 mg/L) (Sammons, 2011). In 2009 and 2010, striped bass habitat generally decreased from spring into late-summer, and gradually increased in the fall as water temperatures cooled.

Alabama Power conducted an entrainment study to estimate the numbers of fish that may be entrained and killed during passage through the Martin dam powerhouse, emphasizing effects on striped bass and largemouth bass. This study was a combination of a desktop assessment and field hydroacoustic data collections. The following summarizes the key results:

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[38] The retention time, or average amount of time for water that has flowed into the reservoir to flow out, estimated to be about 194 days (Alabama Power, 2011a).

[39] The advisory recommends no consumption for women of child-bearing age and for small children, and no more than one meal per month for all others.

- entrainment estimates range up to 6.5 million fish annually;
- most entrainment occurs during the winter months;
- clupeids (threadfin and gizzard shad) compose the majority of fish entrained; most fish entrained were less than 4 inches in length; and
- the number of larger game species, such as striped bass and largemouth bass, entrained is small.

Releases from the project are relatively cool (bottom or hypolimnetic discharge) and infertile. The discharge flows directly into the Yates development reservoir. The Thurlow development is immediately downstream of the Yates development. Alabama Power conducted periodic fisheries monitoring from 1993 to 2009 as part of the Yates and Thurlow license requirements. The species composition downstream of Thurlow dam is similar to Lake Martin and includes spotted and largemouth bass, striped bass, white bass, black crappie, bluegill, reader sunfish, channel catfish, and yellow perch. Surveys found a total of 66 species, indicating a diverse riverine fishery. Species of particular interest that were collected only downstream of Thurlow include the paddlefish, a species of concern for Alabama DCNR, and the American eel.

Paddlefish spawn in the Tallapoosa River downstream of Thurlow dam during March and April. Upstream spawning movements are believed to be linked to an increase in water temperature. Spawning is likely triggered by higher flow events. Hubert et al. (1984) state that spawning occurs at water temperatures greater than 10°C (50°F) and that a rapid increase in river discharge, resulting in an increase in the river elevation by "several meters," is the trigger for spawning. The habitat suitability index (HSI) curves presented by Hubert et al. (1984) assign a rise in river stage of 3 meters (about 9.8 feet) and higher, above the average mid-winter flow level, a suitability index of 1.0 (meaning the highest suitability). They assign a river stage increase of 1.5 meters (about 5 feet) a suitability index of 0.5 (meaning moderate suitability). The HSI curves also indicate that higher river stages need to exist for 10 days, to allow for successful egg incubation and hatching. Paddlefish eggs are adhesive to the river substrate and would be dewatered and killed if river flow decreased soon after spawning. Alabama Power (2011a) identifies that an increase in river flow to 6,000 cfs on the Tallapoosa River as a key factor in triggering paddlefish spawning events in that system. A review of hydropower operational records found that outflows from Thurlow dam commonly meet this 6,000-cfs threshold during the spring spawning period. Flows from Thurlow dam during 1992-2007 (including drought years), reached or exceeded 6,000 cfs a total of 19 days during the months of March and April. In addition, pulsing of flows, related to peaking operations, well above 6,000 cfs occurred on a regular basis during the same time period.

While the paddlefish completes its lifecycle within the freshwater system, catadromous species, like the American eel, live most of their lives in freshwater environments and, upon reaching sexual maturity, migrate to the ocean to spawn. The

juvenile offspring migrate to the mouths of rivers and move upstream to freshwater habitat to live until adulthood. American eels were collected downstream of Thurlow dam, but not immediately downstream of the project. It appears that their upstream migration is blocked by the downstream dams.

Anadromous species migrate from the ocean into freshwater habitat to spawn. Historically, there were several species that migrated from the Gulf of Mexico to inland Alabama rivers (including the Tallapoosa River) to spawn. Striped bass are anadromous by nature, but the striped bass above Thurlow are not able to move in and out of the ocean, because of the dams. No other anadromous species currently occur in the Tallapoosa River immediately downstream of the Martin Dam Project. Again, upstream passage on the Tallapoosa River is blocked by the downstream Yates and Thurlow dams, as well as the three Corps dams on the Alabama River. However, some upstream fish passage may occur at the Corps dams via the navigation locks. Two anadromous species, the Alabama shad and striped bass, are thought to occur downstream of Thurlow dam. The Alabama shad, however, was not found by Alabama Power during sampling conducted as part of the Thurlow license requirements. Striped bass have been collected downstream of Thurlow dam, but these fish could be fish that had dropped down from Lake Martin, and may not have been upstream migrants from the Gulf.

Alabama Power mollusk surveys from 2006 to 2010 found several species of the mostly commonly occurring freshwater mussels and snails in Lake Martin, its tributaries, and downstream of Thurlow dam. Six native mussel species were collected in Lake Martin and its tributaries, including the: little spectaclecase, flat floater, giant floater, yellow sandshell, paper pondshell, and fragile paper shell. The non-native Asiatic clam was also commonly collected in Lake Martin. Diversity was somewhat greater downstream of Thurlow dam, with the collection of live, dead, or empty shells of nine unionid mussel species, including the: Alabama orb, southern pocketbook, Alabama heelsplitter, threehorn wartyback, bleufer, pistolgrip, yellow sandshell, fragile papershell, and giant floater. Five snail species were collected in Lake Martin or in the Martin dam tailrace including the: yellow elimia, cylinder campeloma, marsh rams-horn, two-ridge rams-horn, and unidentified species of the genus *Physella*. Previous sampling downstream of Thurlow dam during minimum flow studies found the Tallapoosa pebblesnail about 0.5 mile downstream of the dam. The Tallapoosa pebblesnail is a species of moderate conservation concern in Alabama, but it is not federally listed.

3.3.2.2 Environmental Effects

Water Quantity

Effects of Increased Winter Pool Elevation on Upstream and Downstream Flooding

Water levels of Lake Martin affect a wide range of aquatic and recreational resources and have the ability to partially control high flow events on the Tallapoosa

River. Flood storage within the reservoir prevents flooding in the reservoir and helps to limit the effects of flooding downstream of the dam along the Tallapoosa River. Alabama Power proposes to change the regulation of Lake Martin by raising the winter flood curve by 3 feet beginning in mid-November through mid-February, as described in greater detail in section 2.2.2, *Proposed Project Operation*, and as shown in figure 2-2.

Lake Martin RA recommends a 4-foot increase in the winter lake level because of potential economic benefits associated with increased use of the lake for recreation during the winter. Lake Martin RA believes that there would not be a substantial increase in downstream flooding. Lake Martin Home Owners & Boat Owners Association (Lake Martin HOBO) recommended a 5-foot increase in the winter lake level.

The Downstream Landowners assert that Alabama Power studies have been inadequate in evaluating and addressing flood damage that may occur to downstream property, lands, farms, timber, historical Indian artifacts, and wildlife. Specifically, they express concern regarding flood damage to their lands near or adjacent to the Tallapoosa River due to mismanagement of releases from the Martin dam.[40] They mentioned two floods (both smaller than the 100-year flood) in 2003, which they claim caused about $2.1 million in damages to crops and production losses. The Downstream Landowners are concerned that a higher winter reservoir level would limit the seasonal flood control capacity of the Martin Dam Project and increase the flooding downstream along the Tallapoosa River.

The Atlanta Regional Commission expresses concern that the proposed flood curve changes at Lake Martin would increase the reliance on Lake Altoona for flood control in the basin and therefore affect its water supply capability. They assert that the cumulative effects of the projects in the Alabama, Coosa, and Tallapoosa River Basins have not been adequately considered and that that the supply capability of Lake Allatoona may be adversely affected. Georgia Environmental Protection Division (Georgia EPD) raises similar concerns and makes several criticisms of Alabama Power's modeling analyses. Georgia EPD states that there was a lack of computer modeling of:

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[40] On February 25, 2005, Judith P. Bryan and 35 other parties (collectively known as "the farmers") sued Alabama Power in the Elmore Circuit Court alleging that Alabama Power negligently operated Martin dam during the flood events in May and July 2003 resulting in flood damage to their properties downstream of Martin dam along the Tallapoosa River. The Circuit Court issued a summary judgment in Alabama Power's favor on January 19, 2007, based on evidence that Alabama Power complied with the existing requirements for operation during the May and July 2003 floods. In addition, the summary judgment stated that Alabama Power's operations lessened the outflow from Martin dam so that the flooding was less than would have occurred without the dam. The farmers filed a timely appeal with the Supreme Court of Alabama, which on January 23, 2009 affirmed the summary judgment of the Circuit Court.

- current operations to be used as the baseline for the analysis of proposed operations;
- proposed drought operations or changes to the flood control operations; and
- the combined effects of its operation on the Coosa and Tallapoosa Rivers.

Our Analysis

As part of the license application process, Alabama Power conducted modeling studies of the upstream river reaches, Lake Martin reservoir, and downstream river reaches and reservoirs to assess the short-term and long-term effects that would result from a range of proposed reservoir level alternatives. Alabama Power's general modeling approach was to use the Corps software program HEC-RAS to evaluate river reaches, the Alabama Power Project Routing Model (described below) to evaluate the Lake Martin reservoir, and the HEC-ResSim model to analyze daily normal operations during non-flood conditions. Models were calibrated and verified using historical flow hydrograph and stage data, and flood effects were simulated using a 100-year design flood.[41] The results are discussed below.

Upstream flood modeling was conducted using HEC-RAS. An unsteady-state flow model was developed for the reach extending from the toe of Harris dam to the upstream face of Martin dam. The model was calibrated using a May 2003 flood event and verified using a March 1990 flood that approximated a 100-year return event. Effects in Lake Martin that would result from the proposed higher winter pool were evaluated using a design flood and the Alabama Power Project Routing Model. These effects were then evaluated using the upstream HEC-RAS model. The results indicate that the increased water level in Lake Martin would result in an upstream effect that would decline from about a 0.5-foot increase in flood level immediately upstream of Lake Martin to less than a 0.3-foot increase about 30 miles upstream of Lake Martin, to a negligible increase at about 70 miles upstream of the lake near the tailwaters of Harris dam (see figures 3-7 and 3-8).

[41] The 100-year design flood was synthetically constructed by applying seven 100-year events. These scale factors were developed from a Log Pearson Type III distribution frequency analysis using data from the ACT and ACF (Alabama-Coosa-Tallapoosa and Apalachicola-Chattahoochee-Flint) Rivers.

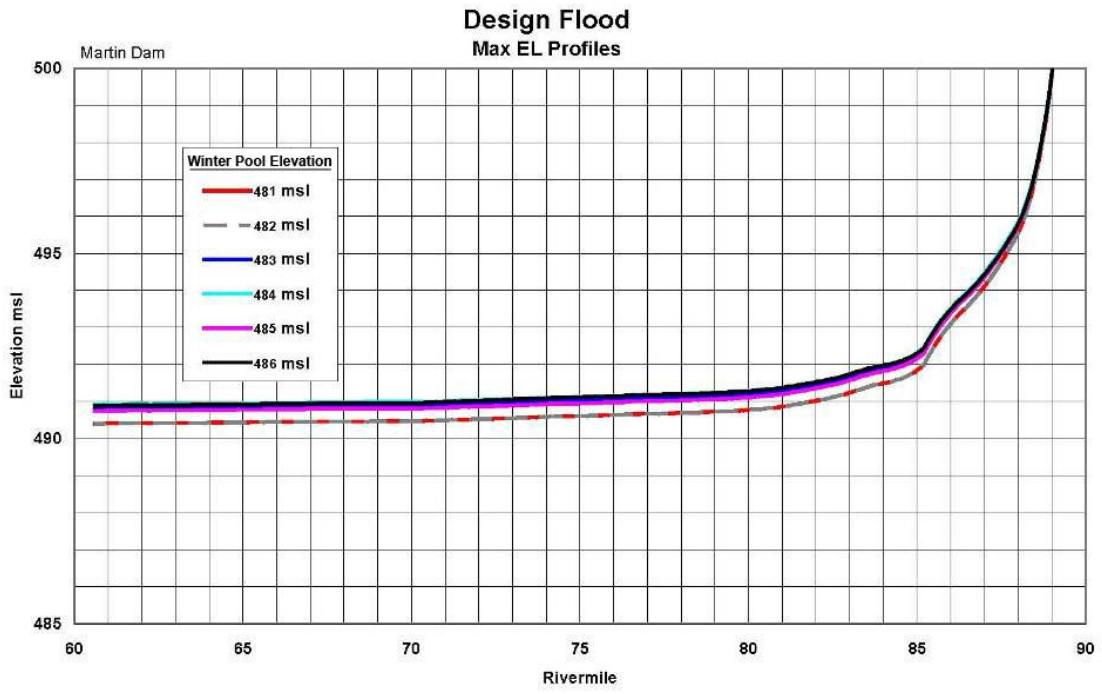

Figure 3-7. Design flood profiles upstream of Martin dam to Harris dam at alternative winter pool elevations (Source: Alabama Power, 2010f).

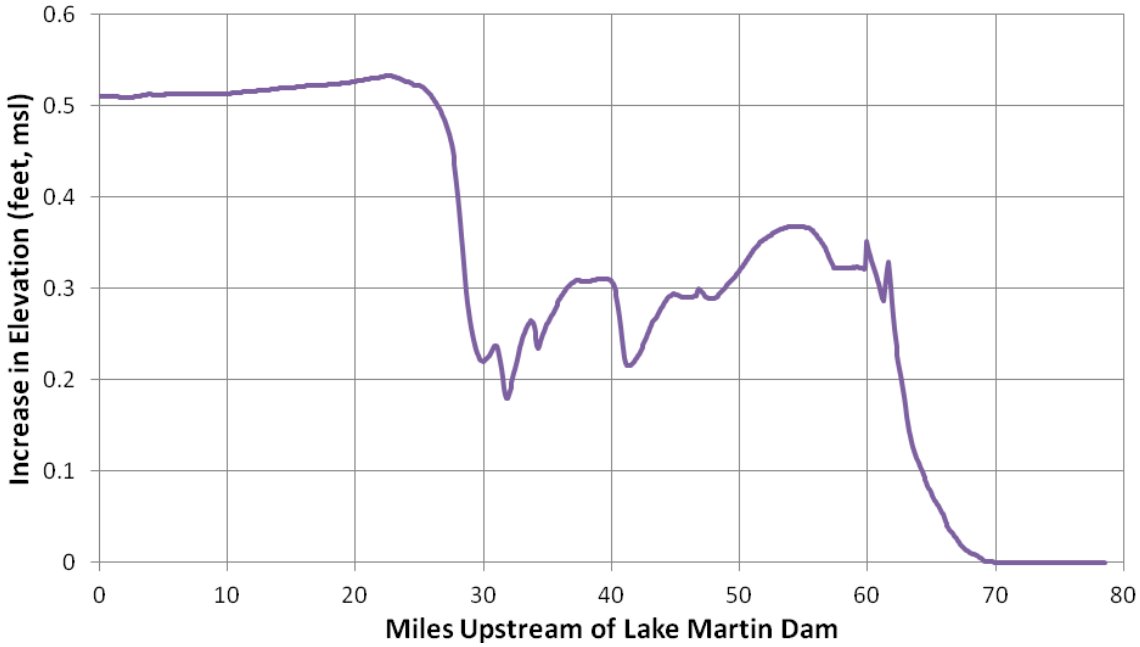

Figure 3-8. Computed increase in 100-year flood levels due to proposed change in flood control curve (3-foot increase in Lake Martin winter pool) (Source: Alabama Power, 2010f, as modified by staff).

Flood modeling within Lake Martin was conducted by routing the 100-year design flood using the Alabama Power Project Routing Model, a spreadsheet based model. This model was calibrated to the March 1990 flood event and then used to predict the reservoir flood levels that would occur as a result of the proposed flood control guideline. As stated previously, these results were used as downstream conditions in the upstream HEC-RAS model discussed above.

Lake Martin flood modeling results, shown in figure 3-9 for six different winter pool elevations, indicate that there would be about a 0.5-foot increase in the peak 100-year flood elevations by increasing the winter pool from elevation 481 feet to elevation 484 feet, but they would not rise above the 491-foot flood control curve. Similar results would occur with a winter pool elevation of 485 feet. The model also showed that the discharge hydrograph from Lake Martin would have an increased peak and greater volume of flow as a result of the proposed flood control curve, which we discuss below under the effects on downstream flooding.

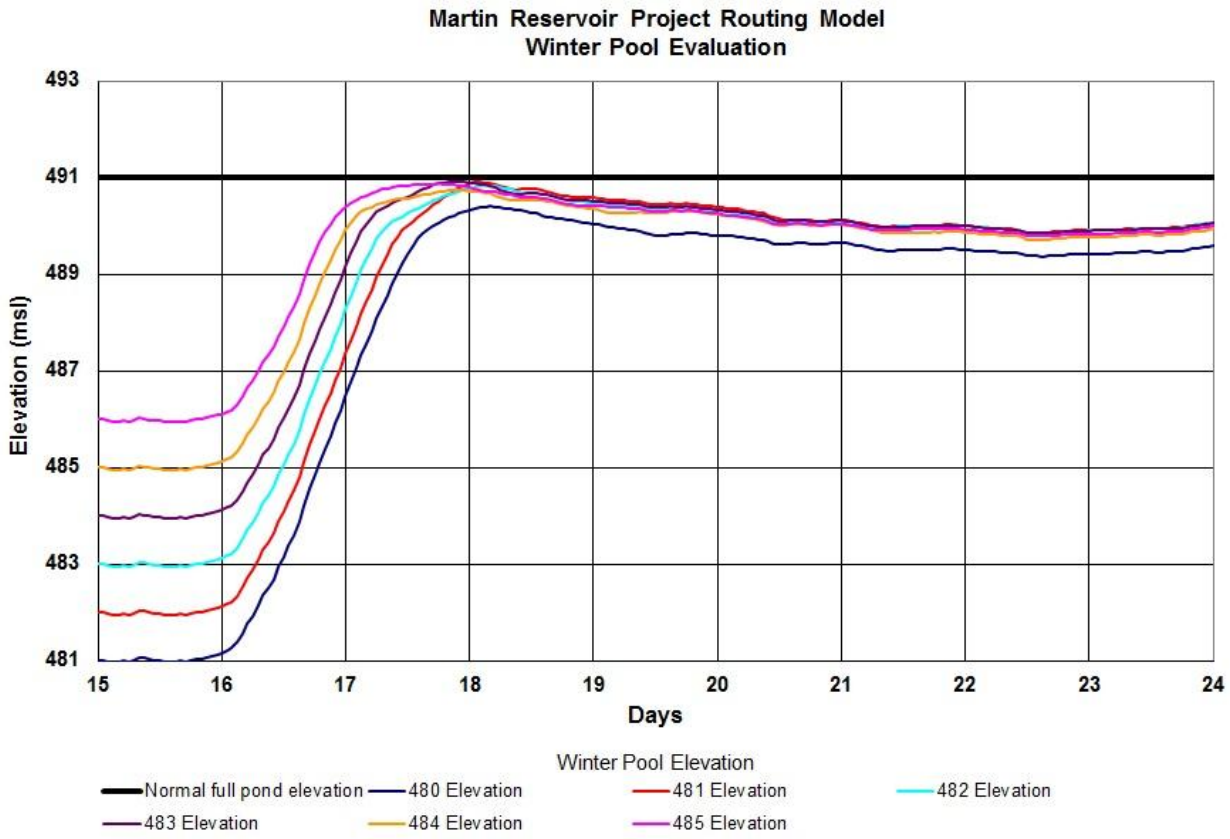

Figure 3-9. Lake Martin 100-year flood elevations under different winter pool elevations (Source: Alabama Power, 2010f, as modified by staff).

Beginning about 1.6 miles downstream of Thurlow dam,[42] Alabama Power used a HEC-RAS model to simulate the downstream flood effects that would result from the proposed higher flood curves.[43] After calibration and verification, the 100-year design flood was applied to the model, and downstream flood level increases were computed to be between 0.75 and 3.0 feet resulting from a 3-foot increase in the winter pool, as measured at cross sections of the HEC-RAS model, with greater increases in the upper section of the river. Table 3-9 shows changes in elevation at three downstream gages. The 3-foot-higher winter pool proposed by Alabama Power would result in flood levels slightly below the SERFC moderate flood stage at the Milstead gage (199.6 feet vs. 200 feet). However, farther downstream at the Montgomery Water Works gage, the 3-foot higher winter pool elevation would result in a flood level that is 0.1 foot below the major flood stage. Under existing conditions, the 100-year flood was modeled to be well within the moderate flood stage at Montgomery Water Works. Table 3-9 also shows resulting flood levels from a 5-foot-higher Lake Martin winter pool, which would be 0.7 to 1.1 feet higher than levels associated with the 3-foot-higher winter pool, placing the flood into the major flood stage category at Montgomery Water Works.

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[42] Alabama Power did not conduct flood modeling in the first 12 river miles downstream of Martin dam because this reach is impounded by the Yates and Thurlow developments and because the developments provide little attenuation of flood flows.

[43] Alabama Power calibrated and verified the model to the 2003 and 2009 flood events to observed stage values, but had difficulty in matching the corresponding gage flow values. Reportedly this was due to the dynamic effects computed by the unsteady-state flow HEC-RAS simulation, compared to the static relationship between stage and flow assumed by USGS at the gaging stations used for model calibration and verification. According to Alabama Power, USGS and Alabama Power agreed that the more important parameter for flood modeling was stage rather than flow. Subsequent analysis of downstream effects by Alabama Power focused on flood levels and not flows. We agree that calibrating to stage is more important than flow due to the effects on flood levels downstream of the project. However, the lack of calibration requires broad interpretation of the model results.

Table 3-9. Modeled downstream flood levels at USGS gage sites, as a result of the increase in the Lake Martin winter pool elevation (Source: Alabama Power, 2010f).

	Computed Existing 100-year Flood Elevation – 481 ft msl Winter Pool	Computed 100-year Flood Elevation – Proposed 484 ft msl Winter Pool	Increase in Computed Flood Level for 3-foot increase in Winter Pool (feet)	Increase in Computed Flood Level for 5-foot increase in Winter Pool (ft)	SERFC Low Flood Stage (ft msl)	SERFC Moderate Flood Stage (ft msl)	SERFC Major Flood Stage (ft msl)
Tallassee Gage (12.6 miles downstream of Martin dam)	204.8	207.1	2.3	3.1	[a]	[a]	[a]
Milstead Gage (20.8 miles downstream)	198	199.6	1.6	2.3	194	200	207
Montgomery Water Works Gage (47.7 miles downstream)	165.4	166.9	1.5	2.6	154	161	167

Note: SERFC - Southeast River Forecast Center

Using LIDAR and aerial photography, Alabama Power created topographical and land use maps of downstream areas that could be affected by flooding both in existing and proposed conditions based upon the HEC-RAS model predictions. These maps were used to identify land area and structures that are currently affected by flooding and could be affected by proposed higher winter lake levels. Figure 3-10 shows an example map for a location about 4 miles upstream from the Montgomery Water Works gage. The shading that makes up only a small portion of the figure shows additional areas that would be affected by increased flooding.

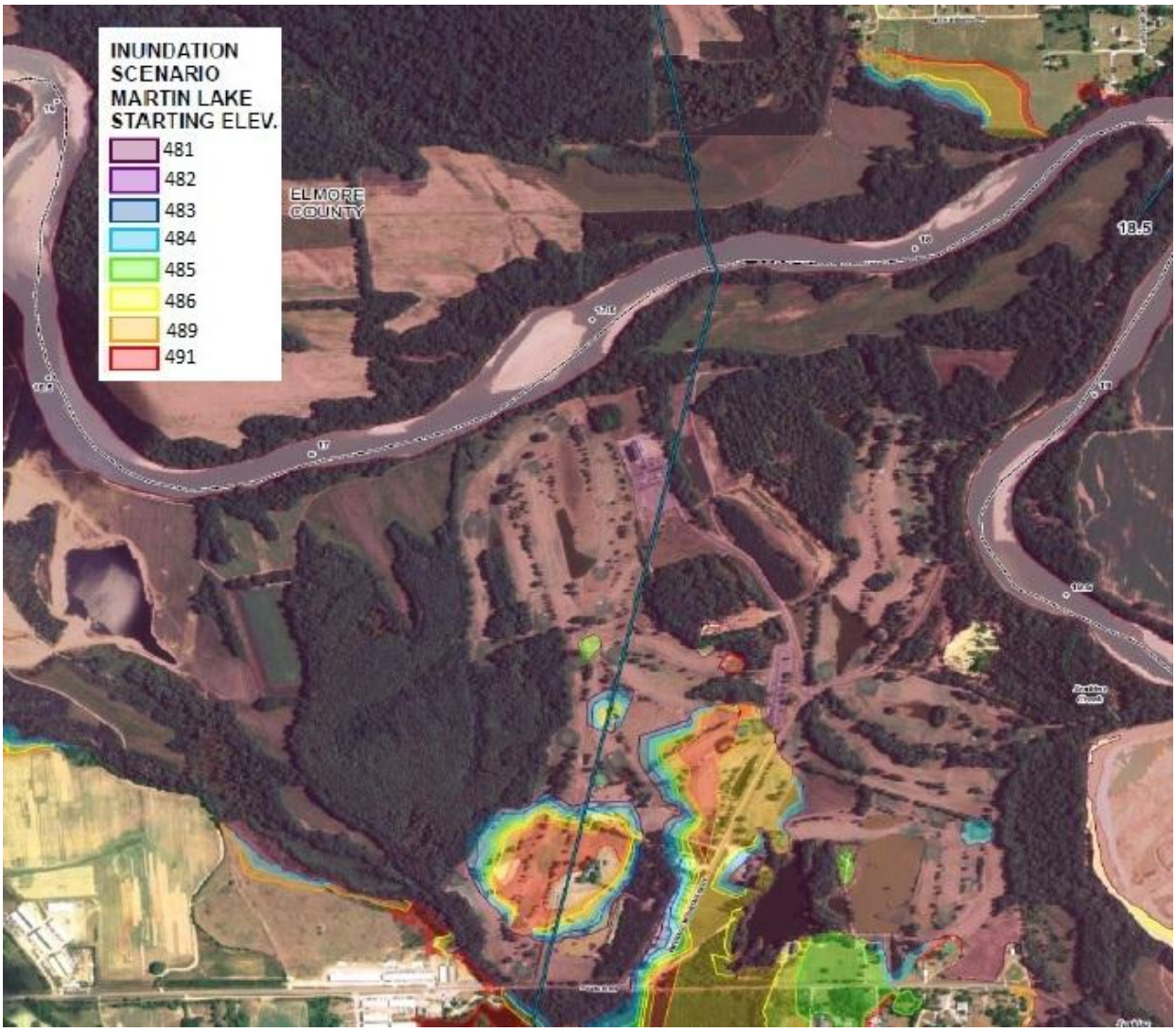

Figure 3-10. Flooding inundation map near RM 17 (Source: Alabama Power, 2010f).

Table 3-10 shows estimates of the currently affected area and the area that would be affected by different modeled scenarios. The proposed winter pool elevation of 484 feet ml would flood an additional 2,119 acres (3.31 square miles) of land, including:

- 2,041 acres of agricultural land;
- 30 acres of industrial land;
- 23 acres of commercial land; and
- 23 acres of residential land.

Table 3-10. Estimated downstream acres of land affected by flooding associated with alternative winter pool levels, at the 100-year flood level (Source: Alabama Power, 2010f).

Model Scenario (Winter Pool elev. feet msl)	Inundated Area (acres)	Inundated Area (acres) by Land Use Category			
		Agricultural	Industrial	Commercial	Residential
481 (existing)	19,924	17,733	448	385	23
482	20,256	18,063	449	385	23
483	20,568	18,354	459	393	25
484 (Alabama Power)	22,043	19,774	478	408	46
485 (Lake Martin RA)	22,500	20,097	491	496	79
486 (Lake Martin HOBO)	23,277	20,752	581	513	94
489	24,353	21,499	607	560	1,230

Table 3-11 shows estimates of the currently affected structures and the number of structures that would be affected by different modeled scenarios. Additional flooding from the higher winter lake level proposed by Alabama Power could affect an additional 10 commercial structures and 13 residential structures. At winter lake levels recommended by Lake Martin HOBO, additional affected structures include one industrial structure, 13 commercial structures, and 19 residential structures as compared to existing conditions.

Table 3-11. Estimated downstream number of structures affected by flooding associated with alternative winter pool levels, at the 100-year flood level (Source: Alabama Power, 2010f).

Model Scenario (Winter Pool elev. feet msl)	Affected Structures	Inundated Structures by Land Use Category		
		Industrial	Commercial	Residential
481 (Existing)	18	3	11	4
482	18	3	11	4
483	27	3	20	4
484 (Alabama Power)	41	3	21	17
485 (Lake Martin RA)	47	4	22	21
486 (Lake Martin HOBO)	50	4	24	22

Our analyses, using the modeling files provided by Alabama Power, show that increases in the downstream flood stages associated with changes in the winter pool elevations would be proportionately smaller with smaller flood events than the 100-year flood event. This is related to the greater influence of the Lake Martin storage capacity, even with higher winter water levels, and the greater effect of tributary inflow downstream of Martin dam. In flood events larger than the 100-year storm, storage effects associated with Lake Martin become less of a factor, and downstream flood levels are more similar to existing conditions.

With the proposed higher Lake Martin winter elevation, in the winter months, there would also be an increase in frequency of spillage at Martin dam (from one or more of the 20 spillway gates), because the project could not use its storage volume to retain small magnitude flood events. Spillage of any volume, based on historical operations from 1940 to 2007, has occurred infrequently, about 0.85 percent of the time. Based on modeling conducted by Alabama Power, with a 5-foot increase in the winter pool, spillage would occur about 1 percent of the time. With a 3-foot increase in winter pool elevation, spillage would occur about 0.95 percent of the time. At higher volumes (above 20,000 cfs) the frequency of spillage would increase slightly from about 0.14 percent to 0.15 percent of the time.

In summary, an increase in the winter pool elevation would increase reservoir levels, flows at Martin dam, and water elevations at downstream locations during flood conditions. The proposed higher winter pool elevation would reduce the useable flood storage volume by about 94,000 acre-feet, or 47,500 cfs-days during the winter. Our analysis shows that, for minor flood events, less than the 100-year flood, the effects on downstream flooding would be small. However, flood levels during a 100-year flood

event during the winter or early spring could be between 0.75 and about 3 feet higher in some downstream locations. Compared to existing conditions, the increase in flood levels could affect an additional 2,119 acres of land and 23 structures under the Alabama Power proposal, and an additional 4,429 acres and 32 structures under the Lake Martin HOBO recommendation.

Effects of Lower Spring and Summer Lake Martin Elevations on Downstream Flooding

The Downstream Landowners assert that Alabama Power's studies have been inadequate in evaluating and addressing downstream flooding, flood damage, and operation of the project for flood control. The Downstream Landowners identify two options which could provide flood control at Martin dam: (1) operate to pre-evacuate the pool when weather reports predict impending heavy rainfall events and (2) require flood control as a project purpose and operate with dedicated flood control storage on a year-round basis.

Alabama Power did not evaluate operating the project with dedicated storage on a year-round basis. Alabama Power's studies focused only on the period in which changes in the flood curve were proposed (i.e., mid-November through mid-March). We conducted an independent analysis of the Downstream Landowners' recommendations, which is presented in appendix C of this EIS. Our conclusions and recommendations on the Downstream Landowners' proposals are discussed in section 5.0, *Conclusions and Recommendations*.

Conditional Fall Extension

During low water levels at Lake Martin, recreational activity could be affected adversely because of reduced access to boat ramps and greater exposure to submerged hazards such as rocks and tree stumps. Alabama Power proposes to evaluate the potential for higher lake levels from September 1 to October 15, primarily to benefit recreation and other uses of Lake Martin into the fall. Each September, Alabama Power would conduct an evaluation each day to determine the feasibility of keeping the flood curve at 491 feet for as long as an additional 1.5 months (September through mid-October), based on four hydrologic and project operational criteria as described in detail in section 2.2.2, *Proposed Project Operations*.

Alabama Power proposes to notify Lake Martin RA and post up-to-date status notifications to its lakes and recreation website (https://lakes.alabamapower.com/), whether or not the conditional fall extension is being implemented. Alabama Power also proposes to abide by all downstream minimum flow commitments and other operational commitments. Thus, the measure is intended to be implemented only in years when there are adequate flows and reservoir elevations to meet such needs.

Both Lake Martin RA and Lake Martin HOBO recommend the fall extension. Lake Martin RA, however, recommends that the fall extension be triggered if the Harris

reservoir on the Tallapoosa River is within 2 feet of its rule curves, instead of 1 foot as proposed by Alabama Power. Lake Martin RA states that this would allow the measure to be implemented more frequently.

Our Analysis

Higher lake levels generally enhance recreational use and associated economic activity in the area. However, such levels also can decrease flood storage capacity and, during reservoir filling, affect the amount of flow available for downstream releases, including for minimum releases and power generation.

Alabama Power analyzed the ability to increase fall lake levels by reviewing historical data on stream flows and lake levels from 1983 to 2010 (the 29 years since Harris dam began operating). Alabama Power then carried out HEC-ResSim modeling for 1940 to 2007, with the inclusion of its proposed winter lake elevation of 484 feet. Table 3-12 shows the percent of time that the four criteria would be met under different hydrologic and operational conditions. Harris reservoir stands out as a limiting factor.[44]

Table 3-12. Number of years criteria were met for the conditional fall extension (Source: Alabama Power, 2011b).

	Number of years criteria met	
Criteria[a]	**Historical Data (1983-2010)**	**Modeled Data (1940-2007)**
1	21 (72%)	59 (87%)
2	24 (83%)	about 50 percent
3	25 (86%)	about 50 percent
4 Harris (within 1 foot)	4 (14%)	22 (32%)
4 Weiss (within 1 foot)	21 (72%)	55 (81%)
4 Neely Henry (within 1 foot)	22 (76%)	65 (96%)
4 Logan Martin (within 1 foot)	21 (72%)	54 (79%)
4 Cumulatively (within 1 foot)	Not Provided	22 (32%)
4 Harris (within 2 feet)	11 (38%)	58 (85%)
4 Weiss (within 2 feet)	27 (93%)	64 (94%)
4 Neely Henry (within 2 feet)	27 (93%)	66 (97%)
4 Logan Martin (within 2 feet)	26 (90%)	65 (96%)

[44] This observation is true for both the 1-foot trigger proposed by Alabama Power and Lake Martin HOBO, and the 2-foot trigger proposed by Lake Martin RA.

Criteria[a]	Number of years criteria met	
	Historical Data (1983-2010)	Modeled Data (1940-2007)
4 Cumulatively (within 2 feet)	22 (76%)	57 (84%)
1, 2, 3, and 4 (within 1 foot) cumulatively	4 (14%)	22 (32%)
1, 2, 3, and 4 (within 2 feet) cumulatively	11 (38%)	57 (84%)

[a] See section 2.2.2, *Proposed Action and Alternatives*, for a description of the four criteria.

While these data show that many of the reservoir level criteria may be met a relatively high percentage of the time, there may not always be enough inflow (criteria 2 and 3) to ensure that the proposed fall extension can be implemented. The combined historical data for all criteria indicate that the fall extension could be implemented about 14 percent of the years with the 1-foot rule curve criteria and about 38 percent of the years for the 2-foot rule curve requirement. Modeled data indicate the fall extension could occur more frequently, about 32 percent of the time for the 1-foot rule curve criteria, and about 85 percent of the time for the 2-foot criteria. The longer period of record for the modeled data that avoids over emphasis on the droughts in the late 1980s, 2000, and 2007/2008, suggests that the modeled data percentages are more representative of future conditions than the observed data.

Additional discussion of the potential effects of the conditional fall extension on recreation is included in section 3.3.5, *Recreation Resources and Land Use*.

Reservoir Levels under Drought Conditions

Alabama Power proposes raising the drought curve by 3 feet in January, February, and December and modifying the drought curve for the remainder of the year as shown in figure 2-2. Operations during drought conditions would also be affected by the proposed higher operating and flood curves (see figure 2-2). As discussed in section 2.1.3, Alabama Power applied for and was granted three temporary amendments (for 2007, 2009, and 2011) to operate Lake Martin at a 3-foot-higher winter pool from November 20 to January 15, with refilling of the reservoir to begin on January 15 instead of February 17, due to drought conditions. The variances also included approval to reduce the minimum flow downstream of Thurlow dam to as low as 350 cfs, depending on flows in the downstream Alabama River.

The Corps expressed concern regarding navigational releases for the Alabama River, especially during low flow and drought conditions. Interior recommended that the

Tallapoosa River portion of the Alabama DROP[45] be used when assessing drought operations.

Lake Martin HOBO recommends that the winter pool level should be raised by 5 feet to elevation 486 feet to prevent the circumstances that occurred during the drought of 2007 when the lake did not refill after the winter drawdown. Lake Martin HOBO stated that with a higher winter pool, it would require much less inflow to reach the normal summer pool elevation.

The Downstream Landowners requested that flood control be a higher priority at the Martin Dam Project. Doing so could impact Alabama Power's ability to manage flows during droughts. Their key requests were for pre-evacuation (lowering the reservoir in advance of a forecasted storm to provide flow storage) or dedicated storage for flood control on a year-round basis. The Atlanta Regional Commission expressed concern regarding the effect that operational changes to Lake Martin reservoir could have on Lake Allatoona, specifically with respect to imposing additional burdens upon that lake as a result of a reduction in minimum releases from Lake Martin. The Atlanta Regional Commission suggested that drought operations had not been adequately considered for the Coosa-Tallapoosa system as a whole and this could adversely affect the primary water supply for more than 500,000 people who rely upon Lake Allatoona. Georgia EPD had similar comments, stating that it was concerned that Alabama Power's proposed operations for its Martin Dam Project in combination with the Coosa River Project would require the Corps to release more water from the Allatoona and Carters reservoirs in the upper Coosa River Basin.

Our Analysis

To evaluate how project operations could be affected during droughts, we analyzed the drought recurrence intervals during the past 25 years in the Tallapoosa and Coosa river basins. We investigated the 61-year period of record for the USGS gage no. 02412000 Tallapoosa River near Heflin, Alabama (1952 to 2012). This gage has one of the largest unregulated watersheds in the Tallapoosa and Coosa river basins. We used

[45] The Alabama DROP is Alabama Power's a draft plan to manage Alabama Power's water resources within the Alabama River basin during drought conditions. The Alabama DROP includes rain and stream flow indicators to determine drought conditions. When these indicators reach specified levels, drought response measures would be triggered resulting in reduced flow into the Alabama River based on drought intensity conditions within both the Tallapoosa and Coosa basins. When the basins are observed to be recovering from drought conditions, a consensus would be sought among Alabama Power and the federal and state agencies before a return to normal operations at Alabama Power's projects located on the Tallapoosa and Coosa Rivers.

Dflow3.1b,[46] with data from USGS gage no. 02412000 (near Heflin, Alabama) upstream of both the Martin and Harris projects to produce figure 3-11. We conclude that droughts similar to years 1986, 1987, and 1988 would occur about once every 10 years; droughts similar to year 2000 would occur once every 25 to 50 years; and droughts similar to 2007 would occur once about every 50 years or more.

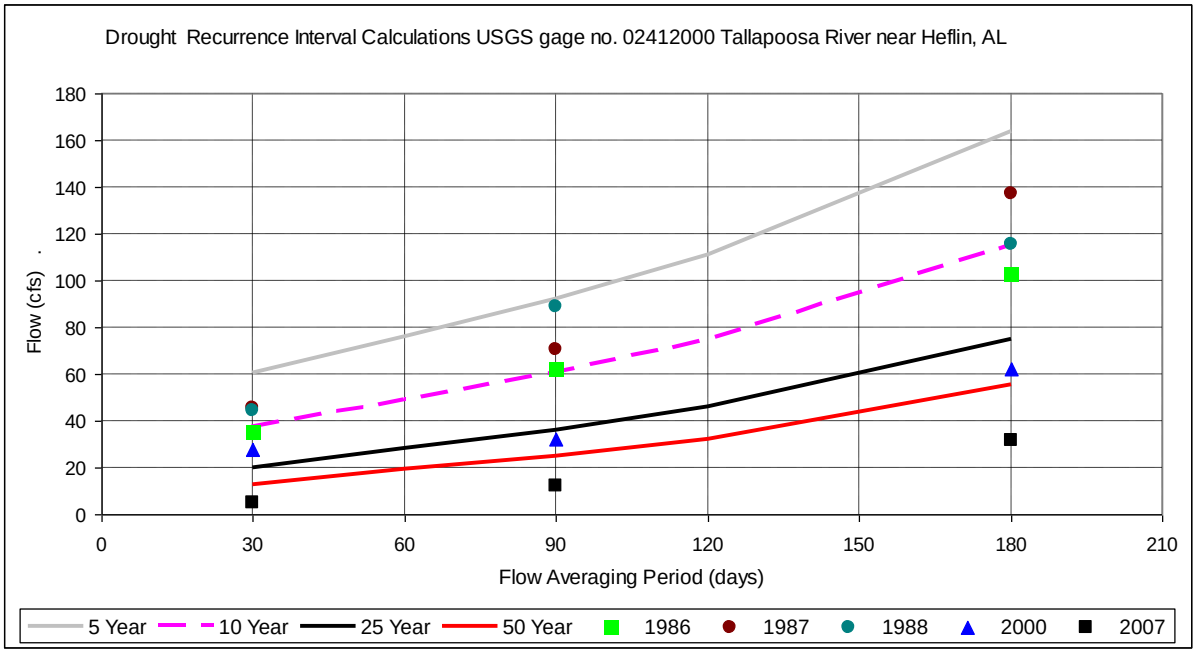

Figure 3-11. Drought recurrence intervals for USGS gage no. 02412000 (Source: USGS, 2012, as modified by staff).

Alabama Power did not model drought conditions directly as part of its relicensing studies. Our analysis using historical reservoir levels and outflows and the HEC-ResSim model showed that under moderate and severe drought conditions, Lake Martin water levels could fall below the current and proposed drought curves. However, these conditions would occur less frequently than once in every 10 years. Meeting minimum flow requirements and navigational releases could be problematic during severe drought conditions, and would not be achieved under some drought conditions, either existing or proposed. The proposed higher winter reservoir levels could help limit the reservoir level reduction associated with droughts such as those with a recurrence interval of less than 10 years and to a lesser extent during moderate or extreme droughts. For example as shown in figure 3-12, in 2007, the lake level in January and February was near elevation 481 feet (near the existing flood control guide curve) but due to very low inflows, the lake level still fell to about elevation 475.5 feet by November. In addition, the lake level was in the

[46] Dflow3.1b is a U.S. Environmental Protection Agency recurrence interval estimation program for streamflow.

elevation 481-foot range (about 10 feet below normal) during most of the July through September period. A higher flood control curve, as proposed by Alabama Power, would result in about 94,000 acre-feet of extra storage or about 47,500 cfs-days. This amount of storage could supply an added outflow of about 500 cfs for 3 months. However, based on data from 2007 and using the same amount of historical outflow, water levels of Lake Martin would still fall to an elevation in the 483 to 484-foot range by the end of the summer even with proposed higher curves.

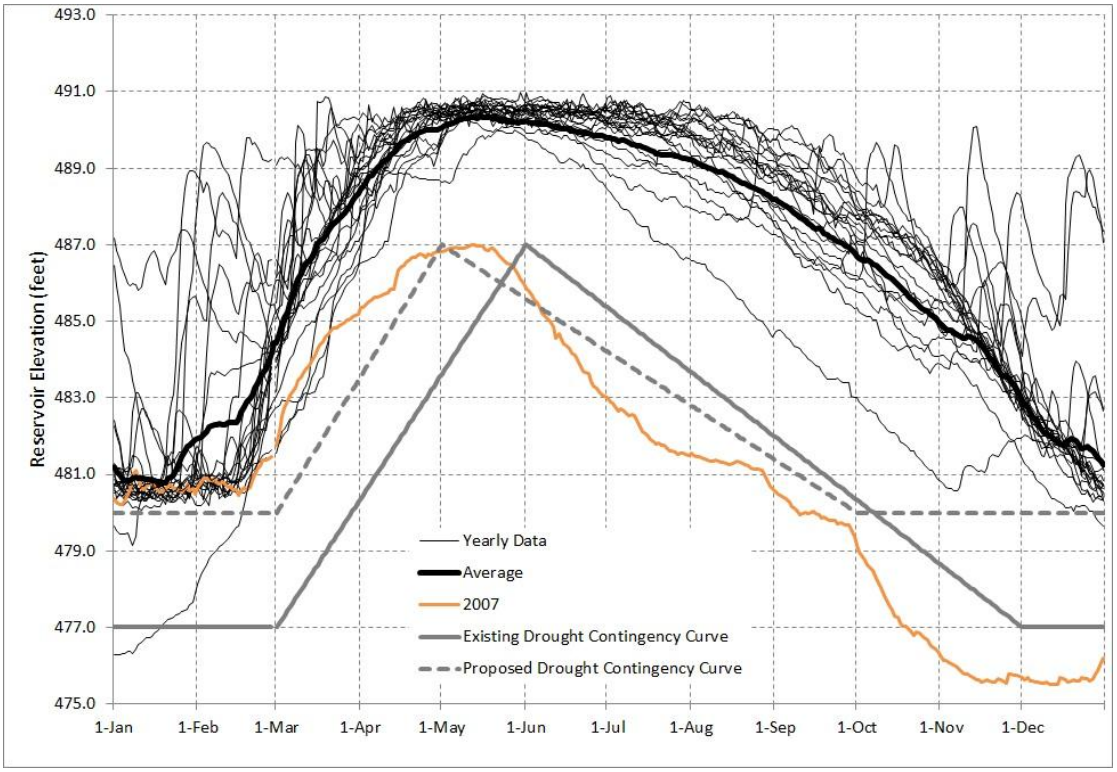

Figure 3-12. Historical Lake Martin water levels (1990 to 2011) and the existing and proposed drought curves (Source: Alabama Power, 2011b, as modified by staff).

During a severe drought such as occurred in 2007, the entire Tallapoosa and Coosa river basins were stressed, and reservoir levels and lake levels in many areas fell to historic lows. During that time Alabama Power, the Corps, and other agencies developed measures to minimize the effect of the drought on lake levels, stream flow requirements (including navigational releases), water supply, power generation, recreation and other resources.

When reservoir levels reach the drought curve value, Alabama Power would consult with the Corps to determine the best possible measures to respond to the drought conditions to limit the effects of the drought on navigation. For example in July 2007 during worsening drought conditions, the Corps prepared an EA (Corps, 2007) to evaluate how navigation could be affected by drought-induced flow reductions proposed by Alabama Power. The EA concluded with a Finding of No Significant Impact (Corps,

2007). As described in the Corps' EA, cutbacks of 10 percent initially, and possibly increasing up to 20 percent contingent upon worsening drought conditions, could be supported by its Finding of No Significant Impact.

The Downstream Landowners recommended lower reservoir elevation for flood control could negatively affect operations during drought conditions because the lower reservoir levels would not allow Alabama Power to maintain water storage that could be used in a drought scenario. The Downstream Landowners' request could trigger drought operations earlier and more often. As can be seen in figure 3-12, Lake Martin has normally reached and remained between elevations 490.0 and 491.0 feet between about May 1 and August 1 during most years for the 1990 to 2011 period. Lower water levels occurred in 2007 and to a much lesser extent during 1999 and 2000, all of which were periods that were defined as droughts of at least a 25-year recurrence interval. On May 1, 2000, Lake Martin water elevations were at 490.41 feet. Had Lake Martin been maintained at a lower elevation of about 488.0 feet on May 1, 2000 (i.e., providing 3 feet of storage), with historical water releases, the reservoir would have dropped enough to trigger drought operations by July of that year.

Lower reservoir elevations in the summer can also affect the ability of the project to support the minimum flow requirements at Thurlow. In Lake Martin, every foot of storage represents about 40,000 acre-feet or enough water to supply the Thurlow minimum flow of 1,200 cfs for about 17 days. Thus, a 3-foot drawdown would be equivalent to about 51 days of providing the 1,200 cfs minimum flow.

Alabama Power's proposed drought curve identifies only that drought conditions exist and but does not specify procedures for how project operations would be managed when a drought is evident. A more detailed operating protocol is necessary to identify how the project would be operated during droughts, such as that described in the draft Alabama DROP filed by Alabama Power for informational purposes on February 4, 2009. In addition, the effects of the Alabama DROP on downstream environmental and socioeconomic resources on the Alabama River or Mobile Bay have not been evaluated thoroughly. Alabama DROP does improve upon the current drought curves by specifying that additional indicators of drought conditions would be used in the final plan. For example, meteorological and hydrologic variables would be considered in addition to the drought curves. Some of the detailed operational responses in the final Alabama DROP may also include measures similar to the decreased minimum flows and higher winter pool levels and an earlier start to refilling of the reservoir as occurred under the three recent temporary amendments to the operating curves received by Alabama Power in 2007, 2009, and 2012.

When lake levels approach or are below Alabama Power's proposed drought curve, it is likely that the basin is in or is approaching drought conditions. Therefore, the proposed drought curve could be an effective trigger mechanism to initiate basin wide drought management. A basin-wide drought management plan would help address and balance declining lake levels and the need to supply downstream flows in the ACT Basin.

In March 2013 the Corps issued a draft EIS to update its water control manual for the ACT Basin. That EIS included the Corps recommendation for a basin-wide drought management plan for projects on both the Coosa and Tallapoosa rivers. The Corps is concerned that any license requirements for the Martin Dam Project not conflict with any future basin-wide drought plan, and recommends that the Commission defer any action on a drought management plan until after the Corps completes the water control manual and drought plan for the ACT Basin.

Proposed Periodic Drawdown

In the event that an increase in the winter pool level is approved and implemented, Alabama Power proposes to lower the reservoir to at least 481 feet every 6 years in coordination with weather conditions to facilitate maintenance and/or construction activities, including repairs to private boat docks.

Our Analysis

Under current conditions, the Lake Martin flood curve is at elevation 481 feet during January and the first half of February and the operating curve is below elevation 480 feet during the same time period (see figure 2-1). As shown in figure 3-12, over the last 20 years Lake Martin has been able to recover from 481 feet during the winter to its normal summer pool elevation of between 490 to 491 feet every year, other than during the severe drought of 2007. Our analysis, as discussed in *Reservoir Levels in Drought Conditions,* determined that the drought of 2007 would occur about once every 50 years or more. In addition, Lake Martin was able to recover to its normal summer pool in 2000 during a drought that we calculated would normally occur once every 25 to 50 years.

If the proposed periodic drawdown is initiated when the basin is not in drought conditions and hydrological conditions of the basin are at least normal conditions and forecasts for the spring precipitation are for average or higher amounts, the reservoir should reach its normal summer pool elevations. Additional discussion on the recreation and land use effects of this proposed periodic drawdown is provided in section 3.3.5, *Recreation Resources and Land Use*.

Water Quality

Effects of Proposed Rule Curve Changes on Water Quality

Alabama Power proposes to increase the winter pool elevation by 3 feet, and implement a conditional fall extension of summer reservoir levels into early fall, if specific conditions are met. The increase in the winter pool elevation would be on an annual basis, while the conditional fall extension as proposed by Alabama Power would be infrequent and may occur from 14 to 32 percent of the years. Lake Martin RA recommends a 4-foot increase in the winter pool, and Lake Martin HOBO recommends a 5-foot winter pool increase and a fall extension of the higher summer pool elevation to October 15, which may occur in 38 to 84 percent of years.

To address water quality issues at the Martin Dam Project, Alabama Power proposes to continue the water quality monitoring as required in the 401 WQC that was issued in May 2011 and to develop and implement structural or operational measures if the results do not indicate compliance. Alabama Power proposes to monitor water quality within the reservoir to detect effects of an increase in the winter pool elevation or of a conditional fall extension if those measures were adopted.

Alabama Power proposes to monitor aquatic vegetation, implement the Nuisance Aquatic Vegetation and Vector Control Management Program, and implement water quality and erosion related BMPs with the SMP. These measures are discussed in other sections.

Our Analysis

Both the higher winter pool levels and the fall extension could have some effects on water quality. The winter pool level increase would maintain higher water levels in late November through February. The fall extension would maintain higher reservoir levels in some years from September 1 through October 15, immediately following the peak summertime conditions of typically the lowest river flow, highest water temperature, and lowest DO levels.

Modeling conducted by Alabama Power indicated that for the 67 years modeled, there would be a higher number of days with spill events at Martin dam as a result of the higher winter pool levels and the conditional fall extension, as summarized below:

- winter pool increase: 3-foot increase - 23 additional spill days; and 5-foot increase - 52 additional spill days;
- fall extension: 3-foot increase - 29 additional spill days; and 5-foot increase - 58 additional days; and
- if both measures implemented: 52 to 110 additional spill days over the 67 years modeled.

These increases in the number of spill days while very small (0.4 percent if both measures were implemented with a 5-foot increase), would result in higher spillage flows downstream on average for one to two days per year. Higher spillage could have beneficial effects on DO as a result of increased aeration, but could also increase downstream erosion and turbidity levels, particularly downstream of Thurlow dam. Thurlow dam has a lower hydraulic capacity than Martin dam, so increased flows from Martin dam would result in higher spillage at Thurlow, into a riverine reach that is not backwatered, unlike immediately below Martin dam where flows discharge into the Yates reservoir.

The increase in the winter pool elevation and the fall extension would result in a small increase in both the depth of the reservoir and the retention time. However, expert opinions gathered by Alabama Power (the Water Quality Expert Panel) suggested that this change would have limited effects on DO levels or water temperatures in the

discharge from the Martin Dam Project. This prediction is based upon the large size of the reservoir, the existing lake level fluctuation due to varying inflows, and the existing DO and temperature conditions that meet state water quality standards.

Alabama Power's current proposal to maintain a 3-foot-higher winter pool from January 1 to February 15 is similar to 2008 and 2009 operations, when Alabama Power was granted temporary amendments to its flood curve to operate Lake Martin at a 3-foot-higher winter pool from November 20 to January 15, with refilling of the reservoir to begin on January 15 instead of February 17, because of drought conditions.[47] In 2007, the Commission issued an EA on the proposed 2008 operations (FERC, 2007) and an order approving them.[48] The order required Alabama Power to monitor water quality during the period that Lake Martin would be maintained at a higher elevation. The 2007 EA concluded that the higher lake levels would result in "no material adverse impacts to water quality in Lake Martin or the Tallapoosa River" (FERC, 2007, page 11). Similarly, the results of water quality monitoring from December 2007 through May 2008 indicated that there was no evidence that the operation of Lake Martin during the flood curve variance had any impact on water quality (temperature, DO, specific conductance, pH, chlorophyll-a, dissolved reactive phosphorus, and other water quality parameters). The monitoring results were submitted to FWS, Alabama DEM, and Alabama DCNR, and the agencies' responses indicated that they had no concerns regarding effects on water quality because of the flood curve variance, which included a 3-foot-higher winter pool. This is further basis for concluding that the current proposal for a 3-foot-higher winter pool would have no measurable effect on water quality.

While direct effects on water quality would likely be minor, aquatic vegetation may become more established due to the higher winter pool (reduced desiccation of the littoral zone), longer retention time, increased photic (light penetrating zone of plant growth) and littoral zones, increased sedimentation in the shallow areas, and stabilization of the lake. While this change would have a beneficial effect on aquatic habitat in the littoral zone, this result might also indirectly increase the nutrient concentrations in Lake Martin. The increased nutrients could result from additional plant growth that could affect the nutrient cycling in the lake by the release of phosphorous to the lake when the plants die in the fall and winter, although this effect likely would also be minor.

Alabama DEM issued the 401 WQC for the Martin Dam Project on May 9, 2011, with conditions based on proposed activities included in Alabama Power's license application. WQC conditions are as follows:

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[47] *See* Order Granting Temporary Amendment to Rule Curve, *Alabama Power Company,* 121 FERC ¶ 62,129 (2007), and Order Granting Temporary Amendment to Rule Curve, *Alabama Power Company,* 126 FERC ¶ 62,104 (2009).

[48] *See* Order Granting Temporary Amendment to Rule Curve 121 FERC ¶ 62,129(2007).

- monitor the Martin dam tailrace for DO and temperature during generation at 30-minute intervals from June 1 to October 31 for a period of 3 years;
- provide DO and temperature monitoring reports to Alabama DEM within 90 days of the end of the annual monitoring; and
- if monitoring does not show compliance with the 4.0 mg/L DO standards, Alabama Power would be required to implement measures to ensure compliance.

Based on current and expected conditions in Lake Martin and in the tailrace, 3 years of monitoring should be sufficient to determine if Alabama Power is successful in maintaining DO concentrations consistent with state standards downstream of Martin dam. Recent monitoring data have demonstrated that Martin dam releases have DO concentrations within the state standard nearly 100 percent of the time. Additional measures and monitoring past the initial 3 years may be needed if, based on the monitoring results, Alabama Power is required to implement additional measures to improve DO in the project tailwaters. Alabama Power's proposed measures to monitor water quality in the reservoir, monitor and control aquatic vegetation, and implement water quality-related BMPs as discussed in section 3.3.3, *Terrestrial Resources*, and section 3.3.5, *Recreation Resources and Land Use*, would help to detect and limit any possible effects.

We expect any effects of Alabama Power's proposal to raise the winter pool three feet to be very small given that project operations would not change substantially. Not changing lake level operations would maintain existing water quality conditions. Compliance with Alabama DEM's 401 WQC requirements would provide adequate DO for downstream communities, particularly given that the Martin Dam Project flows into the Yates project, maintaining lentic (lake) habitat conditions immediately downstream of the Martin dam. Such habitat is not conducive to use by the species of mussels and fish most sensitive to low DO.

Fishery Resources

Effects of the Proposed Rule Curve Changes on Striped Bass Thermal Refugia and Habitat

As we previously described, striped bass habitat in Lake Martin is characterized by relatively rapid seasonal changes, as water with suitable temperature and DO becomes depleted in late summer and fall. Periodic summer deaths of adult striped bass have been reported in the past, as suitable habitat sometimes is depleted. Alabama Power has not proposed any specific measures to address this issue, nor have the resource agencies or other stakeholders made any recommendations related to striped bass habitat in Lake Martin. The only reservoir operational changes proposed by Alabama Power are an increase in the winter pool elevation by 3 feet, and the conditional fall extension of summer reservoir levels into the early-fall, if specific conditions are met. Lake Martin

RA recommends a 4-foot increase in the winter lake level, and Lake HOBO recommends a 5-foot increase in the winter pool.

Our Analysis

Radiotelemetry studies on Lake Martin have investigated striped bass movements, to determine habitat use in the lake. During the summer months, most of the striped bass use the hypolimnion during the daytime, while foraging near the thermocline at night. During the late summer and fall period, the striped bass display reduced movement rates, greater use of deeper water, and may use areas with higher water temperatures and lower DO levels (Sammons, 2011). The occasional summer mortalities have often been associated with heavy rains that have occurred following long periods of above average temperatures.

Alabama Power's proposed operational changes would likely have little effect on reservoir water quality and in-turn little effect on striped bass. The increase in the winter pool would occur during a portion of the year when the reservoir is not stratified and is well mixed, with suitable temperatures and DO throughout the water column. Suitable striped bass habitat would be found throughout the lake, and increasing the lake level would actually result in a small increase in aquatic habitat and potential striped bass habitat. Raising the winter pool by 3 feet would increase the overall area of Lake Martin bottom habitat by about 413 acres, while a 5-foot increase would result in additional 631 acres of bottom habitat.

If the conditional fall extension was adopted, lake levels would be maintained up to about 4 feet higher than current levels from September 1 to October 15. At this time of year striped bass habitat within the lake would be at its minimum level. However, given that the releases would be from the colder, deeper layer of water, the effect of a fall extension on the summer level would be to shift the elevation of the warm, upper layer of water rather than its depth. Overall habitat conditions would be largely the same without or without the extension.

Effects on Fish Passage

Historically, anadromous species (Alabama shad and striped bass) occurred in the Tallapoosa River, but no anadromous species now occur immediately below the Martin Dam Project (Alabama Power, 2011c). Migration from the Gulf of Mexico is blocked by the Yates and Thurlow dams, and by three Corps dams on the Alabama River.

The catadromous American eel is native to the Tallapoosa River system and has been documented below Thurlow dam. Alabama Power proposes to implement a multi-faceted American eel investigation, in consultation with FWS.[49] The investigation would

[49] "Sampling American Eel in the Tallapoosa River Drainage," Final Study Plan filed by James F. Crew, Manager Hydro Services, Alabama Power Company, February 27, 2012.

begin in 2013 and be completed by 2016. It would cover the Tallapoosa River from the project tailrace to the confluence with the Coosa River.

Our Analysis

Upstream passage has occurred at other dams where dedicated eel passage facilities were not present, but rarely. Alabama Power's proposed eel study would document the population and distribution of eels from Martin dam downstream through the unimpounded reach of the Tallapoosa River downstream of Thurlow dam. However, there is no indication that American eels occupy the area between Martin and Thurlow dams. A basic trapping effort at the Martin dam to see if eels are reaching the dam would provide efficient surveillance for eels. Such information would be valuable in considering strategies for upstream passage of eels if deemed necessary.

Effects of Proposed Rule Curve Change on Downstream Fishery Resources, Including Paddlefish

The primary area of concern for aquatic resources downstream of Martin dam is the reach downstream of Thurlow, because it is riverine and contains the paddlefish. The paddlefish has been the focus of studies in the downstream reach, because it is a species of concern for Alabama DCNR, and has been an important sport and commercial species. Taking a broader view, monitoring studies have found a diverse fish community downstream of Thurlow dam, with a total of 66 species collected.

Alabama Power conducted a desktop analysis of the effects of flow releases downstream of Martin dam (Alabama Power, 2010e), which included an evaluation of effects on paddlefish spawning downstream of Thurlow dam. In that analysis Alabama Power concluded that current project operations provide spawning opportunities for paddlefish, except in drought years, but that some changes in the rule curves for Lake Martin could result in increased spawning opportunities downstream of Thurlow dam. As previously discussed, Alabama Power is proposing to increase the winter pool elevation by 3 feet, and implement a conditional fall extension of summer reservoir levels into early fall, if specific conditions are met. The conditional fall extension would have no effect on spawning flows for paddlefish, because paddlefish spawn in the spring (March and April). Increasing the winter pool by 3 feet would affect downstream flow releases in the spring, resulting in increased discharges. Alabama Power (2010e) reports that a flow of 6,000 cfs would trigger and support paddlefish spawning downstream of Thurlow dam, based on previous studies, but a major increase in river stage was also cited as an important factor in triggering spawning. Alabama Power (2010e) estimated that increasing the winter pool by 3 feet would increase the number of days (in March and April) that river flows exceed 6,000 cfs downstream of Thurlow dam by about 5 days per year, suggesting that paddlefish spawning could be enhanced by this rule curve change.

None of the entities providing comments in response to the ready for environmental analysis notice made specific recommendations regarding downstream

flow releases to protect or enhance paddlefish spawning. However, Alabama Rivers Alliance, American Rivers, and the World Wildlife Fund commented that the studies and information provided by Alabama Power in its final license application and in responses to Commission staff additional information requests were insufficient or inadequate and that additional information would be required for Commission staff to complete its analysis of this issue. Regarding paddlefish spawning, these stakeholders commented that, while Alabama Power did describe preferred habitat and conditions for paddlefish during each life stage, it failed to relate that information to proposed operational changes, or failed to recognize the importance of sequential high-flow days for successful paddlefish spawning. The World Wildlife Fund also stated that an 8- to 9-foot increase in river stage may be a more important trigger for upstream spawning migrations than a pulse flow on the order of 6,000 cfs.

The Downstream Landowners requested flood protections from the Martin dam particularly in the spring and summer months. We evaluated a lower elevation of 2 to 3 feet below the existing flood control curve in the spring and summer period to provide flood storage.

Our Analysis

Previous studies cited by Alabama Power (2010e) have indicated that paddlefish appear to prefer spawning in the lower Tallapoosa River, compared to the lower Coosa River. Alabama DCNR staff has also indicated that Mobile River Basin paddlefish populations appear to be stable, especially downstream of Robert F. Henry lock and dam.[50] Paddlefish populations in the area have increased since the implementation of the state-wide paddlefish harvest moratorium.[51] As previously discussed, on average, flows from Thurlow dam reach or exceed 6,000 cfs on a total of 19 days annually during March and April (about 31 percent of the days in March and April), providing flow and stage levels that have been cited as a requirement for paddlefish spawning. At USGS gage no. 02418500, located on the Tallapoosa River below Tallassee, Alabama (located about 2 miles below Thurlow dam), flows in excess of 6,000 cfs are common in March and April, with a mean flow of 6,274 cfs in March and 10 percent exceedance flows of 13,910 and 8,691 cfs, in March and April, respectively (see table 3-5).

Because a major increase in river stage is a likely trigger for paddlefish spawning, we examined the flow record in March and April for USGS gage no. 02418500 for 2001 through 2011 (figure 3-13). We identified all stage increases of at least 50 percent of the

[50] The Corps operates the Robert F. Henry lock and dam, which is located downstream of the confluence of the Coosa and Tallapoosa Rivers on the Alabama River.

[51] Email from N. Nichols, Assistant Chief of Fisheries, Alabama Division of Wildlife and Freshwater Fisheries, to A. Anderegg, Environmental Affairs, Alabama Power Company, November 29, 2010; included in Alabama Power (2010e).

base flow just prior to the stage increase as, "major stage increases." We then identified all major stage increases that resulted in flows equal to or greater than 6,000 cfs. Finally, we identified stage increases that were followed by periods of 10 days where flows were maintained at or above 6,000 cfs. According to Hubert et al. (1984), 10 days of sustained high stage are required for incubation of paddlefish eggs.

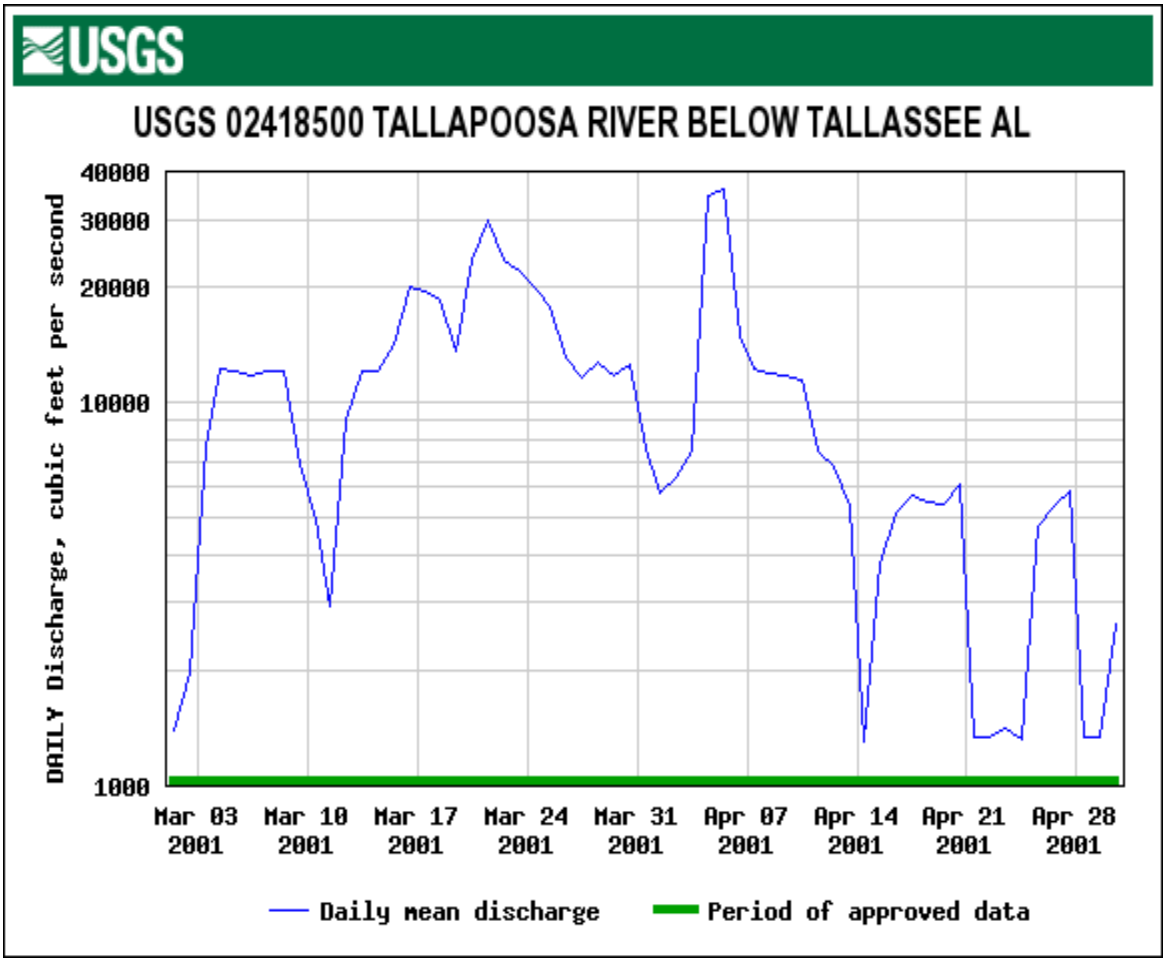

Figure 3-13. Example hydrograph for March and April 2001, used in assessment of paddlefish spawning downstream of Thurlow dam (Source: USGS, 2012).

Major stage increases occurred in all years, including the drought year of 2007 (table 3-13). Flows resulting in major stage increases reached 6,000 cfs in seven of the 11 years examined. Of the seven years that major stage increases reached 6,000 cfs or greater, 10-day periods with flows of at least 6,000 cfs following those stage increases occurred in five of those seven years. In addition, in the 11 years examined, there were multiple stage increases followed by at least 7 days of flows greater than 6,000 cfs, which would offer some protection for incubating eggs. Although it appears that optimum spawning conditions may not have occurred in every year, suitable spawning conditions occurred in most of the years examined.

Some research has reported that female paddlefish spawn about every 3 years, while males may spawn every 2 years (Montana Natural Heritage Program and Montana Fish, Wildlife and Parks, 2012). However, much of this research was conducted in the Missouri and Mississippi River systems. In a study by Lein and DeVries (1998), some female paddlefish captured in the Alabama River system in consecutive years were found to be egg bearing and were observed on the spawning grounds under perceived good spawning conditions in consecutive years, suggesting the capability to spawn annually. Other studies have shown that male paddlefish can spawn every year (Lein and DeVries 1998). Given that females produce many eggs, and that it appears some spawners of both sexes can be on the spawning grounds when conditions are appropriate, the frequency of occurrence of those conditions may be the primary variable in spawning success rather than the biological readiness to spawn.[52]

In addition to stage and flow, temperature is a major spawning factor. Because the reservoir would be well mixed in the early spring, downstream temperature and DO should not be altered significantly by the higher lake levels.

If lake levels were not raised in the winter, the paddlefish would not benefit from the spawning season flows and existing conditions would continue.

Table 3-13. Results of staff analysis of the number of stage increases providing for paddlefish spawning in the Tallapoosa River downstream of the Thurlow dam, March and April 2001 to 2011 (Source: USGS, 2012, as modified by staff).

Year	Major stage increases[a]	Major stage increases reaching 6,000 cfs or greater	Major stage increases to 6,000 cfs followed by a flow of 6,000 cfs or greater for a minimum of 10 days
2001	6	6	3
2002	3	0	0
2003	9	6	0
2004	6	0	0
2005	7	5	2
2006	7	3	0
2007	2	0	0

[52] Lein and DeVries (1998) found the number of eggs per female to range from 208,587 to 525,990.

Year	Major stage increases[a]	Major stage increases reaching 6,000 cfs or greater	Major stage increases to 6,000 cfs followed by a flow of 6,000 cfs or greater for a minimum of 10 days
2008	5	1	0
2009	7	7	1
2010	5	3	1
2011	7	2	1

[a] A major stage increase was defined as a river flow increase of at least 50 percent of the base flow occurring just prior to the stage increase.

Available information indicates that paddlefish populations are stable or are increasing in the Alabama River just downstream of Thurlow dam (email from Nick Nichols, Assistant Chief of Fisheries, Alabama Division of Wildlife and Freshwater Fisheries, to Angela Anderegg, Environmental Affairs, Alabama Power Company, November 29, 2010; included in Alabama Power [2010e]). No entities have recommended any specific operational changes for paddlefish. Alabama Power's proposal to increase the winter pool by 3 feet would, however, increase the number of days (in March and April) that river flows exceed 6,000 cfs downstream of Thurlow by 5 days. The proposal would have a modest, positive effect on paddlefish spawning relative to existing operations. Raising the winter pool 4 or 5 feet would provide greater benefits for paddlefish spawning than the 3-foot proposal. Lowering the summer pool for flood storage would have little effect on the paddlefish. Overall, the proposed changes to the flood curve would have moderate effects, which, to the degree they existed, would be positive.

3.3.2.3 Cumulative Effects

We identified aquatic and fishery resources as resources that could be cumulatively affected by the relicensing of the Martin Dam Project, in association with the operation of other projects in the Tallapoosa and Coosa river basins in both Georgia and Alabama. Cumulatively these impoundments have a major effect on flow regimes in the Tallapoosa, Coosa, and Alabama Rivers, including moderating flood peaks. If lake level operations at Martin dam do not change, issuing a license would have no direct effect on the flood elevation resulting from the project or the suite of projects. However, Alabama Power's proposal to raise the winter pool at Martin dam, would reduce flood storage and raise the 100-year flood levels on the lower Tallapoosa by between 0.75 and 3.0 feet depending on location. One-hundred-year flood levels on the Alabama River under the same operational scenarios would increase by a much lower amount, because the Coosa River Basin has a drainage area of about two times as large as the Tallapoosa

River and would continue to have a greater influence on flows on the Alabama River. However, in combination with Alabama's proposal to raise the winter pools of three developments of the Coosa River Hydroelectric Project, there would be a cumulative effect on downstream flooding. Such an effect likely would be subject to comprehensive analysis by the Corps in developing its basin manuals.

Operations during drought conditions require the balancing of minimum flow requirements, including water for navigation on the Alabama River, hydropower generation, and maintenance of water supply. Neither raising the winter pool elevation nor continuing existing operations would adversely affect the ability to provide flow requirements during drought conditions. Drought planning and indicator development would help to manage cumulative effects on drought flows.

The presence of the Martin Dam Project and other projects on the Tallapoosa and Coosa River has created a series of slackwater impoundments over a large portion of both rivers. Because these reservoirs capture nutrients from upstream sources and because of the volume and depths of the reservoirs, DO stratification occurs in all of the reservoirs. Low DO levels develop at depth, resulting in the release of lower DO waters into the next downstream reservoir. With the lack of riverine reaches between the Martin Dam Project and Thurlow dam, there is little opportunity for natural reaeration of waters, as would occur through natural falls and riffles. However, DO and temperature standards are normally met at monitoring locations downstream of Martin dam. As part of the WQC, there would be continuation of water quality monitoring, and Alabama Power would develop a plan to increase DO levels if standards were not met under the new license conditions. As a result, there would be no change in or a slight improvement in DO levels in the Tallapoosa River.

Fisheries could be cumulatively affected by the relicensing of the Martin Dam Project, in association with the operation of other projects in the Alabama River Basin. Both migratory and resident species would accrue modest benefits from Alabama Power's proposals for habitat and water quality improvements and from staff's proposal for drought management. Paddlefish would benefit slightly from increased spawning season flows associated with Alabama Power's proposal to raise the winter pool at Martin dam, but would not gain this benefit if the license does not include the winter pool elevation increase. Changes in reservoir regulation and potential fisheries enhancements would be unlikely to have any effect on other reservoirs or the remaining unimpounded reaches in the Tallapoosa and Alabama Rivers.

3.3.3 Terrestrial Resources

3.3.3.1 Affected Environment

Vegetation

Natural vegetation for the project area is predominantly oak-hickory forests that dominate dry-mesic ridges and slopes. Mixed hardwood forests are present closer to the

river. However, much of the natural vegetation in the area has been converted to agriculture (primarily forestry, cattle, and row crops), residential and commercial land use, resulting in a patchwork of mostly second growth forests, cleared land, and various stages of ecologic succession from primary to climax communities. Few old growth stages are present within the project area. Table 3-14 presents acreages of timber stands on project lands.

Table 3-14. Timber stand composition on Martin Dam Project lands (Source: Alabama Power, 2011a).

Stand Type	Percent Cover	Acreage
Mixed pine-hardwood	36	3,249
Natural longleaf pine	15	1,381
Natural pine	14	1,243
Upland hardwood	16	1443
Planted pines	8	741
Other	11	1,037
Total	**100**	**9094**

Upland oaks, hickories, and pines dominate the canopy in the older second-growth forests. Commonly abundant oaks include white, black, southern red, rock chestnut, post, scarlet, blackjack, and willow oaks. Hickories tend to be less important, although sand and mockernut hickories frequently occur. Loblolly, scrub, shortleaf, and longleaf pines are also common. Other locally important canopy and subcanopy species 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. 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. Vines in these areas include poison ivy, catbrier, Virginia creeper, muscadine, fox grape, yellow jessamine, cross vine, and cow-itch vine are common. Common herbs include bracken fern, Christmas fern, resurrection fern, needle grass, spike grass, fragrant goldenrod, goldenrod, sweet Betsy, and other aster species (Alabama Power, 2009a). Within hardwood forest communities most (57 percent) of the substrate is composed of bare ground. Grasses account for 6 percent while forbs contribute another 4 percent cover. Legumes comprise less than 1 percent of the understory. Seedlings of canopy species contribute about 5 percent. Vines, in their

creeping form, have about 28 percent cover. Within pine hardwood forests, the herb stratum is rather depauperate with about 71 percent being leaf litter and open ground devoid of vegetation. Vines form most of the vegetation cover (20 percent) with forbs contributing another 5 percent. Grasses are infrequent on the site (completely absent from the survey). Seedlings of woody vegetation account for 4 percent of the ground cover.

Wetlands

According to the National Wetland Inventory maps, approximately 444 acres of wetlands occur within the project boundary, including palustrine, lacustrine, and riverine wetland types. 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, 27.3, 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, 7.1, and 0.4 percent, respectively (table 3-15). Seasonal changes in lake elevation likely result in little variability in the quantity of wetlands surrounding the project due to the steeply banked nature of the reservoir shoreline.

Table 3-15. Area and percentages of wetland types in the project boundary (Source: Alabama Power, 2011a).

Wetland Type	Area[a] (Acres)	Percent of Total (%)
Lacustrine Littoral Rock Bottom	30.7	6.9
Lacustrine Littoral Rocky Shore	0.7	0.16
Lacustrine Littoral Unconsolidated Shore	121.6	27.34
Palustrine Emergent	45.8	10.32
Palustrine Forest	201.4	45.28
Palustrine Scrub-Shrub	42.5	9.55
Palustrine Unconsolidated Bottom	0.2	0.04
Riverine Lower Perennial Rock Bottom	1.8	0.4
Total	**444.7**	**100**
Lacustrine	153.0	34.4
Palustrine	289.9	65.2

Wetland Type	Area[a] (Acres)	Percent of Total (%)
Riverine	1.8	0.4
Total	**444.7**	**100**

[a] 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.

Aquatic Vegetation and Invasive Plants

In the final license application, Alabama Power identified eight species as being the primary invasive flora potentially occurring in the project area: brittle/spiny leaf naiad, 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 Lake Martin headwaters. Additionally, the following species are known to occur in the Tallapoosa basin and pose a concern for expansion into Lake Martin: hydrilla, Eurasian milfoil, milfoil, naiads, creeping water primrose, alligatorweed, coontail, pondweeds, Canadian elodea, fanwort, and bladderwort.

Alabama Power identified 20 sites where potential changes in operations are most likely to affect aquatic vegetation. Because these areas are generally shallower than 6 feet deep, they are completely dewatered and exposed during the current winter drawdown conditions. The current rule curve has annually exposed the shorelines to freezing temperatures as well as soil drying and compaction, which helped to minimize or eliminate aquatic vegetation growth along the exposed shorelines. The proposed higher water levels during the winter could increase the ability of shoreline vegetation to survive the winter months. In addition, the water table will remain higher reducing the total area of soils exposed to compaction and desiccation. Currently about 858 acres of aquatic vegetation occur in these areas.

Wildlife

Lake Martin is within the Piedmont physiographic region of Alabama. The Martin impoundment and surrounding woodland, agricultural, and residential areas 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. Birds typical of project uplands include 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 occurs in the Lake Martin area. 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 include least and short-tailed shrews, southern flying squirrel, eastern wood rat, and eastern red and big brown bats. Reptiles and amphibians include American and eastern spade foot toads; marbled and slimy salamanders; the green anole; the southern fence lizard; five-lined and broad-headed skinks; copperhead, black racer, and gray rat snakes; and eastern box turtle.

Palustrine forested wetlands, which account for almost half of project wetlands, encompass what are commonly referred to as "hardwood bottomlands." These bottomlands likely represent the most diverse and productive wildlife habitat in the project area, harboring a wide range of species including barred owl, red-shouldered hawk, white-tailed deer, fox squirrel, and red and gray fox. Bottomlands are of particular value as stopover habitat for warblers and other migrating songbirds and for cavity nesting species such as the prothonotary 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.

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 the mallard, gadwall, wood duck, hooded merganser, common loon, great blue heron, green heron, and great egret. Birds such as the 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. Reptile species typical of the littoral zone include eastern cottonmouth and red- and yellow-bellied water snakes, the snapping turtle, Alabama map turtle, river cooter, and red-eared pond slider.

Sensitive Wildlife and Sensitive Resources

During preparation of the license application, Alabama Power consulted with FWS and Alabama DCNR to identify species protected under state laws and federal laws other than the ESA. Two terrestrial species considered sensitive wildlife were identified: the alligator snapping turtle and the bald eagle (Alabama Power, 2011a).

The bald eagle (*Haliaeetus leucocephalus*) was delisted under the ESA in 2007 (FWS, 2012e), but it remains federally protected under the Bald and Golden Eagle Protection Act. Bald eagles forage near large aquatic ecosystems such as lakes, reservoirs, or free flowing rivers. Nests are typically located in crowns of large trees, close to foraging areas (FWS, 2012f). Alabama DCNR has monitored bald eagle nests in the project area. The most recent data available was recorded in 2006, when three active bald eagle nests were documented along the shoreline of Lake Martin, and a fourth located on the Tallapoosa River about 5 miles downstream from Martin dam (Alabama Power, 2011b).

The alligator snapping turtle (*Macroclemys temminckii*) is a state-listed species (Mirachi et al., 2004) that is also under review for federal listing (FWS, 2012d). The alligator snapping turtle spends most of its time in water, generally only coming onto land for nesting. Preferred habitat consists of deep water of rivers, sloughs, oxbows, and canals or lakes associated with rivers. Usually it occurs in waters with a mud bottom and some aquatic vegetation, but it may use sand-bottomed creeks (NatureServe, 2012b). Populations have declined throughout its range due to exploitation, habitat loss from dredging, and pollution induced habitat degradation. The current population status in Alabama is unknown (Mirachi et al., 2004).

As part of the SMP, Alabama Power proposes to develop a Sensitive Resources geographic information systems data layer to be part of the Sensitive Resources Lands Classification, which would include locations of rare, threatened, and endangered species, as well as sensitive habitats. Alabama Power proposes to provide the data regarding Sensitive Resources to Alabama DCNR, FWS, and the Commission. For further discussion, see section 3.3.5, *Recreation Resources and Land Use*.

3.3.3.2 Environmental Effects

Vegetation

Proposed changes in the winter pool level and timing of fall operation would cause changes in the timing, duration, and depth of inundation around the lake perimeter, which in turn could affect the distribution and species composition of vegetation communities. Alabama Power proposes to increase the winter pool elevation by 3 feet and evaluate the potential for extending the summer full pool period to as late as October 15 on an annual basis. As discussed in section 3.3.2, *Aquatic Resources*, and section 3.3.5, *Recreation Resources and Land Use*, other stakeholders recommend a 4-foot or a 5-foot increase in winter lake level to provide the ability of Lake Martin to refill by the following.

Implementation of the proposed SMP would guide vegetation management and development (such as a boat ramp) on project lands and waters, potentially affecting vegetation composition in these areas. Implementation of the WMP would include vegetation planting and forest management prescriptions that could influence forest composition and structure.

Our Analysis

Species composition of existing vegetation around the lake perimeter is largely a result of past operations that influence water availability and inundation frequency. These factors select for species that can live and reproduce under the site-specific conditions. Changing these conditions by increasing the winter pool and altering the timing of fall operations could favor species more adapted to wetter conditions.

Modifying project operations that result in an increase in the winter pool elevation and the timing of spring and fall water level fluctuations would alter existing micro-habitat conditions in areas below the 491-foot full pool elevation, and in higher elevation areas where reservoir levels are a dominant factor in vegetation root zone water availability. In most instances these changes would affect wetland vegetation (discussed below). Proposed changes in operations would increase inundation periods in some areas, but would not flood new areas above the full pool elevation. Additionally, increases associated with the proposed conditional fall extension are only expected to occur once every 5 to 6 years and are not likely to have lasting effects. As such these changes would have little effect on upland vegetation.

Implementation of the proposed SMP would protect and enhance shoreline vegetation by encouraging vegetated buffers. Implementation of the WMP would improve forest stand composition and structure on project lands through management prescriptions and planting.

Wetlands

As discussed above, proposed modifications to project operations could alter the timing, duration, and depth of inundation in wetland areas. These changes could influence vegetation species composition and wetland function.

Our Analysis

Implementing an increase in winter pool elevation would affect wetlands around the perimeter of Lake Martin. These modifications to site hydrology would likely result in some changes in vegetation community composition in these areas. Although the water increases would occur in the winter, during the non-growing season, some areas that are currently dewatered during the winter drawdowns would be permanently inundated. This would create anoxic condition in the soils, altering soil chemistry and microbial communities. Wetland and aquatic plants suited to these conditions would persist, replacing species that cannot survive under these conditions. Over time wetland species composition would shift toward more hydrophilic (water-loving) species at lower elevations influenced by increases in the winter pool elevation. In some areas, emergent wetlands would likely be converted to submerged aquatic vegetation, with emergent wetland habitat types moving further upslope. These effects would occur over a greater area with the 5-foot increase as compared to the 3-foot increase. Table 3-16 identifies the

acreage of wetland vegetation, by wetland type, within the areas inundated by the 3-foot and 5-foot increases.

Table 3-16. Wetland acreages, by wetland type inundated by the 3-foot and 5-foot increases in winter pool elevation (Source: Alabama Power, 2011a).

Wetland Type	Total Acres in Project Boundary	Inundated with 3-foot increase	Percent Total	Inundated with 5-foot increase	Percent Total
Lacustrine Littoral Rock Bottom	30.7	5.6	18.3	15.4	50.2
Lacustrine Littoral Rocky Shore	0.7	0.6	81.8	0.7	100
Lacustrine Littoral Unconsolidated Shore	121.6	31.2	25.7	71.6	58.9
Palustrine Emergent	45.8	6.5	14.2	14.6	31.9
Palustrine Forest	201.4	2.5	1.2	8.2	4.1
Palustrine Scrub-Shrub	42.5	0.1	0.2	2.2	5.2
Palustrine Unconsolidated Bottom	0.2	0	0	0	0.0
Riverine Lower Perennial Rock Bottom	1.8	0.4	22.2	0.8	44.4
Total	**444.7**	**46.9**	**10.5**	**113.6**	**25.5**
Lacustrine	153	37.3	24.4	87.9	57.5
Palustrine	289.9	9.2	3.2	24.9	8.6
Riverine	1.8	0.4	22.2	0.8	44.4
Total	**444.7**	**46.9**	**10.5**	**113.6**	**25.5**

Similar changes in wetland community structure would occur in areas where early spring filling and/or delays in fall drawdowns alter local site hydrology. However, these effects would be of lower magnitude than the effects of raising the winter pool elevations because the timing of the spring and fall operations would vary from year to year. Most

areas that would be affected by the early spring fill or fall extension would continue to see wetting and drying on an annual basis. Although additional water availability would likely favor hydrophilic species, there is minimal potential for conversion to submerged aquatic vegetation associated with modifications to the spring or fall operations.

Implementation of the 3-foot increase in winter pool elevation would affect about 10.5 percent of wetlands in the project area. Implementation of the 5-foot winter pool increase would affect about 25.5 percent of project wetlands. Because there would be no increase in summer full pool elevation, there would be no conversion of existing uplands to wetlands to offset these effects and potential for on-site mitigation is low. Fall pool extensions would only occur once every 5 to 6 years and are not likely to have a lasting effect on wetland vegetation. Therefore, effects on wetlands would be moderate.

Aquatic Vegetation and Invasive Plants

As discussed in section 3.3.1, *Geologic and Soil Resources*, the proposed modifications in operations could potentially cause additional erosion and sedimentation. Additional sedimentation in Lake Martin, combined with increased winter pool elevations could result in increases in submerged aquatic vegetation, including increased abundance of invasive species.

Alabama Power (2011a) identified 20 sites that have a high probability of establishing aquatic vegetation. Alabama Power did not measure the total possible increase in emergent vegetation around the entire shoreline perimeter of Lake Martin, only those areas that were most likely to have an increase or have been problematic in the past. There may still be other suitable areas that were not evaluated. In addition, the potential change in sedimentation areas with an increase in the winter pool is not quantified in this analysis. Finally, an increase in nutrient availability may lead to an increase in submerged and emergent aquatic vegetation, but this effect was not quantifiable. As such, Alabama Power's analysis provides a very conservative estimate of the general risk for total increases in aquatic vegetation. Existing aquatic vegetation at these 20 sites was measured at 858 acres, and potential increases based on the 3-foot or 5-foot winter pool increases would result in a new estimated acreage total of 1,271 and 1,489 acres, respectively.

In addition to the effects of an increase in the winter pool elevation, implementing the early spring fill and the conditional fall extension could increase the growing season for aquatic plants. Alabama Power estimates the early spring fill would provide a 30-day increase in the growing season, while the conditional fall extension could add an additional 45 days in the growing season.

Alabama Power proposes to continue to implement its current Nuisance Aquatic Vegetation and Vector Control Management Program. As part of this program, Alabama Power performs lake-wide surveys to identify areas of aquatic plant infestation at a minimum of once per year. Throughout each year Alabama Power also reviews, on a case-by-case basis, requests from the public, state and federal agencies, and Alabama

Power employees to treat nuisance aquatic vegetation. Alabama Power identified criteria for determining when it treats nuisance aquatic vegetation that:

- creates a potential public health hazard by providing mosquito breeding habitat;
- poses a threat to power generation facilities or water withdrawal structures;
- restricts recreational use of the reservoir; and/or
- poses a threat to the ecological balance of the reservoir.

In the event that the Commission approves changes in the flood curve, Alabama Power proposes to develop and implement an additional component of its Nuisance Aquatic Vegetation and Vector Control Management Program. As a component of the program, Alabama Power proposes to develop and implement a plan to monitor aquatic vegetation to identify any increases in nuisance aquatic vegetation and the cause of increased vegetation. Alabama Power proposes to consult with pertinent resource and regulatory agencies to develop the plan, which would become a component of the current Nuisance Aquatic Vegetation and Vector Control Management Program, and to file the revised Nuisance Aquatic Vegetation and Vector Control Management Program within 6 months of the issuance of the new license.

Our Analysis

Changes in the flood curve, including an increase in the winter pool elevation, an early spring fill, and the conditional fall extension would increase suitable habitat for aquatic vegetation and aquatic invasive species. The early spring fill and conditional fall extension would extend the growing season for terrestrial invasive species occurring along the shoreline. Without control measures in place, increases in nuisance aquatic vegetation would be moderate. Such increases could adversely affect the composition and structure of habitat, as well as wildlife diversity and species richness, through habitat alteration and degradation. Additionally, increases in nuisance aquatic vegetation could reduce recreational use of the reservoir, increase public health hazard through increased vectors, and affect water withdrawal structures.

Neither Alabama Power's current Nuisance Aquatic Vegetation and Vector Control Management Program, nor its proposal to revise the program to include a plan to monitor increases in nuisance aquatic vegetation, provide details about the methods for surveying and monitoring aquatic vegetation, such as the frequency, timing, and locations of surveys and monitoring events. Potential effects of increased nuisance aquatic vegetation would be minimized if Alabama Power revised the Nuisance Aquatic Vegetation and Vector Control Management Program to include a plan to monitor and treat increased nuisance aquatic vegetation.

Wildlife

Sensitive Wildlife and Sensitive Resources

No alligator snapping turtles were observed in the study of the influence of shoreline modification on aquatic and semi-aquatic species (Alabama Power, 2009b). Because the study focused broadly on aquatic and semi-aquatic species, and no project related study specifically focused on the alligator snapping turtle, there is not enough evidence to determine either the presence or the absence of the alligator snapping turtle within the project affected area. However, based on the best available information, it seems likely that the alligator snapping turtle occurs within Lake Martin or its tributaries.

Alabama Power (2009b) concluded that neither seawalls nor rip-rap offer suitable habitat that allow turtles to exit the water to access nesting habitat, and even some of the undeveloped shorelines along Lake Martin are undercut from erosion such that turtles could not exit the water. However, no agencies raised concerns about project-related effects on the alligator snapping turtle.

Concerning wildlife other than turtles, Alabama Power (2009b) concluded that most wildlife species are not adapted to using the low quality habitat provided by reservoir shoreline and erosion control structures found along reservoir shorelines. Habitat beyond reservoir shorelines is often low quality due to the presence of lawns. The only high quality habitat found along the shoreline of Lake Martin occurs where unaltered shorelines exist in conjunction with natural forests.

Interior recommends that no new seawalls be constructed unless absolutely necessary to protect land and property. Interior also recommends that Alabama Power encourage shoreline developments to maintain the 30-foot control strip within the project boundary and to increase the total buffer width to at least 100 feet.

Fischer and Martin (1998) note that the operation of hydro projects can affect habitat and cause alteration to the riparian zone and that those effects can be detrimental in the absence of buffer strips. Buffer strips protect water quality by intercepting non-point source pollutants, and also provide numerous other benefits that improve water quality, such as erosion control and bank stabilization, the input of organic matter, and temperature control through shading (Fischer et al., 2000 and Wenger, 1999). Undoubtedly, such improvements to water quality positively affect aquatic and semi-aquatic wildlife species using riparian habitat. All wildlife species, including those using upland habitats, also directly benefit from buffer strips, because buffer strips provide wildlife habitat, corridors for wildlife movement, and connectivity among isolated habitats (Fischer et al., 2000). Therefore, buffer strips provide habitat for a disproportionately high number of wildlife species despite the small proportion of the landscape, (Fischer and Martin, 1998) and thus are known as unique ecological features of the landscape they occupy (Fischer et al., 2000). Concerning dimensions of buffer strips, Fischer and Martin (1998) note that buffer strip width is often positively related to species richness and density. Fischer et al. (2000) discuss the placements and dimensions

of buffer strips in more detail, and conclude that buffer strips over 15 m should be promoted for water quality benefits and buffer strips over 100 m should be promoted for benefits associated with wildlife and their habitats.

Our Analysis

Limiting the construction of seawalls, rip-rap, and shoreline development would protect habitat for aquatic and semi-aquatic wildlife species. Maintaining a natural shoreline would benefit wildlife by maintaining existing habitat to which wildlife species are adapted.

Maintaining the existing 30-foot buffer strip would benefit all wildlife species by providing habitat and corridors to facilitate movement of wildlife among isolated habitats. Increasing buffer widths to 100 feet, as recommended by Interior, could further enhance wildlife species and their habitats by providing a greater amount of habitat and larger corridors. Because large buffer widths are often associated with increased species richness and density as discussed above, increased buffer strips around Lake Martin could benefit state and federally listed species.

Concerning Alabama Power's proposal to develop Sensitive Resources data and provide it to Alabama DCNR, FWS, and the Commission, developing a Sensitive Resources data base would help Alabama Power and the resource agencies consider the needs of sensitive resources in permitting development activities along the shoreline. The Sensitive Resources layer in conjunction with other project land use classifications as identified in the SMP is discussed in section 3.3.5, *Recreation Resources and Land Use*.

Wildlife Management Program

During preparation of the license application, Alabama Power consulted with FWS and Alabama DCNR to develop its proposed WMP. The WMP designates two management areas on project lands: a longleaf pine "Primary Management Area," a 3,166 acre tract along the eastern shore of Lake Martin, and a "Secondary Management Area," a 2,717 acre tract near the Lake Martin headwaters. The specific wildlife management objectives goals of the WMP include:

- the enhancement of available habitat for longleaf pine-dependent species on project lands;
- the management of project lands adjacent to the Irwin Shoals Area (Secondary Management Area) in the upper reaches of Lake Martin for maintenance of water quality buffers and wildlife habitat;
- the development of public hunting opportunities in or near the project boundary;
- the continuation of bald eagle monitoring and management on project lands; and
- the implementation of BMPs on project lands to protect water quality and wildlife habitat surrounding Lake Martin.

Regarding the continued monitoring and management of bald eagles on project lands, Alabama Power proposes to continue conducting annual surveys for overwintering bald eagles. Alabama Power proposes to include the locations of bald eagle nests in a geographic information system data layer identified as Sensitive Resources in the SMP, and provide the nest locations including a Global Positioning System waypoint to Alabama DCNR, FWS, and the Commission (Alabama Power, 2011b). For further discussion, see section 3.3.5, *Recreation Resources and Land Use*.

Alabama Power's proposed wildlife management activities would occur primarily on the Primary Management Area, a 3,166-acre tract that contains the majority of longleaf pine stands existing on project lands. Under the WMP, Alabama Power would manage the Primary Management Area toward a desired forest condition consistent with good quality foraging habitat for the federally endangered red-cockaded woodpecker, as defined in the recovery plan for this species (FWS, 2003a).

The Red-Cockaded Woodpecker Recovery Plan (FWS, 2003a) describes good quality foraging habitat as generally having large old pines, low densities of small and medium pines, sparse or no hardwood midstory, and groundcover consisting of bunchgrasses and forbs. Alabama Power estimates that approximately 325 acres of habitat within the Primary Management Area currently meets the definition of good quality foraging habitat. The proposed WMP includes a number of specific management strategies for longleaf pine stands on the Primary Management Area to enhance good quality foraging habitat. Management strategies included in the plan are described below.

Timber management would consist of an uneven-aged management scheme with a cutting cycle of 25 years and an overall forest rotation of 80 years; a selective cutting to achieve a forest condition consistent with good quality foraging habitat; and a reasonable effort to leave a residual stand with the following characteristics:

- a minimum basal area of 4.6 m^2/ha (20 ft^2/ac) for pines > 60 years in age and > 35 cm (14 in) diameter at breast height (dbh);
- a basal area between 0 and 9.2 m^2/ha (0 and 40 ft^2/ac) for pines 25.4 – 35 cm (10 – 14 in) dbh;
- a basal area below 2.3 m^2/ha (10 ft^2/ac) for pines < 25.4 cm (< 10 in) dbh; and
- a minimum basal area of 9.2 m^2/ha (40 ft^2/ac) for all pines > 25.4 cm (10 in).

Prescribed burns would be implemented on approximately 350 acres annually, such that one third of the Primary Management Area would be burned annually on a 3-year burn rotation. To ensure management practices are having the desired effect on stand structure, Alabama Power proposes to conduct stand inventories on a minimum 6-year interval. Following each inventory, Alabama Power would prepare a report that would be submitted to Alabama DCNR and FWS for review and filed with the Commission.

Alabama Power's proposed WMP also includes planting of an approximately 98-acre tract with containerized longleaf pine seedlings. This area is currently non-project land, but is included in the approximately 367.8 acres proposed for inclusion in the project boundary as part of the Martin Small Game Hunting Area, further discussed in section 3.3.5, *Recreation Resources and Land Use*. Once established, Alabama Power would manage longleaf pine stands on this site similarly to longleaf stands located on the Primary Management Area. Specifically, Alabama Power would use an uneven-aged management scheme with a cutting cycle of 25 years and an overall forest rotation of 80 years. After the 98-acre longleaf stand reaches at least 3 years of age, Alabama Power would implement a burning program to maintain the stand. The entirety of the 98 acres would be burned a minimum of every 5 years.

Interior recommends that within the Core Management Area in the WMP, Alabama Power should manage towards a desired forest condition consistent with the good quality foraging habitat for the federally endangered red-cockaded woodpecker, a species dependent on longleaf pine ecosystems.

Our Analysis

Implementing Alabama Power's proposed WMP would consolidate wildlife management activities within specified management areas for which specific objectives are defined. Broadly speaking, implementing the objectives of the WMP on specified areas would enhance wildlife habitat for all species. The proposed prescribed burns, in conjunction with timber stand inventories and selective timber harvest, would support forest composition and structure indicative of healthy longleaf pine ecosystems and therefore enhance habitat for longleaf pine-dependent species. Maintaining water quality buffers and continuing to implement BMPs would benefit wildlife through improved water quality, providing habitat behind natural and undeveloped shoreline, and providing upland habitat and movement corridors among isolated habitats.

Implementation of the proposed WMP would provide long-term benefits to terrestrial plant and wildlife communities within the project boundary and compliment the objectives contained in the SMP. Because one of the objectives of the WMP involves enhancement of habitat for longleaf pine-dependent species, such as the federally endangered red-cockaded woodpecker, Alabama Power's proposed WMP addresses Interior's recommendation.

3.3.4 Threatened and Endangered Species

FWS initially provided a list of five federally protected species potentially occurring in the project affected area, which it later expanded to ten species (Alabama Power, 2012b). None of the nine federally protected species were documented during the surveys for rare, threatened, and endangered species. Interior, in response to the Commission's notice requesting comments, recommendations, terms and conditions, and prescriptions, stated that no federally listed species are known to occur within the project boundary (letter from J. Stanley, Regional Environmental Protection Assistant, Office of

the Secretary, U.S. Department of the Interior, Atlanta, Georgia, to K.D. Bose, Secretary, Federal Energy Regulatory Commission, Washington, D.C., filed on April 6, 2012).

3.3.4.1 Affected Environment

Action Area

The action area, or project-affected area, for the aquatic rare, threatened, and endangered species includes the Lake Martin reservoir, tailrace, and the Tallapoosa River from Thurlow dam downstream to RM 12.9.[53] The action area, or project affected area, for the terrestrial rare, threatened, and endangered species includes project lands encompassed by the project boundary.[54]

Aquatic Threatened and Endangered Species

The FWS list of potentially occurring species provided to Alabama Power for its studies of rare, threatened, and endangered species included six aquatic species. The mussel species included the threatened Alabama moccasinshell (*Medionidus acutissimus*) and the endangered ovate clubshell (*Pleurobema perovatum*), finelined pocketbook (*Hamiota (=Lampsilis) altilis*), and southern clubshell (*Pleurobema decisum*). The fish species included the threatened Gulf sturgeon (*Acipenser oxyrinchus desotoi*) and the endangered Alabama sturgeon (*Scaphirhynchus suttkusi*).

The historic range of the four threatened and endangered mussel species included most rivers, and associated tributaries, of the Mobile River Basin (FWS, 2004). Extant populations are localized, and uncommon to rare, throughout the current ranges (Mirachi, 2004). FWS (2000) published a recovery plan for a suite of aquatic species occurring in the Mobile River Basin. The recovery plan includes the Alabama moccasinshell, ovate clubshell, finelined pocketbook, and southern clubshell. FWS designated critical habitat for 11 mussels, including the aforementioned species, in the Mobile River Basin. Although the critical habitat designation does include portions of the Tallapoosa River drainage, no critical habitat occurs within the project affected area (FWS, 2004).

Alabama Power consulted with FWS and Alabama DCNR to determine appropriate sampling locations within the action area and methods for the mussel species surveyed. Alabama Power conducted surveys for mussels in the project affected area between May and November 2009, and May and June 2010. No federally listed mussels were found to occur in the project affected area. One state listed species, the lipstick darter (*Etheostoma chuckwachatte*), was collected in two tributaries to Lake Martin. No

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[53] *See* the Commission's Clarification to Study Plan Determination, issued on May 1, 2009.

[54] *See* the Commission's Study Plan Determination issued on April 17, 2009.

further analysis of the lipstick darter is included in this section because it is not protected under the ESA.

The federally listed threatened Gulf sturgeon historically occurred in most major rivers from the Mississippi River to the Suwannee River, and marine waters of the central and eastern Gulf of Mexico to Florida Bay. No information is available about population levels of the Gulf sturgeon in other rivers. Documentation of occurrences of the Gulf sturgeon in rivers of the Mobile Basin are rare and incidental (FWS and Gulf States Marine Fisheries Commission, 1995). FWS designated critical habitat for the Gulf sturgeon, but the Tallapoosa River is not included in the designation (FWS, 2003b).

The federally listed endangered Alabama sturgeon historically occurred in the Mobile Basin. Records are extremely rare and indicate the species could be near extinction. FWS recently published a draft recovery plan for the species (FWS, 2012a). FWS designated critical habitat for the Alabama sturgeon, but the Tallapoosa River is not included in the designation (FWS, 2009).

Alabama Power consulted with FWS and Alabama DCNR to determine appropriate sampling locations within the action area and methods for the fish species surveyed. Fish surveys were conducted between July 2009 and June 2010. No federally listed fish species were found in the project affected area.

Terrestrial Threatened and Endangered Species

FWS' list of potentially occurring species provided to Alabama Power for its studies of rare, threatened, and endangered species included three terrestrial species. The two plants included were the federally listed threatened little amphianthus (*Amphianthus pusillus*) and the candidate Georgia Rockcress (*Arabis georgiana*). The avian species included was the federally endangered red-cockaded woodpecker (*Picoides borealis*).

Little amphianthus, also called pool sprite, is a federally listed threatened species that was probably historically rare due to its specialized habitat in temporary pools in depressions of granitic outcrops (FWS, 1993). Extant populations are known to occur in five Alabama counties including Tallapoosa County (FWS, 2008; FWS, 2012b). FWS published a recovery plan for three granite outcrop plants including little amphianthus (FWS, 1993). No critical habitat has been designated for this species.

Georgia Rockcress is a candidate species for federal listing under the ESA. Georgia rockcress occurs along eroding river banks and in dry conditions associated with rocky bluffs and outcrops (FWS, 2011) and slopes along water courses, including sandy loam along eroding riverbanks (NatureServe, 2012a). Currently, 16 populations are known to exist in Georgia and Alabama (FWS, 2011). In Alabama it is known to occur in Tallapoosa County (FWS, 2012c). No recovery plan has been published and no critical habitat has been designated for this candidate species.

Alabama Power conducted surveys for little amphianthus and Georgia Rockcress during June and July, 2009. No suitable habitat for little amphianthus was observed

within the project boundary during this study and no observations of suitable habitat were documented during previous visits to the project site. While suitable habitat was observed for Georgia rockcress, no individuals were documented during the surveys (Alabama Power, 2009a).

The federally endangered red-cockaded woodpecker requires open, old growth pine forests and savannahs for nesting and roosting habitat. For foraging habitat, the red-cockaded woodpecker requires pine forests with little to no hardwood or pine midstory, little or no hardwood overstory, and the presence of native bunchgrasses and forbs. Because of habitat loss, alteration, and degradation, it is estimated that red-cockaded woodpeckers currently occur at only 3 percent of the species' historic abundance (FWS, 2003a). FWS (2003a) published a recovery plan for the species, as well as a 5-year review (FWS, 2006). No critical habitat has been designated for this species. During 2006, Alabama Power conducted extensive surveys in the longleaf pine forests within the project boundary. No active colonies of red-cockaded woodpeckers were documented (Alabama Power, 2011g).

3.3.4.2 Environmental Effects

Aquatic Threatened and Endangered Species

Alabama Power's studies of aquatic rare, threatened, and endangered species showed that no federally listed mussels or fish occur within the project affected area. The results of Alabama Power's studies are consistent with Interior's statement, by letter filed April 6, 2012, that no federally listed species are currently known to occur within the Martin Dam Project boundary. In its biological assessment (BA) Alabama Power determined that its continued project operations would have no effect on federally listed aquatic species (Alabama Power, 2012b). Alabama Power also determined that no critical habitat for these federally listed aquatic species occurs in the area, and therefore, the proposed project would have no effect on critical habitats for aquatic species. Alabama Power also concluded that formal consultation pursuant to section 7 of the ESA would be unnecessary for aquatic species (Alabama Power, 2012b).

On June 6, 2012, Alabama Rivers Alliance and American Rivers filed comments on Alabama Power's BA. They state that surveys are inadequate and do not provide enough information to make a consultation determination, and that Alabama Power's BA is deficient. Alabama Rivers Alliance and American Rivers further state that several aquatic species, including the finelined pocketbook, ovate clubshell, southern clubshell, and Alabama sturgeon have been known to occur in the lower Tallapoosa River and Alabama River. Alabama Rivers Alliance and American Rivers recommend that the BA include an assessment of effects on all listed species that may occur in the area, regardless of Alabama Power's survey results.

Our Analysis and Finding

Alabama Power's Study Plan 5 was developed in consultation with FWS and Alabama DCNR and was approved by the Commission in April 2009. None of the species on the species list provided by FWS for the rare, threatened, and endangered species study were collected. No agencies raised concerns about federally listed species or critical habitats occurring within the project affected areas, and no agencies raised concerns about the study results.

Because no federally listed aquatic species and no designated critical habitats are known to occur within the project affected area, we find that continued operation of the Martin Dam Project would have no effect on the federally listed mussels including the Alabama moccasinshell, ovate clubshell, finelined pocketbook, and federally listed fish species including the Gulf sturgeon and Alabama sturgeon. Therefore, no further consultation is necessary for these species.

Terrestrial Threatened and Endangered Species

Alabama Power concluded that no suitable habitat for little amphianthus occurs within the project boundary. Although suitable habitat for Georgia rockcress does occur within the project boundary, no individual plants were documented during the surveys (Alabama Power, 2009a). Interior's letter, filed April 6, 2012, substantiates Alabama Power's conclusion that no federally listed plant species are known to occur within the project boundary. In its BA, Alabama Power found that its continued project operations would have no effect on little amphianthus and Georgia Rockcress (Alabama Power, 2012b).

Our Analysis and Finding

Because neither little amphianthus nor its habitat occurs within the project boundary, and because Georgia Rockcress is not known to occur within the project boundary, we find that continued operation of the Martin Dam Project would have no effect on the federally listed little amphianthus and candidate Georgia Rockcress. Therefore, no further consultation is necessary for these species.

Red-cockaded Woodpecker

The results of Alabama Power's surveys of longleaf pine forests showed that no active colonies of red-cockaded woodpeckers occur within the project boundary. Alabama Power's conclusion is consistent with Interior's statement, by letter filed April 6, 2012, that no federally listed species are currently known to occur within the Martin Dam Project boundary. However, longleaf pine forests do occur on project lands. As part of the WMP, Alabama Power proposes to manage the longleaf pine forests toward mature, open stands of longleaf pines that provide good quality foraging habitat suitable for red-cockaded woodpeckers. Interior, by letter filed April 6, 2012, recommends managing the Core Management Area of the WMP toward a desired forest condition

consistent with the good quality foraging habitat indicative of healthy longleaf pine ecosystems. In its BA, Alabama Power concluded that the Martin Dam Project, including Alabama Power's proposed 3-foot increase in the winter pool would likely affect, but not adversely affect, the red-cockaded woodpecker.

Our Analysis and Finding

Although no red-cockaded woodpeckers are known to occur within the project boundary, longleaf pine forests do occur within the project boundary. As part of its WMP, Alabama Power proposes to manage longleaf pine forests toward good quality foraging habitat for red-cockaded woodpeckers. Because, forest management for good quality foraging habitat could ultimately lead to colonization by red-cockaded woodpeckers, issuing a new license for the Martin Dam Project could provide long-term benefits for the red-cockaded woodpecker. Therefore, issuing a new license for the project may affect, but is not likely to adversely affect, the red-cockaded woodpecker.

3.3.5 Recreation Resources and Land Use

3.3.5.1 Affected Environment

Regional Recreation Resources and Land Use

The Tallapoosa River and its tributaries offer a wide range of recreation opportunities. Regional recreation opportunities located within an approximately 50-mile radius of the Martin Dam Project include two state parks - Cheaha and Chewacla - which offer bank fishing, cabins, campsites, picnic areas, swimming areas, playgrounds, and hiking and biking trails. The approximately 11,000-acre Tuskegee National Forest, administered by the U.S. Forest Service, is located about 40 miles southeast of the project. The forest offers bank fishing, primitive campsites, approximately 29 miles of hiking and biking trails (including 8.5 miles of the Bartram National Recreation Trail),[55] a horseback riding trail, and picnic areas.

Other regional recreation resources include Lake Walter F. George, Lake Harding, Harris Reservoir (Lake Wedowee), Lake Jordan/Bouldin, Lay Lake, Mitchell Lake, Neely Henry Lake, Logan Martin Lake, and West Point Lake, which provide boat launches, marinas, restaurants, picnic areas, and campsites.

The Horseshoe Bend National Military Park, administered by the National Park Service, is located about 10 miles upstream of the project and offers an overlook, a visitor center, and about 3 miles of hiking trails. The park preserves the site of the Battle of the Creek War (1813-1814), which was part of the War of 1812.

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[55] The approximate 115-mile-long Bartram National Recreation Trail is named after the 18th Century botanist/artist William Bartram who traveled, between 1773 and 1776, through eight states in the southeast region and documented plants.

The 1,445-acre Wind Creek State Park is located on the northeastern shore of Lake Martin, with land-based activities located outside of the project boundary. The park offers 626 campsites, cabins, restrooms, a marina, six boat launches, a fishing pier, a dock, hiking trails, two playgrounds, picnic areas, and trash receptacles. From May 1 through September 3, 2007, Alabama Power (2008) estimated 100,311 recreation user-days[56] at Wind Creek State Park. Ricks (2006) notes a significant amount of participation in black bass tournaments occurs at Wind Creek State Park. At least one black bass tournament occurs nearly every weekend from February through May, and from September through November. Ricks (2006) cites to other studies whereby researchers found the tournament attracts non-resident anglers and provides substantial economic benefit to local communities.

Downstream of the Martin Dam Project on the Tallapoosa River, Alabama Power operates and maintains the existing Yates and Thurlow Project No. 2407. The Yates dam is located at RM 52.7, which is 7.9 miles downstream of Martin dam. Similarly, the Thurlow dam is located at RM 49.7, which is 3 miles downstream of Yates dam. The Yates and Thurlow developments provide access to the respective reservoirs, and to the river downstream of Thurlow dam. There are three access sites on Yates reservoir and one on Thurlow reservoir.

Downstream of the dams, the river exhibits natural bedrock outcroppings between RM 49 and RM 47. Within this river segment, the river channel drops 9 feet in elevation (Alabama Power, 2011a) and provides whitewater boating opportunities, varying in whitewater class from Class II to Class IV on the International Scale of River Difficulty.[57] The Thurlow dam put-in is located downstream of Thurlow dam on the Tallapoosa River at RM 49.5, and the Tallapoosa take out is located at RM 48.0. Flows downstream of Thurlow dam typically range from 1,200 to 18,000 cfs. For further discussion on flows, see section 3.3.2, *Aquatic Resources*.

Recreation Sites

Recreation sites along the project shoreline offer day-use, campsites, fishing, picnic areas, swimming, and boat launches. There are 58 recreation sites providing access to project lands and waters that include 21 public sites, 14 commercial sites, six quasi-public sites, and 17 private sites. Of the 58 recreation sites, 26 recreation sites are located entirely, or partially, within the existing Martin Dam Project boundary. The remaining 32 recreation sites are located entirely outside of the project boundary. The 26

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[56] A recreation user-day is a visit to an area for recreational purposes during any portion of a 24-hour period.

[57] The International Scale of River Difficulty defines six classes of whitewater: Class I-Easy; Class II-Novice; Class III-Intermediate; Class IV-Advanced; Class V-Expert; and Class VI-Extreme.

recreation sites provide an estimated 195 picnic tables, six swimming areas, 19 hard surfaced boat launches with 24 lanes, two gravel or carry-in boat launches, 120 recreation vehicle sites, 40 cabin sites, 23 tent sites, and six primitive campsites.

In accordance with the proposed final Recreation Plan for the Martin Dam Project, filed December 9, 2011, Alabama Power considers 19 of the 26 recreation sites as project recreation sites because Alabama Power owns, operates, and maintains the recreation sites, although it may delegate O&M of the site to another entity. Of these 19 recreation sites, table 3-17 only identifies 12 existing project recreation sites included in the current project license.

Recreation Use

Alabama Power (2008 and 2010g) conducted recreation studies to identify and characterize recreation use within, or adjacent to, the project boundary. Visitor use was estimated using visitor counts in conjunction with on-site interviews with visitors throughout the study area and mail-back questions. The 2008 study identified the study area as the major arms and tributaries of Lake Martin (e.g., Kowaliga arm, Blue Creek, Sandy Creek, and Manoy Creek) from Irwin Shoals to Martin dam, a distance of approximately 27 miles. Recreational use at the 57 public, commercial, and private sites identified in the study was estimated at 1,058,670 recreation days. The 2010 study identified the study area as: (1) the reservoir; (2) 11 public, commercial, and private recreation sites located at Lake Martin; and (3) the tailwater of Martin dam, as defined from Martin dam to 0.25 mile downstream of the dam. Recreational use for this study is discussed below.

Alabama Power (2010g) estimated 370,538 recreation user-days for the combined recreational use at Lake Martin and the tailwater area, with most recreational use attributed to visitors and seasonal landowners (263,060 recreation user-days), and the remainder attributed to permanent residents (105,114 recreation user-days). Most recreation occurs from April through August, with a noticeable increase in recreational use during July, and a considerable decrease in September and October (table 3-18).

Of the total 370,538 recreation user-days, Alabama Power (2010g) estimates use of the project tailwater area at 2,365 recreation user-days annually, with recreational use attributed to visitors and seasonal landowners (1,690 recreation user-days), and the remainder attributed to permanent residents (675 recreation user-days).

Table 3-17. Existing project recreation sites included in the current project license (Source: Alabama Power, 2011a, as modified by staff).

Site Name	Type of Facility	Acres	Minimum Elevation That Boat Ramp Is Useable (feet msl)
Anchor Bay Marina	Commercial/Day Use	6.4	480*/484#
Camp Alamisco	Quasi- public/Campground/campsites	51.5	486
Camp ASCCA (Dadeville Campus)	Quasi-public/Campground/campsites	22.8	483#
DARE Boat Landing	Public/Day Use	2.5	482#
DARE Power Park	Public/Day Use	218.2	N/A
Kamp Kiwanis	Quasi-public/Campground/campsites	90.5	486
Maxwell Gunter AFB Recreation Area	Quasi-public/Campground/campsites	45.3	479*
Parker Creek Marina	Commercial/Day Use	9.7	481*
Pleasure Point Park and Marina	Commercial/ Campground/campsites	6.6	481*
Real Island Marina and Campground	Commercial/Day Use	9.6	482#
Scenic Overlook	Public/Day Use	1.5	N/A
Union Ramp	Public/Day Use	11.4	483#

Notes: * provides access during current winter operations to elevation 481 feet msl.
would provide access during proposed winter operations to elevation 484 feet msl.

Table 3-18. Estimated recreation use (in recreation user-days) at the Martin Dam Project from June 1, 2009, to June 13, 2010 (Source: Alabama Power, 2010g, as modified by the staff).

Month	Average Weekday Use	Total Weekday Use	Average Weekend Use	Total Weekend Use	Average Holiday Use	Total Holiday Use	Total
January	144	3,014	103	1,027	0	0	4,041
February	170	3,393	173	1,386	0	0	4,779
March	462	10,630	410	3,283	0	0	13,913
April	502	11,042	2,117	16,933	0	0	27,974
May	824	16,482	1,635	13,082	358	1,074[a]	30,638
June	1,230	27,052	3,502	28,014	0	0	55,065
July	3,206	70,537	11,269	67,616	3,468	10,405	148,558
August	811	17,031	2,307	23,069	0	0	40,099
September	435	9,145	1,592	9,552	1,641	4,922	23,619
October	256	5,625	378	3,400	0	0	9,025
November	179	3,757	453	4,076	0	0	7,833
December	71	1,632	125	996	0	0	2,628
Subtotal	695	179,339	1,760	172,433	1,822	16,401	368,173
Tailwater[b]	6	1,516	8	812	4	37	2,365
Total	701	180,855	1,768	173,245	1,826	16,438	370,538

[a] Lake use on Memorial Day during the study year was adversely affected by inclement weather.

[b] Tailwater use is annual estimate only.

Pleasure boating is the most popular activity at Lake Martin, accounting for more than one-half (52 percent) of all recreational activity. Recreational boating use indicates that boating is concentrated in the main portion of Lake Martin, as well as in the Blue Creek arm of the lake, which is most likely due to Wind Creek State Park and to the numerous public boat launches at the lake. The second most popular activity is spending

time at the lake with "no primary activity" (9.6 percent) (Alabama Power, 2010g; 2008). Including water-skiing/tubing and fishing, three of the five primary recreation activities at the lake are related to boating.

With regard to recreational use at the Martin Dam Project, Alabama Power filed, on April 1, 2009, the most recent Licensed Hydropower Development Recreation Report (Form 80)[58] data for the project. This 2008 data indicates annual daytime visitation of 2,955,600 and annual nighttime visitation of 620,700. The Form 80 data indicates the swimming area (69 percent occupancy), parks (designated areas which usually contain multiple facilities (e.g., picnic sites, boat ramps) (54 percent occupancy), and campsites (47 percent occupancy) are popular recreation sites.

As discussed in section 3.3.2, *Aquatic Resources*, some of the predominant recreational fish species in Lake Martin include spotted and largemouth bass, black crappie, and bluegill. Striped bass are stocked by Alabama DCNR on an annual basis to provide an additional game fishery (Sammons, 2011; CH2MHill, 2005). Greene et al. (2008) notes that bass tournament data collected for the B.A.I.T. program indicate that Lake Martin ranked second out of 22 reservoirs statewide in angler percent success, but twenty-first in average weight. Greene et al. (2008) find that the high angler success rate is primarily due to the abundance of small fish.

As discussed in section 3.3.3, *Terrestrial Resources*, a variety of wetland types occur within the project boundary. Studies (Bergstrom, et al., 1996; Henderson, et al., 2001) show that anglers generally prefer increased aquatic vegetation because it provides food and cover for fish and other species. In addition, the studies show that anglers' visitation decreased as the amount of aquatic vegetation decreased. Non-anglers displayed a 'mirror-image' visitation trend of anglers. Visitation from non-anglers increased as aquatic vegetation decreased.

Future projections of recreation use at the project indicate an increase of 24 percent over current recreation use by the year 2050 (table 3-19). Activities with the highest growth potential (in percent) by the year 2050 include wildlife observation (88 percent), sightseeing (76 percent), and picnicking (64 percent). Activity growth with the highest potential increase in the total number of recreation user-days by the year 2050 at the project includes pleasure boating (30,618 more recreation user-days) and "no primary activity" (18,813 more recreation user-days). Hunting is projected to decrease by 19 percent by the year 2050.

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[58] To evaluate recreation resources at the project, the Commission requires the licensee to prepare and submit a Form 80 every 6 years (*see* 18 C.F.R. section 8.11). Each Form 80 must identify the project's recreation facilities and the level of public use of these facilities.

Table 3-19. Projected recreation use at the Martin Dam Project by activity type from 2010-2050 (Source: Alabama Power, 2011d, final Recreation Plan, as modified by staff).

Activity	2010	2020	2030	2040	2050	Projected Growth (%)
Pleasure Boating, Waterskiing, Jetskiing	243,840	248,717	256,032	268,223	282,854	16
No primary activity/Other activities	39,139	43,836	48,924	54,423	59,883	53
Fishing	35,722	38,579	41,080	42,153	42,153	18
Swimming/Beach use/Non-pool swim	29,574	31,348	33,419	36,080	39,333	33
Sailing	5,458	5,676	6,113	6,877	8,078	48
Sightseeing	2,884	3,374	3,893	4,470	5,076	76
Camping (Developed & Primitive)	5,014	5,841	6,744	7,671	8,649	72
Wildlife observation	429	545	656	746	807	88
Hunting	320	310	298	278	259	-19
Canoeing, Kayaking, Windsurfing	7,871	8,186	8,816	9,918	11,649	48
Picnicking	288	325	369	418	472	64
Total	370,539	386,737	406,344	431,257	459,213	24

Land Use

Section 3.3.3, *Terrestrial Resources*, discusses the vegetative cover types and distributions that contribute to the land use.

The Tallapoosa River Basin is rural with agriculture and forest products as the primary land uses. Agriculture includes livestock, corn, wheat, soybeans, cotton, and hay. The U.S. Department of Agriculture Census of Agriculture (USDA, 2007) estimates the combined market value of agricultural products sold in Tallapoosa, Elmore, and Coosa Counties totaled $35 million. Other economic sectors include the automotive industry, manufacturing, retail trade, and public service (Alabama Development Office, 2011).

The Natural Resources Conservation Service (2007; 2008) recognizes a recent trend in land use has been, in some areas, the loss of prime farmland to industrial and urban areas. By the year 2030, the land use pattern in the Tallapoosa River Basin is projected to change significantly. Agricultural land is projected to decline by 70 percent, and undeveloped land is projected to decline by 50 percent. In general, land use is expected to change from open space and agriculture to residential.

The project is located in east central Alabama near Alexander City, Dadeville, and Jacksons Gap in Coosa, Elmore, and Tallapoosa Counties, Alabama. Central Alabama Regional Planning and Development Commission (2007) notes Elmore County is ranked as the third highest growing county in Alabama. Table 3-20 shows population and business data for Coosa, Elmore, and Tallapoosa Counties. While Lake Martin provides numerous recreation opportunities and local businesses supply the demand for recreation-related products associated with recreation at the lake (e.g., lodging, restaurants, sporting goods, marine sales) the three-county region provides for non-recreation businesses across a variety of industries. Alabama Power (2010g) estimated that recreationists spent $9.8 million on trip-related purchases associated with their visits to Lake Martin during the 12-month study period. Visitors and seasonal residents account for approximately two-thirds of trip-related spending.

Table 3-20. Population and business data for Coosa, Elmore, and Tallapoosa Counties (Source: U.S. Census Bureau, 2010a, b, c; Alabama Power, 2010g, as modified by staff).

	Coosa County	**Elmore County**	**Tallapoosa County**
Square miles	650.93	618.49	716.52
Population, 2010 estimate	11,539	79,303	41,616
Population density	17.7 persons/sq. mile	128.2 persons/sq. mile	58.1 persons/sq. mile
Total establishments	94	1,111	760
Primary industries	Agriculture, forestry, fishing, and hunting; construction; public service; retail trade	Construction; health care; public service; retail trade	Agriculture, forestry, fishing, and hunting; construction; health care; retail trade
Total employees reported March 2010	1,009	13,768	10,674
Total industry sales (millions)	$364.9	$3,975.6	$2,498.8

Alexander City, Alabama, located on U.S. Highway 280 adjacent to the northwest part of Lake Martin, is the largest municipality with a population of 14,875. The population of Alexander City decreased between 2000 and 2010 by 0.9 percent (U.S. Census Bureau, 2010d). Similar data is unavailable for Dadeville and Jacksons Gap, Alabama. For Coosa, Elmore, and Tallapoosa Counties, the projections (from 2005 to 2035) for the population 65 years and older indicate a 97.6 percent, a 176.6 percent, and a 60.0 percent increase, respectively (U.S. Census Bureau and The University of Alabama, 2009).

Currently, project lands encompass 8,602 acres, including 1.39 acres of federal lands administered by BLM. Alabama Power manages these lands and waters for the project facilities and issuances of permits and leases to other entities and individuals for non-project use and occupancy of project lands or waters consistent with project operation.

There are 6,901 privately owned shoreline parcels adjacent to, or near, Lake Martin, which encompass the three affected counties. With regard to these parcels, 456 parcels are located in Coosa County, 2,037 parcels are located in Elmore County, and 4,408 parcels are located in Tallapoosa County (Alabama Power, 2010g). Over the next 35 years, the City of Alexander City et al. (2009) project 6,211 housing units adjacent to, or near, Lake Martin.

Alabama Power's existing Comprehensive Recreation Plan, or exhibit R of the current license, identifies land uses within the project boundary. Alabama Power owns lands within the entire length of the shoreline to the 491-foot contour; however, Alabama Power does not own lands above the 491-foot contour. The Comprehensive Recreation Plan characterizes existing project lands into eight classifications, including Unclassified Lands (see table 3-21):

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

- Quasi-public Recreation – 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.
- Commercial Recreation – includes existing concessionaire-operated public marinas and recreational areas that provide a wide variety of recreational services to the public on a fee basis.
- 30-foot Buffer – Defines a strip of land along the shoreline in certain areas of the reservoir. This 30-foot buffer is located on land once owned by Alabama Power. When sold, Alabama Power retained a 30-foot control strip to act as a buffer and prohibit certain activities (e.g., habitable structures).

Table 3-21. Current land use classifications within the Martin Dam Project boundary (Source: Alabama Power, 2011a).

Classifications	**Total Area (Acres)**	**Shoreline Length (Miles)**
Prohibited Access	279.8	3.5
General Public Use	781.2	20
Natural/Undeveloped	6203.1	127.8
Potential Residential	329.6	16.1
Quasi-public Recreation	261.6	6.3
Commercial Recreation	62.9	3.9
30-Foot Buffer	683.8	193.3
Unclassified	n/a	510.1
Total	8,602.0	879.5[a]

[a] 1.5 miles of shoreline classified as Prohibited Access occur in the Martin tailrace and are not included in the amount of shoreline miles.

Shoreline Permitting Program

As part of the current Shoreline Permitting Program, Alabama Power administers a program that addresses specific use and occupancy of the Lake Martin shoreline not tied to project purposes. The shoreline permitting program provides a process for a landowner or a commercial developer who proposes to construct or modify a pier, a boat dock, or shoreline stabilization materials, such as a seawall, on lands within the Martin

Dam Project boundary. Alabama Power monitors activities along the shoreline to ensure that those activities are permitted and consistent with conditions as outlined in the permit.

The Corps has given Alabama Power the authority to manage certain permitting on the lake that ordinarily would be subject to Corps permitting. Thus, Alabama Power holds a Programmatic General Permit, issued by the Corps, that authorizes certain types of work, minor structures and activities in or affecting waters of the United States, including navigable waters of the United States, such as the Tallapoosa River. The permit allows Alabama Power to expedite authorization of work within the Martin Dam Project boundary and contains provisions to protect the environment.[59]

In a letter filed March 14, 2012, Alabama Power provided an updated summary of its progress for implementing its Shoreline Compliance Program at its eight hydroelectric projects, including the Martin Dam Project. The Shoreline Compliance Program establishes a framework primarily to address unpermitted structures (e.g., a satellite dish) on project lands and waters consistent with Alabama Power's Shoreline Permitting Program and the Commission's standard land use article. The Shoreline Compliance Program comprises six components including: (1) Shoreline Permitting Program; (2) Structure Identification, Assessment and Resolution; (3) Public Education and Communication; (4) Surveillance Program; (5) Shoreline Litigation; and (6) Shoreline Preservation Initiatives.

By letter issued August 17, 2012, we acknowledged Alabama Power's above letter regarding its progress implementing its Shoreline Compliance Program for its eight hydroelectric projects, including the Martin Dam Project. In our letter, we determined, among other items, that Alabama Power must monitor project property to ensure that no unauthorized uses and occupancies occur within the project boundary. Alabama Power is required to file annual status reports on activities under its Shoreline Compliance Program, including an overview of its progress in resolving the unpermitted structures.

3.3.5.2 Environmental Effects

Project Operations and Lake Management

Alabama Power currently operates the project according to three curves. See figure 2-1 and section 3.3.2, *Aquatic Resources*, for further discussion of project operations. To enhance recreation and other related environmental resources, Alabama Power proposes to increase the winter pool elevation by 3 feet to elevation 484 feet, and change the operating and drought curves. Alabama Power also proposes a conditional fall extension of the summer reservoir elevation. See section 3.3.2, *Aquatic Resources*, for discussion of these conditions.

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[59] *See* Alabama Power's Response to Additional Information Request No. 26, filed December 9, 2011.

Should the 3-foot winter pool elevation be implemented, Alabama Power proposes to lower the reservoir elevation to 481 feet every 6 years, dependent on weather conditions, to facilitate maintenance and/or construction activities of shoreline properties, such as a boat dock.

Lake Martin RA recommends a 4-foot increase in the winter pool elevation to 485 feet, and a trigger for the fall extension when other reservoirs are within 2 feet of their operating curves instead of 1 foot as proposed by Alabama Power (one of the criteria for triggering the fall extension). With its recommended 4-foot increase, Lake Martin RA comments that the risk of downstream flooding is not substantially increased over the proposed 3-foot increase in the winter pool elevation to 484 feet.

Lake Martin HOBO, in an effort to reduce the effects of any future region-wide drought on the ability of Lake Martin to refill by the following spring, recommends a 5-foot increase in winter pool elevation to 486 feet. Lake Martin HOBO also recommends extending the summer pool elevation (491 feet) from September 1 to October 15 to improve recreation opportunities at the lake, and that the Commission direct Alabama Power to treat Lake Martin HOBO, Russell Lands and/or Lake Martin RA equally in consultations related to lake operations.

The Downstream Landowners, concerned about damages to their property from flood events, comment that summer flooding events could be reduced if Alabama Power were to provide storage in Lake Martin for flood control.

Our Analysis

Higher fall and winter lake levels could enhance recreation resources and associated economic activity in the project area by extending the season in which access for boats is available, while at the same time providing some assurance that the reservoir would refill the following spring. However, higher lake levels can decrease flood storage capacity and the amount of flow available for downstream releases, including power generation. Reduced flood storage capacity could have an effect on the frequency and magnitude of floods downstream, potentially affecting public access at Yates and Thurlow reservoirs and whitewater boating opportunities below Thurlow dam, although recreational use is usually limited during flood events. Lower summer lake levels could compromise lake based recreation resources, by restricting boat access and reducing navigability. For further discussion related to potential effects on flooding and downstream releases, see section 3.3.2.2, *Aquatic Resources*. We discuss the effects of the potential reservoir changes on recreation below.

Higher Winter Lake Levels

Raising the winter pool elevation by 3 feet, to 484 feet, from the end of November through February as proposed by Alabama Power could have a direct effect on boating at the project. Currently, seven boat ramps within (see table 3-17) or proposed to be within (see table 3-26) the project boundary provide access to the winter pool (useable boat

ramp elevation of 481 feet or less).[60] An increase in winter pool elevation of 3 feet to 484 feet as proposed by Alabama Power would allow an additional six boat ramps to be useable within the current project boundary. Bakers Bottom Landing is the only site proposed for inclusion in the project boundary that would not provide boater access at elevation 484 feet. As such, non-resident visitors to the area would have access at winter lake levels via these public boat launches at both the existing and proposed 3-foot-higher winter pool.

Approximately 28.6 percent of annual recreational use at Lake Martin is shoreline landowners. From June 1, 2009, through June 13, 2010, Alabama Power (2010g; 2011b) surveyed 688 shoreline landowners on Lake Martin and at shoreline recreation sites. Lake Martin is generally at elevation 487 feet by the end of September, and survey results indicated that 8 percent of respondents find it impractical to moor their boat at their dock at that elevation. Survey results also indicate the following. At elevation 481 feet, 92 percent of survey respondents indicated it was impractical to moor their boat at their dock. At the proposed 3-foot higher winter pool elevation of 484 feet, 71 percent of survey respondents indicated it was impractical to moor their boat at their dock. If Lake Martin was raised 4 feet in the winter to elevation 485 feet, as recommended by Lake Martin RA, 56 percent of survey respondents indicated it was impractical to moor their boat at their dock. If the lake was raised 5 feet higher in the winter to elevation 486 feet, as recommended by Lake Martin HOBO, 24 percent of survey respondents find it impractical to moor their boat at their dock. While lower lake levels may strand privately owned boat docks around Lake Martin, there are several boat ramps available to the public that provide access to the lake under the varied lake levels. Thus, raising the winter pool elevation, as recommended by the Lake Martin RA or Lake Martin HOBO, would primarily benefit shoreline landowners and their private docks.

Approximately 71.4 percent of the annual recreational use at Lake Martin is visitors and seasonal landowners (Alabama Power, 2010g) and two-thirds of the total visitation occurs in June, July, and August. The local businesses supported by recreational spending experience highly seasonal patterns. Alabama Power (2010g) survey results indicate that people would use the lake more often if lake levels were higher; however, it is not clear whether a higher lake level would be for the public because access is not a limiting factor, with the public boat ramps providing access on the lake under current conditions (winter pool of elevation 481 feet).

Any increase in recreation usage would likely be modest given the higher winter level would primarily benefit shoreline landowners during the off-season not typically

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[60] Of the seven boat ramps, the boat ramps at Anchor Bay Marina, Maxwell Gunter AFB Recreation Area, Parker Creek Marina, Paces Point Ramp, and Pleasure Point Park and Marina are located within the project boundary. Alabama Power proposes to make the boat ramps at Madwind Creek Ramp and Smith Landing project facilities and bring them into the project boundary.

associated with boating and water-based recreation activities. To those boaters that do use the reservoir during the winter, higher lake elevations may allow boaters to access certain areas of the reservoir for fishing or other recreation activities that may have been difficult to access, or inaccessible under existing conditions during this time of year. The higher reservoir elevation could improve navigation by creating safer boating conditions by decreasing the chance of collision with submerged objects that would be deeper under higher reservoir levels.

The winter season is typically cold and uncomfortable to participate in boating. Therefore, an increase in recreational use and associated expenditures would likely be modest. Given this is the coldest time of the year, improved access for shoreline residents would also likely only result in a modest increase in recreational boating during the winter.

Conditional Fall Extension

Alabama Power's proposal to implement a conditional fall extension of the summer lake level could benefit recreation at the project by increasing recreation use during the fall, resulting in increased recreation-related spending. Figure 3-12 in section 3.3.2, *Aquatic Resources* (historical and average lake elevations), shows that, on average, the reservoir elevation is about 488 feet on September 1, 486 feet by October 15, and 485 feet on November 1. Given that the majority of public boat ramps are still useable at these elevations as discussed above, the public is provided access to Lake Martin until at least November 1 (or later) under current conditions. So, similar to the higher winter water levels, the greatest benefit would be to shoreline residents who access the lake via private docks that tend to be at higher elevations.

Several studies have been conducted to evaluate the overall economic impact of lake tourism and recreation on their surrounding regions (Allen et al., 2010). Hatch and Hanson (2001) cite several studies whereby results indicate that maintaining higher water levels for longer periods during the summer and fall resulted in considerable gains in estimated recreational benefits. Other data find higher water levels added value to homes surrounding a lake and increased the recreational and aesthetic values of the residential lot. The authors note, however, their study did not include agriculture, municipalities, industry, and navigation uses of water. The authors also note that to determine the effect of a resource change on all of these potential users would be a large undertaking.

Platt and Munger (1999) find the quality of the recreation experience influences the number of recreation trips taken, which can be affected by many factors including reservoir elevation. The authors note lake management practices influence housing prices, recreation, and aesthetic values. The authors find if other recreation sites occur nearby, which would be unaffected by a lake drawdown, it is likely recreationists would move to those recreation sites. If a lake drawdown occurs within a previous range, recreationists may have adapted to, and be willing to accept, a certain level of fluctuations in reservoir elevations.

Sammons (2011) finds that because Lake Martin has a high degree of residential development along its shorelines, and water levels are kept at full pool throughout the summer, Alabama Power must generate large volumes of water through Martin dam during periods of high rainfall to reduce flooding effects. In his study, Sammons cites to another study whereby its authors find changes in water levels within Lake Martin have economic impacts on property owners that must be taken into account when trying to manage for striped bass habitat.

Alabama Power (2010g) assessed the potential benefits of a conditional fall extension and concluded that this measure would offer a greater potential for increased recreational activity than the proposed winter pool increase. Water temperatures would still be warm enough for water sports in the fall, and an extended summer pool into the middle of October would improve the usability of the shorefront docks. Reservoir elevations can have a direct role in the amount of potential recreation available to shoreline landowners. As the reservoir level decreases, private docks and piers become unusable, as described above. Study results indicate that about 8 percent of property owners find it impractical to moor their boats at their dock by the end of September (at elevation 487 feet), and by the end of October (at elevation 485 feet), the number of property owners that find it impractical to moor their boats rises to more than one-half (56 percent).

Overall, higher fall reservoir elevations could provide more opportunities to access Lake Martin in that public boat ramps and private docks would continue to be accessible; however, the amount of recreation that would be expected to occur during the conditional fall extension period is likely modest. Given that two-thirds of the visitation occurs in June, July, and August, and that 71.4 percent are visitors and seasonal landowners (Alabama Power, 2010g), the demand for recreation is likely to be lower after Labor Day weekend because people, generally speaking, would return to school and have limited vacation time once school begins. This demand would be further diminished because any fall extension would be conditional, based on hydrological and project operational criteria. Review of table 3-12 indicates the four criteria required to implement the fall extension would only be expected to be met 32 percent of the time under Alabama Power's proposal. As such, it would be difficult for potential visitors interested in boating to make decisions ahead of time (e.g., lodging reservations) at Lake Martin due to the majority of years the conditional fall extension may not occur.

Utilization of a 2-foot trigger (one of the criteria related to how close the Tallapoosa and Coosa River reservoirs are to their guide curves - Alabama Power is proposing a 1-foot trigger) as recommended by Lake Martin RA - would increase the probability that a conditional fall extension would occur to about 84 percent of the time, and would provide more certainty to visitors making decisions related to recreating at the lake (table 3-12). As proposed by Alabama Power, the conditional fall extension would only occur *if* all four criteria are met, which would be monitored by Alabama Power on a daily basis throughout September. Implementing the conditional fall extension with a 1-foot trigger could also include a provision for informing the public that there would be an

effort to maintain higher lake levels into mid-October in most years, providing more certainty that boating opportunities could be available.

Lower Summer Reservoir Elevations

While lower summer Lake Martin levels could offer some protection to downstream resources from flooding (discussed in section 3.3.2.2, *Aquatic Resources*), lake based recreation resources could be adversely affected. Although all public boat ramps would continue to be accessible should the lake elevation be lowered by 2 to 3 feet (between elevations 488 and 486 feet), boaters could be exposed to risks from submerged hazards (e.g., rocks and tree stumps) in the backwater and shallower areas of the reservoir. This would pose the greatest risk to the boating type activities such as water skiing, which are common during the peak summer recreation season, and could reduce the area of the lake where such activities could safely occur. A lower summer lake level would also have an effect on accessibility to private docks that are not constructed at elevations as low as the public boat ramps.

A 2 to 3-foot decrease in the summer pool could result in some changes in accessibility or the character of shoreline locations used by boaters, or for picnicking, swimming, and other shore/land based activities. In some locations, lower summer lake levels could affect the aesthetics of the area (a wider "bath-tub ring" of shoreline between the water and the tree/vegetation line would be visible). Although the overall effects on recreational use and economic activity associated with that use would be difficult to predict, these lower lake levels would occur during the peak recreation season, and may have the potential to have a noticeable effect on some activities (including potentially increased shoreline/beach based uses). Overall, lower lake levels may not significantly affect the overall use of the reservoir, as most of the major recreational facilities (such as a public boat ramp) would still be available and accessible.

Reservoir Drawdown to Elevation 481 feet

Should the 3-foot winter increase of Lake Martin be implemented, Alabama Power proposes to draw down the reservoir every 6 years to elevation 481 feet, which would benefit shoreline landowners and commercial property owners by providing them the opportunity to perform maintenance and repairs to docks and shoreline structures. Notification of this drawdown to local residents, shoreline owners, and to the public in advance would minimize conflicts with recreational activities and visitor use. Having a regularly scheduled drawdown could allow landowners and commercial property owners to schedule any required repairs with contractors, and the recreating public could plan visits accordingly in order to avoid drawdown periods.

Downstream Flows

Changes in project operation and reservoir elevations discussed above could affect recreation opportunities and lands downstream of Martin dam. Alabama Power proposes to operate the Martin Dam Project in accordance with a new flood curve, including an increase in the winter pool level and a conditional fall extension. For further discussion,

see section 2.2, *Proposed Project Operation*. Alabama Power would also operate the project so that the downstream Thurlow dam continues to meet its minimum flow requirement of 1,200 cfs.

Lake Martin RA recommends a 4-foot increase in the winter pool elevation to 485 feet, and triggers for the conditional fall extension when other reservoirs are within 2 feet of their rule curve instead of 1 foot as proposed by Alabama Power (one of the criteria for triggering the fall extension). Lake Martin HOBO recommends that the winter pool elevation be raised by 5 feet to elevation 486 feet, and supports extension of the summer pool elevation 491 feet from September 1 through October 15. Any changes in reservoir operations could affect downstream flows, due to seasonal changes in reservoir storage or modifications in the timing of releases from the project.

Alabama Rivers Alliance and American Rivers comment that Alabama Power's final license application and supplemental filing in response to the Commission's additional information request do not provide the necessary information for Commission staff to adequately assess Alabama Power's proposals.

As discussed above in section 3.3.2.2, *Aquatic Resources*, and appendix C, the Downstream Landowners recommend the project should be operated with a greater emphasis on flood control.

Our Analysis

Alabama Power's proposed operational changes designed to benefit recreation on the reservoir could alter the frequency and magnitude of floods downstream. Alabama Power (2010f) used a number of data sources including LIDAR and hydrological modeling results to examine flood frequency and magnitudes in relation to five recreation access points downstream of Martin dam to RM 12.9 on the Tallapoosa River. As described in section 3.3.2.2, *Aquatic Resources*, 100-year flood events during September and October, when the conditional fall extension would be implemented, are predicted to occur less than 0.2 percent of the time. Furthermore, any changes in flood characteristics as a result of the conditional fall extension would be infrequent because all four hydrologic and operational criteria would have to be met to initiate the conditional fall extension. As described above, the four criteria would only be met about 32 percent of the time under Alabama Power's proposal but 84 percent of the time under Lake Martin RA's recommendation.

Should the conditional fall extension and/or the higher winter reservoir pool conditions be implemented as described under Alabama Power's proposal, flood modeling results indicate that there would be no change to access at the downstream Yates Dam Boat Ramp, Tallassee Park, and the Tallapoosa Take Out. The remaining three downstream sites, Gold Mine Road, Coon Creek Ramp, and Thurlow Dam Put-in, would experience some changes in access over the baseline; however, under all modeling scenarios, the maximum number of days these three sites would be inaccessible would be an additional 3 days over the entire 67-year period of record used in the analysis.

In addition to examining access to the above sites, the effects of the various flood curve alternatives, on flows in the Tallapoosa River downstream of Thurlow dam, were compared to flow descriptions for the quality of whitewater boating, published by the Alabama Whitewater Paddling Guide. Table 3-22 summarizes the paddling guide's classification of the flows at the six whitewater features on the Tallapoosa River. According to the paddling guide, the classification of the flows at these six features is rated as follows: minimum = 1,200 cfs, low = 5,000 cfs, good = 10,500 cfs, and great = 11,500 - 13,000 cfs. The paddling guide also indicates that if the Thurlow Project releases flows (e.g. 1,277 cfs) over the continuous minimum flow (1,200 cfs) boaters are able to make the run; however, it is a "scrape with almost no play."

Table 3-22. Classification of flows below Thurlow dam according to the Alabama whitewater paddling guide at six whitewater features on the Tallapoosa River (Source: Alabama Power, 2010f, as modified by staff).

cfs	Two Class I Shoals	Sticky Hole	Breaking Wave Holes	Big O	The Falls	Bionic Wave
1,200	Scrape	-[a]	-	-	Fun	-
5,000	Good	-	-	-	Extra caution	-
10,500	Good	Great	-	-	Awesome	-
11,500-13,000	Great	Great	Great	-	Awesome	-
18,000	Washed out	Good	-	-	Washed out	-
50,000	Washed out	Good	Washed out	Washed out	Washed out	Washed out

[a] Not all features evaluated at all flow levels.

Generally, as flows increase, hydraulics at different features change so some spots become better destinations for wave features or safe passage while others wash out (whitewater features no longer exist). For example, at 18,000 cfs, a feature known as Sticky Hole may be rated good, while another feature, Two Class I Shoals, may be washed out. At 50,000 cfs Sticky Hole is the only feature rated good, while the rest of the river is washed out. Table 3-23 summarizes the estimated number of days within specified flow ranges in the Tallapoosa River downstream of Thurlow dam for a dry, normal, and wet year.

Table 3-23. Estimated number of days within specified flow ranges by water year type for the Tallapoosa River downstream of Thurlow dam under baseline conditions (Source: Alabama Power, 2010f, as modified by staff).

Flow Range (cfs)	Dry	Normal	Wet
1,200	152	8	0
1,201-5,000	206	237	172
5,001-10,000	8	92	123
10,001 – 13,000	0	22	29
13,001-18,000	0	6	20
>18,000	0	3	16

Alabama Power modeled changes in flows for the Tallapoosa River downstream of Thurlow dam under various operational scenarios for dry, normal and wet conditions to better understand potential effects downstream. The change in available storage within the reservoir would require changes in the releases out of Martin dam to maintain the proposed higher winter pool elevations and the conditional fall extension, if implemented. Flow frequencies would be altered, but the extent of the flow changes, considering overall precipitation throughout the basin, would likely be small compared to the baseline condition.

According to the model results, the various winter pool alternatives would result in a reduction in the total number of days within preferred flows for whitewater boating (flows in the 10,000 to 13,000 cfs range). Tables 3-24 and 3-25 summarize the results. Modeling results show that in a normal year, flows in the range of 5,001 to 10,000 cfs were reduced, while flows in the range of 1,201 to 5,000 cfs were increased (result of passing smaller flows more frequently to accommodate a lower storage capacity). For each winter pool alternative, there was an increase in the number of days the flow would average 13,001 to 18,000 cfs.

Table 3-24. Estimated changes in the number of days within observed flow ranges downstream of Thurlow dam: Winter pool elevations (Source: Alabama Power, 2010f, as modified by staff).

	484 foot winter pool			485 foot winter pool			486 foot winter pool		
Flow Range (cfs)	**Dry**	**Normal**	**Wet**	**Dry**	**Normal**	**Wet**	**Dry**	**Normal**	**Wet**
1,200				-7			-9		
1,201 - 5,000				10	13	10	11	19	13
5,001 - 10,000	-5	8	13	-4	-11	-10	-4	-18	-13
10,001 – 13,000	-3	-12	-15	1	-7	-2	1	-6	-3
13,001-18,000		4	2		5	2	1	5	1
>18,000				1			2		

Table 3-25. Estimated changes in the number of days from existing conditions that specific flow ranges would be observed downstream of Thurlow dam (Source: Alabama Power, 2010f, as modified by staff).

	Fall Extension			**484 and Fall Extension**			**485 and Fall Extension**			**486 and Fall Extension**		
Flow Range (cfs)	**Dry**	**Normal**	**Wet**	**Dry**	**Normal**	**Wet**	**Dry**	**Normal**	**Wet**	**Dry**	**Normal**	**Wet**
1,200	-1	3	2	-6	3	2	-8	3	2	-10	3	2
1,201-5,000	1	-4	-8	8	4	5	11	9	2	12	13	5
5,001-10,000		-1	6	-3	-5	-9	-4	-11	-4	-4	-16	-8
10,001 – 13,000		2		1	-6	1	1	-6	-2	1	-5	-2
13,001-18,000					4	1		5	2	1	5	1
>18,000							1			2		

In a wet year, winter pool levels of 484 feet or higher would increase the number of days flows would average in the 10,000 to 13,000 cfs range. Lake Martin RA's and Lake Martin HOBO's recommendations would result in more days in the 10,000- to 13,000-cfs range than Alabama Power's proposed winter pool elevation. However, all proposals would reduce the number of days from current conditions in this particular range. Incorporating the conditional fall extension would decrease the number of days in this range for Alabama Power, Lake Martin RA, and Lake Martin HOBO winter pool scenarios with Alabama Power's proposal resulting in a reduction of days of flows in the 10,000 to 13,000 cfs range. The conditional fall extension would be implemented much more often under Lake Martin RA's recommended 2-foot trigger as described above, and not every flow is optimal for every whitewater boating feature although opportunities would be available at every flow.

Finally, modeling results suggested that most of the flow changes described above occur during the period of November through March. Alabama Power (2010d) states there were no differences between the baseline number of flow days for flows in the broad preferred range for whitewater boating (5,000 to 17,999 cfs) and any of the winter pool alternatives during the months of April through October. Model results further estimated one additional day within this range when the conditional fall extension was included. Even though Alabama Power states there is no change in the number of days over the broad range of whitewater boating flows, there would likely be changes within the narrower ranges similar to those summarized in tables 3-24 and 3-25, and within the more typical flows (at the lower end between 1,200 and 5,000 cfs).

The conditional fall extension would mainly affect flows below 10,000 cfs according to model results. Flow changes in dry years were minimal. In a normal flow year, most of the effects would be an increase in the average number of days at the minimum flow, with some increase in flows in the boater-preferred range of 10,001 to 13,000 cfs. Wet years would experience a reduction in flows in the less preferred range of 1,201 to 5,000 cfs, with most of this flow getting shifted to a flow range of 5,001 to 10,000 cfs. Again, the frequency of these changes altogether would depend on the four criteria laid out for implementation of the conditional fall extension (as described in section 3.3.2, *Aquatic Resources*).

Alabama Power (2010d) finds that other recreation activities below Thurlow dam may benefit from the potential flow changes. Fishing is the most common use occurring in the Tallapoosa River downstream of Thurlow dam, with most of the anglers fishing from the riverbank. Alabama Power (2010d), citing FIMS (1989), indicated that 49 percent of anglers interviewed in the section of the Tallapoosa River below Thurlow dam preferred "high water," 44 percent preferred "low water." However, 7 percent had no preference for water levels. These qualitative descriptors were not defined in the Alabama Power report (2010d). Other activities, such as swimming, could benefit from lower flows downstream for safety and accessibility of the rocks. However, because these proposals are targeted for the fall and winter months when water temperatures are cooler, the number of swimmers potentially affected would be expected to be low.

Maintaining a lower reservoir elevation in the summer, as analyzed by staff to address the concerns of the Downstream Landowners, could have an effect on the whitewater boating opportunities downstream. According to the Alabama Whitewater Paddling Guide, as flows increase, some whitewater features become better destinations for boaters. This suggests that boaters rely on operational releases or rain events, conditions that result in flows above the minimum releases from Thurlow. Table 3-23 indicates that boaters are more likely to experience flows in the 1,200 to 5,000 cfs range than any other range, as flows in this range occur about 65 percent of the time (during a normal year). Very few days each year have flows greater than 10,000 cfs (less than 10 percent of the time during a normal year). The hydrological records from a USGS gage located a short distance below Thurlow dam (USGS gage no. 02418500, Tallapoosa River, below Tallassee, Alabama) show the majority of these events occur during the late winter/early spring (table 3-5).

As described in section 3.3.2 *Aquatic Resources*, lower summer reservoir elevations would reduce the potential for summer rainfall events to result in higher flows downstream (by design), reducing the opportunities within this season for boating flows above the minimum Thurlow releases of 1,200 cfs. To achieve lower reservoir elevations in the summer, Alabama Power would have to release more water throughout the spring period, thereby contributing to the number of potential boating days downstream during this season. Daily operational interests should dictate the timing of the releases to provide greatest benefit to boaters, because releases from the Martin Dam Project (and subsequently Yates and Thurlow Project) made after sunset would diminish any potential benefit to boaters looking to take advantage of releases.

To address the potential flood risk to downstream property owners, Alabama Power examined a range of potential reservoir elevations using analytical tools such as the HEC-RAS model. The results of our analysis of the downstream flooding issue are found in section 3.3.2.2, *Aquatic Resources*.

Recreation Plan

Alabama Power proposes to implement its final Recreation Plan (filed on December 9, 2011) for the Martin Dam Project. The plan was developed in consultation with interested entities during the relicensing process and includes: (1) a general description of recreation sites that are owned and operated by either Alabama Power or another entity; (2) a discussion of methodology used in the development of the plan; (3) proposed recreational enhancements and associated implementation schedules; (4) a discussion of other specific recreation-related issues or potential improvements; and (5) proposed measures for annual consultation and addendum/update to the plan.

In addition to including the 12 existing project recreation sites under the current license, as previously discussed, Alabama Power proposes to add six recreation sites and reserve one site, Ponder Camp (Stillwaters Area Boat Ramp), for future recreation development. Of the six recreation sites, Madwind Creek Ramp and Smith Landing are

not located within the project boundary, and therefore, would be made project facilities and brought into the project boundary (see table 3-26). In total, there would be 19 project recreation sites, which the final Recreation Plan identifies.

Table 3-26. Proposed project recreation sites and the minimum elevations that the boat ramps are useable (Source: Alabama Power, 2011b).

Proposed Project Recreation Sites	Type of facility	Acres	Minimum Elevation That Boat Ramp Is Usable (feet msl)
Bakers Bottom Landing	Public/Day Use	1.9	485
Jaybird Landing	Public/Day Use	19.9	484
Madwind Creek Ramp	Public/Day Use	5.8	480
Paces Point Ramp	Public/Day Use	8.7	480
Paces Trail	Public/Campground/ Campsites and Day Use	24.1	N/A
Smith Landing	Public/Day Use	4.2	480
Ponder Camp (Stillwaters Area Boat Ramp)	Public/Day Use	36.4	N/A

As part of the Recreation Plan, Alabama Power proposes the following measures at three project recreation sites:

Jaybird Landing

- Replace the existing boat ramp, construct two bank fishing sites on the south side of the Tallapoosa River, and construct a gravel parking area within 1 year of license issuance.

Ponder Camp

- Retain 36.4 acres for future recreation. When need demands and in consultation with Alabama DCNR, Alabama Power proposes to construct a paved access road, single-lane boat ramp, parking lot, and courtesy pier.

Smith Landing

- Expand the parking area at Smith Landing, as needed and in consultation with Alabama DCNR.

Alabama Power proposes annual O&M at DARE boat landing, DARE Power Park, Scenic Overlook, Union Ramp, Bakers Bottom Landing, Pace Point Ramp, Pace Trail, Jaybird Landing, Madwind Creek Ramp, Ponder Camp, and Smith Landing.

Alabama Power proposes to meet annually with Alabama DCNR to assess progress of the Recreation Plan and public access at the project. As part of this consultation, Alabama Power proposes to file a yearly addendum with the Commission as a separate document to include meeting minutes, scheduling changes, photographs, as-built drawings of recreation facility components, and a description of any changes that occurred in the preceding year, and reasons for the change. Specifically within the first year after license issuance, Alabama Power proposes to meet with Alabama DCNR to consult about the need for additional bank/pier fishing opportunities at the project.

Our Analysis

The Recreation Plan would continue to guide current and future management of project recreation resources and provide a framework for Alabama Power's implementation of the site improvements and coordination with associated measures, such as improvements to boat ramps and construction of bank fishing facilities. The proposed facility improvements would ensure that public access and recreation needs are met, enhance the physical condition of project-related recreation facilities, and reduce recreation-related adverse effects on environmental resources. Boating is the most popular recreational activity at Lake Martin; therefore, improving the recreation sites that provide boat launches and public access to Lake Martin (i.e., Jaybird Landing) would be beneficial. Alabama Power's proposal to reserve land at Ponder Camp for future recreation development would accommodate a projected increase in recreational use at the project.

The proposed annual O&M by Alabama Power would ensure each project recreation site would be operated and maintained for the public. Consequently, the measures would benefit the local economy by providing recreational opportunities that would not otherwise be available nearby. The additional spending associated with implementing the recreation measures would provide some additional employment during the construction and monitoring.

The proposed annual meeting between Alabama Power and Alabama DCNR would establish a schedule and procedure for evaluating recreation trends and updating the Recreation Plan as necessary. The annual addendum to the Recreation Plan would summarize progress made in the preceding year, and could possibly include recommendations for future improvements, after consultation with interested entities.

However, Alabama Power's Recreation Plan, as proposed, does not include specific details for project recreation measures that Alabama Power would be responsible for at the Martin Dam Project. In particular, section 3.1, Site Descriptions, does not reflect the updated information included in appendix D of the plan, entitled "As-Built/Concept Design Drawings/Maps of Project Recreation Sites." We note that Appendix D contains drawings labeled Sheet D-1 through Sheet D-19 that clearly show the type of recreation facility, its location in relation to the project boundary, and the amenities, such as the number of parking spaces.

Alabama Power's proposed annual meeting with Alabama DCNR and the annual addendum to the Recreation Plan could provide the means to inform stakeholders and the Commission about the status of the implementation of the Recreation Plan. However, it is not clear whether Alabama Power would continue to provide the annual addendum after it completes the proposed facility upgrades. In addition, Alabama Power does not provide specific provisions in the Recreation Plan beyond the Form 80 filings for long-term monitoring of recreation facilities at the project, or specific methods for modifications or update to the Recreation Plan.

A revised Recreation Plan, therefore, should identify and discuss each project recreation site, including its existing and proposed facilities, identify an implementation schedule, provide for future monitoring of recreation facilities at the project, and include a provision to review, update, or modify the Recreation Plan.

Because of the potential for increased recreation demand at the project and the project's proximity to nearby communities, the revised Recreation Plan should include a report to the Commission every 6 years, concurrent with the Form 80 filing, which discusses recreational use and demand, associated project-related resource effects, and any additional measures or modifications to the project recreation sites that may be needed and a schedule for implementing such changes.

Shoreline Management Plan

Alabama Power (2011e) proposes to implement its final SMP for the Martin Dam Project that includes: (1) long-term shoreline management goals to provide guidance for existing and future management actions within the project boundary; (2) a redefined shoreline classification system; (3) updated shoreline permitting program; (4) other policies related to activities that may affect the shoreline (e.g., dredging, bank stabilization, channelization); (5) BMPs; and (6) an implementation plan and review process for the SMP.

The general goals of the SMP are to provide for reasonable public access, protect fish and wildlife habitat, protect cultural resources, protect operational needs, facilitate compliance with license articles, minimize adverse effects on water quality and aesthetic resources, minimize erosion, and guide shoreline development. Specific components of Alabama Power's proposed SMP are described below.

Shoreline Land Use Classifications

As part of its final SMP and its proposal to modify the project boundary, as discussed herein, Alabama Power proposes to revise the shoreline land use classification system to guide current and future shoreline management and permitting activities within the Martin Dam Project boundary. Further, Alabama Power proposes to develop a Sensitive Resources layer in conjunction with other project land use classifications, such as Natural/Undeveloped. The proposed shoreline land use classifications include:

Project Operations – Lands would be reserved for current and potential future operational activities. This includes project lands used for hydroelectric generation, switchyards, transmission facilities, right-of-way areas, security lands, and other operational uses. There would be 279.8 acres of land under this classification.

Recreation – Lands would be managed by Alabama Power for existing and/or future recreational use. This includes land developed for commercial recreation with provisions for public access, recreation, open space, and future recreation development. There would be 334 acres of land under this classification.

Quasi-public – Lands would be reserved to provide a natural, outdoor, recreational setting for the enjoyment of non-profit groups. Organizations interested in the use of these lands would be required to submit detailed plans to Alabama Power for facilities they propose to construct and lease, along with details of how the proposed facilities would be maintained by that organization on a long-term basis. There would be 237.2 acres of lands within this classification.

Commercial Recreation – Lands would contain existing concessionaire-operated public marinas and recreational areas that provide a wide variety of recreational services to the public on a fee basis. There would a total of 32.3 acres of lands within this classification.

Natural/Undeveloped – Lands would remain undeveloped for specific project purposes including to: protect environmentally sensitive areas; maintain aesthetic qualities; serve as buffer zones around public recreational areas; and provide a means for preventing overcrowding of partially developed shoreline areas. This classification would allow for public hiking trails, nature studies, primitive camping, wildlife management (excluding hunting), and forestry management practices. This classification would total 6,992.4 acres.

Martin Small Game Hunting Area – This area is a sub-classification under the Natural/Undeveloped Lands Classification. This 528.2-acre area would be managed according to the Martin Dam Project WMP.

30-foot Control Strip – This classification addresses project lands held within an easement retained by Alabama Power on properties once owned by the company. Alabama Power prohibits certain activities (e.g., habitable structures) within this classification. There would be 690.2 acres of land within this classification.

Unclassified – This classification represents the shoreline miles where Alabama Power has no project lands above the 491-foot contour. There would be 507.6 miles of shoreline within this classification.

Alabama Power also proposes to reclassify the shoreline at the following recreation sites (currently classified as General Public Use) to the Recreation classification: DARE Boat Landing, DARE Power Park, Scenic Overlook, and Union

Ramp. Alabama Power also proposes to reclassify the shoreline at General Public Use Site #2 from General Public Use to Natural/Undeveloped classification.

Shoreline Permitting Program

The proposed SMP contains a Shoreline Permitting Program. This program describes the following: (1) levels of permitting and reviewing entities; (2) permit process; (3) guidelines; (4) supporting documentation; (5) permit enforcement; (6) permit transferability; (7) permit revocation; and (8) substandard and non-conforming structures.

The Shoreline Permitting Program allows Alabama Power to respond to shoreline landowners' permitting needs.

Private shoreline property is subject to permitting by Alabama Power. The Shoreline Permitting Program provides an ongoing plan for shoreline development by private landowners, commercial developers, and other entities who may request Alabama Power's approval for constructing piers, boat launches, seawalls, or other structures on Alabama Power-owned lands within the Martin Dam Project boundary. Private and commercial owners are provided a copy of Alabama Power's guidelines for recreational development and a copy of Alabama Power's permitting program and permit application. Alabama Power schedules on-site meetings with the entity to review the placement of structures and specific issues that must be addressed prior to Alabama Power's approval.

Alabama Power proposes to continue to implement its Shoreline Permitting Program to manage development of non-project use of project lands, and thereby protect the scenic, recreational, and environmental resources at the project. Alabama Power proposes to implement riprap guidelines and specifications for seawalls through the permitting program. Further, Alabama Power would encourage landowners to establish or maintain a 15-foot naturally vegetated buffer on privately owned shoreline lands located outside of the project boundary. Similarly, Alabama Power proposes to continue to retain a 30-foot Control Strip on any project lands removed from the project boundary. Alabama Power would encourage the use of BMPs by landowners through a combination of permits and its public education and outreach efforts, as discussed under *Public Education and Outreach Plan*.

Shoreline Management Policies

Alabama Power developed policies for five shoreline management permit requests. The five shoreline management policies include:

Bank Stabilization – Alabama Power encourages the use of alternative bank stabilization techniques other than seawalls, including riprap, bioengineering techniques, vegetation with riprap, and gabions. Alabama Power proposes to require, as a condition of a permit, that any future seawall proposals include the placement of riprap for fish habitat and increased stability in front of the seawall. If Alabama Power found riprap would not be an effective measure for bank stabilization, or it would be not economically feasible, then Alabama Power would permit a seawall without riprap.

Dredging – Alabama Power would allow dredging, consistent with the Corps' Programmatic General Permits, except that dredging would be restricted in and around the shoreline classified as Sensitive Resource Lands. Alabama Power (2011b) proposes to manage individual applications for dredging activities in accordance with its Dredge Permit Program approved by the Commission on July 6, 2011.[61] The program establishes the process and procedures for permittees seeking to obtain direct authorization from Alabama Power for dredging activities (below the full pool elevation) at the project, and would ensure that such activities would not interfere with project operations, and are consistent with the scenic, recreational, and other values of the project.

Channelization – Alabama Power would prohibit channelization on Lake Martin, including channelization proposals by both private and commercial interests.

Water Withdrawals – Alabama Power would evaluate each application for permission to withdraw water from its project reservoir, and seek Commission authorization. In accordance with the provisions of its license, Alabama Power would charge reasonable compensation for water withdrawals based on the replacement cost of energy lost as a result of the withdrawal, and the replacement cost of the storage in the reservoir allocated to the withdrawer. Adjacent single-family home uses, such as lawn/garden watering or other similar non-commercial uses would be excluded from this policy.

Causeways – Alabama Power would prohibit the creation of causeways on Lake Martin to connect islands to the mainland or to other islands, to protect the integrity of the existing project features and shoreline, as well as fish habitat, navigation, and project operations.

SMP Review and Update

Alabama Power proposes to conduct a review of the SMP every 6 years, with input from interested entities. Alabama Power states that the review process would provide the means for the permitting program to change, if necessary, or for additional BMPs to be adopted or replaced as their effectiveness is tested. Alabama Power also states that any information related to Sensitive Resources Lands Classification (e.g., rare, threatened, and endangered species locations and habitats) would be updated as new information arises. Alabama Power proposes to advertise the review process in various media formats (e.g., the SMP website, the *Shorelines* newsletter, and contact with homeowner associations) one month before the review process begins. In addition, Alabama Power proposes to issue a report, every 6 years, through various outlets (e.g., the SMP website, the *Shorelines* newsletter) with the number of permits it has processed within each shoreline land use classification at Lake Martin.

[61] 136 FERC ¶ 62,012 (2011).

Alabama Power also proposes to host public workshops to address SMP questions, especially with regard to permitting, during the six-year review process. By December 31 of the fifth year of the 6-year cycle, Alabama Power proposes to meet with interested entities to determine the progress of implementing the SMP and any suggested modifications to the SMP.

Interior recommends that no new sea walls be constructed unless absolutely necessary to protect land and property. Alabama Power states in response that prohibiting seawalls entirely would be impractical, but confirms their awareness that riprap provides a better alternative for fish densities. Alabama Power states that use of the proposed permitting program, including BMPs and riprap guidelines, would improve water quality and aquatic habitat. Interior also recommends that Alabama Power encourage shoreline developments to maintain the 30-foot-wide control strip within the project boundary, and increase the total buffer width to at least 100 feet.

In response to Interior, Alabama Power stated that it could not increase the buffer to at least 100 feet, as recommended by Interior, because it did not have control of privately owned land located outside of the project boundary.

Our Analysis

Implementation of Alabama Power's proposed SMP would provide shoreline management guidelines, update shoreline land use classifications and policies, and an overall framework for managing project lands at the Martin Dam Project. The shoreline land use classifications would provide a framework for specific shoreline management activities and measures within designated areas. Rare, threatened, and endangered species, as discussed in section 3.3.3, *Terrestrial Resources*, and 3.3.4, *Threatened and Endangered Species*, would be protected by the permitting activity for lands under the Natural/Undeveloped Lands classification. Cultural resources, as discussed in section 3.3.6, *Cultural Resources*, would also be protected under this classification. The classification of Natural/Undeveloped lands would protect undeveloped areas while allowing for public hiking trails, nature study, primitive camping, and wildlife and forestry management activities. Approximately 507.6 acres of lands would be designated Unclassified. It is not clear from this lack of classification if these lands are developed with private facilities (e.g., docks or piers) or if applications for such facilities would be allowed throughout these areas.

Alabama Power's proposal to reclassify 91 acres of project lands from the Natural/Undeveloped classification to the Recreation classification would be consistent with existing uses as the acreage comprises eight recreation sites[62] that are currently used

[62] The eight recreation sites are: (1) Madwind Creek Ramp (5.8 acres); (2) Smith Landing (4.2 acres); (3) Union Ramp (7.0 acres); (4) Bakers Bottom Landing (1.9 acres); (5) Jaybird Landing (19.9 acres); (6) Paces Point Ramp (8.7 acres); (7) Paces Trail (24.1 acres); and (8) Ponder Camp (36.4 acres).

for recreation. Alabama Power also proposes to reclassify any recreation sites under the General Public Use classification to the Recreation classification. Similar to the Natural/Undeveloped classified sites, all of these General Public Use sites to be reclassified as Recreation are currently being used for recreation. Alabama Power proposes to reclassify General Public Use Area #2, which is an informal recreation area located within the project boundary, and other areas currently classified under Potential Residential to the Natural/Undeveloped classification because these areas are undeveloped or receive minimal recreation use. The reclassifications would result in an increase in lands classified as Natural/Undeveloped, compared to current classifications. Reclassification of the project lands to more accurately describe their use is appropriate for management practices.

Alabama Power's Shoreline Permitting Program would protect the Lake Martin shoreline during construction, operation, and maintenance of non-project structures, such as docks. It is the intent of the Shoreline Permitting Program to continue to ensure consistency of non-project use of project lands and waters with other project purposes.

However, Alabama Power is responsible for ensuring project lands are protected and maintained for their designated project purposes, such as O&M, flowage, recreation, public access, protection of environmental resources, and shoreline control. Alabama Power proposes to address unpermitted structures at each of its project reservoirs, including the Martin Dam Project.[63] The proposed Shoreline Permitting Program should provide a general overview of Alabama Power's progress in resolving the unpermitted structures. We make this finding because Alabama Power proposes to modify the current project boundary and those lands may have an unpermitted structure (e.g., a recreational vehicle).

Adherence to the SMP policies would protect the project shoreline and associated recreational, scenic, and environmental resources by restricting dredging within Sensitive Resources areas and prohibiting channelization and causeways on project waters. Alabama Power's policy to encourage the use of alternative bank stabilization techniques, such as riprap, bioengineering techniques, vegetation with riprap, and use of gabions, would promote the use of shoreline structures that by design provide greater benefits to aquatic resources than the use of seawalls.

In a study, Purcell et al. (2011) find shoreline development type did affect the abundance and community composition of juvenile and adult fishes. The authors find fish abundances were highest at sites containing riprap while both species richness and species diversity tended to be highest at undeveloped sites versus any of the developed

[63] *See* Alabama Power's filing of March 14, 2012. This document was filed to update the Commission on Alabama Power's progress in implementing its Shoreline Compliance Program at its eight projects, including the Martin Dam Project.

sites. The authors find fish abundance can be enhanced by providing some degree of structure with interstitial spaces, such as riprap.

Interior's recommendation to prohibit the construction of any new seawalls unless necessary would be consistent with Alabama Power's proposal to encourage the use of alternative bank stabilization techniques, BMPs, and permitting guidelines before the construction of seawalls. However, Alabama Power does not describe under what circumstances a seawall without riprap would be permitted. Additionally, a seawall without riprap may exacerbate the rate of shoreline erosion and is effective if maintained. Defining such circumstances would ensure shoreline erosion is controlled while providing benefits to aquatic resources.

Alabama Power's proposed SMP review and update would provide a forum to consult with interested parties on shoreline development, effectiveness of permit programs, and any need for changes to shoreline management policies and implementation strategies. Alabama Power could present updated information about the number of new seawalls constructed to Interior and other consulted agencies, thus providing agencies the chance to provide comments and recommendations on the adequacy of the bank stabilization policy included in any final SMP.

Consultation during this update and review process would ensure a coordinated effort among Alabama Power and the interested parties with respect to other project-related plans to protect and enhance the environmental resources. Provision of a SMP update, filed with the Commission every 6 years, would ensure implementation of shoreline management guidelines, policies, and an overall framework for management of project lands.

The establishment of vegetated buffers around the reservoir would maintain or improve water quality by trapping and removing various non-point source pollutants. Interior's recommendation for a 30-foot-wide control strip within the project boundary, and an increase in the total buffer width to 100 feet likely would be more effective at improving water quality and provide more wildlife habitat (Fischer et al., 2000).

Through its proposed Public Education and Outreach Program Plan, Alabama Power (2011b) proposes to: (1) develop a brochure, and publish in its *Shorelines* newsletter and/or Lake Magazine, that would contain information to assist shoreline landowners on how to protect and enhance the Lake Martin shoreline; (2) consult with the appropriate agencies to develop techniques for informing and educating boaters and shoreline landowners on methods to prevent or minimize shoreline erosion and sedimentation; and (3) publish periodic articles in its *Shorelines* newsletter and/or Lake Magazine regarding invasive aquatic vegetation. With these proposed measures, a public awareness could be realized for protecting the Lake Martin shoreline, within, and adjacent to, the project boundary.

Project Boundary Modifications

The existing project boundary for the Martin Dam Project encompasses 8,602 acres. These lands are used by Alabama Power primarily for the O&M of the Martin Dam Project under the terms of its current license.

Alabama Power proposes to add 991.4 acres to, and remove 499.2 acres from, the project boundary, resulting in an increase of 492.2 acres of land within the Martin Dam Project boundary. Alabama Power proposes to reclassify land use on 1,294.4 acres within the project boundary. Alabama Power proposes to maintain a 30-foot control strip (or vegetated buffer) around the reservoir; therefore, the buffer strip would not be affected by the project boundary modifications. The project boundary, therefore, would be modified from 8,602 acres to 9,094 acres (Alabama Power, 2011a). The 1.39 acres of federal lands would remain within the project boundary.

With regard to the total 991.5 acres to be added, Alabama Power proposes to add 17 acres of non-project lands that include: 5.8 acres for the existing boat launch, courtesy dock, and parking area at Madwind Creek Ramp; 4.2 acres for the existing boat launch, courtesy dock, and parking area at Smith Landing; and 7 acres to correct a mapping error at Union Ramp. Alabama Power proposes to add 606.7 acres that it owns in fee and 367.8 acres to be designated as the Martin Small Game Hunting Area. For further discussion, see section 3.3.3, *Terrestrial Resources*.

With regard to the total 499.2 acres to be removed, Alabama Power proposes to remove 25.8 acres of project land at Pleasure Point Park and Marina, but retain 6.6 acres of land within the project boundary. These 6.6 acres of land have rental cabins, a marina, and a boat ramp that provide public access to Lake Martin. Alabama Power proposes to remove 24.2 acres of Lake View Park, classified as Quasi-public from the project boundary, because the site is not needed for project purposes, is under a lease agreement with Lake View Park, and therefore, managed accordingly. Alabama Power proposes to remove 373.1 acres designated as Natural/Undeveloped and 75.9 acres proposed for private development (designated as Potential Residential) from the project boundary. Alabama Power (2011b) finds the lands are not necessary for project purposes or is inconsistent with Commission policy of public use of project lands. Alabama Power, however, would retain a 30-foot control strip (buffer) in front of all lands proposed for removal.

Alabama Power proposes to reclassify 1,294.4 acres either as Natural/Undeveloped or as Recreation, which would be consistent with the use occurring at those sites. Alabama Power proposes to reclassify certain lands as Recreation that include: 1.9 acres for the boat launch and parking area at Bakers Bottom Landing; 19.9 acres for the boat launch and proposed improvements that include two bank fishing sites and a gravel parking area at Jaybird Landing; 8.7 acres for the boat launch, courtesy pier, and parking area at Pace Point Ramp; and 36.4 acres at Ponder Camp (Stillwater Area Boat Ramp) for future recreation development.

Alabama Power (2011b) proposes to maintain 32.3 acres as Commercial Recreation, which is consistent with the use occurring at the sites. These lands include: Anchor Bay Marina (6.4 acres), Parker Creek Marina (9.7 acres), Pleasure Point Park and Marina (6.6 acres) and Real Island Marina and Campground (9.6 acres).

Our Analysis

According to the Commission's regulations at 18 C.F.R. section 4.51(h), in part, a project boundary must enclose only those lands necessary for operation and maintenance of the project and for other project purposes, such as recreation, shoreline control, or protection of environmental resources.

Parcels to be brought into the project boundary are currently being used by Alabama Power, and would continue to be used, for project purposes, including three recreation sites at Smith Landing, Madwind Creek Ramp, and Union Ramp. Additionally, certain recreation facilities at four recreation sites – Bakers Bottom Landing, Jaybird Landing, Pace Point Ramp, and Paces Trail – would be included within the project boundary. Because the above-described parcels are currently, and would continue, serving project purposes (recreation), it would be appropriate for these parcels to be brought into the project boundary. Furthermore, a previous mapping error in acreage at Union Ramp would be resolved.

There would be no adverse environmental effects associated with the proposed project boundary modifications. Alabama Power's (2011b) proposal to remove acreage from the project boundary includes an area within Pleasure Point Park and Marina currently being used for seasonal cabins. Consistent with Commission policy, the cabins are neither necessary for operation of the project nor serve a project purpose. At the site, 6.6 acres include a the marina, boat ramp, and rental cabins, which currently meet the Commission requirement to provide public access to Lake Martin, and would be included in the project boundary. Alabama Power also proposes to remove the Lake View Park from the current project boundary and retain a 30-foot control strip (buffer) to protect the shoreline. This park is managed by a private entity and part of a residential community via a lease agreement. The lands at Pleasure Point Park and Marina and Lake View Park are not needed for project purposes, and removal of the acreage would be appropriate. Reservation of the 30-foot control strip would ensure management decisions are consistent with Alabama Power's SMP policies.

Alabama Power proposes to remove 373.1 acres (about 12 separate parcels) designated as Natural/Undeveloped from the project boundary to better distribute and maintain the Natural/Undeveloped lands more evenly at the project. However, it is not clear as to why these lands are not necessary for project purposes. For further discussion, see section 5.0, Conclusions and Recommendations.

Public Education and Outreach Program Plan

As part of the Public Education and Outreach Program Plan, Alabama Power (2011f) proposes to enhance its existing website to include specific information on shoreline management and the proposed Shoreline Permitting Program. The website enhancements would include, at a minimum, permit guidelines for shoreline landowners; BMPs; alternative and example designs (particularly for bank stabilization); useful links and other related information; sample permit applications; contact information; and information on the Longleaf Pine Legacy Program. Alabama Power also proposes to incorporate information on its "carry in, carry out" policy in their brochures and on the updated Alabama Power website.

Instead of signage, Alabama Power proposes to prepare an article for the *Shorelines* newsletter on a tri-annual basis to inform shoreline landowners and the public about the effects of domestic livestock on terrestrial resources, particularly on the islands in Lake Martin. Alabama Power also proposes to develop a brochure about the Longleaf Pine Legacy Program.

Our Analysis

An objective in the Tallapoosa River Basin Management Plan is to educate the public on shoreline protection (CH2MHill, 2005). The Alabama Statewide Comprehensive Outdoor Recreation Plan (Alabama Department of Economic and Community Affairs, 2012) focuses on public education and outreach and uses multiple methods to present public information on water supply and watershed management. We find Alabama Power's proposed measures in its draft Public Education and Outreach Program Plan, and discussed below, would complement the goals and objectives for public education and outreach.

Improving the website and including articles in the *Shorelines* newsletter, as proposed, would be an effective means of communicating information. Information about the permitting guidelines, BMPs, alternative and example designs for bank stabilization, sample permit applications, and information about the Longleaf Pine Legacy Program would continue to foster an awareness of the public and shoreline landowners on these initiatives.

Although Alabama Power included in its Public Education and Outreach Program Plan a provision for a "carry-in, carry-out" policy for the public, we find the policy would be more appropriate as part of the revised Recreation Plan because Alabama Power proposes to identify and remove certain existing trash receptacles and install containers with appropriately-sized bags at identified project recreations sites.

Alabama Power's proposal to provide information about the effects of domestic livestock on terrestrial resources could inform the public about this issue and as a result, minimize adverse effects on terrestrial resources. Alabama Power's proposal to provide brochures and information online and in hard copy would make the information available to the public and shoreline landowners.

3.3.5.3 Unavoidable Adverse Impacts

Construction of, and improvements to, project recreation facilities would cause temporary, minor disturbance in local areas. Implementation of soil erosion control measures and revegetation of disturbed areas, where appropriate, would minimize soil erosion and associated effects on aquatic and terrestrial resources.

3.3.6 Cultural Resources

3.3.6.1 Affected Environment

Section 106 of the National Historic Preservation Act of 1966, as amended, requires the Commission to evaluate potential effects on properties listed or eligible for listing in the National Register prior to an undertaking. An undertaking means a project, activity, or program funded in whole, or in part, under the direct or indirect jurisdiction of a federal agency, including, among other things, processes requiring a federal permit, license, or approval. In this case, the undertaking is the proposed issuance of a new license for the project. Potential effects associated with this undertaking include project-related effects associated with day-to-day O&M of the project after issuance of a new license.

Historic properties are defined as any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register. Traditional cultural properties are a type of historic property eligible for the National Register because of their association with cultural practices or beliefs of a living community that: (1) are rooted in that community's history; or (2) are important in maintaining the continuing cultural identity of the community. In this draft EIS we also use the term "cultural resources" to include properties that have not been evaluated for eligibility for listing in the National Register. In most cases, cultural resources less than 50 years old are not considered eligible for the National Register.

Section 106 also requires that the Commission seek concurrence with the Alabama SHPO on any finding involving effects or no effects on historic properties, and allow the Advisory Council on Historic Preservation an opportunity to comment on any finding of effects on historic properties. If Native American properties have been identified, section 106 also requires that the Commission consult with interested Native American tribes that might attach religious or cultural significance to such properties.

Area of Potential Effects

Pursuant to section 106, the Commission must take into account whether any historic property could be affected by issuance of a new license within a project's APE. The APE is defined as the geographic area or areas which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. In this case, the Cultural Resources Work Group, including the Commission staff, defined the APE for the project as lands above 491 feet enclosed by

the project boundary which encompass a 41,150-acre reservoir (Lake Martin), a dam, a spillway, a powerhouse, a tailrace, two 450-foot-long transmission lines, project recreation sites, and appurtenant facilities (Alabama Power, 2012a). In its December 9, 2011, response to the Commission's Additional Information Request, Alabama Power stated that the Alabama SHPO concurred with the project's APE.

Prehistoric and Historic Background

The following text summarizes the cultural overview provided by Alabama Power (2012a).

Climatic changes occurring around 8,000 BC resulted in changes in human subsistence strategies. The Archaic (8,000-1,200 BC) was marked by a decrease in the abundance of large game associated with the Pleistocene. Hunter-gatherers diversified, and began to focus on regional and seasonal food sources. During the early Archaic, projectile points became smaller and other tools such as knives, adzes, and end scrapers became common. The use of the atlatl was a major technological milestone that allowed spears to be thrown greater distances and with greater speed and accuracy. Fibers were also woven to create baskets and nets. By the middle Archaic, regional variation increased, and there is evidence of greater sedentism and reliance on river resources. Typical Archaic sites are small camp sites, but larger sites containing midden development, hearth features, and storage pits are also found. Middle Archaic toolkits included smaller specialized implements such as awls, needles, atlatl hooks, and ornamental items including beads and gorgets. During the late Archaic, seasonal weather patterns stabilized, and riverine sites expanded. Trade networks for raw materials and goods were established, and burial mounds suggest a social hierarchy. Late Archaic sites may contain a greater number of house floors, hearths, and other features. Soapstone bowls and other storage containers also indicate a greater reliance on horticulture and plant domestication. Many Archaic sites have been recorded in the Tallapoosa River Basin.

During the Gulf Formational stage (1,200-300 BC), pottery made with clay tempered with fibers, grit, sand, and crushed shell became prevalent. There are many sites in the Tallapoosa Basin that are represented by such plain ceramics. However, ceramics became more stylized during the later Woodland stage (300 BC-AD 1000) and reflected regional decorative patterns and techniques. The introduction of the bow and arrow during this time resulted in smaller projectile points being used as time markers for identifying Woodland archaeological sites. However, temporally diagnostic ceramics became more important in analyzing site chronology. During this time, populations increased their reliance on agriculture, with corn and squash as prime food crops. Many Woodland sites have been recorded in the Tallapoosa River Basin.

Mississippian populations (AD 1000-1500) lived in large village sites with an agrarian economy. Villages were marked by increased social hierarchy under a ruling class. Specialized workers created goods for an expanding trade network. Mississippian

archaeological sites often contain large earth mounds that were central to society. Such sites are not typical for the Tallapoosa River Basin, although several sites have been documented.

Spanish explorers, including Hernando de Soto, were the first Europeans to arrive in southeastern Alabama, but the French were the first to establish long-term contact with indigenous populations. Fort Toulose was established in 1717 at the confluence of the Tallapoosa and Coosa Rivers. By the beginning of the 18th century, British traders arrived.

Following the creation of a Federal Road from Washington D.C. to New Orleans, the area, now known as the Mississippi Territory, became unstable resulting in an 1813-1814 war between Native Americans and the United States government. Battles took place throughout the territory including what was later to become the Lake Martin area. Following the relocation of the Native Americans to Oklahoma on the Trail of Tears, American settlers occupied the area and developed a number of mills on rivers and streams. This development continued until the Civil War in 1861, when activity slowed until 1885. After the war, agriculture and industries flourished.

Construction of Martin dam, first known as Cherokee Bluffs Dam, began in July 1923 and was completed in December 1926. It was the first of four dams built on the Tallapoosa River. The dam originally had three generating units, but a fourth was installed in 1952. The three original generators were upgraded between 2001 and 2004 to increase generating capacity. The fourth generator has not been ungraded since its installation.

Archaeological and Historic-era Properties

According to a record search conducted by Alabama Power, 15 cultural resources studies have been undertaken in the vicinity of the project APE (Alabama Power, 2012a). These include Phase I and Phase II archaeological studies of eight locations proposed for recreational improvements. Additionally, the University of Alabama, Office of Archaeological Research (University of Alabama) conducted surveys in 1995 and 1996.

These studies resulted in the identification of 22 cultural resource sites (Alabama Power, 2012a; University of Alabama, 2006). Eleven of these sites were recorded during the University of Alabama studies. Table 3-27 provides a summary of all prehistoric and historic resources identified to date within or adjacent to the project boundary APE.

Table 3-27. Previously recorded archaeological and historic resources within or adjacent to the project boundary APE (Source: University of Alabama, 2006, as modified by staff).

Resource Number	Description	Impacts/Recommendations[a]
1Cs93	Prehistoric “creek” site with pits, hearths, ceramics	Inundated by Lake Martin

Resource Number	Description	Impacts/Recommendations[a]
1Cs151	Multicomponent site; Prehistoric lithic and tool scatter and historic stone chimney and artifact scatter	Recommended no integrity due to logging activity
1Cs152	Ceramic and sparse lithic scatter	Minimal disturbance
1Cs153	Lithic scatter	Logging activity, but minimal disturbance
1Cs154	Lithic and ceramic scatter	Recommended as very disturbed
1Cs155	Multicomponent site; Prehistoric lithic and ceramic scatter, historic "Creek" site	Inundated most of the year but exposed during the winter. "Near 100 percent eroded."
1Ee33	"Creek" site	Inundated most of the year
1Ee433	Small lithic scatter (all artifacts reported collected)	Reported heavily impacted by construction and logging; erosion
1Tp3	Small lithic and tool scatter	Intact
1Tp4	Small lithic scatter	Unknown
1Tp31	Historic artifact scatter	Heavily eroded and disturbed
1Tp32	Multi-component; historic chimney and artifact scatter; prehistoric lithic scatter	Heavily eroded and disturbed
1Tp33	Historic artifact scatter	Heavily eroded and disturbed
1Tp34	Multi-component; historic chimney feature and artifact scatter, prehistoric artifacts	Erosion
1Tp35	Burned out house and storage shed complex	Unknown impacts; further research recommended
1Tp38	Lithic scatter	Normally inundated; "scoured to subsoil"
1Tp86	Lithic scatter	Logging
1Tp125	Multi-component; historic Umphress Family Cemetery and lithic scatter	Surface lithic materials collected; cemetery abandoned and being relocated.
1Tp130	Possible historic house and artifact scatter	Erosion
1Tp131	Multicomponent; Historic artifact scatter, prehistoric projectile point fragment	Unknown
1Tp133	Lithic scatter	Unknown
1Tp134	Portion of historic Savannah and Memphis Railroad	Unknown

[a] Impacts/recommendations provided by University of Alabama (2006) and summarized by staff.

Alabama Power has not conducted additional cultural resources surveys within the project APE and acknowledges that other cultural resource sites may be present. It has also not undertaken National Register evaluations of any of the 22 previously identified sites, but in its application, it recommends that eight are potentially eligible for listing on the National Register (Alabama Power, 2011a). In its application, Alabama Power also states that the project facilities, including the powerhouse, dam, and associated features represent an important engineering development in the State of Alabama. However, Alabama Power identified only the Martin powerhouse as eligible for listing on the National Register (Alabama Power, 2012a). The Martin Construction Camp and Project Village was also identified as potentially eligible for its contribution to the eligibility of the powerhouse.

Traditional Cultural Properties

Alabama Power identified 14 federally recognized tribes with traditional ties to lands within the project APE. The Alabama-Quassarte Tribal Town, the Thlopthlocco Tribal Town, the Choctaw Nation of Oklahoma, the Poarch Band of Creek Indians, the Alabama-Coushatta Tribe of Texas, the Muscogee (Creek) Nation of Oklahoma, the Kialegee Tribal Town of the Muscogee Creek, the Seminole Tribe of Florida, the Chickasaw Nation, the Coushatta Indian Tribe, and the Tunica-Biloxi Tribe did not report any potential traditional cultural properties within the project APE. Three additional tribes chose not to participate in relicensing consultation: the Mississippi Band of Choctaw Indians, the Jena Band of Choctaw Indians, and the Seminole Nation of Oklahoma.

3.3.6.2 Environmental Effects

Effects on historic properties within the APE can result from project-related activities, such as reservoir operations, project-related ground disturbance, and recreational activities. Effects can also result from wind and soil erosion, vandalism, and private and commercial development. However, the final license application focuses primarily on the potential effects of changing reservoir levels on shoreline resources.

For cultural resources within the project boundary, Alabama Power states that reservoir inundation provides an overall positive effect on cultural resources (Alabama Power, 2011a). In its response to the Commission's August 11, 2011, Additional Information Request regarding further analysis and support of this conclusion, Alabama Power cites a study undertaken in 1981 that stated under sufficient depth of water, cultural resources are protected from erosion, deposition, decomposition, human impacts, and floral and faunal impacts (Alabama Power, 2012a). Alabama Power also states that, while exposure to high flow events could have an adverse effect on archaeological resources on the Tallapoosa River downstream from Martin dam, these impacts would be

located outside of the APE for cultural resources (Alabama Power, 2011a; 2012a). For those reasons, Alabama Power states that no further analysis of cultural resources affected by high flow events is required.

Historic Properties Management Plan

Alabama Power filed, and initially proposed to implement, a February 2012 draft HPMP to manage cultural resources within the project APE. The draft HPMP describes standards to be applied during project activities that have the potential to affect historic properties. Therefore, to discuss the provisions of the draft HPMP and cultural resources at the project, we established a Cultural Resources Work Group (CRWG) consisting of Alabama Power, Alabama SHPO, the Alabama-Quassarte Tribal Town, the Thlopthlocco Tribal Town, the Poarch Band of Creek Indians, the Alabama Coushatta Tribe of Texas, the Muscogee (Creek) Nation of Oklahoma, the Kialegee Tribal Town of the Muscogee (Creek) Nation, BLM, and Commission staff.

Alabama Power's proposal changed on June 12, 2012, when Alabama Power signed the final PA as a concurring party, thereby agreeing to develop and implement a final HPMP within one year of license issuance.

Our Analysis

Alabama Power defined the project APE in consultation with the CRWG, including BLM and the Commission staff. A provision of a final HPMP would require Alabama Power to include a map or maps that depict the boundary of the APE in relation to the project boundary. Any project-related, ground-disturbing activities that might be necessary outside of the APE as defined would be subject to the requirements of section 106.

Alabama Power's February 2012 draft HPMP requires completion of all surveys in a segmented fashion by the 20th year of the new license. Dependent upon the length of a new license term, taking as much as 20 years to complete these surveys would mean that cultural resources sites within the APE may remain unprotected from potential project effects.

To determine project-related effects on historic properties within the APE, Alabama Power proposes to complete the cultural resources survey of selected survey sites (807 acres), pursuant to a provision of a final HPMP. The CRWG agreed with this approach. Therefore, in accordance with this provision, the final HPMP would include a schedule to complete the survey. Implementation of this schedule would provide the necessary cultural resources inventory data. We find that completing these surveys within 5 years of the issuance date of the license would ensure that all resources are identified, and that appropriate protection and mitigation measures for unavoidable adverse effects on historic properties are determined and implemented in a timely manner (i.e., stabilization, data recovery).

Effects on cultural resources within the APE can include, but are not limited to, inundation of areas due to project operation, recreational use of Lake Martin and associated project lands, project-induced shoreline erosion, and modifications or repairs to project facilities. The type and level of effects on cultural resources can vary, depending upon site location and setting, features and attributes, visibility of the resource, and public knowledge and access to a resource.

Alabama Power's February 2012 draft HPMP provides a process for evaluating and assessing the effects of future project-related actions on cultural resources and historic properties. This plan requires consultation with the Alabama SHPO and interested tribes if impacts to cultural resources as a result of project activity are unavoidable. We note, however, that BLM should be included in the consultation. However, for current potential impacts, Alabama Power's application and HPMP primarily focus on impacts associated with reservoir operation. While a single report cited by Alabama Power implies that inundation of cultural sites under hydroelectric reservoirs is beneficial overall (Alabama Power, 2012a), this report is greater than 30 years old and more recent studies indicate that this conclusion may not be warranted in all cases.

Alabama Power is correct that inundation can protect cultural sites from vandalism and recreational use. However, in 1975, four federal agencies, including the National Park Service, Bureau of Reclamation, Corps, and Soil Conservation Service, completed an intensive 5-year study of the effects of freshwater reservoir inundation on cultural resources. The resulting two-volume National Reservoir Inundation Study was summarized in a 1989 Corps report (Ware, 1989). The National Reservoir Inundation Study found that archaeological sites can be adversely affected by inundation, particularly those that are located in shoreline fluctuation zones. The summary report states that while some researchers claim that inundation is an effective option to preserve archaeological data, "the long-term mechanical and biochemical effects of deepwater burial are poorly understood" and suggested that this idea is "untenable unless one can demonstrate the feasibility and practicality of future data withdrawals" (Ware, 1989:31). Additionally, our own independent review of hydroelectric project license applications has allowed us to examine numerous examples of the effects of reservoir operation and inundation on submerged archaeological sites, and we have found that inundation can result in a high degree of sorting, redistribution, and erosion of cultural materials. These disturbances can be adverse because they can affect the integrity of sites that may otherwise meet the criteria for inclusion on the National Register.

Each individual site within a project's APE should be examined, evaluated for listing on the National Register, and evaluated for potential project effects in the particular context in which it is located; some sites may see little disturbance while others may be impacted. The HPMP would include a provision that requires Alabama Power to: (1) evaluate currently inundated sites within the APE for listing on the National Register *if and when they become exposed*, and any sites that may be inundated in the future; (2) assess the effects of inundation on all eligible resources in accordance with 36 C.F.R.

800.5; and (3) implement appropriate treatment measures. These actions would ensure that cultural resources would be addressed in accordance with section 106.

Other potential project effects on cultural resources could occur from recreational use. The Martin Dam Project is a popular destination for shoreline landowners who reside adjacent to, or near, the project and for the public. As discussed in section 3.3.5.1, *Recreation Resources and Land Use*, Alabama Power (2010g) estimates 370,538 recreation user-days for the combined recreational use at Lake Martin and the tailwater area (from Martin dam to 0.25 mile downstream). We find that the potential effects of recreational use could be taken into account through a provision in a final HPMP, which would require Alabama Power to provide public interpretation of the historic and archeological properties at the project. However, any additional mitigation measures for unavoidable project-related recreational impacts would be developed in consultation with the Alabama SHPO, Indian tribes, and BLM in accordance with a provision in a final HPMP.

The February 2012 draft HPMP states that the project powerhouse has been recommended as eligible for listing on the National Register. We have not received a copy of the evaluation report or documentation that the Alabama SHPO has concurred with this recommendation. While the February 2012 draft HPMP addresses potential changes, repairs, and modifications to the exterior of the structure, three of the four generators date to the late 1920s and one generator dates to the early 1950s. The original three generators were upgraded between 2001 and 2004. Since this equipment no longer retains its original integrity, it does not contribute to the eligibility of the powerhouse. However, the fourth generator is more than 50 years old and may contribute to the eligibility of the powerhouse. The February 2012 draft HPMP also does not address the potential historic nature of the dam itself. The project was constructed in 1926, and Martin dam was the first of four dams constructed on the Tallapoosa River. The final HPMP, however, would provide for identification and evaluation of historic properties, as well as determination of effects and identification of ways to avoid, minimize, or mitigate adverse effects. This provision would also entail implementation of appropriate treatment that would minimize or mitigate unavoidable adverse effects on historic properties. Therefore, clarification in a final HPMP of the National Register status of the Martin dam, and any other project features and equipment more than 50 years old, including the fourth generating unit, would ensure that all potentially historic features are addressed.

Alabama Power has not identified proposals for major changes, repairs, or modifications to potentially historic project structures, and appendix B of the February 2012 draft HPMP provides a list of activities that Alabama Power believes should be exempt from section 106 review because these activities would have little or no potential effect on historic properties. Among general maintenance activities to the hydroelectric structures, these include changes, repair, or replacement of the four powerhouse generators. Should future changes to any project structures be proposed, including changes to any associated equipment that may contribute to a structure's National

Register eligibility, Alabama Power would need to prepare a treatment plan for Commission and Alabama SHPO review prior to receiving approval for actions that may have adverse effects on National Register-eligible properties. Any major repairs or modification to National Register-eligible historic project structures conducted during the new license period would be performed after consultation with the Alabama SHPO, and in accordance with the Secretary of the Interior's Standards for the Treatment of Historic Properties.

To meet the requirements of section 106, we issued a draft PA on February 29, 2012. The Alabama SHPO, the Choctaw Nation of Oklahoma, and the Alabama Coushatta Tribe of Texas commented on the draft PA, and their comments were addressed in the final PA issued for signature on June 4, 2012. The Commission and the Alabama SHPO executed the final PA on June 12, 2012. Alabama Power, the Poarch Band of Creek Indians, and the Alabama-Coushatta Tribe of Texas concurred. Implementation of the PA would ensure that Alabama Power addresses all historic properties identified within the project's APE through the finalization of the draft HPMP after consultation with the Alabama SHPO, the participating tribes, and BLM.

3.4 NO-ACTION ALTERNATIVE

Under the no-action alternative the project would continue to operate as it has in the past. None of Alabama Power's proposed measures or the resource agencies' recommendations and mandatory conditions would be required. Lake Martin would continue to support extensive recreational usage and an important lake fishery. The proposed changes to the reservoir rule curve, however, would not occur, and winter reservoir levels would continue at about a 10-foot drawdown from full pool. The shoreline littoral zone would continue to be dewatered during the winter months and aquatic habitat within the drawdown zone would not be protected. Enhancement of recreational use would not occur during the winter months, nor during the early fall as a result of the conditional fall extension of summer reservoir levels to October 15, which would occur under the proposed action.

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4.0 DEVELOPMENTAL ANALYSIS

In this section, we look at the Martin Dam Project's use of the Tallapoosa River for hydropower purposes to see what effect various environmental measures would have on the project's costs and power generation. Under the Commission's approach to evaluating the economics of hydropower projects, as articulated in *Mead Corp.*,[64] the Commission compares the current project cost to an estimate of the cost of obtaining the same amount of energy and capacity using a likely alternative source of power for the region (cost of alternative power) without consideration of future escalation of fuel prices in valuing the hydropower project's power benefits.

For each of our licensing alternatives, our analysis includes: (1) an estimate of the cost of individual measures considered for the protection, mitigation, and enhancement of environmental resources affected by the project; and (2) an estimate of the project power benefits for each of the licensing alternatives. To determine the net annual power benefit for each of the licensing alternatives, we compare project costs to the value of the power output as represented by the cost of a likely alternative source of power in the region. For any alternative, a positive net annual power benefit indicates that the project power costs less than the current cost of alternative generation resources and a negative net annual power benefit indicates that project power costs more than the current cost of alternative generation resources. This estimate helps to support an informed decision concerning what is in the public interest with respect to a proposed license. However, project economics is only one of many public interest factors the Commission considers in determining whether, and under what conditions, to issue a license.

4.1 POWER AND ECONOMIC BENEFITS OF THE PROJECT

Table 4-1 summarizes the economic assumptions and economic information we use in our analysis. Most of the information was provided by Alabama Power in its license application. We find that the values provided by Alabama Power are reasonable for the purposes of our analysis. Cost items common to all alternatives include taxes and insurance costs; net investment (the total investment in power plant facilities remaining to be depreciated); estimated future capital investment required to maintain and extend the life of plant equipment and facilities; relicensing costs; normal O&M cost; and Commission fees.

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[64] See *Mead Corporation, Publishing Paper Division*, 72 FERC ¶ 61,027 (July 13, 1995). In most cases, electricity from hydropower would displace some form of fossil-fueled generation, in which fuel cost is the largest component of the cost of electricity production.

Table 4-1. Parameters for the economic analysis of the Martin Dam Project.

Assumption	Value	Source
Period of economic analysis (years)	30	Staff
Current net investment (2013 dollars)[a]	$16,304,840	Alabama Power
Current annual costs including O&M, and FERC fees (2013 dollars)[b]	$3,004,950	Alabama Power
Relicense application costs (2013 dollars)[c]	$9,136,840	Alabama Power
Term of financing (years)	20	Staff
Cost of capital (percent)[d]	12.72	Alabama Power
Discount rate (percent)[e]	8	Staff
Energy rate ($/MWh)[f]	72.5	Alabama Power
Capacity rate($/kilowatt-year)[f]	145.5	Alabama Power

[a] The net investment value of the project as of December 31, 2010 ($19,182,170), was provided by Alabama Power in its December 9, 2011, Additional Information Request response, Revised Exhibit D, section 2.2. This value has been depreciated by staff to 2013 dollars.

[b] Annual costs ($2,850,030) were derived from Alabama Power's Additional Information Request response dated December 9, 2011, Question 2c. This value has been escalated to 2013 dollars by staff.

[c] The cost to develop the license application ($8,400,000) was provided by Alabama Power in its December 9, 2011, response to a Commission Additional Information Request response (revised Exhibit D, section 5). This cost has been escalated to 2013 dollars by staff.

[d] The cost of capital was in Alabama Power's Additional Information Request response dated December 9, 2011, Question 2a.

[e] The discount rate was not provided in the license application, and was therefore approximated by staff.

[f] The energy rate and capacity rate were provided in Alabama Power's Additional Information Request response dated December 9, 2011, Question 3.

4.2 COMPARISON OF ALTERNATIVES

Table 4-2 compares the annual costs and annual power benefits for the three alternatives considered in this draft EIS: no action, Alabama Power's proposal, and the staff alternative.

4.2.1 No-action Alternative

Under the no-action alternative, the project would continue to operate as it does now. The project would have an installed capacity of 182,456 kilowatt (kW), and generate an average of 375,614 MWh of electricity annually. The average annual cost of alternative power value would be $53,277,090, or about $141.84/MWh. The average annual project cost would be $8,220,870, or about $21.89/MWh. Overall, the project would produce power at a cost that is $45,056,220, or about $119.95/MWh less than the cost of alternative power.

Table 4-2. Summary of annual costs and annual power benefits for the alternatives for the Martin Dam Project (Source: staff).

	No Action	Alabama Power's Proposal	Staff Alternative[b]
Authorized installed capacity (kW)	182,456	182,456	182,456
Dependable capacity (kW)	179,000	179,000	179,000
Annual generation (MWh)	375,614	377,161	375,614[b]
Annual power value[a]	$53,277,090	$53,387,140	$53,277,090
($/MWh)	141.84	141.55	141.84
Annual costs	$8,220,870	$12,342,170	$12,018,150
($/MWh)	21.89	32.72	32.00
Power benefit (i.e., power value minus costs)	$45,056,220	$41,044,970	$41,258,940
($/MWh)	119.95	108.83	109.84

[a] The power value includes the energy rate of $72.50/MWh and the dependable capacity rate of $145.50/kilowatt-year.

[b] The Staff Alternative includes operating the project under existing operations with environmental measures proposed by Alabama Power and staff. Operation of the project and generation would be similar to existing conditions.

4.2.2 Alabama Power's Proposal

Under Alabama Power's proposal, the project would generate an average of 377,161 MWh of electricity annually. Based on a total installed capacity of 182,456 kW, a dependable capacity of 179,000 kW, and an average annual generation of 377,161 MWh, the cost of alternative power would be $53,387,140, or about $141.55/MWh. The average annual project cost would be $12,342,180, or about $32.72/MWh. Overall, the project would produce power at a cost which is $41,044,970, or about $108.83/MWh, less than the cost of alternative power.

4.2.3 Staff Alternative

The staff alternative has the same capacity and energy attributes as existing operation (i.e., the No Action alternative). Table 4-3 shows the staff-recommended additions, deletions, and modifications to Alabama Power's proposed environmental protection and enhancement measures and the estimated cost of each. Based on a total installed capacity of 182,456 kW, a dependable capacity of 179,000 kW, and an average annual generation of 375,614 MWh, the cost of alternative power would be $53,277,090, or about $141.84/MWh. The average annual project cost would be $12,018,150, or about $32.00/MWh. Overall, the project would produce power at a cost which is $41,258,940, or about $109.84/MWh, less than the cost of alternative power. This alternative would cost $211,880 less than the project proposed by Alabama Power.

4.3 COST OF ENVIRONMENTAL MEASURES

Table 4-3 shows the costs for each of the environmental mitigation and enhancement measures considered in the analysis. We convert all costs to equal annual (levelized) values over a 30-year period of analysis to give a uniform basis for comparing the benefits of a measure to its cost.

Table 4-3. Cost of environmental mitigation and enhancement measures considered in assessing the environmental effects of continuing to operate the Martin Dam Project (Source: Alabama Power, 2011b, as modified by staff).

Enhancement/Mitigation Measures	Entities	Capital Cost (2012$)[a]	Annual Cost (2012$)[a]	Levelized Annual Cost (2012$)[b]
Aquatic Resource Measures				
1. Implement the proposed 3-foot increase in winter pool elevation.	Alabama Power	$0	-$112,160 (1,547 MWh gained generation)	$112,160[c]
2. Implement the proposed conditional fall extension.	Alabama Power	$0	$6,730 ($11,150 in O&M costs offset by $4,420 in gained generation (61 MWh))	$6,730[c]
3. Implement periodic drawdowns to elevation 481 feet msl.	Alabama Power	$0	$67,440	$67,440[c]
4. Implement a 4-foot increase in winter pool elevation.	Lake Martin RA	$0	-$153,410 (2,116 MWh gained generation)	-$153,410[d]
5. Implement a 5-foot increase in winter pool elevation.	Lake Martin HOBO	$0	-$194,590 (2,684 MWh gained generation)	-$194,590[c]
6. Implement alternative operation of Lake Martin for downstream flood control. Summer lake level at 488 feet msl.	Downstream Landowners		$630,000 (8,800 MWh lost generation), plus loss in dependable capacity	

Enhancement/Mitigation Measures	Entities	Capital Cost (2012$)[a]	Annual Cost (2012$)[a]	Levelized Annual Cost (2012$)[b]
7. Implement alternative operation of Lake Martin for downstream flood control. Summer lake level 486 feet msl.	Downstream Landowners		$587,000 (8,100 MWh lost generation), plus loss in dependable capacity	
8. Develop a drought management plan for the Tallapoosa River.	Staff	$0	$0	$0[e]
9. Monitor water quality in Lake Martin and in the tailrace as per the conditions of the 401 WQC.	Alabama Power, staff	$0	$1,123,960	$1,123,960[f]
10. Document the occurrence and abundance of eels from Martin dam to the Alabama River.	Alabama Power	$0	$269,750	$269,750[c]
11. Implement annual American eel surveys downstream of the dam.	Staff	$0	$4,660	$4,660[g]
Terrestrial Resource Measures				
1. Implement the Nuisance Aquatic Vegetation and Vector Control Management Program and prepare a plan to monitor increases in aquatic vegetation resulting from the proposed 3-foot increase in the winter pool elevation.	Alabama Power	$0	$348,430	$348,430[c]

Enhancement/Mitigation Measures	Entities	Capital Cost (2012$)[a]	Annual Cost (2012$)[a]	Levelized Annual Cost (2012$)[b]
2. Revise and implement the Nuisance Aquatic Vegetation and Vector Control Management Program, in consultation with FWS and Alabama DCNR, to include information on Alabama Power's protocol for conducting lake-wide surveys and monitoring nuisance aquatic vegetation, such as the such as the frequency, timing, and locations of surveys and monitoring events and the implementation schedules.	Staff	$5,000	$348,430	$349,390[c]
3. Implement the WMP.	Alabama Power, staff	$48,950	$696,680	$706,110[c]
4. Within the Core Management Area of the WMP, manage toward a desired forest condition consistent with the good quality foraging habitat for the federally listed endangered red-cockaded woodpecker.	Interior, staff	$0	$0	$0[h]

Enhancement/Mitigation Measures	Entities	Capital Cost (2012$)[a]	Annual Cost (2012$)[a]	Levelized Annual Cost (2012$)[b]
5. Continue Alabama Power's support of aquatic restoration within the Mobile Basin and work with Interior and Alabama DCNR to identify suitable habitats (primarily tributaries) for species reintroduction within the project boundaries.	Interior	$0	$0	$0[h]
Recreation Resource Measures				
1. Implement the final Recreation Plan.	Alabama Power	$853,860	$747,260	$911,820[c]
2. Develop and implement a revised Recreation Plan to (a) describe the amenities at the 19 project recreation sites, including a map or maps of the project recreation sites in relation to the project boundary, (b) describe the number and location of the bank fishing areas, and (c) include a provision for periodic updates of the plan.	Staff	$868,860	$753,820	$921,270[i]

Enhancement/Mitigation Measures	Entities	Capital Cost (2012$)[a]	Annual Cost (2012$)[a]	Levelized Annual Cost (2012$)[b]
Land Use Measures				
1. Implement the final SMP.	Alabama Power	$81,550	$169,140	$184,860[c]
2. Develop and implement a revised SMP to include (a) a discussion of the project boundary modifications; (b) a discussion of the Dredging Permit Program; (c) a discussion of the Shoreline Permitting Program; (d) a provision to limit construction of new seawalls; and (e) a provision to address unpermitted structures at the project.	Staff	$106,580	$169,140	$189,680[j]
3. Educate local landowners on the value of natural shorelines; prohibit construction of a new seawall unless it is absolutely necessary to protect land and property.	Interior, staff	$0	$0	$0[h]
4. Encourage shoreline developments to maintain 30-foot wide control strip within the project boundary and also increase the total buffer width to at least 100 feet.	Interior	$0	$0	0[h]

Enhancement/Mitigation Measures	Entities	Capital Cost (2012$)[a]	Annual Cost (2012$)[a]	Levelized Annual Cost (2012$)[b]
5. Develop and implement a final Public Education and Outreach Plan.	Alabama Power, staff	$0	$57,870	$57,870[c]
Cultural Resource Measures				
1. Develop and implement a final HPMP to include the requirements specified in the PA executed on June 12, 2012.	Alabama Power, staff	$5,000	$443,370	$444,330[k]

[a] Annual costs typically include operational and maintenance costs and any other costs which occur on a yearly basis.

[b] All capital and annual costs are converted to equal annual costs over a 30-year period to give a uniform basis for comparing costs.

[c] Original 2010 costs provided by Alabama Power in its December 2011 Additional Information Request response (revised exhibit D) have been escalated to 2013 dollars.

[d] We interpolated the cost based on the cost of the 3-foot pool increase and the 5-foot increase.

[e] We have not estimated a cost to develop this plan, because it would involve an unknown number of future meetings and consultations among Alabama Power, the Corps, and other state and federal agencies.

[f] Alabama Power estimated the combined cost of monitoring water quality in Lake Martin and the project tailrace at $1,096,770/year. We only recommend monitoring water quality in the project tailrace, which would cost substantially less. However, since Alabama Power did not provide separate costs for monitoring water quality in Lake Martin vs. the project tailrace, we used the $1,096,770 combined cost estimate by Alabama Power.

[g] Cost estimated by staff.

[h] We anticipate that no additional cost would be incurred to implement the measure.

[i] We added $15,000 to the proposed capital cost to finalize the plan and $60,000 per year in years 8, 14, 20, and 26 ($6,560 annual equivalent) for recreation monitoring.

[j] We added $25,000 to the proposed capital cost to finalize the SMP and consult with agencies.

[k] We added $5,000 to the proposed capital cost and $50,000 to the proposed annual cost to finalize the HPMP and implement additional staff components to the plan.

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5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 COMPARISON OF ALTERNATIVES

In this section we compare the development and non-developmental effects of Alabama Power's proposal, Alabama Power's proposal as modified by staff, and the no-action alternative.

We estimate the annual generation of the project under the three alternatives identified above. Our analysis shows that the annual generation would be 377,161 MWh for the proposed action; 375,614 MWh for the staff alternative; and 375,614 MWh for the no-action alternative.

We summarize the environmental effects of the different alternatives in table 5-1.

Table 5-1. Comparison of alternatives for the Martin Dam Hydroelectric Project (Source: staff).

Resource	No-action Alternative	Proposed Action	Staff–Recommended Alternative
Generation	375,614 MWh	377,161 MWh	375,614 MWh
Water Resources	No measures required for drought management	No specific measures proposed for drought management	Drought management plan with interim measures
		Increase in winter pool level may increase downstream flooding	Winter pool level unchanged, thus no effect on downstream flooding
Aquatic Resources	Current release of low DO water to tailrace during some periods of generation	DO improvement in tailrace during generation	DO improvement in tailrace during generation
	Fish entrainment and mortality would continue	Eel occurrence and abundance in Tallapoosa River documented and passage considered	Eel presence at Martin dam assessed and passage considered
		Fish entrainment and mortality would continue	Fish entrainment and mortality would continue
		Some improvement in paddlefish spawning conditions	

Resource	No-action Alternative	Proposed Action	Staff–Recommended Alternative
Terrestrial Resources	No changes to shoreline vegetation or wetlands; no protection of water quality and wildlife habitat through maintenance of buffer strips; no habitat enhancement for longleaf pine-dependent species	Potential effects on 46.9 acres of wetlands due to 3-foot winter pool increase; potential gain of 413 acres of aquatic vegetation due to winter pool increase; protection of water quality and wildlife habitat through maintenance of buffer strips; habitat enhancement for longleaf pine-dependent species	No-action alternative with protection of water quality and wildlife habitat through maintenance of buffer strips; habitat enhancement for longleaf pine-dependent species
Threatened and Endangered Species	No effect on federally listed species	May affect, but not likely to adversely affect the red-cockaded woodpecker; no effect on other federally listed species	May affect, but not likely to adversely affect the red-cockaded woodpecker; no effect on other federally listed species
Recreation Resources	No change in project operation	Conditional fall extension and/or higher winter pool level could increase recreational opportunities at Lake Martin. Very minor changes at downstream boat ramps.	No-action alternative, thus no significant changes to public recreational opportunities
	Maintain 12 existing project recreation sites	Improvements to 12 existing project recreation sites would cause short-term increases in soil	Beneficial effects on recreation resources would occur due to an increase in the number

Resource	No-action Alternative	Proposed Action	Staff–Recommended Alternative
		erosion; six project recreation sites and one site reserved for future recreation development within the project boundary would increase recreational opportunities	of project recreation sites
Shoreline Management Program	Continue existing shoreline permitting program	Public access and protection of environmental and cultural resources would continue	Same as proposed action
	The current project boundary would not be modified	Project boundary modification would increase the number of project recreation sites and protect the shoreline	Same as proposed action
Cultural Resources	Eligible sites protected under the current license	Develop and implement final HPMP in accordance with the PA	Same as proposed action to avoid, minimize, and mitigate adverse effects on historic properties

5.2 COMPREHENSIVE DEVELOPMENT AND RECOMMENDED ALTERNATIVE

Sections 4(e) and 10(a)(1) of the FPA require the Commission to give equal consideration to the power development purposes and to the purposes of energy conservation; the protection, mitigation of damage to, and enhancement of fish and wildlife; the protection of recreational opportunities; and the preservation of other aspects of environmental quality. Any license issued shall be such as in the Commission's judgment will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for all beneficial public uses. This section contains the basis for, and a summary of, our recommendations for relicensing the Martin Dam Project. We weigh the costs and benefits of our recommended alternative against other proposed measures.

Based on our independent review of agency and public comments filed on this project and our review of the environmental and economic effects of the proposed project and its alternatives, we select the no-action alternative with most of Alabama Power's proposed environmental measures and staff-recommended modifications as the preferred alternative. We recommend this alternative because: (1) issuing a new license for the project would allow Alabama Power to continue to operate its project and provide a beneficial and dependable source of electrical energy; (2) the 182.5 MW of electric capacity comes from a renewable resource that does not contribute to atmospheric pollution; (3) the staff alternative would not increase flooding on residential and commercial structures and public roads downstream of Martin dam; (4) the staff alternative includes defined measures that can be predicted to provide benefits; and (5) the recommended measures would protect fish and wildlife resources, improve recreational opportunities, and protect cultural resources at the project.

In the following section, we make recommendations as to which environmental measures proposed by Alabama Power or recommended by agencies or other entities should be included in any license issued for the project. In addition to Alabama Power's proposed environmental measures, we recommend additional staff-recommended environmental measures to be included in any license issued for the project, and we describe these requirements in the draft license articles in appendix A.

5.2.1 Measures Proposed by Alabama Power

Based on our environmental analysis of Alabama Power's proposal in section 3, and the costs presented in section 4, we conclude that the following environmental measures proposed by Alabama Power would protect and enhance environmental resources and would be worth the cost. Therefore, we recommend including these measures in any license issued for the project.

Aquatic Resources

- Implement the requirements of the 401 WQC, which requires maintaining DO concentrations consistent with the state standard when the project is generating, and monitoring water temperature and DO in the tailrace.

Terrestrial Resources

- Implement a WMP for project lands.
- Implement the Nuisance Aquatic Vegetation and Vector Control Management Program.

Recreation Resources

- Develop and implement a Public Education and Outreach Plan.

Land Use

- Modify the project boundary to add 991.4 acres to, and remove 499.2 acres from, the project boundary, resulting in an increase of 492.2 acres of land; reclassify land uses on 1,295 acres within the project boundary to be consistent with existing land use or other project purposes.

Cultural Resources

- Develop and implement an HPMP in accordance with the PA, executed on June 12, 2012.

5.2.2 Measures Recommended by Staff

We recommend the measures described above, and the following additional staff measures: (1) regulate the Martin Lake level according to the existing guide curves (flood control curve, operating curve, and drought curve); (2) develop a drought management plan for the project which includes provisions for minimum flows and downstream navigation; (3) implement measures for flood control operation based on Alabama Power's Exhibit H, with staff modifications; (4) revise the Nuisance Aquatic Vegetation and Vector Control Management Program; (5) require regular trapping for eels immediately below Martin dam; (6) revise the Recreation Plan; and (7) revise the SMP. Below, we discuss our additional staff-recommended measures.

Operation for Flood Control

Alabama Power proposes to continue operating for flood control as described in section 2.1.3, *Existing Project Operation*, with the changes noted in **bold** below:

1) When the reservoir is above the flood curve and between elevations **484** and 486 feet, turbines at Martin dam would be operated to provide for an outflow from Thurlow dam that is at least the hydraulic capacity of the turbines at Yates dam (12,400 cfs).
2) When the reservoir is above the flood curve and between elevations 486 and 489 feet:
    a. With **increasing** inflows, turbines at Martin dam would be operated to provide for an outflow from Thurlow dam that is at least the hydraulic capacity of the turbines at **Thurlow dam (13,200 cfs)**.
    b. With **decreasing** inflows, turbines at Martin dam would be operated to provide for an outflow from Thurlow dam that is at least the hydraulic capacity of the turbines at **Yates dam (12,400 cfs)**.
3) When the reservoir is above the flood curve and above elevation 489 feet msl, the turbines at Martin dam would be operated as in (2) a above, and further if required to avoid rising above elevation 491 feet, turbines would be operated to provide an outflow from Lake Martin at least equivalent to all turbine units

operating at full gate (17,900 cfs), and spillway gates would be raised. An exception to this would be that the reservoir may continue to rise after all gates are raised and inflow exceeds the gate capacity**, which would be beyond the control of Alabama Power.** At elevation 491 feet, the spillway would have an outflow capacity of approximately 133,000 cfs.

4) **During periods when inflow exceeds the total capacity of the hydraulic turbines, the 3-hour average outflow rate from the reservoir would not exceed the concurrent 3-hour average inflow rate except to evacuate accumulated surcharge storage prior to the predicted time of peak inflow. This would ensure that the outflow from the reservoir is lower than the inflow.**

5) **Alabama Power would continue its current practice to notify the National Weather Service (NWS) when spillway gate operation is used in flood control operations and would continue to share data with the NWS' Southeast River Forecast Center (SERFC) and the Corps.**

Appendix A, article 403, identifies staff's recommended license article for flood control operations. We recommend that any license issued for the Martin Dam Project include an article for flood control consistent with Alabama Power's proposed four changes listed above, with the four following exceptions:

1) Item No. 1 increases the flood curve elevation from 481 feet to 484 feet. We are not recommending a 3-foot change in the winter pool elevation, thus this change is not recommended.

2) Item No. 2 reduces the releases from Martin dam from 13,200 cfs to 12,400 cfs when inflows to Lake Martin are decreasing. This minor reduction in releases from Martin dam has the potential to increasing flooding in Lake Martin, thus we recommend that Alabama Power consult with the Commission's Atlanta Regional Office and provide a report which analyzes the potential effect on local flooding and the adequacy of the spillway to provide such flows. Appendix A, Article 301 further describes this recommendation.

3) Item No. 3 adds the text, "which would be beyond the control of Alabama Power." This proposed change does not define an operational measure to be implemented for flood control. Therefore, we are not recommending this change.

4) Item No. 5 reduces coordination with the Corps when compared to the current Exhibit H conditions. Specifically, the current Exhibit H states,

> "During flood periods, communications will be maintained with the Weather Bureau's River Forecast Center, Atlanta, Georgia, and the Corps of Engineers, and if greater flood control benefits can be attained through increased coordination of operations at the Tallapoosa and Coosa river

dams, and increased coordination with the Corps of Engineers' downstream Alabama River dams than would be attained through use of the above flood control procedures, then these procedures will be modified as mutually agreed to verbally by the Corps of Engineers and Alabama Power Company."

Alabama Power provides no justification for this modification of Exhibit H, which effectively reduces the level of coordination with the Corps; therefore, we are not recommending this change.

Drought Management Plan

As discussed in section 3.3.2, *Aquatic Resources*, in wet and normal water years inflows to the project generally are adequate to maintain normal reservoir levels and meet existing downstream flow needs, including maintaining downstream water quality, aquatic habitat, water supply, power generation, navigation, and recreation. However, during extreme drought years, as experienced in 2007 and to a lesser extent in other recent years, inflows to the project have been inadequate to maintain downstream flow needs and at times normal reservoir levels. Alabama Power proposes no specific measures for operations during droughts, other than revising the drought curve as described in section 2.2.2, *Proposed Operations*. The drought curve only identifies that drought conditions exist and does not specify procedures for how project operations should be managed in a drought. The draft Alabama DROP, which is still in the development stage, does not contain detailed operational measures. The Alabama DROP does specify additional indicators of drought conditions that would be used in the final plan; for example, meteorological and hydrologic variables would be considered in addition to the drought curves.

In order to provide indicators and response measures specific to the Martin Dam Project we recommend that Alabama Power develop, in consultation with the Corps and other state and federal agencies, a drought management plan for the Tallapoosa River that would balance competing water resource needs in the basin, including for the Martin Dam Project reservoir. The drought management plan should: (1) assist in operating the project during low inflows and/or drought conditions; (2) provide a means to prioritize water needs such that Alabama Power and the agencies can cooperatively determine whether flow obligations can be temporarily reduced or suspended, or the reservoir operations modified to allow drawdowns to meet flow needs; (3) serve to limit adverse effects on resources from the fluctuating lake level, low lake levels, or reduced downstream flows; and (4) ensure that appropriate consideration is given to generation needs, navigation, the protection of aquatic resources, sensitive species, water supply, water quality, agriculture, and recreational opportunities.

For the Martin Dam Project, the Commission's Standard Article 12 gives the Commission ample authority to ensure that downstream navigation will be protected. The Corps is currently updating its reservoir regulation manuals to provide a

management plan for the Coosa and Tallapoosa river basins that would include drought management.[65] Therefore, the drought management plan for the Martin Dam Project should include a provision for updating the plan once the Corps' updated ACT Manual is finalized.

As an interim measure, until the final drought management plan is approved by the Commission, during drought conditions, for each specific case in which flow releases from the Martin Dam Project are inadequate to meet the current navigation flow requirement, Alabama Power should consult with the Corps and file a request for Commission approval for any changes which may be needed to maintain navigation downstream of the project.

While important, navigation is just one project purpose that needs to be considered in a drought management plan. The plan should also address water supply, fish and wildlife resources, and power generation. Implementation of a drought management plan would provide long-term benefits to these resources by coordinating management of flows during drought years. We estimate the cost of developing and finalizing the drought management plan would be relatively minor as the basis for a plan has already been developed by Alabama Power's DROP. Additional costs would be included in current administrative costs. The long- term benefits would justify the low cost for developing the plan; therefore, we recommend this measure.

Water Quality Monitoring

Recent monitoring data have demonstrated that Martin dam releases meet state standards for DO nearly 100 percent of the time. Alabama Power proposes to monitor DO in the tailrace during generation for 3 years after license issuance. Additional monitoring beyond the initial 3 years, however, may be required if monitoring results indicate that additional measures may be necessary to meet the state DO standards. Alabama Power's proposed measures to monitor water quality in the tailrace (Condition No. 3 of WQC), monitor and control aquatic vegetation and implement water quality related BMPs as discussed in sections 3.3.2, *Aquatic Resources*, 3.3.3, *Terrestrial Resources*, and 3.3.5, *Recreation Resources and Land Use*, would detect and limit any possible project effects on water quality, even though we expect any effects to be small given that project operations would not change substantially. Based on costs provided by Alabama Power, we estimate that the levelized annual cost for the water quality monitoring programs would be $1,123,960. Tailrace monitoring is a mandatory measure of the WQC, and the additional monitoring proposed by Alabama Power.

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[65] On March 1, 2013, the Corps issued a draft EIS for an update of the water control manual for the ACT Basin in Georgia and Alabama. This draft EIS describes the Corps' proposal for a basin-wide drought management plan, which would include the Martin Dam Project, and provisions for ensuring adequate flows for navigation in the Alabama River.

would ensure that water quality is protected in Lake Martin and in the Tallapoosa River downstream of Martin dam, both of which support important aquatic resources and provide recreational opportunities. We conclude that the cost is worth the benefits.

American Eel Trapping Plan

The catadromous American eel is native to the Tallapoosa River system and has been documented downstream of Thurlow dam. Alabama Power proposes to implement an American eel investigation, in consultation with FWS and Alabama DCNR, from the project tailrace to the mouth of the Tallapoosa River. Alabama Power's proposed eel study would estimate the population and distribution of eels from Martin dam downstream through the unimpounded reach of the Tallapoosa River downstream of Thurlow dam. Data gathered from this study would determine any potential need for additional measures to protect or enhance American eel at the project. We estimate that the levelized annual cost for this eel study would be $269,750.

Because eel passage may be blocked below Thurlow dam, the nexus between eel studies below Thurlow dam and Martin dam is tenuous. A general survey of eel distribution in the Tallapoosa River, as proposed by Alabama Power, is not necessary to identify a need for eel passage at Martin dam or to develop specific measures to do so. . However, an annual eel trapping effort immediately below Martin dam would be more informative and relevant to the decision of whether passage is needed at Martin dam because such an effort would determine when eels are present at Martin dam. We estimate that sampling for eel annually over the 30-year period for which we conduct our economic analysis, would have a capital cost of $180,000, or a levelized annual cost of $4,660. Regular sampling for eel would provide the basis for possible actions the Commission could require at future dates related to eel passage. We find that the benefits of this approach would justify this cost and recommend the Alabama Power develop a plan to trap eels at Martin dam annually to identify any need for development of an upstream eel passage. The trapping plan would include, but not be limited to, the following provisions: (1) an eel trapping design for the waters immediately below Martin dam including a method for determining the appropriate trapping period for detecting upstream migrants; (2) a schedule for implementing the annual eel trapping program at Martin dam within a year of plan approval by the Commission; and (3) preparation of an annual report to be filed with the Commission following each year of trapping. The report should contain any recommendation for continuing or modifying the sampling program.

Nuisance Aquatic Vegetation and Vector Control Management Program

As part of its current Nuisance Aquatic Vegetation and Vector Control Management Program, Alabama Power performs lake-wide surveys to identify areas of aquatic plant infestation at a minimum of once per year. Throughout the year Alabama Power also reviews, on a case-by-case basis, requests to treat nuisance aquatic vegetation made by the public, state and federal agencies, and Alabama Power

employees. Alabama Power treats nuisance aquatic vegetation that: (1) may provide mosquito breeding habitat; (2) could pose a threat to power generation facilities or water withdrawal structures; and (3) could restrict recreational use of the reservoir, and/or pose a threat to the ecological balance of the reservoir.

Alabama Power proposes to continue implementing its Nuisance Aquatic Vegetation and Vector Control Management Program with a plan to monitor increases in aquatic vegetation for the purpose of reducing potential effects of increased nuisance aquatic vegetation on the ecological balance of the reservoir. As discussed in section 3.3.3, *Terrestrial Resources*, neither the current Nuisance Aquatic Vegetation and Vector Control Management Program, nor Alabama Power's proposed revision, describe the survey and monitoring methods. These details should be developed and filed for Commission approval to ensure its effective implementation and the Commission's administration of any such license requirement. We estimate the cost of preparing the survey plan to be $5,000 per year. We find that the benefits of this measure would justify this cost and recommend the development of the enhanced program.

Recreation Plan

Alabama Power proposes to implement its final Recreation Plan (filed on December 9, 2011). The plan: (1) describes recreation sites owned and operated by Alabama Power and other entities at the project; (2) provides for the continued O&M of 18 existing recreation sites, 12 of which are currently recognized project facilities and 6 that would become project facilities under the new license; (3) provides for the improvements to the amenities at these facilities, including improvements to boat ramps and parking areas, new bank fishing sites, and trash removal; and (4) reserving one additional site, the 36.4-acre Ponder Camp (Stillwaters Area Boat Ramp), for future recreation development as demand increases. The plan also includes a provision for an annual meeting with Alabama DCNR and filing an annual addendum to the Recreation Plan to provide the means to inform stakeholders and the Commission about the schedule for implementing the Recreation Plan.

However, Alabama Power's proposed Recreation Plan includes non-project facilities (i.e., facilities that it would not operate and maintain), does not reflect all existing project facilities, does not describe how Alabama Power would monitor recreational use and demand, and does not provide certain details (e.g., number of parking spaces). Accordingly, we recommend that the revised Recreation Plan include, at a minimum, the following components: (1) a description of the amenities at the 19 project recreation sites; (2) a map or maps showing the location of the 19 project recreation sites in relation to the project boundary; (3) an implementation schedule for the proposed enhancement; (4) a provision to review or update the plan every 6 years, including monitoring protocols; and (5) a provision to file a Recreation Monitoring Report that discusses recreational use and demand , associated project-related resource effects, and any additional measures or modifications to the project recreation sites that

may be needed and a schedule for implementing such changes. These modifications would improve Commission oversight of the license requirements and ensure future recreation needs are met at the project.

In section 4, *Developmental Analysis*, we estimate that the levelized annual cost for a revised Recreation Plan that includes the additional provisions described above would be $921,270. We find the benefits of this measure would justify the cost and therefore, would be in the public interest.

Public Education and Outreach Plan

A Public Education and Outreach Plan that provides: (1) a description of current public education efforts, such as, the *Shorelines* newsletter, and an updated website; (2) a brochure about BMPs that would be published in the *Shorelines* newsletter and submitted for publication in *Lake Magazine*; (3) the results of a striped bass hooking mortality study that would be published in the *Shorelines* newsletter and submitted for publication in *Lake Magazine*; (4) periodic articles about nuisance aquatic vegetation in the *Shorelines* newsletter and/or *Lake Magazine*; (5) an "Adopt an Island" program on project lands to address litter and the effects of domestic livestock on native terrestrial resources; (6) a brochure about the Longleaf Pine Legacy Program; and (7) periodic updates to the plan.

Development and implementation of a Public Education and Outreach Plan would document the means by which shoreline landowners and the public will be informed of Alabama Power's various initiatives, as identified above. Therefore, we recommend that Alabama Power develop and implement a Public Education and Outreach Plan, which we estimate would have a levelized annual cost of $57,870. We find the benefits of this measure would justify the cost and therefore, would be in the public interest.

Shoreline Management Plan

Alabama Power proposes to implement its final SMP to protect environmental resources along the project shoreline, and enhance public access to the project's lands and waters. As part of the SMP, the Shoreline Permitting Program addresses specific uses and occupancy of the Lake Martin shoreline not tied to project purposes. This program takes into account the ability of Alabama Power to grant permission, without prior Commission approval, for the use and occupancy of project lands for such minor activities as landscape plantings.

Under the SMP, Alabama Power would encourage shoreline landowners to use riprap, gabions, bioengineering techniques (willow and wetland plantings along Lake Martin shoreline), and native vegetation for shoreline stabilization, which would control or minimize soil erosion and improve aquatic and wildlife habitat.

Interior recommends that Alabama Power implement its final SMP with a provision to limit construction of seawalls to only instances where necessary to protect

land and property. Interior also recommends that Alabama Power encourage shoreline developments to maintain the 30-foot-wide control strip within the project boundary, and increase the total buffer width to at least 100 feet. We recommend that the SMP contain a provision to limit construction of new seawalls because the use of alternative bank stabilization techniques would provide greater benefits to aquatic resources than the use of a seawall. With regard to Interior's recommendation to increase the total buffer width to 100 feet, Alabama Power does not own the land beyond elevation 491 feet and would need to acquire rights to those lands. While some environmental benefits could accrue from an increased buffer, there is nothing in the record to indicate that an increased buffer is necessary. The existing 30-foot buffer is adequate and we do not recommend expanding the project boundary in order to increase the buffer zone.

Additionally, the existing Shoreline Classification maps do not take into account certain project boundary modifications proposed by Alabama Power, including changes to the land use classification system. Therefore, we recommend that the SMP be revised to include updated Shoreline Classification maps.

In its filing of March 14, 2012, and as discussed in section 3.3.5, *Recreation and Land Use*, Alabama Power found several unpermitted structures (e.g., a recreational vehicle) on all of its project lands and waters, including the Martin Dam Project lands. In a letter dated August 17, 2012, the Commission required Alabama Power to address the unpermitted structures and file annual status reports on activities under its Shoreline Compliance Program at each of its project reservoirs, including the Martin Dam Project. Thus, to protect project lands and waters the revised SMP should address an unpermitted structure at the project.

Therefore, we recommend that Alabama Power file a revised SMP that includes among other items: (1) a provision for BMPs to protect environmental resources and control soil erosion and sedimentation; (2) a description of the Shoreline Compliance Program specific to the Martin Dam Project; (3) a provision to limit construction of a new seawall; and (4) a provision to address unpermitted structures on its project lands and waters, including a schedule for resolution. We estimate that the levelized annual cost for our recommended revised SMP would increase the cost from $184,860 to $189,680. We find the benefits of this measure would justify the cost and, therefore, would be in the public interest.

Project Boundary Modifications

The existing project boundary for the Martin Dam Project encompasses 8,602 acres. These lands are used by Alabama Power primarily for the O&M of the project under the terms of its current license. There are 1.39 acres of federal lands administered by BLM within the project boundary.

Alabama Power proposes to add 991.4 acres to, and remove 499.2 acres from, the project boundary, resulting in an increase of 492.2 acres of land within the project boundary. Alabama Power proposes to reclassify land use on 1,295 acres within the

project boundary. A 30-foot control strip (or vegetated buffer) would be maintained on the project lands withdrawn from the project boundary. The project boundary, therefore, would be modified from 8,602 acres to 9,094 acres. As previously discussed in section 3.3.5, *Recreation Resources and Land Use*, the affected acreage primarily encompasses Alabama Power-owned land for project recreation, and should be brought into the project boundary.

The estimated 499.2 acres proposed to be removed from the project boundary would consist of Lake View Park (classified Quasi-public), Pleasure Point Park and Marina (classified Commercial), and land classified as Natural/Undeveloped or Potential Residential. As previously discussed in section 3.3.5, *Recreation Resources and Land Use*, the affected acreage is not needed for project purposes because the land is either in commercial use or proposed for potential residential use and should be removed from the project boundary.

Of the 499.2 acres Alabama Power proposes to remove from the project boundary, 373.1 acres are designated as Natural/undeveloped. Because it is not clear why these lands are not necessary to project purposes we recommend a revised SMP include a provision for Alabama Power to: (1) explain why the 373.1 acres are no longer needed for project purposes and (2) identify this acreage on a map or maps in relation to the project boundary.

Alabama Power proposes to classify 1,294.4 acres either as Natural/Undeveloped or as Recreation, which would be consistent with the use occurring at those sites. Alabama Power proposes to classify lands under the Recreation Land classification that include: 1.9 acres for the boat launch and parking area at Bakers Bottom Landing; 19.9 acres for the boat launch and proposed improvements that include two bank fishing sites and a gravel parking area at Jaybird Landing; 8.7 acres for the boat launch, courtesy pier, and parking area at Pace Point Ramp; and 36.4 acres at Ponder Camp (Stillwater Area Boat Ramp) for future recreation development.

Alabama Power also proposes to maintain 32.3 acres as Commercial Recreation, which is consistent with the use occurring at the sites. These lands include: Anchor Bay Marina (6.4 acres), Parker Creek Marina (9.7 acres), Pleasure Point Park and Marina (6.6 acres) and Real Island Marina and Campground (9.6 acres).

Alabama Power's proposal to modify the project boundary would more clearly delineate lands necessary for the O&M of the project and for other project purposes, such as recreation, shoreline control, or protection of environmental resources. Also, Alabama Power's proposal to classify certain lands would make those lands consistent with the use occurring at those sites. The current exhibit G drawings do not reflect the changes to the project boundary. We recommend that Alabama Power file revised exhibit G drawings to reflect the project boundary modifications.

Historic Properties Management Plan

Alabama Power filed, and initially proposed to implement, a February 2012 draft HPMP to protect cultural resources within the project's APE.[66] The draft HPMP was developed after consultation with the CRWG, consisting of Alabama Power, Alabama SHPO, the Choctaw Nation of Oklahoma, and the Alabama Coushatta Tribe of Texas. The draft HPMP describes standards to be applied during project activities that have the potential to affect historic properties.

Alabama Power defined the project APE in consultation with the CRWG, including BLM and the Commission staff. The APE for the project is lands above 491 feet enclosed by the project boundary which encompasses a 41,150-acre reservoir (Lake Martin), a dam, a spillway, a powerhouse, a tailrace, two 450-foot-long transmission lines, project recreation sites, and appurtenant facilities. Because of Alabama Power's proposal to modify the current project boundary, the APE may need to be revised to reflect the change and potential project-related effects on cultural resources. The CRWG, therefore, included a provision of an HPMP for Alabama Power to identify the APE for the project and include a map or maps that clearly show the APE in relation to the project boundary.

Alabama Power has not completed cultural resources surveys of the project APE. Therefore, the HPMP requires Alabama Power to conduct a cultural resources survey prior to any project-related ground disturbing construction activities within the project's APE which have not been subject to an archaeological survey, including, but not limited to, recreation developments and project-related protection, mitigation, and enhancement measures. Further, the HPMP requires Alabama Power to complete cultural resource surveys of selected sites (807 acres). Completion of these surveys would ensure that all cultural resources are identified and appropriate measures for unavoidable adverse effects on historic properties are determined and implemented (e.g., stabilization, data recovery).

The project powerhouse has been recommended as eligible for listing on the National Register. The original three generators constructed in the late 1920s were upgraded between 2001 and 2004. Since this equipment no longer retains its original integrity, it does not contribute to the eligibility of the powerhouse. However, the fourth generator is now greater than 50 years old and may contribute to the eligibility of the powerhouse. In addition, the dam was constructed in 1926. Therefore, the HPMP requires Alabama Power to complete the identification of historic properties within the project's APE. This measure would address the National Register status of the dam,

[66] Alabama Power's proposal changed on June 12, 2012, when Alabama Power signed the final PA as a concurring party, thereby agreeing to develop and implement a final HPMP within one year of license issuance.

and any other project features and equipment older than 50 years, including the fourth generating unit.

The HPMP defines a process for evaluating and assessing the effects of future project-related actions on cultural resources and historic properties. The HPMP provides for consultation with the Alabama SHPO, interested tribes, and BLM, if impacts on cultural resources as a result of project activity are unavoidable.

While Alabama Power comments that inundation can protect cultural sites from vandalism and recreational use, we find that project operations could result in impacts on cultural sediments and materials. These disturbances can be adverse because they can affect the integrity of sites that may otherwise meet the criteria for inclusion on the National Register. Therefore, the HPMP requires Alabama Power to identify and evaluate historic properties, as well as determine effects and identify ways to avoid, minimize, or mitigate adverse effects and implement appropriate treatment. This measure would ensure that historic properties are addressed in accordance with section 106 of the National Historic Preservation Act.

Other provisions required in an HPMP include documentation of the Martin Construction Camp/Village (148 acres), the continued use and maintenance of historic properties, public interpretation of historic and archeological properties at the project, and a review of the final HPMP during the term of the license. Overall, these measures would continue to protect historic properties and inform the public about cultural resources.

To meet the requirements of section 106 of the National Historic Preservation Act, the Commission executed a PA with the Alabama SHPO on June 12, 2012. Alabama Power, the Poarch Band of Creek Indians, and the Alabama-Coushatta Tribe of Texas concurred. The PA requires Alabama Power to develop and implement an HPMP within one year of license issuance. We estimate that the levelized annual cost for an HPMP would be $444,330. We find the benefits of this measure would justify the cost and therefore, would be in the public interest.

5.2.3 Measures Not Recommended by Staff

We find that some of the proposed or recommended measures would not contribute to the best comprehensive use of the Tallapoosa River, do not exhibit sufficient nexus to project environmental effects, or would not result in benefits to non-power resources that would be worth their cost. The following discussion explains why we did not recommend such measures.

Increase in Lake Martin Winter Pool

Alabama Power proposes to modify the flood curve by implementing a 3-foot increase in the winter pool (from elevation 481 feet to elevation 484 feet). Lake Martin RA recommends a 4-foot increase in the winter lake level. Lake Martin HOBO recommends a 5-foot increase in the winter lake level. While an increase in winter lake

level may have benefits to aquatic resources and recreation use at the reservoir, it would reduce flood storage within the reservoir and result in an increase in flood levels downstream of the project and lesser effects upstream of the project. As described in section 3.3.2.2, *Effects of Increased Winter Pool Elevation on Upstream and Downstream Flooding*, Alabama Power's studies conclude that the potential increase in flooding would be modest, but could affect an additional 13 residential structures, 10 commercial structures, and public roads.[67]

Alabama Power's studies conclude that the increase in 100-year flood elevation in the Tallapoosa River below Martin dam, associated with Alabama Power's proposed 3-foot winter pool increase, is estimated to vary between 0.75 and 3 feet, with the greater increases in the upper section of the river. This increase in the 100-year flood level[68] would increase the flood area by about 10 percent under the Alabama Power proposal, by about 12 percent under the Lake Martin RA recommendation, and by about 16 percent under the Lake Martin HOBO recommendation. There could be modest cumulative effects in the Alabama River in combination with proposals by Alabama Power to reduce winter flood storage on the Coosa River as well.

Spring spawning flows for paddlefish downstream of Thurlow dam would be enhanced by an increase in the winter pool because the amount of spill would be greater and the downstream water levels would be higher. At the lake level of 484 feet proposed by Alabama Power, days per year above 6,000 cfs, the flow that provides the necessary depth for spawning, would increase during the spawning season by 5 (from 19 to 24). At the level of 485 feet proposed by Martin RA, the number of days above 6,000 cfs would double (from 19 to 38). At the level of 486 feet proposed by Martin HOBO, the number of days above 6,000 cfs would increase by 53 (from 19 to 72). With an increasing number of days, the possibility of 10 consecutive days of sustained flow over 6,000 cfs, considered good for paddlefish spawning, would increase. Indications are that paddlefish spawning is occurring under existing conditions.

The proposed increase in the winter pool elevation would likely result in a beneficial effect by providing additional recreation access to Lake Martin. Currently, seven project boat ramps within, or proposed to be within, the project boundary provide public access to the winter pool (usable boat ramp elevation of 481 feet or less). An increase in winter pool elevation of 3 feet to 484 feet, as proposed by Alabama Power,

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[67] The flood model was validated to flood stage, but not flood volume. While stage is the more important variable, the uncertainty in the modeling requires us to assume that if there is error in the estimation, the actual effects would be more severe.

[68] These increases are based on a 100-year storm event occurring during a period when the reservoir is at the proposed or recommended higher winter pool elevation as compared to the existing winter pool level of elevation 481 feet.

would allow an additional six boat ramps within the project boundary to be usable during the winter.

With regard to shoreline landowners and access to their private boat docks, survey results (Alabama Power, 2010g; 2011b) indicate the following. At elevation 481 feet, 92 percent of survey respondents indicated it was impractical to moor their boat at their dock. At the proposed 3-foot higher winter pool elevation of 484 feet, 71 percent of survey respondents indicated it was impractical to moor their boat at their dock. If Lake Martin was raised 4 feet in the winter to elevation 485 feet, as recommended by Lake Martin RA, 56 percent of survey respondents indicated it was impractical to moor their boat at their dock. If the lake was raised 5 feet higher in the winter to elevation 486 feet, as recommended by Lake Martin HOBO, 24 percent of survey respondents find it impractical to moor their boat at their dock. While lower lake levels may strand privately owned boat docks around Lake Martin, there are several boat ramps available to the public that provide access to the lake under current conditions.

Stakeholders have identified the importance of achieving a full lake level in the spring/summer season, and its importance to Lake Martin recreation. A higher winter pool elevation increases the potential for Lake Martin to reach full lake level (approximately 490 feet) by May of each year, particularly during drought years.

Staff's recommendation not to adopt Alabama Power's proposal to raise the winter pool elevation would not necessarily affect Alabama Power's efforts to fill Lake Martin in early spring. Alabama Power has effectively reduced potential impacts by requesting variances to maintain higher lake levels through the winter or begin raising lake levels earlier in the year in periods of forecasted drought conditions. Alabama Power also has been granted variances by the Corps lowering the required combined release requirement for the Tallapoosa and Coosa Rivers. In cases of forecasted drought conditions, Alabama Power may continue to request variances in project operation. With the combination of reductions in releases from the project, as well as a maintaining higher winter pool elevation or early initiation of raising the pool, when justified by drought conditions, Alabama Power should be able to fill Lake Martin as effectively as it would by maintaining a higher winter pool elevation each year.

Alabama Power's proposed 3-foot increase in the winter pool would have a levelized annual benefit of $112,160**,** because there would be a net gain in energy generation of 1,547 MWh. Slightly higher energy gains would occur with Lake Martin RA's recommended 4-foot increase (2,116 MWh) and Lake Martin HOBO's recommended 5-foot increase (2,684 MWh). If the winter pool elevation were not increased, the need for water quality monitoring in the pool would be eliminated, removing a portion cost of $1,096,770/year estimated for both reservoir and tailrace monitoring.

The benefits associated with the varied proposals and recommendations to increase lake levels must be considered against the flood effects to downstream landowners. The benefits of increasing the winter pool elevation by 3, 4, or 5 feet,

including increased electricity generation and increased access to private boat docks during the winter where there are useable public boat ramps, are difficult to justify considering the additional risk of flooding at least 23 residential and commercial structures, and public roads downstream of Martin dam. Therefore, the staff alternative does not include the recommendations from Alabama Power, Lake Martin RA, or Lake Martin HOBO for increased winter pool elevations.

6-Year Drawdown of Lake Martin to Elevation 481 feet

If the Commission were to approve Alabama Power's proposal to implement a 3-foot increase in the winter pool to 484 feet, Alabama Power proposes to lower the reservoir elevation to at least 481 feet every 6 years to facilitate seawall and boat dock construction, and maintenance and other activities benefiting from lower lake levels. Should the measure be implemented it would allow shoreline landowners and commercial landowners to make repairs to non-project features, such as a boat dock and a seawall. This would be a reasonable operational measure that would allow shoreline landowners and commercial landowners to schedule required repairs with contractors. The measure would not be implemented in drought periods, so there would be no effect on the ability of Lake Martin to refill by the beginning of the spring recreation season. The measure may facilitate scouring of sediment from depositional areas at the creek mouths. Overall, the measure should not have substantial effects on public recreational use because the drawdown would occur during the winter when recreational use is low.

Current project operation provides winter pool levels at 481 feet. This measure is only necessary if the 3-foot increase in the winter pool is implemented, raising the winter pool level to 484 feet. However, as discussed above, we do not recommend the 3-foot, 4-foot, or 5-foot increase in the winter pool level.

Downstream Landowners' Recommendation for Flood Control

The Downstream Landowners express concern regarding flood damage to their lands located downstream of the Martin Dam Project.[69] The Downstream Landowners request that Martin dam be operated with the unequivocal duty for downstream flood control to reduce flooding of their land. The Downstream Landowners identify two options that could provide flood control at Martin dam: (1) operate to pre-evacuate the pool using weather reports of impending heavy rainfall events; and (2) require flood

[69] The Downstream Landowners' March 9, 2011, filing identifies their primary concerns, and analyses to support their recommendations. The March 9, 2010, filing states that it represents about three dozen landowners and farmers that utilize the lower Tallapoosa delta for agricultural activities. About 19 landowners participated in the relicensing process and filed multiple comments. Estimates of damages resulting from flooding were provided by 11 landowners.

control as a project purpose and operate with dedicated flood control storage on a year-round basis.

The Downstream Landowners assert that Alabama Power's studies have been inadequate in evaluating and addressing flood damage that may occur to downstream property. In order to address these concerns, we conducted an independent analysis and modeling to evaluate the Downstream Landowners' recommended operation measures. Staff's detailed analysis and modeling results are included in appendix C, *Analysis of Potential to Operate the Martin Dam Project for Downstream Flood Control*.

Staff's modeling study shows that moderate floods could be minimally reduced, but not avoided. We evaluated the March 2003 flood and concluded it had a recurrence interval of between 10 and 25 years. In this case, providing either 3 or 5 feet of dedicated flood storage in Lake Martin resulted in minor reductions of peak outflow from Lake Martin. With no summer storage, the peak outflow would have been 124,000 cfs. With 3 and 5 feet of summer storage, the peak outflow decreased to 111,000 cfs and 94,000 cfs, respectively. For the March 2003 flood, a starting reservoir elevation of 482 feet, or about 9 feet of storage, would have been required to reduce peak outflow from Martin dam to 60,000 cfs, which is the flow Downstream Landowners state would avoid most downstream flooding. In this case, a summer drawdown of 9 feet would cause the surface elevation to fall below the drought curve and place the reservoir in a drought status.

Most damages associated with the March 2003 flood would not have been avoided with dedicated flood storage in Lake Martin. We estimate that with 3 and 5 feet of storage, the acres flooded in March 2003 would have been reduced from 19,500 acres, to 18,800 and 17,700 acres, respectively. With only a 10-percent reduction in flooded acres, most of the $2.1 million in damages claimed by Downstream Landowners would have still occurred.

We evaluated the effect of dedicated flood storage on a less severe flood event, in this case a flood with a 5-year recurrence interval. Our analysis showed that, assuming no tributary inflow downstream of Martin dam, a 3-foot drawdown would have been adequate to avoid the 5-year flood. The potential effect of tributary inflow is important to staff's analysis because past floods have shown that, in cases of substantial rainfall occurring downstream of Martin dam, no changes in operation of Martin dam could be implemented to avoid downstream flooding.

No cost data were available to quantify the downstream damages associated with a 5-year flood event; however, it is reasonable to assume that damages would be far less than the $2.1 million dollars reported by the Downstream Landowners for the May and July 2003 floods (two separate events). Staff's best estimate is to extrapolate from the $2.1 million losses in 2003. The 5-year flood would inundate about 50 percent less acreage than the May 2003 flood, and thus cause half the damage, about $1.1 million. Assuming such flood losses occur every 5 years, staff estimated this is equivalent to a

loss of $210,000 per year. Absent actual loss data, this provides staff's best estimate for comparison purposes.

In determining whether to adopt a flood control measure as part of the staff alternative, we consider the potential effects of dedicated flood storage on all resources, which include generation, dependable capacity, lake-based recreation, the ability to maintain minimum flows and navigation flows, and the ability of Lake Martin to provide drought relief to the river basin. Staff's analysis shows that 3 feet of summer storage for flood control would reduce project generation by 10,192 MWh valued at approximately $738,920 per year. In addition, there would be a reduction in dependable capacity.

With regard to effects on non-developmental resources, 3 feet of summer storage for flood control could adversely affect public, private, and commercial uses at Lake Martin. Alabama Power estimates 370,538 recreation user-days for the combined recreational use at Lake Martin and the tailwater area (as defined from Martin dam to 0.25 mile downstream of the dam) could be reduced by the lower summer lake levels. Alabama Power identified 6,901 privately owned parcels of property adjacent to, or near, Lake Martin, some of which have private boat docks, which could be affected by lower summer elevations. However, public recreation sites would have usable boat docks with up to a 5-foot drawdown, thus the effect on public access would be minimal. With a 5-foot drawdown in the summer, we estimate the area of Lake Martin for boating would be reduced from 40,000 acres to 36,000 acres, which would expose 4,000 acres of shoreline. With a 3-foot drawdown in the summer, we estimate an additional 3,000 acres of shoreline would be exposed. Further, lower summer lake levels would likely affect aquatic vegetation and the associated wildlife.

Providing 3 feet of summer storage for flood control would reduce Alabama Power's ability to use Lake Martin to assist in meeting minimum flow requirements downstream of Thurlow dam. A 3-foot drawdown would be equivalent to providing 1,200 cfs of minimum flow releases, as measured downstream of Thurlow dam, for about 50 days. A 5-foot drawdown would be equivalent to providing a 1,200 cfs minimum flow for about 85 days.

Lower summer lake elevations would increase the likelihood of triggering drought operations. Modified operations due to drought have occurred infrequently on Lake Martin. However, had Lake Martin been maintained at elevation 488.0 feet in Year 2000 (i.e., to provide 3 feet of storage), with historical releases the reservoir would have dropped below the drought curve by July of that year, thus triggering drought operations.

In summary, we do not consider pre-evacuation a viable procedure for flood control at this project. Weather reports are not precise enough in predicting either the location or amount of precipitation events, thus pre-evacuation could exacerbate downstream flooding. We also do not recommend operating the Martin Dam Project with dedicated flood storage. Although technically feasible, staff's modeling shows that

such a measure would have little effect on larger, less frequent flood events, thus could not completely eliminate flooding along the Tallapoosa River. While providing dedicated storage for flood control could be implemented to avoid smaller, more frequent flood events, the cost of implementing the measure for small events, and the effects on other resources, would far exceed estimated flood damages to the Downstream Landowners' properties. Therefore, we conclude that the benefits of providing dedicated storage for flood control would not justify the costs to developmental and non-developmental resources.

Conditional Fall Extension

Alabama Power proposes to implement a conditional fall extension, in which the flood curve would be maintained at elevation 491 feet for an additional 1.5 months (September 1 through October 15), in years that each of four operational conditions are met. The four operational conditions would be calculated daily during the month of September. As proposed, the measure could be terminated at any time it was demonstrated that the four conditions were not being met. Under Alabama Power's proposal, the company also could terminate the extension at its discretion. Alabama Power proposes to abide by all downstream minimum flow commitments and other operational commitments, thus the measure is intended to be implemented only in years when there are adequate flows and reservoir elevations to meet such needs. Lake Martin HOBO and Lake Martin RA recommend the conditional fall extension with Lake Martin RA recommending a modification of the criterion that Lake Harris, upstream on the Tallapoosa River be within 2 feet of its guide curve rather than 1 foot as proposed by Alabama Power.

Staff's best estimate is that the flood curve would be extended infrequently, likely less than 1 in 3 years under Alabama Power's proposal. Staff's analysis shows that there would be minimal public benefit from a conditional fall extension in years that it would be implemented, because recreational use decreases significantly after Labor Day. As discussed in section 5.2.2, *Additional Measures Recommended by Staff*, shoreline landowners who access Lake Martin from their private docks would benefit from higher lake levels. Given that the public boat ramps are still useable until at least November 1 under current operations, the public will continue to have access to Lake Martin to until at least November.

While the Lake Martin RA modification to Alabama Power's proposal would increase the frequency of criteria for the conditional fall extension being met, it would require lowering the threshold for the lake level at Lake Harris to 2 feet below the guide curve. However, a lake level 2 feet below the guide curve at Lake Harris indicates reduced water availability in the Tallapoosa River system. Staff does not recommend changing that criterion.

The conditional fall extension is not likely to have significant impacts on downstream flow needs because the measure would be implemented during above

average flow years when adequate flows are available throughout the Tallapoosa and Coosa River Basins. The measure would slightly increase project generation. Generation at the Martin Dam Project would increase from 377,162 MWh/year to 377,352 MWh/year, an increase of 191 MWh/year valued at $22,000/year. The cost for determining whether to initiate the fall extension each year of the conditional fall extension would be about $10,000 per year.

Alabama Power evaluated the effect of the conditional fall extension on downstream flooding based on a 100-year flood event. The probability of a 100-year flood event in September and October is less than 0.2 percent, thus Alabama Power concluded the effect on downstream flooding would be minimal. The conditional fall extension would be implemented outside the timeframe that flooding is most likely to occur in the region. However, staff identified rapid increases in Lake Martin's water level (a sudden 3.5-foot rise from 486 feet to 489.5 feet) in 2 years between 1990 and 2011 (see figure 3-5), which indicate potential for increased downstream flooding under some conditions.

The potential benefits associated with the conditional fall extension must be considered against the flood effects to downstream landowners, the likelihood of implementation. The conditional fall extension would not be an operational measure that recreational users could rely on consistently. It would not be implemented every year and more likely would occur once every 3 years, or less. It would require analyzing detailed criteria at least annually to determine that it could be implemented, but it could be decided against or suspended at Alabama Power's discretion. Its benefits are limited. The benefits would be primarily limited to shoreline property owners. Finally, because of existing flexibility in Alabama Power's current operation, at least some of the benefit intended by the proposal for the conditional fall extension could be provided without Alabama Power's proposed changes in operating requirements. Therefore, the staff-recommended alternative does not include the proposal for the conditional fall extension.

5.3 UNAVOIDABLE ADVERSE EFFECTS

Continued operation of the Martin Dam Project would result in continued peaking operations and fluctuations in flow releases downstream of Martin dam. Fish entrainment and some mortality would continue at Martin dam, but the overall effects would continue to be minor based on the fisheries upstream and downstream of the dam.

Regulation of the Martin Dam Project's reservoir levels would continue, resulting in seasonal drawdown affecting the shoreline landowners' ability to access their private boat docks at certain times of the year. Construction of, and improvements to, project recreation facilities would cause temporary, minor disturbance in local areas. Implementing soil erosion control measures and revegetating disturbed areas, where

appropriate, would minimize soil erosion and associated effects on aquatic and terrestrial resources.

Project operations would continue to affect some cultural resources sites, but Alabama Power's proposal to implement an HPMP, along with other staff-recommended measures, would protect cultural resources. In the event that a project-related activity could not be modified to avoid an adverse effect on a historic property within the project's APE, Alabama Power would consult with the Alabama SHPO, interested tribes, and BLM in order to develop mitigation measures.

5.4 FISH AND WILDLIFE AGENCY RECOMMENDATIONS

Under the provisions of section 10(j) of the FPA, each hydroelectric license issued by the Commission shall include conditions based on recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, and enhancement of fish and wildlife resources affected by the project.

Section 10(j) of the FPA states that whenever the Commission believes that any fish and wildlife agency recommendation is inconsistent with the purposes and the requirements of the FPA or other applicable law, the Commission and the agency will attempt to resolve any such inconsistency, giving due weight to the recommendations, expertise, and statutory responsibilities of such agency. In response to our ready for environmental analysis notice, Interior submitted recommendations for the project in a letter filed April 6, 2012.

Table 5-2 lists Interior's recommendations filed subject to section 10(j), and whether the recommendations are adopted under the staff alternative. Environmental recommendations that we consider outside the scope of section 10(j) have been considered under section 10(a) of the FPA and are addressed in the specific resource sections of this document and the previous section. No section 10(j) recommendations were filed by state agencies.

Table 5-2. Fish and wildlife agency recommendations for the Martin Dam Hydroelectric Project (Source: staff).

Recommendation	Agency	Within the scope of section 10(j)	Annualized cost	Adopted?
1. SMP: In order to protect fish spawning and rearing habitat, and maintain wildlife habitat diversity, no new sea walls should be constructed unless necessary to protect land and property.	Interior	Yes	$0	Adopted
2. SMP: In order to protect the shoreline from erosion and protect sensitive resources, encourage shoreline developments to maintain a 30-foot-wide control strip within project boundary, and increase the buffer width to at least 100 feet.	Interior	Yes	$0	Adopted in part (see section 5.2.2). 30-foot-wide control strip recommended; increasing the buffer with to at least 100 feet would require acquisition of private property without specified benefit, not recommended

Recommendation	Agency	Within the scope of section 10(j)	Annualized cost	Adopted?
3. Continue Alabama Power's support of aquatic restoration within the Mobile Basin and work with Interior and Alabama DCNR to identify suitable habitats (primarily tributaries) for species reintroductions within the Martin Dam Project boundary.	Interior	No. Funding is not a specific measure to protect, mitigate, or enhance fish and wildlife resources	$0	Not adopted.
4. Consider utilizing the Tallapoosa River portion of the Alabama DROP when assessing drought operations.	Interior	No. Not a specific measure to protect, mitigate, or enhance fish and wildlife resources	$0	Adopted

Recommendation	Agency	Within the scope of section 10(j)	Annualized cost	Adopted?
5. Within the Core Management Area in the WMP, Alabama Power should manage towards a desired forest condition consistent with the "good quality foraging habitat" for the federally listed endangered red-cockaded woodpecker, a longleaf pine ecosystem.	Interior	Yes	$0	Adopted

[a] In its draft biological assessment Alabama Power describes its support of aquatic restoration within the Mobile Basin as an off-license measure (Alabama Power, 2012b).

5.5 CONSISTENCY WITH COMPREHENSIVE PLANS

Section 10(a)(2) of the FPA, 16 U.S.C. §803(a)(2)(A), requires the Commission to consider the extent to which a project is consistent with federal or state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by the project. We reviewed 11 comprehensive plans that are applicable to the Martin Dam Project, located in Alabama (table 5-3). No inconsistencies were found.

Table 5-3. Comprehensive plans considered for the Martin Dam Project (Source: staff).

Comprehensive Plan	Agency
Wildlife lands needed for Alabama, October 1990.	Alabama Department of Conservation and Natural Resources, Montgomery, Alabama
Alabama's comprehensive wildlife conservation strategy. Undated.	Alabama Department of Conservation and Natural Resources. Montgomery, Alabama
Alabama Statewide Comprehensive Outdoor Recreation Plan (SCORP): 2008-2012.	Alabama Department of Economic and Community Affairs. Montgomery, Alabama
The striped bass fishery of the Gulf of Mexico, United States: A regional management plan. March 2006.	Gulf States Marine Fisheries Commission. Ocean Springs, Mississippi
Recovery plan for the Mobile River Basin aquatic ecosystem. November 17, 2000.	U.S. Fish and Wildlife Service
Aquatic resource management plan for the Alabama River Basin. May 17, 2006.	U.S. Fish and Wildlife Service. Daphne, Alabama.
Gulf sturgeon (*Acipenser oxyrhynchus desotoi*) recovery/management plan. September 15, 1995.	National Marine Fisheries Service. Gulf Sturgeon Recovery/Management Task Team. Atlanta, Georgia
The Nationwide Rivers Inventory. 1993.	National Park Service. Department of the Interior, Washington, D.C.
North American waterfowl management plan. May 1986.	U.S. Fish and Wildlife Service. Canadian Wildlife Service.
Gulf Coast joint venture plan: A component of the North American waterfowl management plan. June 1990.	U.S. Fish and Wildlife Service.
Fisheries USA: the recreational fisheries policy of the U.S. Fish and Wildlife Service. Undated.	U.S. Fish and Wildlife Service. Washington, D.C.

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6.0 LITERATURE CITED

ADPH (Alabama Department of Public Health). 2011. News release: Alabama Department of Public Health issues 2011 Fish Consumption Advisories. http://www.adph.org/tox/assets/FishAdvNR2011.pdf. Accessed July 2, 2012.

Alabama Development Office. 2011. Alabama Economic Development Guide: A Comprehensive Resource for Site Selection. Montgomery, Alabama.

Alabama Power (Alabama Power Company). 2012a. Draft historic properties management plan, Martin Dam Project (FERC No. 349-173). Birmingham, Alabama. February 1, 2012.

Alabama Department of Economic and Community Affairs. 2012. Alabama Statewide Comprehensive Outdoor Recreation Plan (SCORP): 2008-2012. Montgomery, Alabama.

_____. 2012b. Biological Assessment of the Martin Dam Project (FERC No. 349-173).

_____. 2011a. Application for new license, major project – existing dam. Martin Dam Hydroelectric Project No. 349-173. Birmingham, Alabama.

_____. 2011b. Response to additional information request. Martin Dam Hydroelectric Project No. 349-173. Birmingham, Alabama. December 9, 2011.

_____. 2011c. Tallapoosa River fish passage information document: Martin relicensing project (FERC No. 364). Prepared by Kleinschmidt for Alabama Power. January 2011.

_____. 2011d. Final recreation plan: Martin Dam Project No. 349. Birmingham, Alabama. December 2011.

_____. 2011e. Final shoreline management program: Martin Dam Project No. 349. Birmingham, Alabama. June 2011.

_____. 2011f. Draft public education and outreach program plan: Martin Dam Project No. 349. Birmingham, Alabama. December 2011.

_____. 2011g. Final Wildlife Management Program: Martin Dam Project No. 349. Birmingham, Alabama. December 2011.

_____. 2010a. Study Report 10 - Erosion and sediment report. Prepared by Environmental Compliance for Alabama Power. October 2010.

_____. 2010b. Study Report 12(b)– Effects of a rule curve change on sedimentation and nuisance aquatic vegetation. Birmingham, Alabama. October 2010.

_____. 2010c. Study Report 12(d) – Effects of a rule curve change on lake and downstream erosion. Prepared by Environmental Compliance for Alabama Power. October 2010.

_____. 2010d. Final Study Report 12(f) – Effects of a rule curve change on downstream recreation. Prepared by Kleinschmidt for Alabama Power. September 2010.

_____. 2010e. Evaluation of minimum flows downstream of Martin Dam report. Martin Dam Hydroelectric Project, FERC No. 349. Prepared by Kleinschmidt for Alabama Power. December 2010.

_____. 2010f. Final Study Report 12(a) – Flood control guideline change modeling analysis. Birmingham, Alabama. May 2010.

_____. 2010g. Effects of increasing duration of summer pool and level of winter pool on recreation use and selected economic indicators at Lake Martin, Alabama (Study Report 12g). Fernandina Beach, Florida. Prepared by Southwick Associates, Inc., for Alabama Power. December 15, 2010.

_____. 2010h. Final Study Report 11– Water quantity, water use, and water withdrawals. Birmingham, Alabama. July 2010.

_____. 2009a. Lake Martin Vegetation Report: Martin Relicensing Project (FERC No. 364). Prepared by Whetstone Consulting for Alabama Power. September 2009.

_____. 2009b. Martin Hydroelectric Project: Assessment of the influence of shoreline modifications on aquatic and semi-aquatic species' use of modified areas. Prepared by Conservation Southeast, Inc. for Alabama Power. September 2009.

_____. 2008. Recreation Use Report: Martin Dam Project No. 349. Prepared by Kleinschmidt for Alabama Power. May 2008.

Allen, J.S., R.T. Carey, L.A. Dickes, E.W. Saltzman, and C.N. Allen. 2010. An economic analysis of low water levels in Hartwell Lake: A final report. Strom

Thurmond Institute of Government and Public Affairs, Clemson University. Prepared for the U.S. Army Corps of Engineers, Savannah District. November 8, 2010.

Bergstrom, John C., R. Jeff Teasley, H. Ken Cordell, Ray Souter, and Donald B.K. English. 1996. Effects of reservoir aquatic plant management on recreational expenditures and regional economic activity. *Journal of Agricultural and Applied Economics*, 28, 2 (December 1996): 409-422.

Central Alabama Regional Planning and Development Commission. 2007. Draft Elmore County comprehensive plan: Bridging our future. Montgomery, Alabama.

CH2MHill. 2005. Tallapoosa River Basin Management Plan. Prepared for The Alabama Clean Water Partnership. Montgomery, Alabama. March 2005.

City of Alexander City, Elmore County Commission, Lake Martin Area Economic Development Alliance, Lake Martin Resource Association, Middle Tallapoosa River Basin Clean Water Partnership, Russell Lands, Inc., and Tallapoosa County. 2009. Economic impact analysis of Lake Martin. May 1, 2009.

Corps (U.S. Army Corps of Engineers). 2007. Environmental assessment and finding of no significant impact for Alabama Power Company proposal for a temporary modified minimum flow agreement in the Alabama River for drought water management operation in the Alabama-Coosa-Tallapoosa River Basin. Prepared by Mobile District, U.S. Army Corps of Engineers, Mobile, Alabama. July 2007.

Corps (U.S. Army Corps of Engineers). 19988. Water allocation for the Alabama-Coosa-Tallapoosa (ACT) River basin, Alabama and Georgia. Prepared by Mobile District, U.S. Army Corps of Engineers, Mobile, Alabama, September 1998.

EPA (U.S. Environmental Protection Agency). 2008. Currently designated nonattainment areas for all criteria pollutants web page. Available at www.epa.gov/oar/oaqps/greenbk/ancl3.html. Accessed June 12, 2008. U.S. Environmental Protection Agency, Washington, D.C.

FERC and Corps (Federal Energy Regulatory Commission and U.S. Army Corps of Engineers). 2009. Final Environmental Assessment for the Coosa River Hydroelectric Project No. 2146. Washington, D.C. December 2009.

FERC (Federal Energy Regulatory Commission). 2007. Environmental assessment for a temporary variance to the Martin Project rule curve and minimum flow releases

at the Yates and Thurlow Project. Martin Dam Project No. 349-134 and the Yates and Thurlow Project No. 2407-121. November 19, 2007.

Fischer, R.A., C.O. Martin, and J.C. Fischenich. 2000. Improving riparian buffer strips and corridors for water quality and wildlife. International Conference on Riparian Ecology and Management in Multi-land Use Watersheds. American Water Resources Association. August, 2000.

Fischer, R.A., and C.O. Martin. 1998. Corridors and vegetated buffer zones—guidelines for Corps of Engineers projects. U.S. Army Engineer Waterways Experiment Station. In: Ecosystems Management and Restoration—Technology News from the Ecosystem Management and Restoration Research Program.

FIMS (Fishery Information Management Systems). 1989. Recreational use and sport fishing survey: Yates and Thurlow Reservoirs and the Thurlow Tailwater on the Tallapoosa River. Alabama Power Company, Birmingham, Alabama.

FWS (U.S. Fish and Wildlife Service). 2012a. Technical/Agency Draft Recovery Plan for the Alabama Sturgeon, *Scaphirynchus suttkusi*. 54 pp. Available at http://ecos.fws.gov/docs/recovery_plan/FINAL%20DRAFT%20T-A%20Draft%20AL%20Sturgeon%20Recovery%20Plan%20042012jeffP.pdf. Accessed October 26, 2012.

_____. 2012b. Species Profile for Little Amphianthus. Available at http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=Q1ST b. Accessed October 31, 2012.

_____. 2012c. Species Profile for Georgia rockcress. Available at http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=Q02R. Accessed October 31, 2012.

_____. 2012d. Species Profile for the Alligator Snapping Turtle. Available at http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=Q02R. Accessed November 21, 2012.

_____. 2012e. Species profile for the Bald Eagle. Available at http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B008. Accessed November 21, 2012.

_____. 2012f. Migratory Bird Program: Bald Eagle. Available at http://www.fws.gov/migratorybirds/BaldEagle.htm. Accessed November 21, 2012.

_____. 2011. Endangered and Threatened Wildlife and Plants; Review of Native Species That Are Candidates for Listing as Endangered or Threatened; Annual Notice of Findings on Resubmitted Petitions; Annual Description of Progress on Listing. 76 FR 66370 66439. Available at http://www.gpo.gov/fdsys/pkg/FR-2011-10-26/pdf/2011-27122.pdf. Accessed October 26, 2011.

_____. 2009. Designation of Critical Habitat for Alabama Sturgeon. 74 FR 26488 26510. Available at http://www.gpo.gov/fdsys/pkg/FR-2009-06-02/pdf/E9-12517.pdf#page=1. Accessed October 26, 2012.

_____. 2008. Three Granite Outcrop Plants Five Year Review. Available at http://ecos.fws.gov/docs/five_year_review/doc1987.pdf. Accessed August 13, 2012.

_____. 2006. Red-cockaded woodpecker 5-Year Review. Available at http://ecos.fws.gov/docs/five_year_review/doc787.pdf. Accessed August 13, 2012.

_____. 2004. Designation of Critical Habitat for Three Threatened Mussels and Eight Endangered Mussels in the Mobile River Basin. Available at http://www.gpo.gov/fdsys/pkg/FR-2004-07-01/pdf/04-14279.pdf#page=1. Accessed October 26, 2012.

_____. 2003a. Recovery plan for the red-cockaded woodpecker (*Picoides borealis*): second revision. U.S. Fish and Wildlife Service, Atlanta, Georgia. 296 pp. Available at http://ecos.fws.gov/docs/recovery_plan/030320_2.pdf. Accessed June 7, 2012.

_____. 2003b. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Gulf Sturgeon. Available at http://www.gpo.gov/fdsys/pkg/FR-2003-03-19/pdf/03-5208.pdf#page=1. Accessed October 26, 2012.

_____. 2000. Mobile River Basin Aquatic Ecosystem Recovery Plan. Atlanta, GA. 128 pp. Available at http://ecos.fws.gov/docs/recovery_plan/001117.pdf. Accessed October 26, 2012.

_____. 1993. Recovery Plan: Three Granite Outcrop Plants. Available at http://ecos.fws.gov/docs/recovery_plan/930707.pdf. Accessed August 13, 2012.

FWS and Gulf States Marine Fisheries Commission. 1995. Gulf sturgeon Recovery Plan. Atlanta, GA. 170 pp. Available at

http://www.fws.gov/ecos/ajax/docs/recovery_plan/950922.pdf. Accessed October 26, 2012.

Greene, J.C., R.G. Lovell, and R.A. McVay. 2008. Martin Reservoir management report: 2008. Alabama Department of Conservation and Natural Resources. September 1, 2008.

Hatch, L.U. and T.R. Hanson. 2001. Change and conflict in land and water use: resource valuation in conflict resolution among competing users. Journal of Agricultural and Applied Economics 33: 297-306.

Henderson, J.E., J.P. Kirk, S.D. Lamprecht, and W.E. Hayes. 2003. Economic impacts of aquatic vegetation to angling in two South Carolina reservoirs. *J. Aquatic Plant Management*, 41: 2003.

Hubert, W.A., S.H. Anderson, P.D. Southall, and J.H. Crance. 1984. Habitat suitability index models and instream flow suitability curves: Paddlefish. U.S. Fish and Wildlife Service. FWS/OBS-82/10.80.

Jenkins R.E. and N.M. Burkhead. 1993. Freshwater fishes of Virginia. American Fisheries Society, Bethesda, Maryland.

Lein, G.M. and D.R. DeVries. 1998. Paddlefish in the Alabama River drainage: population characteristics and the adult spawning migration. Transactions of the American Fisheries Society 127:441-454.

Mirachi, R.E. 2004. Alabama Wildlife. Volume 1. A Checklist of Vertebrates and Selected Invertebrates: Aquatic Mollusks, Fishes, Amphibians, Reptiles, Birds, and Mammals. The University of Alabama Press, Tuscaloosa, Alabama. 209 pp.

Mirachi, R.E., M.A. Bailey, T.M. Haggerty, and T.L. Best. 2004. Alabama Wildlife. Volume 3. Imperiled Amphibians, Reptiles, Birds, and Mammals. The University of Alabama Press, Tuscaloosa, Alabama. 225 pp.

Montana Natural Heritage Program and Montana Fish, Wildlife and Parks. 2012. Montana Field Guide: Paddlefish. Available at http://FieldGuide.mt.gov/detail_AFCAB01010.aspxMontana Field Guides. Accessed June 30, 2012.

Natural Resources Conservation Service. 2007. Soil Survey of Tallapoosa County, Alabama. In cooperation with Alabama Agricultural Experiment Station and Alabama Soil and Water Conservation Committee.

_____. 2008. Soil Survey of Coosa County, Alabama. In cooperation with Alabama Agricultural Experiment Station and Alabama Soil and Water Conservation Committee. 333 pp.

NatureServe. 2012a. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available at http://www.natureserve.org/explorer. Accessed June 7, 2012.

_____. 2012b. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available at http://www.natureserve.org/explorer/servlet/NatureServe?sourceTemplate=tabular_report.wmt&loadTemplate=species_RptComprehensive.wmt&selectedReport=RptComprehensive.wmt&summaryView=tabular_report.wmt&elKey=102590&paging=home&save=true&startIndex=1&nextStartIndex=1&reset=false&offPageSelectedElKey=102590&offPageSelectedElType=species&offPageYesNo=true&post_processes=&radiobutton=radiobutton&selectedIndexes=102590. Accessed May 31, 2012.

NERC (North American Electricity Reliability Corporation). 2011. 2011 Long-term Reliability Assessment. Princeton, New Jersey. November 2011.

Platt, J. and D. Munger. 1999. Impact of fluctuation reservoir elevation on recreation use and value. U.S. Bureau of Reclamation, Denver, Colorado. December 1999.

Purcell, T.R., D.R. DeVries, and R.A. Wright. 2011. The relationship between shoreline development and resident fish communities in Lake Martin, Alabama. Final Report submitted to Alabama Power Company. Department of Fisheries and Allied Aquacultures, Auburn University, Auburn, Alabama. February 2, 2011.

Ricks, B.R., Jr. 2006. The effects of tournament fishing on dispersal, population characteristics, and mortality of black bass in Lake Martin, Alabama. A Thesis Submitted to the Graduate Faculty of Auburn University in Partial Fulfillment of the Requirements for the Degree of Master of Science. Auburn University, Alabama. May 11, 2006.

Sammons, S.M. 2011. Summer behavior and habitat use, habitat availability, and catch and release angling mortality of adult striped bass in Lake Martin, Alabama. Final Report submitted to Alabama Division of Wildlife and Freshwater Fish. Department of Fisheries and Allied Aquacultures, Auburn University, Alabama. November 15, 2011.

Soil Conservation Service. 1955. Soil Survey: Elmore County, Alabama. Series 1939, No. 26. September 1955.

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

U.S. Census Bureau. 2010a. Coosa County QuickFacts from the U.S. Census Bureau. Available at http://quickfacts.cenus.gov. Accessed April 11, 2012.

_____. 2010b. Elmore County QuickFacts from the U.S. Census Bureau. Available at http://quickfacts.census.gov. Accessed April 11, 2012.

_____. 2010c. Tallapoosa County QuickFacts from the U.S. Census Bureau. Available at http://quickfacts.census.gov. Accessed April 11, 2012.

_____. 2010d. Alexander City QuickFacts from the U.S. Census Bureau. Available at http://quickfacts.census.gov. Accessed April 11, 2012.

U.S. Census Bureau and The University of Alabama. 2009. Alabama County Population 65 and Over 2000-2005 and Projections 2010-2035. August 2009. Available at http://cber.cba.ua.edu. Accessed April 11, 2012.

USDA (U.S. Department of Agriculture). 2007. Census of Agriculture. County Profiles for Tallapoosa, Coosa, and Elmore, Alabama. Available at http://www.agcensus.usda.gov/index.php. Accessed April 11, 2012.

USGS (U.S. Geological Survey). 2012. National Water Information System: Web Interface. USGS Surface-Water Daily Data for Alabama. Available at http://waterdata.usgs.gov/al/nwis/dv/?referred_module=sw. Accessed June 18, 2012.

Ware, J.A. 1989. Archeological inundation studies: manual for reservoir managers. U.S. Army Corps of Engineers DACW 39-87-P-1062. Museum of New Mexico, Santa Fe. Prepared for the U.S. Army Corps of Engineers, Waterways Experiment Station, Vicksburg, Mississippi.

Wenger, S. 1999. A review of the scientific literature on riparian buffer width, extent, and vegetation. Office of Public Service and Outreach, Institute of Ecology, University of Georgia. Available at http://www.rivercenter.uga.edu/service/tools/buffers/buffer_lit_review.pdf. Accessed August 14, 2012.

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APPENDIX A—Draft License Conditions Recommended by Staff

I. MANDATORY CONDITIONS

On May 9, 2011, the Alabama Department of Environmental Management issued a water quality certification.

II. ADDITIONAL LICENSE ARTICLES RECOMMENDED BY COMMISSION STAFF

We recommend including the following license articles in any license issued for the project in addition to the mandatory conditions.

Draft Article 301. *Reservoir Operation Report.*

Within 60 days of the date of this license, the licensee shall submit one copy to the Division of Dam Safety and Inspections (D2SI)–Atlanta Regional Engineer and two copies to the Commission (one of these shall be a courtesy copy to the Director, D2SI), of a report describing the effects of modifying flood control operations on local flooding and spillway adequacy of the project dam.

The report should include a flood routing study that evaluates the ability of the project to safely pass flows up to the Inflow Design Flood. The frequency that the non-overflow structures would be overtopped under the historical and limited drawdowns should be compared. The report should discuss if there would be an increased likelihood of low-lying structures located upstream and downstream of the reservoir being flooded under the new operating scenario. If necessary, the report should include a plan and schedule for performing any remedial measures necessary to ensure the continued safe operation of the project during high flows.

The licensee shall not implement the revised reservoir operation plan for the project until the D2SI-Atlanta Regional Engineer determines that these altered project operations have no adverse impact of project safety, and issues a letter indicating such.

Draft Article 401. *Commission Approval and Reporting.*

(a) Requirement to File Reports.

The licensee must file with the Commission the following reports or notifications as required by the Alabama Department of Environment Management's (Alabama DEM) water quality certification.

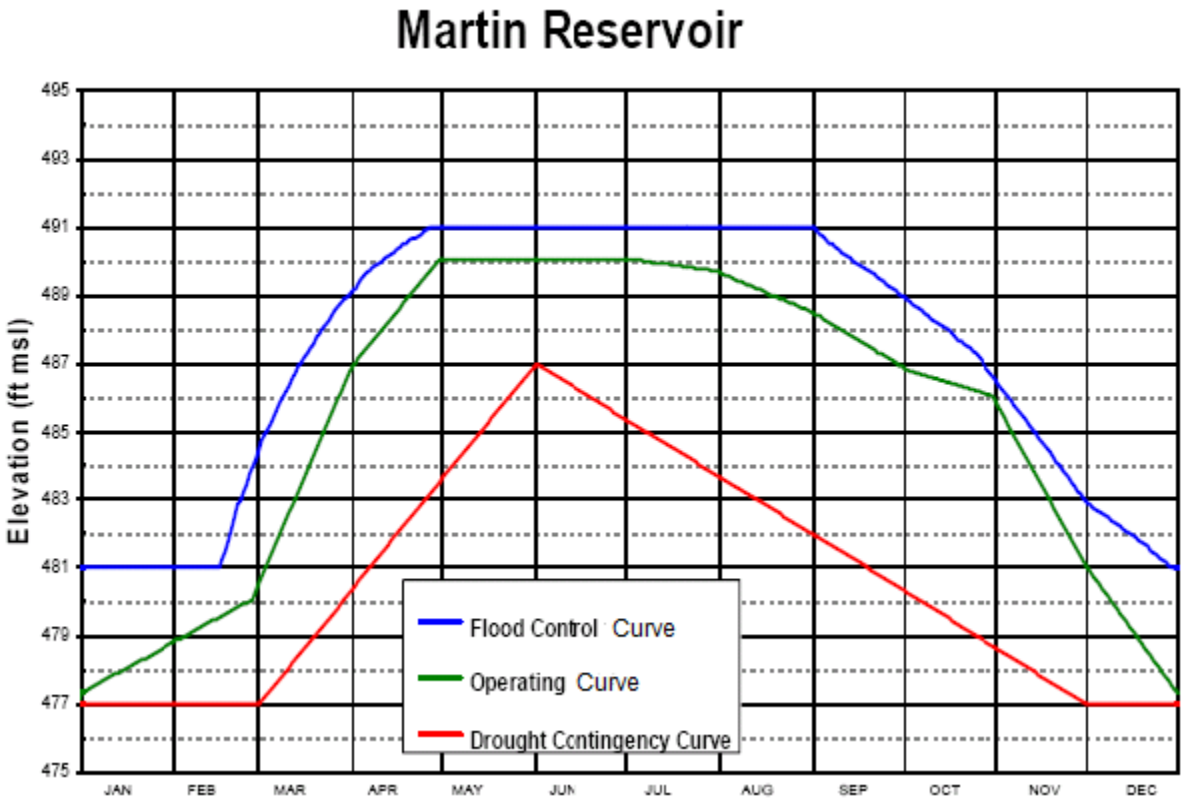
Alabama DEM Condition Number	**Report Name**	**Commission Due Date**

5	Dissolved oxygen and water temperature monitoring report	Within 90 days following the end of the annual monitoring period

(b) Filing of Amendment Applications.

Alabama DEM's Condition 6 of the water quality certification attached to this order contemplates unspecified long-term structural and/or operational changes for the purpose of ensuring compliance with state water quality criteria for dissolved oxygen. These changes may not be implemented without prior Commission authorization granted after the filing of an application to amend the license.

Draft Article 402. *Lake Martin Water Level Management.* Upon approval of the Reservoir Operations Report required in Article 301 of this license, the licensee shall implement the lake level management provisions of this article. To protect the ecological and recreational values of Lake Martin and continue to provide for flood control and downstream navigation, the licensee shall operate the Martin Dam Project in accordance with the guide curves and elevations as shown in the figure below and described herein:



Flood Control Curve. The flood control curve reflects the maximum elevation at which the lake may be maintained before implementing the flood control provisions as identified in Article 403. On January 1, the curve is at elevation 481 feet mean sea level (msl) and remains at this elevation until February 17, when filling begins. On this date the curve rises until it reaches elevation 491 feet msl on April 28. The curve remains at this elevation until August 30, and is gradually lowered 10 feet to elevation 481 feet msl by December 31.

Operating Curve. The area between the flood control curve and operating curve represents the range in which the lake should be maintained under normal conditions. On January 1, the curve is at elevation 477 feet msl and gradually rises to elevation 480 feet msl on February 28. On this date the curve gradually rises to elevation 490 feet msl by April 28, and remains at elevation 490 feet msl until July 5. The curve gradually lowers to elevation 486 feet msl by October 31, and continues to lower to elevation 477 feet msl by December 31. The licensee shall notify the Commission when Lake Martin is at or below 487 feet for 7 days June 1 through Labor Day, or 2 feet below the operating curve for 7 days Labor Day through May 31.

Drought Curve. Reservoir elevations below the drought curve indicate that Lake Martin is in drought condition. On January 1, the curve is at elevation 477 feet msl and remains at this elevation until February 28. On this date the curve rises to elevation 487 feet msl by May 31, then gradually lowers to elevation 477 feet msl by November 31. The curve remains at elevation 477 feet msl December 1 through December 31. The drought curve shall be included in the drought management plan required in Article 404.

The licensee shall, to the extent possible, maintain the lake level between the flood control and operating curves, except as provided in Articles 403 for flood control and 404 for drought management. In addition, between May 1 and August 31, the licensee shall manage the lake level to be no less than 0.5 foot below the flood control curve (i.e., 490.5 feet msl). The licensee shall continually review hydrologic conditions and adhere to the requirements of Article 403 during flooding conditions, and Article 404 during drought conditions.

The lake level requirements may be temporarily modified if required by operating emergencies beyond the control of the licensee, and for short periods upon mutual agreement among the licensee, the U.S. Army Corps of Engineers, Alabama Department of Environmental Management, and Alabama Department of Conservation and Natural Resources. If the lake level is so modified, the licensee shall notify the Commission as soon as possible, but not later than 10 days after each such incident, and shall provide the reason for the change in lake levels. For variances for any reason other than those listed in this paragraph, the licensee shall notify the Commission as soon as possible, but no longer than three business days after the incident.

Draft Article 403. *Flood Control Operations.* Upon approval of the Reservoir Operations Report required in Article 301 of this license, the license shall operate the Martin Dam Project for flood control as provided for in this article.

The licensee has easements up to elevation 491 feet mean sea level (msl), thus the licensee shall operate the project such that Lake Martin does not exceed elevation 491 feet msl. Flood control operation shall be guided by the following:

(1) When Lake Martin is above the flood control curve and between elevations 481 and 486 feet msl, the turbines at Martin dam shall be operated to provide an outflow from Thurlow dam of at least the equivalent of the hydraulic capacity of the turbines at Yates dam (12,400 cfs).

(2) When Lake Martin is above the flood control curve and between elevations 486 and 489 feet msl:

a) With increasing inflows, the turbines at Martin dam shall be operated to provide an outflow from Thurlow dam of at least the equivalent of the hydraulic capacity of the turbines at Thurlow dam (13,200 cfs).
b) With decreasing inflows, the turbines at Martin dam shall be operated to provide for an outflow from Thurlow dam of at least the equivalent of the hydraulic capacity of the turbines at Yates dam (12,400 cfs).

(3) When Lake Martin is above the flood control curve and above elevation 489 feet msl, the turbines at Martin dam shall be operated as it would in the increasing inflow scenario described in No. 2(a). In addition, if required to avoid rising above elevation 491 feet msl, the turbines shall be operated to provide an outflow from Lake Martin at least equivalent to all turbine units operating at full gate (17,900 cfs), and spillway gates raised. An exception to this requirement would occur if the reservoir continues to rise after all gates are raised and inflow exceeds the gate capacity, the licensee shall operate the project to return the lake to elevation 491 feet msl as soon as practicable. At elevation 491 feet msl the spillway would have an outflow capacity of approximately 133,000 cfs.

(4) During periods when inflow exceeds the total hydraulic capacity of the turbines, the 3-hour average outflow rate from Lake Martin shall not exceed the concurrent 3-hour average inflow rate, except to evacuate accumulated surcharge storage prior to the predicted time of peak inflow. This measure should ensure that the outflow from Lake Martin is lower than the inflow.

(5) The licensee shall continue its current practice of notifying the National Weather Service (NWS) when spillway gate operation is used in flood control operations and shall continue to share data with the NWS' Southeast River Forecast Center

(SERFC), and the U.S. Army Corps of Engineers (Corps). In addition, the licensee shall coordinate its planned operation of its spillway gates with the SERFC and the Corps to limit the effects of discharge from the Martin Dam Project to the extent practicable. If greater flood control benefits can be attained through increased coordination of operations at the Tallapoosa and Coosa River dams, and increased coordination with the Corps' downstream Alabama River dams than would be attained through use of the above flood control procedures, then these procedures may be modified as mutually agreed to verbally by the Corps and the licensee. The licensee shall notify the Commission as soon as possible, but no later than 10 days after each temporary change to flood control measures which may arise as part of a verbal agreement between the licensee and Corps.

Draft Article 404. *Drought Management Plan.* Within 180 days from the date of license issuance, the licensee shall file with the Commission for approval, a drought management plan that incorporates the drought curve, as described in Article 402. The plan shall include a provision to review and revise the plan for consistency with the licensee's Alabama Drought Response Operating Proposal, and the U.S. Army Corps of Engineers' Alabama-Coosa-Tallapoosa Reservoir Regulation Manual within 90 days of those plans being finalized.

The drought management plan shall: (1) provide a means to prioritize water needs such that the licensee and the agencies can cooperatively determine whether flow obligations can be temporarily reduced or suspended, or the reservoir operations modified to allow drawdowns to meet flow needs; (2) serve to limit adverse effects on resources from the fluctuating lake level, low lake levels, or reduced downstream flows; and (3) ensure that appropriate consideration is given to generation needs, navigation, the protection of aquatic resources, sensitive species, water supply, water quality, agriculture, and public recreation.

As an interim measure, until a final drought management plan is approved by the Commission, when the licensee cannot maintain releases from the Thurlow project of 1,200 cubic feet per second (cfs) or when the licensee cannot maintain flows necessary for navigation in the Alabama River (i.e., the 7-day-average of 4,640 cfs, as reported at Montgomery, Alabama), the licensee shall inform the Commission within 15 days and file for Commission approval operating measures to maintain adequate minimum flows at Thurlow and navigation flows in the Alabama River. For the navigation flows, the revised operating measures shall be developed in consultation with the Corps.

The drought management plan shall be developed after consultation with the Corps, U.S. Geological Survey, U.S. Fish and Wildlife Service, Alabama Department of Environmental Management, and Alabama Department of Conservation and Natural Resources. The licensee must include with the plan documentation of consultation, copies of recommendations on the completed plan after it has been prepared and provided to the entities above, and specific descriptions of how the entities' comments are accommodated by the plan. The licensee must allow a minimum of 30 days for the

entities to comment and to make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on project-specific reasons.

The Commission reserves the right to require changes to the plan. Upon Commission approval the licensee shall implement the plan, including any changes required by the Commission.

Draft Article 405. *Tailrace Water Quality Monitoring Plan.* Within one year of license issuance the licensee shall file with the Commission for approval, a tailrace water quality monitoring plan consistent with Conditions two through six of the 401 Water Quality Certification (Appendix B of this license). The plan must define the water quality parameters that will be monitored, monitoring methods for data collection, and proposed schedules for data collection and reporting.

The plan must be developed after consultation with the U.S. Fish and Wildlife Service, Alabama Department of Environmental Management, and Alabama Department of Conservation and Natural Resources. The licensee shall include with the plan documentation of consultation, copies of recommendations on the completed plan after it has been prepared and provided to the entities above, and specific descriptions of how the entities' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the entities to comment and to make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific reasons.

The Commission reserves the right to require changes to the plan. Upon Commission approval the licensee shall implement the plan, including any changes required by the Commission.

Draft Article 406. *Project Operation and Flow Monitoring Plan.* Within 120 days from the date of license issuance, the licensee shall file with the Commission for approval, a plan to monitor compliance with: (1) Lake Martin water levels required in Article 402; (2) operations for flood control required in Article 403; and (3) the drought management plan required in Article 404.

The Project Operation and Flow Monitoring Plan shall be developed after consultation with the Alabama Department of Conservation and Natural Resources, Alabama Department of Environmental Management, U.S. Fish and Wildlife Service, and the U.S. Army Corps of Engineers. The licensee shall include with the plan an implementation schedule, documentation of consultation, copies of recommendations on the completed plan after it has been prepared and provided to the entities above, and specific descriptions of how the entities' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the entities to comment and to make

recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include licensee's reasons, based on project-specific reasons.

The Commission reserves the right to require changes to the plan. Upon Commission approval the licensee shall implement the plan, including any changes required by the Commission.

Draft Article 407. *Reservation of Authority to Prescribe Fishways.* Authority is reserved to the Commission to require the licensee to construct, operate, and maintain, or to provide for the construction, operation, and maintenance of such fishways as may be prescribed by the Secretary of the Interior pursuant to section 18 of the Federal Power Act.

Draft Article 408. *Regular American Eel Trapping Plan at Martin Dam.* Within 180 days of license issuance, the licensee shall file for Commission approval a plan to trap eels at Martin dam annually to identify any need for development of an upstream eel passage. The trapping plan shall include, but not be limited to, the following provisions: (1) an eel trapping design for the waters immediately below Martin dam including a method for determining the appropriate trapping period for detecting upstream migrants; (2) a schedule for implementing the annual eel trapping program at Martin dam within a year of plan approval by the Commission and every year following through the term of the license; and (3) preparation of an annual report to the Commission following each year of trapping. The annual report shall include any recommendations to modify the sampling program.

The licensee shall provide the annual report to FWS and Alabama DCNR prior to filing it with the Commission. The licensee shall allow a minimum of 30 days for the entities to comment on the report and to make recommendations before filing the report with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific reasons.

The plan shall be developed after consultation with FWS and Alabama DCNR. The licensee shall include with the plan documentation of consultation, copies of recommendations on the completed plan after it has been prepared and provided to the entities above, and specific descriptions of how the entities' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the entities to comment on the plan and to make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific reasons.

The Commission reserves the right to require changes to the plan. Upon Commission approval the licensee shall implement the plan, including any changes required by the Commission.

Draft Article 409. *Nuisance Aquatic Vegetation and Vector Control Program.* Within six months of license issuance, the licensee shall file for Commission approval, a revised Nuisance Aquatic Vegetation and Vector Control Program. The revised program shall specifically address operating conditions associated with this license and include, but not be limited to, the following: (1) methods, including the frequency, timing, and locations, of surveys to identify areas where nuisance aquatic vegetation could create a public health hazard, affect power generation facilities, restrict recreational use, or pose a threat to the ecological balance of the reservoir; (2) methods for monitoring increases in nuisance aquatic vegetation; (3) methods for controlling nuisance aquatic vegetation; and (4) a schedule for implementation of control measures and monitoring.

The revised Nuisance Aquatic Vegetation and Vector Control Program shall be developed after consultation with the U.S. Fish and Wildlife Service, Alabama Department of Conservation and Natural Resources, and the U.S. Bureau of Land Management. The licensee shall include with the plan documentation of consultation, copies of recommendations on the completed plan after it has been prepared and provided to the entities above, and specific descriptions of how the entities' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the entities to comment and to make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific reasons.

The Commission reserves the right to require changes to the plan. Upon Commission approval the licensee must implement the plan, including any changes required by the Commission.

Draft Article 410. *Wildlife Management Program*. The licensee's final Wildlife Management Program, filed on December 9, 2011, consisting of pages 1 through 23, is approved and shall be implemented. The program shall be implemented according to section 6.0, *Implementation Timeline,* of the *Wildlife Management Program*. Reporting must be completed according to section 7.0, *Consultation and Reporting*, of the *Wildlife Management Program*. The plan shall be coordinated with the Shoreline Management Plan required under Article 413.

Any revisions to the program must be developed after consultation with the U.S. Fish and Wildlife Service, Alabama Department of Conservation and Natural Resources, and the U.S. Bureau of Land Management. The licensee must include with the program documentation of consultation, copies of recommendations on the completed plan after it has been prepared and provided to the entities above, and specific descriptions of how the entities' comments are accommodated by the program. The licensee must allow a

minimum of 30 days for the entities to comment and to make recommendations before filing the program with the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on project-specific reasons.

The Commission reserves the right to require changes to the program. Upon Commission approval the licensee must implement the program, including any changes required by the Commission.

Draft Article 411. *Recreation Plan*. The Appendix D, consisting of Sheet D-1 through D-19, of the licensee's final Recreation Plan, filed on December 9, 2011, is approved and shall be implemented upon Commission approval of the Recreation Plan.

Within 1 year of license issuance, the licensee shall file with the Commission for approval, a revised Recreation Plan for the Martin Dam Project to reflect the revised project boundary at the project. The plan shall include, at a minimum provisions for:

(1) describing the 19 project recreation sites: Anchor Bay Marina; Camp Alamisco; Camp ASCCA (Dadeville Campus); DARE Boat Landing; DARE Power Park; Kamp Kiwanis; Maxwell Gunter AFB Recreation Area; Parker Creek Marina; Pleasure Point Park and Marina; Real Island Marina and Campground; Scenic Overlook; Union Ramp; Bakers Bottom Landing; Jaybird Landing; Madwind Creek Ramp; Paces Point Ramp; Paces Trail; Smith Landing; and Ponder Camp (Stillwaters Area Boat Ramp);

(2) identifying the 19 project recreation sites on a map or maps that clearly defines the project boundary as licensed herein;

(3) at Bakers Bottom Landing, including the existing boat ramp and parking area within the project boundary;

(4) at Jaybird Landing: (a) including the existing boat ramp within the project boundary; (b) improve the boat ramp; (c) construct two bank fishing sites; and (d) construct a gravel parking area;

(5) at Madwind Creek Ramp: (a) including 5.8 acres at Madwind Creek Ramp within the project boundary that consists of an existing boat ramp, a courtesy dock, and parking area; and (b) expand the parking area, if necessary;

(6) at Paces Point Ramp, including an existing boat ramp, a courtesy dock, and parking area within the project boundary;

(7) at Paces Trail, including the existing fishing pier within the project boundary;

(8) at Pleasure Point Park and Marina: (a) removing 25.8 acres of project land from the site; (b) retaining 6.6 acres of the site to include the existing marina, associated amenities, and boat ramp; and (c) describing the marina and associated amenities;

(9) at Ponder Camp (Stillwaters Area Boat Ramp), reserving 36.4 acres of project land for future recreation development;

(10) at Smith Landing: (a) including 4.2 acres at Smith Landing within the project boundary that consists of an existing boat ramp, a courtesy dock, and parking area; and (b) expanding the parking area, if necessary; and

(11) at Union Ramp, including 7 acres at Union Ramp within the project boundary that consists of an existing boat ramp, a courtesy pier, and parking area.

The revised Recreation Plan shall also include: (1) identification of the number and location of the additional bank fishing areas to be developed; (2) provisions for a "carry-in/carry-out" informational sign for the public to carry out their trash from the project recreation sites, identification and removal of identified existing trash receptacles, and installation of containers with appropriately-sized bags at identified project recreation sites; (3) a description of soil erosion and sediment control measures to be used where ground-disturbing activities are proposed; and (4) a discussion of how the needs of the disabled were considered in the planning and design of the recreation facilities; and (5) a provision to review and update, every 6 years, the Recreation Plan. The licensee shall operate and maintain, or arrange for the operation and maintenance of, the project recreation sites.

The revised Recreation Plan shall be developed after consultation with the U.S. Fish and Wildlife Service, Alabama Department of Conservation and Natural Resources, and the U.S. Bureau of Land Management. The licensee shall include with the plan an implementation schedule, documentation of consultation, copies of recommendations on the completed plan after it has been prepared and provided to the entities above, and specific descriptions of how the entities' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the entities to comment and to make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific reasons.

Concurrent with the filing of the Licensed Hydropower Development Recreation Report (Form 80) with the Commission, the licensee shall file a Recreation Monitoring Report that shall include, but not be limited to: (1) a summary of any meeting with the entities above that discusses recreational use and demand, associated project-related

resource effects; and (2) any additional measures or modifications to the project recreation sites that may be needed and a schedule for implementing such changes.

The Commission reserves the right to require changes to the plan. Upon Commission approval the licensee shall implement the plan, including any changes required by the Commission.

Draft Article 412. *Public Education and Outreach Plan*. Within 1 year of license issuance, the licensee shall file with the Commission for approval, a final Public Education and Outreach Plan to enhance the public experience at the Martin Dam Project. The plan shall include, at a minimum: (1) a detailed description of public education and outreach activities at the project, including the effects of domestic livestock on terrestrial resources and the effects of nuisance aquatic vegetation; (2) a description of the brochure about the longleaf pine forest and the licensee's efforts in the Longleaf Pine Legacy Program; (3) the results of a striped bass hooking mortality study for public dissemination; (4) a provision for informing the public of the licensee's procedures for issuance of a permit and/or lease to occupy project lands and waters, including the application process; and (5) a provision for review and update of the plan every 6 years. The Public Education and Outreach Plan shall be developed after consultation with the Alabama Department of Conservation and Natural Resources, the U.S. Fish and Wildlife Service, and the U.S. Bureau of Land Management. The licensee shall include with the plan an implementation schedule, documentation of consultation, copies of recommendations on the completed plan after it has been prepared and provided to the entities above, and specific descriptions of how the entities' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the entities to comment and to make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific reasons.

The Commission reserves the right to require changes to the plan. Upon Commission approval the licensee shall implement the plan, including any changes required by the Commission.

Draft Article 413. *Shoreline Management Plan*. Within 1 year of license issuance, the licensee shall file with the Commission for approval, a revised Shoreline Management Plan to protect the scenic quality of, and environmental resources at, the Martin Dam Project. The plan shall include, at a minimum: (1) a description of the land use classification system that includes: (a) a map or maps of the following eight land use classifications: (i) Project Operations; (ii) Recreation; (iii) Quasi-public; (iv) Commercial Recreation; (v) Natural/Undeveloped; (vi) Martin Small Game Hunting Area; (vii) 30-Foot Control Strip; and (viii) Unclassified; (b) a table that identifies the acres associated with each of the above land use classifications; (c) a provision for using a geographic information system to record sensitive species found in areas classified as

Sensitive Resources; and (d) a description of allowable and prohibited uses for each of the above land use classification; (2) a description of best management practices, including bio-engineering techniques such as willow and wetland plantings to control erosion; (3) a description of the Dredging Permit Program; (4) a description of the Shoreline Compliance Program specific to the Martin Dam Project; (5) a provision to limit construction of new seawalls and criteria that must be applied in approving the installation of any new seawall; (6) a description of existing unpermitted structures at the Martin Dam Project, including a schedule for resolution; and (7) a provision for review and update, if necessary, of the Shoreline Management Plan.

The revised Shoreline Management Plan shall also include a provision to classify project lands from the Natural/Undeveloped Classification to the Recreation Classification that comprises eight project recreation sites: (1) Madwind Creek Ramp (5.8 acres); (2) Smith Landing (4.2 acres); (3) Union Ramp (7.0 acres); (4) Bakers Bottom Landing (1.9 acres); (5) Jaybird Landing (19.9 acres); (6) Paces Point Ramp (8.7 acres); (7) Paces Trail (24.1 acres); and (8) Ponder Camp (Stillwaters Area Boat Ramp) (36.4 acres).

The licensee shall explain why the 373.1 acres designated as Natural/Undeveloped are no longer needed for project purposes and identify the acreage on a map or maps in relation to the project boundary.

The Shoreline Management Plan shall be developed after consultation with the Alabama Department of Conservation and Natural Resources, the U.S. Fish and Wildlife Service, the Alabama State Historic Preservation Office, and the U.S. Bureau of Land Management. The licensee shall include with the plan an implementation schedule, documentation of consultation, copies of recommendations on the completed plan after it has been prepared and provided to the entities above, and specific descriptions of how the entities' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the entities to comment and to make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific reasons.

The Commission reserves the right to require changes to the plan. Upon Commission approval the licensee shall implement the plan, including any changes required by the Commission.

Draft Article 414. *Programmatic Agreement*. The licensee shall implement the "Programmatic Agreement Between the Federal Energy Regulatory Commission and the Alabama State Historic Preservation Officer for Managing Historic Properties that May be Affected by Issuing a New License to Alabama Power Company for the Continued Operation of the Martin Dam Hydroelectric Project in Coosa, Elmore, and Tallapoosa Counties, Alabama (FERC No. 349-173)," executed on June 12, 2012, and including, but

not limited to, the development and implementation of an Historic Properties Management Plan (HPMP) for the project. Pursuant to the requirements of this Programmatic Agreement, the licensee shall file for Commission approval, an HPMP within one year of the issuance date of the license. The Commission reserves the right to require changes to the HPMP at any time during the term of the license. If the Programmatic Agreement is terminated prior to Commission approval of the HPMP, the licensee must obtain approval from the Commission and the Alabama State Historic Preservation Officer before engaging in any ground-disturbing activities or taking any other action that may affect any historic properties within the project's area of potential effects.

Pursuant to the Programmatic Agreement, the licensee shall complete a cultural resources survey of selected survey sites (807 acres). This survey must be undertaken within 5 years of the issuance date of the license. Pursuant to Programmatic Agreement, the licensee shall identify and evaluate historic properties, which would include inundated sites if and when the site or sites become exposed during the term of a license, and mitigate adverse effects.

Article 415. *Use and Occupancy*. (a) In accordance with the provisions of this article, the licensee must have the authority to grant permission for certain types of use and occupancy of project lands and waters and to convey certain interests in project lands and waters for certain types of use and occupancy, without prior Commission approval. The licensee may exercise the authority only if the proposed use and occupancy is consistent with the purposes of protecting and enhancing the scenic, recreational, and other environmental values of the project. For those purposes, the licensee must also have continuing responsibility to supervise and control the use and occupancies for which it grants permission, and to monitor the use of, and ensure compliance with the covenants of the instrument of conveyance for, any interests that it has conveyed, under this article. If a permitted use and occupancy violates any condition of this article or any other condition imposed by the licensee for protection and enhancement of the project's scenic, recreational, or other environmental values, or if a covenant of a conveyance made under the authority of this article is violated, the licensee must take any lawful action necessary to correct the violation. For a permitted use or occupancy, that action includes, if necessary, canceling the permission to use and occupy the project lands and waters and requiring the removal of any non-complying structures and facilities.

(b) The type of use and occupancy of project lands and waters for which the licensee may grant permission without prior Commission approval are: (1) landscape plantings; (2) non-commercial piers, landings, boat docks, or similar structures and facilities that can accommodate no more than 10 water craft at a time and where said facility is intended to serve single-family type dwellings; (3) embankments, bulkheads, retaining walls, or similar structures for erosion control to protect the existing shoreline; and (4) food plots and other wildlife enhancement. To the extent feasible and desirable to

protect and enhance the project's scenic, recreational, and other environmental values, the licensee must require multiple use and occupancy of facilities for access to project lands or waters. The licensee must also ensure, to the satisfaction of the Commission's authorized representative, that the use and occupancies for which it grants permission are maintained in good repair and comply with applicable state and local health and safety requirements. Before granting permission for construction of bulkheads or retaining walls, the licensee must: (1) inspect the site of the proposed construction, (2) consider whether the planting of vegetation or the use of riprap would be adequate to control erosion at the site, and (3) determine that the proposed construction is needed and would not change the basic contour of the impoundment shoreline. To implement this paragraph (b), the licensee may, among other things, establish a program for issuing permits for the specified types of use and occupancy of project lands and waters, which may be subject to the payment of a reasonable fee to cover the licensee's costs of administering the permit program. The Commission reserves the right to require the licensee to file a description of its standards, guidelines, and procedures for implementing this paragraph (b) and to require modification of those standards, guidelines, or procedures.

(c) The licensee may convey easements or rights-of-way across, or leases of project lands for: (1) replacement, expansion, realignment, or maintenance of bridges or roads where all necessary state and federal approvals have been obtained; (2) storm drains and water mains; (3) sewers that do not discharge into project waters; (4) minor access roads; (5) telephone, gas, and electric utility distribution lines; (6) non-project overhead electric transmission lines that do not require erection of support structures within the project boundary; (7) submarine, overhead, or underground major telephone distribution cables or major electric distribution lines (69-kV or less); and (8) water intake or pumping facilities that do not extract more than one million gallons per day from a project impoundment. No later than January 31 of each year, the licensee must file three copies of a report briefly describing for each conveyance made under this paragraph (c) during the prior calendar year, the type of interest conveyed, the location of the lands subject to the conveyance, and the nature of the use for which the interest was conveyed.

(d) The licensee may convey fee title to, easements or rights-of-way across, or leases of project lands for: (1) construction of new bridges or roads for which all necessary state and federal approvals have been obtained; (2) sewer or effluent lines that discharge into project waters, for which all necessary federal and state water quality certification or permits have been obtained; (3) other pipelines that cross project lands or waters but do not discharge into project waters; (4) non-project overhead electric transmission lines that require erection of support structures within the project boundary, for which all necessary federal and state approvals have been obtained; (5) private or public marinas that can accommodate no more than 10 water craft at a time and are located at least one-half mile (measured over project waters) from any other private or

public marina; (6) recreational development consistent with an approved report on recreational resources of an Exhibit E; and (7) other uses, if: (i) the amount of land conveyed for a particular use is five acres or less; (ii) all of the land conveyed is located at least 75 feet, measured horizontally, from project waters at normal surface elevation; and (iii) no more than 50 total acres of project lands for each project development are conveyed under this clause (d)(7) in any calendar year. At least 60 days before conveying any interest in project lands under this paragraph (d), the licensee must file a letter with the Commission, stating its intent to convey the interest and briefly describing the type of interest and location of the lands to be conveyed (a marked Exhibit G map may be used), the nature of the proposed use, the identity of any federal or state agency official consulted, and any federal or state approvals required for the proposed use. Unless the Commission's authorized representative, within 45 days from the filing date, requires the licensee to file an application for prior approval, the licensee may convey the intended interest at the end of that period.

(e) The following additional conditions apply to any intended conveyance under paragraph (c) or (d) of this article:

(1) Before conveying the interest, the licensee must consult with federal and state fish and wildlife or recreation agencies, as appropriate, and the State Historic Preservation Officer.

(2) Before conveying the interest, the licensee must determine that the proposed use of the lands to be conveyed is not inconsistent with any approved report on recreational resources of an Exhibit E; or, if the project does not have an approved report on recreational resources, that the lands to be conveyed do not have recreational value.

(3) The instrument of conveyance must include the following covenants running with the land: (i) the use of the lands conveyed must not endanger health, create a nuisance, or otherwise be incompatible with overall project recreational use; (ii) the grantee must take all reasonable precautions to ensure that the construction, operation, and maintenance of structures or facilities on the conveyed lands will occur in a manner that will protect the scenic, recreational, and environmental values of the project; and (iii) the grantee must not unduly restrict public access to project waters.

(4) The Commission reserves the right to require the licensee to take reasonable remedial action to correct any violation of the terms and conditions of this article, for the protection and enhancement of the project's scenic, recreational, and other environmental values.

(f) The conveyance of an interest in project lands under this article does not in itself change the project boundaries. The project boundaries may be changed to exclude land conveyed under this article only upon approval of revised Exhibit G drawings

(project boundary maps) reflecting exclusion of that land. Lands conveyed under this article will be excluded from the project only upon a determination that the lands are not necessary for project purposes, such as operation and maintenance, flowage, recreation, public access, protection of environmental resources, and shoreline control, including shoreline aesthetic values. Absent extraordinary circumstances, proposals to exclude lands conveyed under this article from the project must be consolidated for consideration when revised Exhibit G drawings would be filed for approval for other purposes.

(g) The authority granted to the licensee under this article must not apply to any part of the public lands and reservations of the United States included within the project boundary.

APPENDIX B—401 Water Quality Certification Conditions

Water Quality Certificate Conditions for the Martin Dam Hydroelectric Project No. 349 Issued By the Alabama Department of Environmental Management, May, 9, 2011.

Conditions of Certification:

LIMITATIONS

1. The operation of this project, including the operation of the turbines and existing turbine aeration systems, shall be managed such that dissolved oxygen (D.O.) criteria specified at ADEM Administrative Code Reg. 335-6-1 0-.09(2)4., 335-6-1 0-.09(3)4., and 335-6-10-.09(5)4, shall be maintained at all times at the monitoring point prescribed herein downstream of the project. Management steps required to maintain the D.O. concentration shall be implemented to assure that the 4.0 mg/1 minimum D.O. criterion is maintained.

MONITORING AND REPORTING

2. The monitoring point for determining compliance with paragraph 1 above shall be located in an area immediately downstream of Martin Dam at the existing monitoring location indicated in Figure 1. The location is at approximately latitude 32.679350 N and longitude 85.911648 W.

3. The monitor in the Martin Dam tailrace will record D.O. concentrations and water temperature at 30-minute intervals during periods of hydroelectric generation following one continuous hour of generation beginning June I and extending through October 31. During flood events, the monitoring may be temporarily discontinued until tailrace elevations return to normal. The monitoring program will begin within 18 months of the effective date of a new license issued by the Federal Energy Regulatory Commission (FERC) for the Martin Project if the effective date is within the prescribed monitoring period. If the effective date of the license is not within the prescribed monitoring period, monitoring shall begin the following June I. The monitoring program shall continue for a period of three years.

   Alabama Power Company will provide adequate and frequent maintenance and calibration of the D.O. and temperature monitoring equipment to assure its proper operation. The D.O. monitoring equipment will be calibrated at an acceptable frequency using the manufacturer's recommendations, the modified Winkler Method, Method 360.2 of the Environmental Protection Agency's Method for

Chemical Analysis of Water and Wastes, latest edition, or other equivalent methods.

4. Dissolved oxygen and temperature monitoring reports shall be submitted with appropriate certifications to the ADEM within 90 days following the end of the annual monitoring period. Following the final year of monitoring, the complete set of data shall be submitted to ADEM for review and comment prior to submittal to the FERC. In addition to dissolved oxygen and temperature data, the monitoring reports shall specify whether turbines were in operation at the time of the dissolved oxygen and temperature measurements and the discharge rate of water flow passing through each turbine at the time of the measurements. Monitoring reports shall be submitted in an electronic form compatible with the MicrosoftTM Excel and Word software.

5. An assessment of the effects of the operation of the Martin Project on the State of Alabama's water quality standards shall be conducted using the results of the monitoring as described in the previous paragraphs. If the monitoring results do not indicate compliance with the State of Alabama water quality standards (maintenance of a D.O. concentration of 4.0 mg/1 or greater), Alabama Power Company shall develop and implement measures to ensure compliance with the 4.0 mg/1 D.O. criterion through structural and/or operational modifications at the project as prescribed in paragraph I. The assessment shall be filed with ADEM within 6 months following the end of the three year monitoring period. As a part of the assessment Alabama Power Company shall furnish, at the Department's request, other data and information that may be available but not expressly required in this monitoring plan.

6. The Department also certifies that there are no applicable effluent limitations nor other limitations imposed under Sections 30 I (b) or 302 or other standards imposed under Sections 306 or 307 of the Clean Water Act. This certification does not, however, exempt Alabama Power Company from requirements imposed under the National Pollutant Discharge Elimination System for other discharges at these facilities regulated by the Department.

APPENDIX C—Analysis of Potential to Operate the Martin Dam Project for Downstream Flood Control

Introduction

The Downstream Landowners [70] assert that Alabama Power's studies have been inadequate in evaluating and addressing flood damage that may occur to downstream property, lands, farms, timber, historical Indian artifacts, and wildlife. Specifically, they express concern regarding flood damage to their lands near or adjacent to the Tallapoosa River due to alleged mismanagement of releases from the Martin dam.

The Downstream Landowners request that Martin dam be operated with the unequivocal duty for downstream flood control, which would benefit downstream owners and farmers. Their comments in the public record focus on two floods in 2003 (both smaller than the 100-year flood). The Downstream Landowners claim that the 2003 floods (one from May 7-11, and the other from July 1-3) were allegedly the direct result of preventable flood events that were caused by Alabama Power's "negligence" in operating Martin dam, and that the May 2003 and July 2003 flood events were common 4-year and 2-year flood events, respectively. The Downstream Landowners claim that a 3-day pre-evacuation plan could have eliminated the flooding downstream of Martin, Yates, and Thurlow dams in these events. In testimony made during the Judith P. Bryan et al. v. Alabama Power Company lawsuit hearing (2009 WL 153932 [Ala.]) (Court Case), the expert for the Downstream Landowners declined to state what lake level Alabama Power should have maintained at Lake Martin to prevent the flood; however, the expert opined that Alabama Power should have reserved between 2 and 3 feet of storage space during the summer months for flood control. Finally, the Downstream Landowners claim that the 2003 floods caused about $2.1 million in damage.

The Downstream Landowners also mentioned other smaller floods in 2009 and 2010. A flood in late-March 2009 caused some damage, but farmers were able to re-plant because it was early in the season, while a flood in November/December 2009 flooded several hundred acres of mature cotton, causing a 50 to 60-percent loss for some farmers. A minor flood in late-March 2010 caused one farmer to replant about

[70] Includes the following 19 landowners, farmers, and businesses: Euel A. Screws, Jr.; W. Thomas Dozier III; W. T. Dozier Farm, Inc.; Parmer G. Jenkins; R. Shepherd Morris, Sr.; Morris & Morris Farms, Inc.; Daniel G. Taylor; Mark B. Taylor; Carl E. Taylor; Milstead Farm Group, Inc.; Dale M. Taylor; Jimmy M. Dozier; Judy P. Bryan; Auttossee Plantation; L. A. Wisener; Howard T. Weir, III; Anne Weir; Charles E. Herron, Jr.; and Rock Springs Land & Timber, Inc.

100 acres of cotton. The Downstream Landowners provided no further detail on these 2009 and 2010 floods.

The Downstream Landowners identify two options which could provide flood control at Martin dam: (1) operate to pre-evacuate the pool in the face of weather reports of impending heavy rainfall events; and (2) require flood control as a project purpose and operate with dedicated flood control storage on a year-round basis. Staff conducted its own independent analysis to evaluate these two operation measures.

Recurrence Interval of the May 2003 Food Event

The Downstream Landowners have characterized the May 2003 flood event as a "common" occurrence with a 4-year return interval. We reviewed the data provided by the Downstream Landowners for the May 2003 flood, and determined that the 4-year return interval flood flow calculated by the Downstream Landowners is based on the average rainfall occurring at 13 locations in the Tallapoosa basin during the period April 23 through May 31, 2003 rather than actual flow data over the same period. The frequency interval of rainfall events for each location varied widely, ranging from less than 1 year to as high as 20 years, and averaging ***4 years***. An average "4-year rainfall event" is not the same as a "4-year flood event." However, the landowners appear to use these terms interchangeably. When we analyzed the May 2003 data, we calculated that the May 2003 flood had a longer return interval of 10-25 years.[71] In other words, the May 2003 flood event is a much less common event than alleged by the Downstream Landowners. From these calculations, we conclude that rainfall in the basin is not the most appropriate measure to use in characterizing flooding, because rainfall does not necessarily have a high degree of correlation with flows in the receiving river. This is particularly true in this case where the Harris reservoir regulates flows in the basin.

Staff Analysis, Pre-evacuate Lake Martin

The Downstream Landowners recommend that the Martin Dam Project operate to pre-evacuate Lake Martin in the face of weather reports of impending heavy rainfall events. The Farmers state a 3-day pre-evacuation would have eliminated the flooding along the lower Tallapoosa River during the May and July 2003 floods.

In general, pre-evacuation procedures require an accurate prediction of the amount and distribution of rainfall, in combination with monitoring and analysis of the flows in the project's water basin, to guide when a reservoir level should be lowered.

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[71] Our estimate of flood frequency is based on the occurrence of flows measured upstream of the Martin Dam Project at the Horseshoe Bend flow gage.

Pre-evacuation measures are sometimes implemented in areas where inflows are highly predictable. Predictable inflows often occur in cases of snowmelt related floods in the spring, or when the project is located immediately downstream of another flood control reservoir. Pre-evacuation may also be used in cases where evacuated flows are unlikely to coincide with other flows in the project area. With inaccurate predictions of rainfall amount and distribution, and intervening tributary flows, pre-evacuation could actually exacerbate downstream flooding. This is the case for a project configuration such as the Martin Dam Project, in which downstream flooding is the result of releases from Martin dam in combination with inflows from tributaries along the Tallapoosa River downstream of Martin dam. Alabama Power has identified cases in which tributary inflow increased peak flows downstream of Martin dam by as much as 20 percent.

The downstream landowners provided an example of how pre-evacuation could be implemented to reduce downstream flooding. The example states, "And at any time their models indicate they will be spilling within the next 72 hours **and there is excess channel capacity downstream of the project**, they should commence that spill immediately……" This example demonstrates that excess channel capacity downstream of the project is a critical element of the pre-evacuation procedure.

The ability to quantify excess channel capacity is only as reliable as rainfall predictions and flow assessments in the region. Rainfall predictions in the vicinity of the Martin Dam Project have not been accurate. The March 9, 2011 filing by the Downstream Landowners included the March 2009 Alabama Supreme Court case, which stated, "The record shows that meteorologists had made errors in predicting the path of the storm such that heavy rains were not predicted for the Tallapoosa River Basin until June 30, 2003, the day before the heaviest rainfall of the storm on the morning of July 1, 2003." In this case pre-evacuation could have not been implemented without introducing the risk of larger floods.

In conclusion, we find that the reliability of forecasts of weather and rainfall in the Tallapoosa River watershed are inadequate to implement pre-evacuation on a regular basis.

Staff Analysis, Dedicated Flood Control Storage at Lake Martin

As part of the license application process, Alabama Power focused their modeling studies to assess the short-term and long-term effects that would result from a range of proposed reservoir level alternatives. Alabama Power's modeling focused on the winter time period, since that was the period they proposed changes to the flood guide curve. Alabama Power's general modeling method was to use the Alabama Power Project Routing Model (described below) to evaluate the reservoir levels and outflows from Lake Martin, and the Corps software program HEC-RAS to evaluate effects (water levels and inundation) on downstream river reaches. Models were

calibrated and, where necessary, verified using historical flow hydrograph and stage data, and flood effects were simulated using a 100-year design flood.

The Downstream Landowners requested that the Martin Dam Project operate with dedicated flood storage, but did not identify any specific level of storage for analysis. Staff conducted reservoir and riverine modeling to address the concerns of the Downstream Landowners. Our analysis focused on more frequently occurring flood events, and the spring/summer period, which is the period the farmers are most affected by flooding.

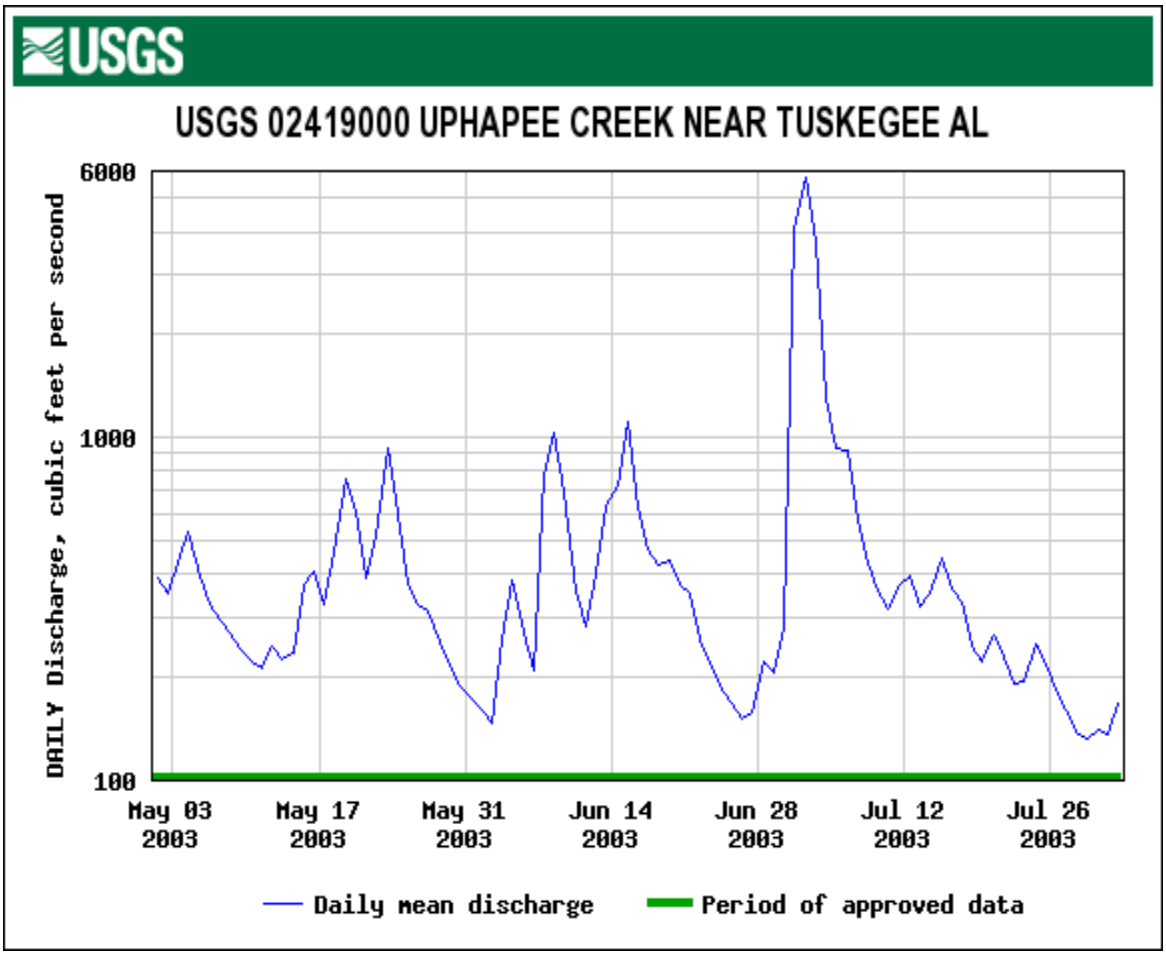
Modeling Parameters

We focused our modeling on the May 2003 flood because it was a key recent flood discussed by the Downstream Landowners, and the focus of the Alabama Supreme Court Case. With the May 2003 flood, the majority of the heavy rainfall was located mostly upstream of Martin dam. Therefore, the operation of the Martin Dam Project could have an effect on downstream flooding along the lower Tallapoosa River and would demonstrate the maximum potential effect that Martin dam could have on downstream flooding, if it was to be used for flood control during the summer months.

The July 2003 flood [72] by comparison, was the result of heavy rainfall both upstream and downstream of Martin dam. During the July 2003 flood, there was a greater influence from tributary inflows downstream of Martin dam, compared to the May 2003 flood. Figure C-1, provides an example of the differences between the May and July 2003 stream flows on a tributary downstream of Martin dam, as recorded by USGS gage no. 02419000 Uphapee Creek near Tuskegee, Alabama.[73] This creek enters the Tallapoosa River a short distance downstream of Thurlow dam. The Uphapee Creek at this location has a drainage area of 333 square miles, and while stream flows recorded by this gage remained below 500 cfs during the May 2003 flood, it had a peak instantaneous value of 7,460 cfs on July 2, 2003 (USGS, 2012a). In comparison, the 100-year flood modeled by Alabama Power occurred in March of 1990, with a peak instantaneous value of 28,400 cfs on March 17, 1990.

[72] We estimate that the July 2003 flood had a recurrence interval of about 5 years, while the Downstream Landowners stated that it was a 2-year flood.

[73] Figure C-1 also demonstrates the significance of tributary inflows to the Tallapoosa River downstream of Martin dam.



Our modeling assessed the outflow from Lake Martin for the May 2003 flood while maintaining lower summer reservoir elevations of 488 and 486 feet msl (3 and 5 feet below the existing flood control guideline elevation 491 feet msl). We also estimated the reservoir elevation which would have been necessary to prevent the May 2003 flood. To asses a more frequently occurring flood event, we modeled an estimated 5-year flood event [74] with an initial reservoir level of 3 feet (elevation 488 feet msl) below the flood control guide.

As part of our modeling, we slightly adjusted the measured inflow to Lake Martin as measured immediately upstream of the reservoir at USGS Gage No. 02414715 Tallapoosa River at Horseshoe Bend, to provide a reasonable fit to the

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[74] We estimate that the May 2003 flood had a recurrence interval of between 10 and 25 years, contrary to the Downstream Landowners' assertion that it was a 4-year flood. Thus, to evaluate the more frequent flood events, staff developed an inflow dataset representative of a 5-year flood.

historic reservoir outflows and elevations for the May 2003 flood. At the start of the May 2003 flood, on May 7, Lake Martin had a reservoir elevation of 490.24. The peak outflow for the May 2003 flood was about 119,000 cfs. This hydrograph was then routed through Lake Martin using Alabama Power's spreadsheet reservoir model to obtain a discharge hydrograph with the starting lake levels at elevations 488 and 486 feet msl. The reservoir model followed current operational procedures of Alabama Power during flood conditions.

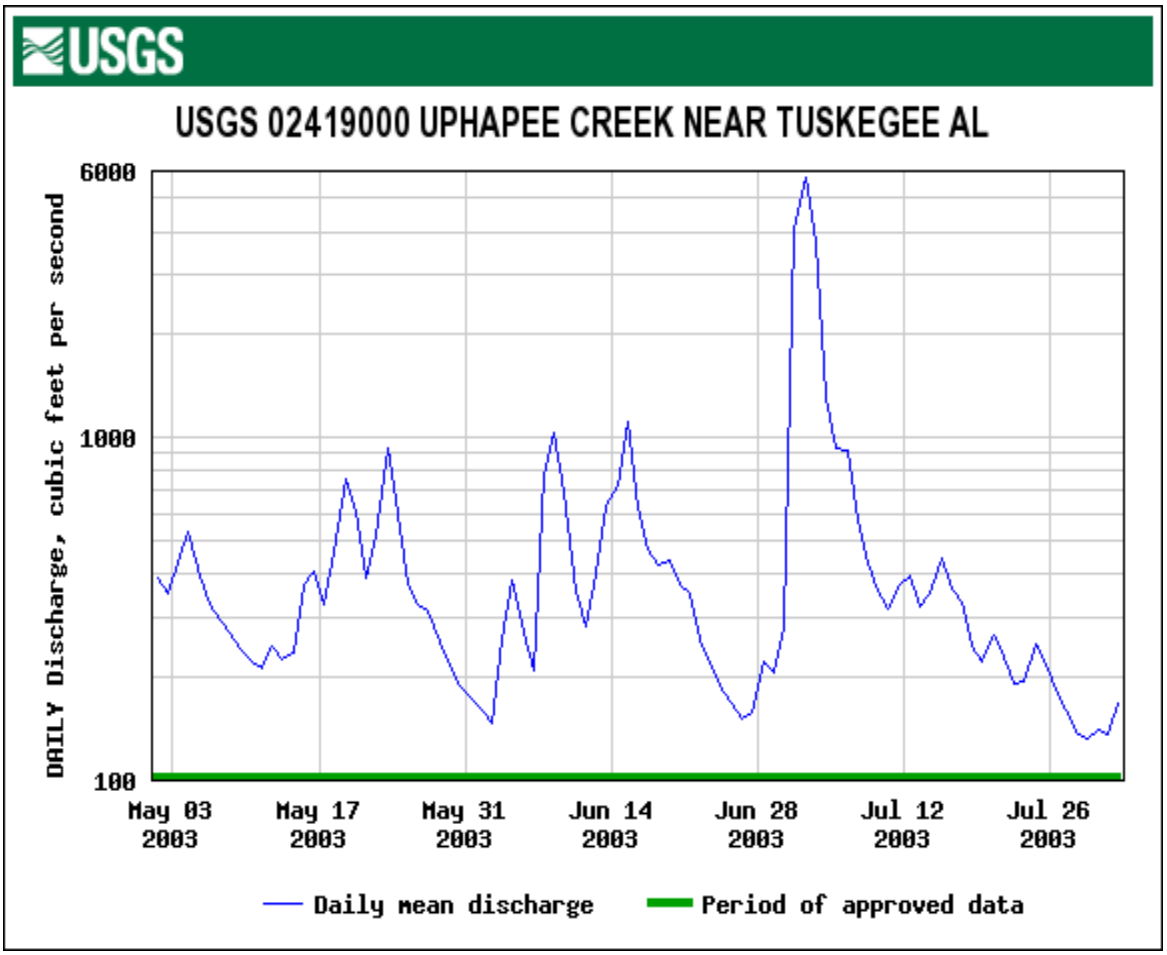

Figure C-1. Daily mean flows for Uphapee Creek, located downstream of Martin dam, for May 1, 2003 to August 1, 2003 (Source: USGS, 2012a). Uphapee Creek is representative of tributary inflows to the Tallapoosa River downstream of Martin dam.

Peak Flows

Table C-1 and figures C-2 and C-3 show the results of our modeling. In the May 2003 flood the initial reservoir elevation of Lake Martin was 490.24 feet, resulting in an outflow from Martin dam which peaked at 119,000 cfs. The operation of Lake Martin, and reservoir storage created prior to the flood, reduced the peak outflow from 124,000 cfs to 119,000 cfs, a reduction of 5,000 cfs. With Lake Martin starting elevations of 488

and 486 feet, the peak outflow from Lake Martin would have been decreased to about 111,000 cfs and 94,000 cfs, respectively, compared to the actual outflow of 119,000 cfs. A starting elevation of 482 feet would have been required to reduce the peak outflow from Martin dam to 60,000 cfs, which is the flow Downstream Landowners states would avoid most downstream flooding.

Table C-1. Comparison of peak flows which would have occurred in May 2003 by implementing annual summer/fall drawdowns at Lake Martin.

Lake Martin Elevation (ft. msl)	Approximate drawdown May through October (ft.)	Peak flow from Martin dam (cfs)
491	0	124,000*
490.24	0.7	119,000
488	3	111,000
486	5	94,000
482	9	60,000

* Staff recognizes that the modeled peak flow of 124,000 cfs is slightly less than the 128,000 cfs peak flow reported in Court Case, however staff deems this an acceptable fit for modeled versus actual flow data.

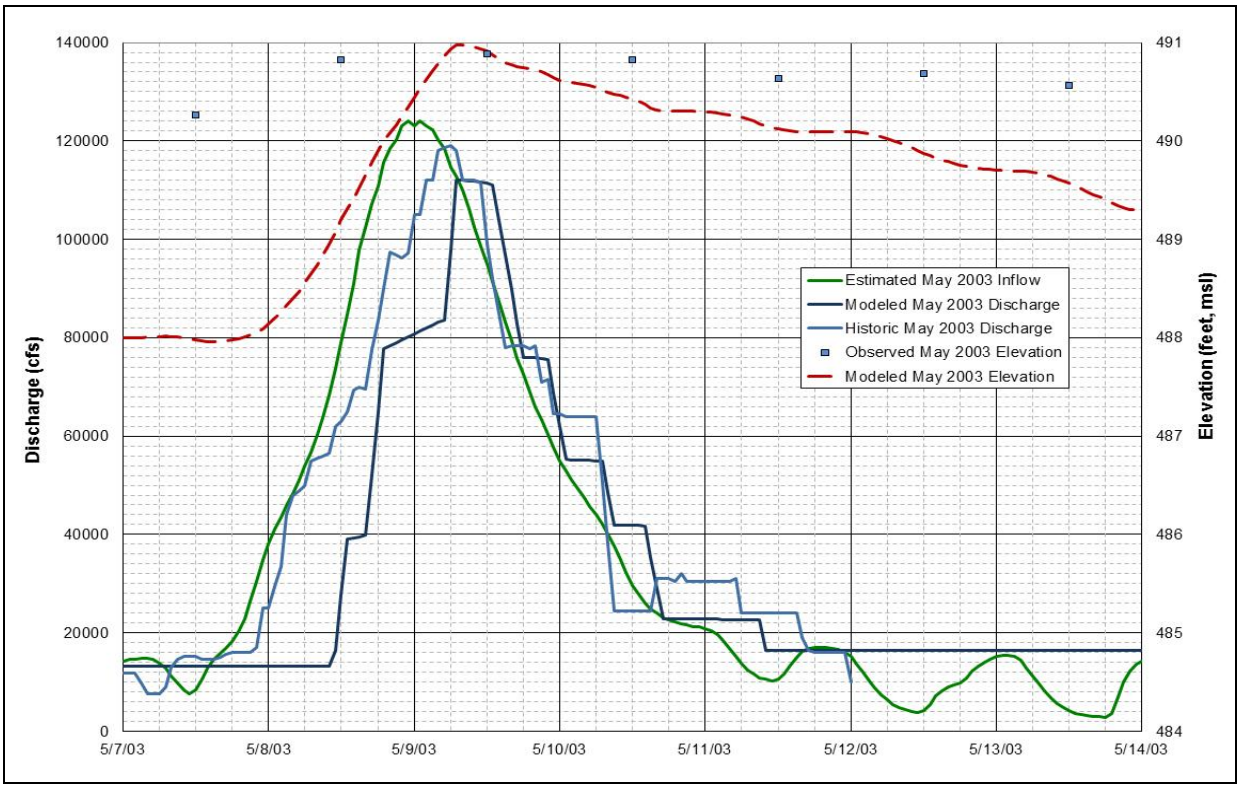

Figure C-2. May 2003 discharge from Martin dam with a reservoir elevation of 488 feet msl, with historical flow and reservoir level data (Source: staff).

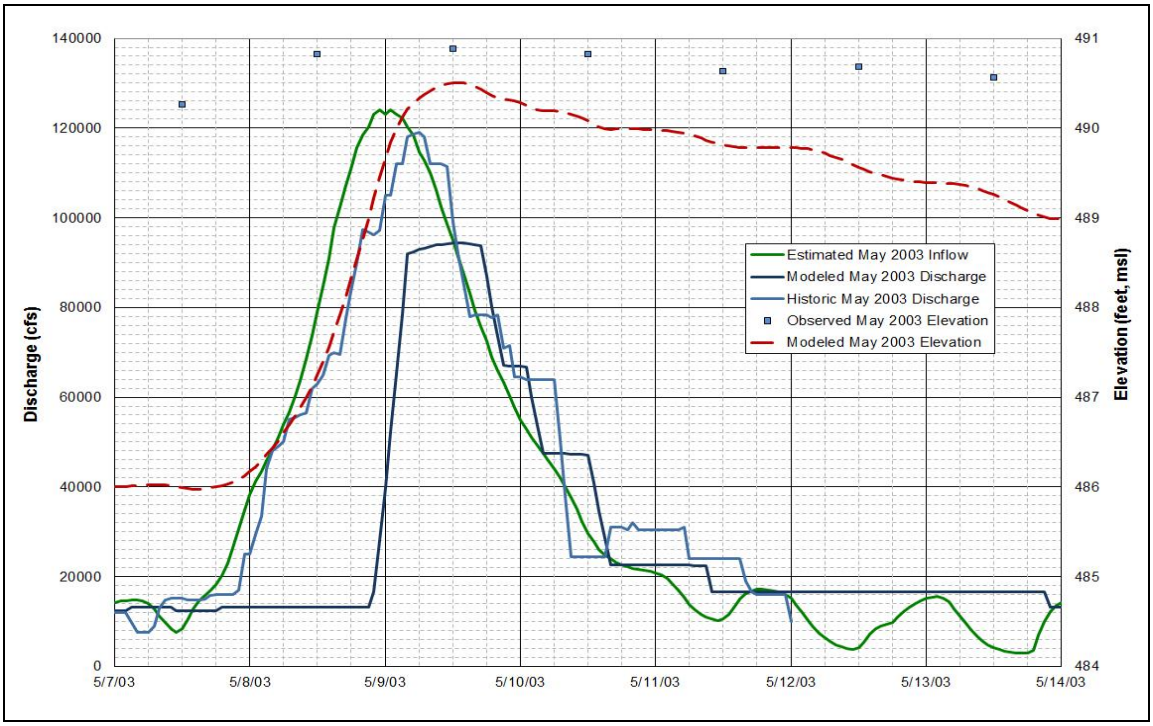

Figure C-3. May 2003 discharge from Martin dam with a reservoir elevation of 486 feet msl, with historical flow and reservoir level data (Source: staff).

5-Year Flood Event

Downstream Landowners presented the May 2003 flood as an example of a frequently occurring flood (i.e., a 4-year flood event) which could have been significantly reduced or avoided had adequate storage been provided in Lake Martin. We estimated that the May 2003 flood had a recurrence interval of between 10 and 25 years. To evaluate more frequent flood events we estimated that the 5-year flood event would be about 67 percent of the observed May 2003 peak inflow at the Horseshoe Bend gage located above Lake Martin, on the basis of the computed 1-day average flow using data as shown in table C-2. This estimated 5-year inflow flood hydrograph was routed through Lake Martin using the Alabama Power spreadsheet reservoir model.

The results for a 5-year inflow flood are displayed in table C-3 and figure C-4. Our analysis shows that a peak inflow rate of 82,000 cfs would be decreased to an outflow of about 78,000 cfs at an initial reservoir elevation of 490.24 feet msl, but would be decreased to an outflow of about 43,000 cfs with an initial reservoir elevation of 488 feet msl. Thus, in this case, assuming no tributary inflows downstream of Martin dam, a 3-foot drawdown would have been adequate to avoid the 5-year flood event.

Table C-2. Calculated flood frequency flows (in cfs) for Martin dam and historical flood flows (in cfs) at Martin dam and the Tallahassee gage (Source: Alabama Power, 2010f; Alabama Power, 2011a; USGS, 2012).

Calculated Unimpaired Flows at Martin Dam								
Average Flow	2-Year	5-Year	10-Year	50-Year	100-Year	500-year	April 1979	March 1990
1-day	48,000	72,000	87,000	118,000	130,000	156,000	114,551	125,019
3-days	NA	NA	66,400	91,400	102,000	125,000	92,446	103,610
5-days	NA	NA	51,800	71,700	80,100	99,600	68,262	78,483
Historical Recorded Flows from Martin Dam								
Average Flow		March 1990	May 2003	July 2003				
1-day		105,884	96,035	59,038				
3-days		75,665	66,522	47,945				
5-days		59,141	47,236	36,200				
Historical Recorded Flows from the Tallahassee Gage								
Average Flow	April 1979	March 1990	May 2003	July 2003				
1-day	110,000	125,000	94,000	68,900				
3-days	76,433	85,667	62,967	51,133				
5-days	59,240	66,940	45,800	39,580				

Table C-3. Comparison of peak flows which would have occurred for a 5-year flood by implementing annual summer/fall drawdowns at Lake Martin.

Lake Martin Elevation (feet msl)	Approximate drawdown May through October (feet)	Peak flow from Martin dam (cfs)
491	0	82,000
490.24	0.7	78,000
488	3	43,000

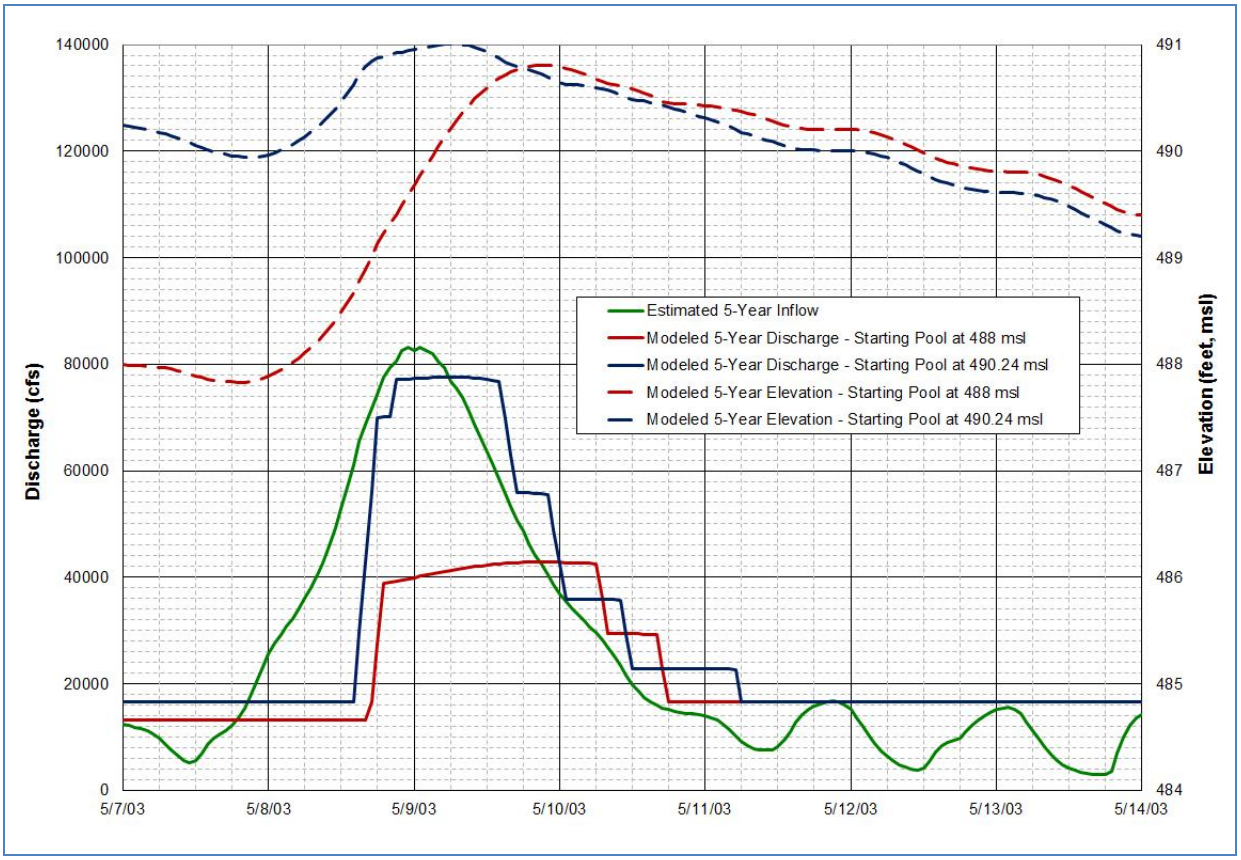

Figure C-4. Modeled 5-year flood discharge from Martin dam (Source: staff).

The discharge hydrographs from our modeled May 2003 flood and 5-year flood described above were then used as input to the upstream boundary of the Lower Tallapoosa HEC-RAS model developed by Alabama Power. The lateral hydrographs

representing inflow from tributaries downstream of Lake Martin remained unchanged for our HEC-RAS modeling as compared to Alabama Power's calibration run for the May 2003 storm. The resulting HEC-RAS profiles for the two modeled scenarios, compared to historic conditions are shown in figures C-5 and C-6. These figures show that peak flood levels along the lower Tallapoosa River would have been about 0.7 to 1.2 feet lower with an initial reservoir elevation of 488 feet msl at the beginning of the May 2003 flood. Similarly, flood levels along the lower Tallapoosa River would have averaged about 2 feet lower with an initial reservoir level of 486 feet msl. HEC-RAS modeling associated with the smaller 5-year flood event with starting reservoir elevation of 488 feet msl, indicated that peak water levels in the lower Tallapoosa River would be 2 to 8 feet lower than what would occur with an initial reservoir elevation of 490.24 feet msl (figure C-7).

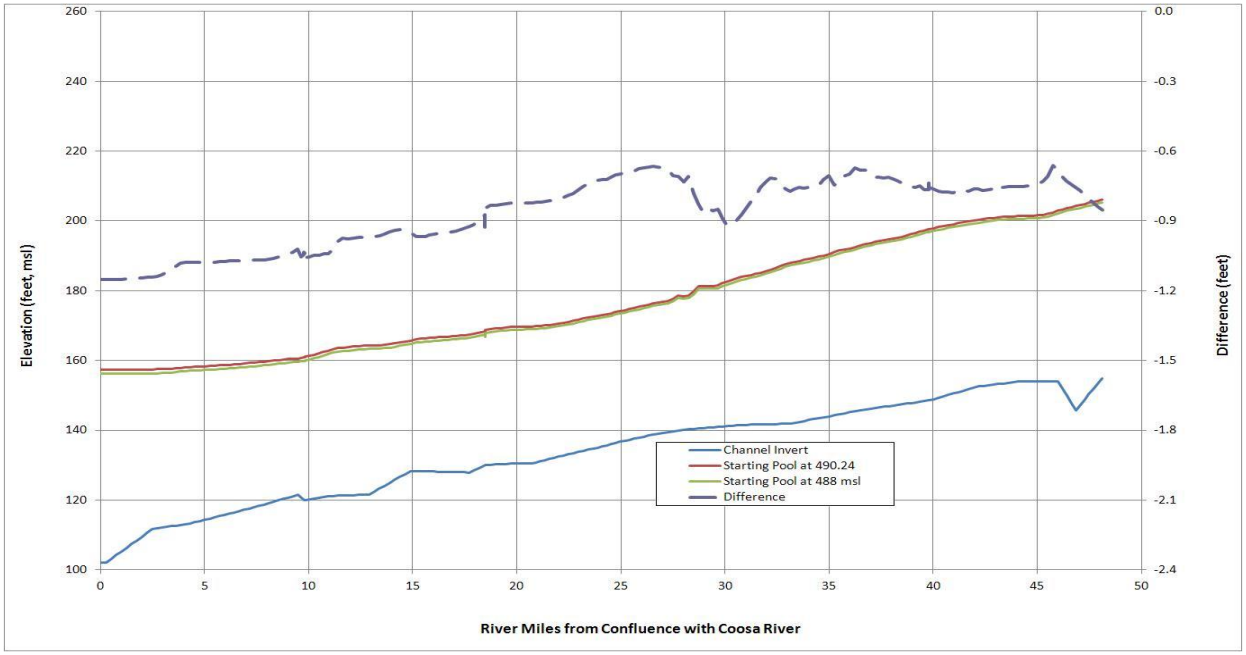

Figure C-5. May 2003 flood profile for the lower Tallapoosa River with a reservoir elevation of 488 feet msl, and difference from historical conditions (starting pool of 490.24 feet msl) (Source: staff).

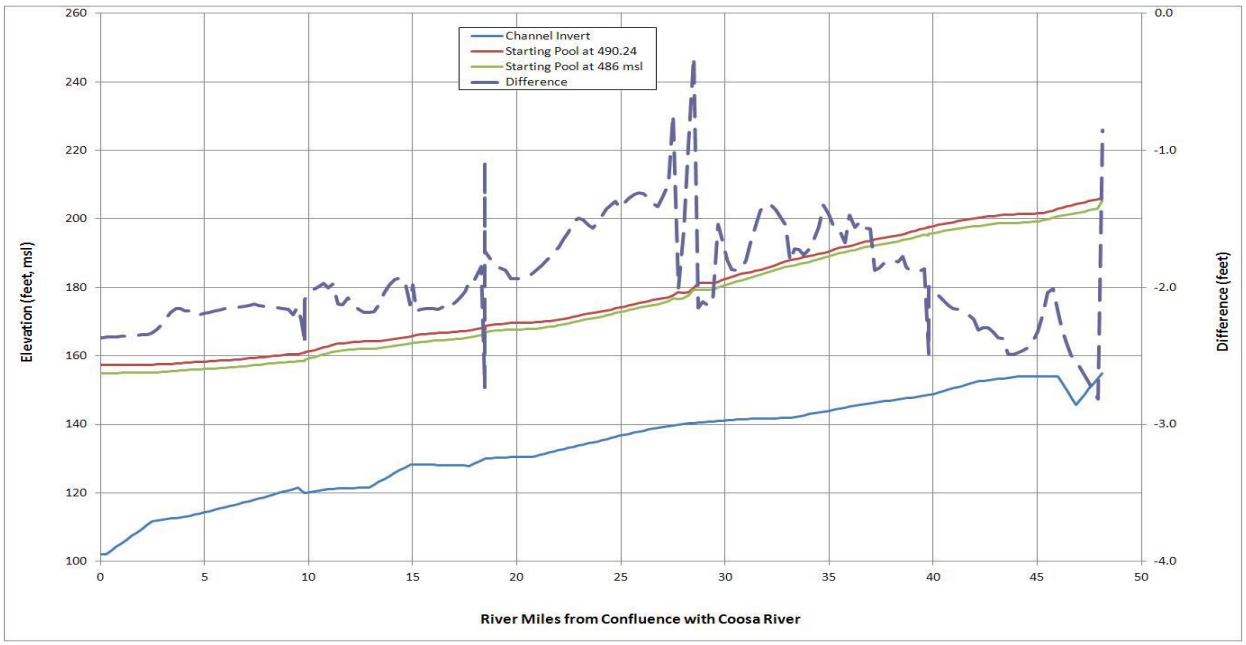

Figure C-6. May 2003 flood profile for the lower Tallapoosa River with a reservoir elevation of 486 feet msl, and difference from historical conditions (starting pool of 490.24 feet msl) (Source: staff).

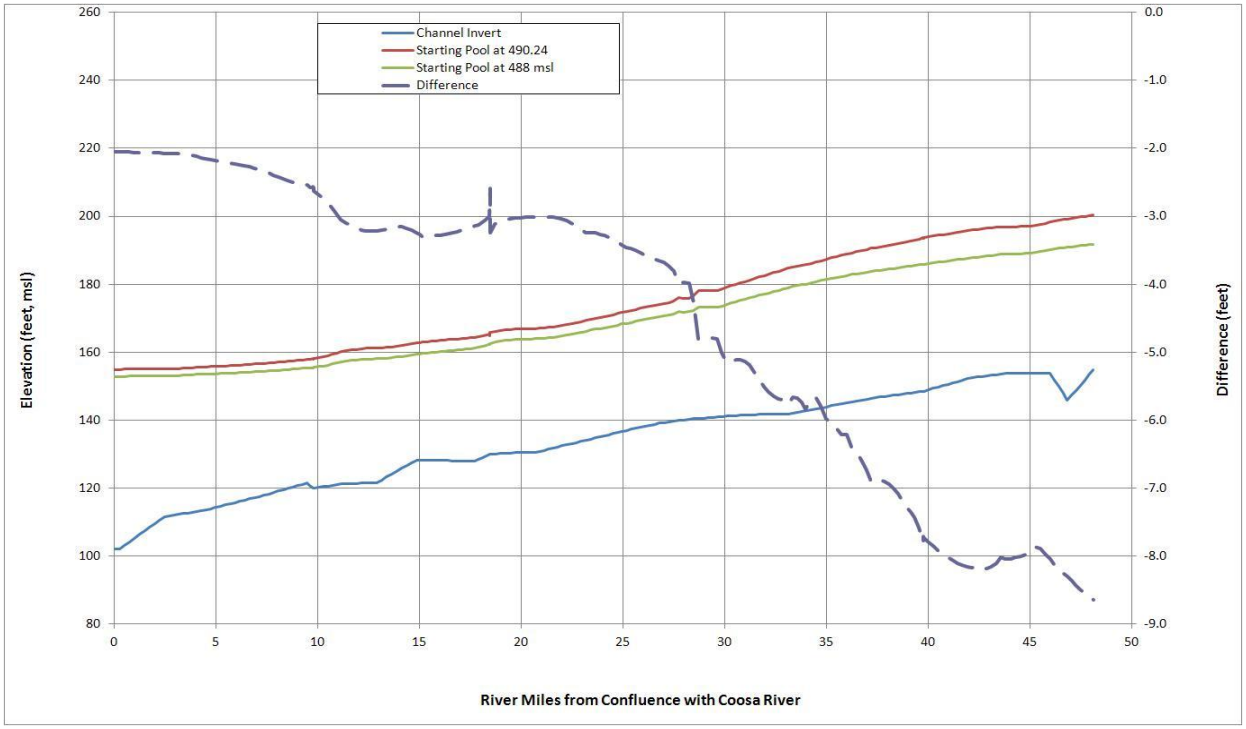

Figure C-7. Five-year flood profile for the lower Tallapoosa River with a reservoir elevation of 488 feet msl, and difference from historical conditions (starting pool of 490.24 feet msl) (Source: staff).

Acres Flooded

We also analyzed the amount of land along the lower Tallapoosa River that would have been flooded in the May 2003 flood under the modeled lower reservoir levels. We used data from Alabama Power's mapping as presented in Study Plan 12(a) Appendix D: Inundation Mapping & Assessment, which we summarize in table C-4.

Table C-4. Estimated downstream acres of land affected by flooding associated with alternative winter pool levels, at the 100-year flood level (Source: Alabama Power, 2010f).

Model Scenario (elev. feet msl)	**Inundated Area (acres)**	**Inundated Area (acres) by Land Use Category**			
		Agricultural	**Industrial**	**Commercial**	**Residential**
481 (existing)	19,924	17,733	448	385	23
482	20,256	18,063	449	385	23
483	20,568	18,354	459	393	25
484 (Alabama Power)	22,043	19,774	478	408	46
485 (Lake Martin RA)	22,500	20,097	491	496	79
486 (Lake Martin HOBO)	23,277	20,752	581	513	94
489	24,353	21,499	607	560	1,230

Table C-5. Comparison of downstream inundation which would have occurred in May, 2003 by implementing annual summer/fall drawdowns at Lake Martin.

Lake Martin Elevation (ft. msl)	Approximate drawdown May through October (ft.)	No. acres inundated by flood (acres)
491	0	NA
490.24	0.7	19,500
488	3	18,880
486	5	17,770
482	9	NA

We calculated (table C-5) that about 19,500 acres of mostly agricultural land were inundated during the May 2003 flood event. Under lower Lake Martin elevations of 488 and 486 feet msl, we estimate that the extent of inundated area in our modeled 2003 flood event would drop to 18,880 and 17,700 acres, respectively. Our modeled water levels for the May 2003 flood, with the three different initial Lake Martin water levels remained below the 100-year flood modeled by Alabama Power, which had an initial Lake Martin elevation of 481 feet msl, and was estimated to affect 18 structures (see table 3-10 in this draft EIS). Because our modeled May 2003 floods were lower than the modeled 100-year flood, fewer structures than 18 would be affected. We were unable, however, to estimate the precise number of structures that could be affected by the smaller floods, with available information.

Generation

We also analyzed the effects of lower Lake Martin water levels of 488 and 486 feet msl, from May 1 until September 1, on generation at the Martin Dam Project by analyzing four representative water years, 2003, 2004, 2005, and 2006 as summarized below in table C-6. As expected, generation was generally reduced due to the lower head. However, in some years (2003 in particular) a lower reservoir level would allow higher river flows to be retained in Lake Martin and then used later (for generation) as the reservoir level was drawn down to return to the modeled elevations of 488 or 486 feet msl. This compares to the current operations where the reservoir level is kept near elevation 490.5 feet msl, with limited ability to retain high-flow events. The ability to capture high-flow events would be more apparent at elevation 486 feet msl than at elevation 488 feet msl.

Our calculations showed that at a summer lake level of 488 feet msl, annual generation at the Martin Dam Project would decrease by an average of 8,800 MWh at a cost of $630,000, for the four years modeled.[75] At a lower summer reservoir elevation of 486 feet msl, annual generation at the project would decrease an average of 8,100 MWh at a cost of about $587,000, for the four years modeled.

The four years modeled include a range of low-to-high water years, thus the average for these years should be characteristic of the level of generation losses which could be expected if annual drawdowns were implemented. However, for the four years analyzed we note a wide range of generation losses, from $150,000 in Water Year 2006

[75] The value of power was calculated using the same assumptions identified in section 4.0, Developmental Analysis, of the draft EIS. The power value includes the energy rate of $72.50/MWh and the dependable capacity rate of $145.50/kilowatt-year.

to $1,421,363 for Water Year 2005. Generation losses could be further refined if a longer period of record were analyzed.

Table C-6. Estimates for generation changes under lower spring and summer Lake Martin water levels (Source: staff).

Water Year & Period Modeled	Historical (MWh)	Modeled 3 ft. Lower Pool (MWh)	Difference	Modeled 5 ft. Lower Pool (MWh)	Difference
Water Year 2003					
10/1/02 – 11/15/02	45,935	42,146	3,789 (loss)	44,396	1,539 (loss)
3/10/03-9/30/03	334,353	325,594	8,759 (loss)	332,071	2,282 (loss)
Net Total			12,548 (loss)		3,821 (loss)
Value			$909,730 (loss)		$277,020 (loss)
Water Year 2004					
10/1/03 – 11/15/03	33,800	32,367	1,433 (loss)	26,773	7,027 (loss)
3/10/04-9/30/04	107,451	106,559	892 (loss)	110,826	3,375 (gain)
Net Total			2,325 (loss)		3,652 (loss)
Value			$168,562 (loss)		$264,770 (loss)
Water Year 2005					
10/1/04 – 11/15/04	48,439	43,701	4,738 (loss)	38,459	9,980 (loss)
3/10/05-9/30/05	289,975	275,108	14,867 (loss)	277,096	12,879 (loss)
Net Total			19,605 (loss)		22,859 (loss)
Value			$1,421,363 (loss)		$1,657,280 (loss)
Water Year 2006					
10/1/05 – 11/15/05	27,197	30,368	3,171 (gain)	24,776	2,421 (loss)
3/10/06-9/30/06	102,485	98,592	3,893 (loss)	102,831	346 (gain)
Net Total			722 (loss)		2,075 (loss)
Value			$52,345 (loss)		$150,440 (loss)

Water Year & Period Modeled	Historical (MWh)	Modeled 3 ft. Lower Pool (MWh)	Difference	Modeled 5 ft. Lower Pool (MWh)	Difference
Average for Water Years 2003-2006					
Average generation loss (MWh/year)			8,800		8,100
Value of energy ($/year)			$638,000		$587,250

Notes: Water Year 2003 was a generally wet year, Water Year 2004 was a slightly dry year, Water Year 2005 was a slightly wet year, and Water Year 2006 was a near average year.

Dependable Capacity

Summer drawdowns could greatly reduce dependable capacity at the Martin Dam Project. Staff did not conduct a detailed analysis of dependable capacity losses because such an analysis would require information for a long-term period of record, which is not readily available. Alabama Power estimates the present dependable capacity for the project is 179,000 kW valued at $26,044,500/year. Annual generation from the project is estimated to be 377,161 MWh valued at $27,344,170; thus, dependable capacity provides about half the power benefit of $53,388,670 for the project. As a rough estimate, average annual generation for the four years analyzed would be reduced by about 2.3 percent for a 3-foot drawdown. A similar reduction in dependable capacity would be about 4,176 kW valued at $607,675/year. Annual losses in generation and dependable capacity would total $1,245,675 for a 3-foot drawdown.

Damages to Downstream Landowners

Staff has no information on the damages associated with a 5-year flood event; however, it can be assumed to be far less than the number reported by the Downstream Landowners for 2003, which staff estimated more likely represents the 10-25 year storm event. The Downstream Landowners stated the losses due to flooding in 2003 were about 2.1 million dollars. The Downstream Landowners estimate is based on a survey of landowners in which 11 landowners responded (table C-7).

It is important to note that the stated losses were for both the May and July 2003 floods; thus it is not possible to distinguish the percentage of losses attributed to the May 2003 flood which was analyzed by staff. In addition, the losses were a combination of crop losses (estimated at $1,569,428) and other losses (river bank repairs estimated at $545,091). Assuming a flood such as the one in May 2003 occurs about every 10 years, the $2.1-million loss reported by the Downstream Landowners would be equivalent to a loss of about $210,000 per year.

Table C-7. Downstream Landowner Losses in 2003, May and July Floods.

	Crop Losses	Additional Production	Other (River Bank Repairs)	Total
	92338	0	362600	454938
	37439	10768	0	48207
	336046	0	50500	386546
	50700	10400	30000	91100
	172482	2880	0	175362
	85020	0	0	85020
	362160	15793	79941	457894
	37076	3539	1350	41965
	17964	6728	20700	45392
	270457	0	0	270457
	107746	0	0	107746
Total	$1,569,428.00	$50,108.00	$545,091.00	$2,164,627.00

Downstream Minimum Flows, Drought Operations

Lower reservoir elevations in the summer can affect the ability of the project to provide minimum flows, especially during drought years. Currently, the Martin Dam Project operates to maintain a 1,200-cfs minimum flow as measured below Thurlow dam. In Lake Martin, every foot of storage represents about 40,000 acre-feet, or enough water to supply 1,200 cfs for about 17 days. Thus, a 3-foot drawdown would be equivalent to about 51 days of providing a 1,200-cfs minimum flow. A 5-foot drawdown would be equivalent to about 85 days of providing a 1,200-cfs minimum flow.

Lower reservoir elevations in the summer increase the likelihood of triggering drought operations. Staff notes that drought operations have occurred infrequently on Lake Martin; however, had the lake been maintained at elevation 488.0 feet in 2000

(i.e., providing 3 feet of storage), with historical releases the reservoir would have dropped enough to trigger drought operations by July of that year.