



WALLACE DAM



Proposed Study Plan

Wallace Dam Hydroelectric Project FERC Project Number 2413

Prepared with:

Southern Company Generation Hydro Services

and



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ACRONYMS AND ABBREVIATIONS

APE	Area of potential effect
CFR	Code of Federal Regulations
Commission	Federal Energy Regulatory Commission
DO	dissolved oxygen
EPA	U.S. Environmental Protection Agency
FERC	Federal Energy Regulatory Commission
FS	U.S. Forest Service
ft	feet
FWS	U.S. Fish and Wildlife Service
GDNR	Georgia Department of Natural Resource
GEPD	Georgia Environmental Protection Division
Georgia Power	Georgia Power Company
GPS	Global Positioning System
HPD	Historic Preservation Division
HPMP	Historic Properties Management Plan
HUC	Hydrologic Unit Code
Hwy	Highway
I-20	Interstate 20
ILP	Integrated Licensing Process
mg/L	milligrams per liter
National Register	National Register of Historic Places
NEPA	National Environmental Policy Act
NF	National Forest
NTU	Nephelometric turbidity units
NWI	National Wetlands Inventory
PAD	Pre-Application Document
PD	plant datum
PLP	Preliminary Licensing Proposal
PSP	Proposed Study Plan
ROW	right-of-way
RTE	rare, threatened, and endangered
SCORP	State Comprehensive Outdoor Recreation Plan
SD1	Scoping Document 1

SWAP	State Wildlife Action Plan
USACE	U.S. Army Corps of Engineers
WMA	Wildlife Management Area
WRD	Wildlife Resources Division

1.0 INTRODUCTION

Georgia Power Company (Georgia Power) is filing with the Federal Energy Regulatory Commission (FERC or Commission) a Proposed Study Plan (PSP) as part of the relicensing of the existing 321.3-megawatt Wallace Dam Hydroelectric Project (FERC No. 2413) (Wallace Dam Project, the Project). The Wallace Dam Project is a pumped storage project consisting of Wallace Dam, a powerhouse, and Lake Oconee and is located on the Oconee River in Hancock, Putnam, Greene, and Morgan Counties, Georgia (Figure 1-1). The Wallace Dam Project operates using Lake Oconee as the upper reservoir. Lake Sinclair, located immediately downstream, serves as the lower reservoir and is operated by Georgia Power as the separately licensed Sinclair Hydroelectric Project (Sinclair Project) (FERC No. 1951). Georgia Power is not proposing to add capacity or make any major modifications to the Wallace Dam Project under the new license. Georgia Power is requesting removal of the transmission line from the Project. The Project occupies about 370 acres of U.S. Forest Service (FS) lands within the Oconee National Forest (NF), and which also abuts Lake Oconee's northernmost reaches. The current license expires May 31, 2020.

Pursuant to FERC's Integrated Licensing Process (ILP) (18 Code of Federal Regulations [CFR] Part 5), Georgia Power filed its Pre-Application Document (PAD) with FERC on February 18, 2015. The PAD describes the existing facilities and current operation of the Wallace Dam Project; characterizes the affected environment and potential resource impacts of continued operation; and sets forth a Process Plan and Schedule for all pre-application activities and stakeholder participation. In addition, the PAD lists the resource studies proposed by Georgia Power for further detailed development in this PSP. The PAD is available on Georgia Power's Wallace Dam Relicensing Website at:

<http://www.georgiapower.com/about-energy/energy-sources/hydro-power/hydro-projects/wallace/home.cshtml>

FERC issued Scoping Document 1 (SD1) on April 17, 2015, and held National Environmental Policy Act (NEPA) scoping meetings and a site visit on May 19-20, 2015. Relicensing stakeholders subsequently filed their comments on the PAD and SD1, as well as study requests, by June 19, 2015. FERC requires that any study requests address the content criteria established at 18 CFR § 5.9(b).

This PSP is being filed with FERC for review and comment by relicensing stakeholders, who have until October 26, 2015, to file their comments. During the 90-day comment period, Georgia Power will consult with the resource agencies and other participants in Study Plan Meetings to be held on August 25 and 26, 2015 (see below). The goal of these meetings will be to discuss information gathering needs and informally resolve any differences between the PSP and the study requests and study request modifications filed by stakeholders. After the

PSP comment period, Georgia Power will file a Revised Study Plan for FERC approval by November 24, 2015.

1.1 Content of Proposed Study Plan

With respect to each proposed study, this PSP provides the following information as required at 18 CFR § 5.11 (b):

- A detailed description of the study and the methodology to be used.
- A schedule for conducting the study.
- Provisions for a progress report, to be filed by Georgia Power by August 31, 2016.
- If a requested study was not adopted, an explanation of why, with reference to the study request criteria at 18 CFR § 5.9(b).

Additionally, as required by 18 CFR § 5.11(c) and reference therein to § 5.15, Georgia Power has made provisions for the Study Reports and Study Results Meetings as discussed below in the master schedule for study implementation.

1.2 Document Organization

Study Plans for each of seven resource areas are provided in Sections 2 through 8. Each Study Plan follows the content requirements at 18 CFR § 5.11(d), including goals and objectives, study background, study area, methodology, reporting, and schedule. They are:

- **Section 2** – Geology and Soils
- **Section 3** – Water Resources
- **Section 4** – Fish and Aquatic Resources
- **Section 5** – Terrestrial Resources (wildlife and botanical resources, as well as wetlands, riparian, and littoral habitats)
- **Section 6** – Rare, Threatened, and Endangered Species
- **Section 7** – Recreation and Land Use
- **Section 8** – Cultural Resources

1.3 Study Plan Meetings

In accordance with 18 CFR § 5.11(e), Georgia Power will hold Study Plan Meetings on August 25 and 26, 2015. The purposes of these meetings will be to clarify Georgia Power's PSP and stakeholders' study requests and to work together to informally resolve any outstanding issues with respect to the PSP. Georgia Power will incorporate these efforts into the Revised Study Plan. The meetings will be held as follows:

Tuesday, August 25, 2015 (Day 1)

- Time: 10:00 am to 5:00 pm Eastern Daylight Time
- Location: Rock Eagle 4-H Center, Sutton Hall
350 Rock Eagle Road
Eatonton, Georgia 31024
(706) 484-2868
- Resource Areas: Fish and Aquatic Resources
Water Resources
Recreation and Land Use

Wednesday, August 26, 2015 (Day 2)

- Time: 10:00 am to 5:00 pm Eastern Daylight Time
- Location: Rock Eagle 4-H Center (same as above)
- Resource Areas: Rare, Threatened, and Endangered Species
Terrestrial Resources (wildlife, botanical, wetlands)
Geology and Soils
Cultural Resources

1.4 Master Schedule for Study Implementation

The master schedule in Table 1-1 provides the estimated start and completion dates of all proposed field studies, deadlines for filing Progress Reports and Study Reports, and the dates for Study Results Meetings. All proposed field work will be completed during the 2016 study season. Progress Reports for each resource will be filed as a complete package by August 31, 2016, and Initial Study Reports will be filed as a complete package by November 18, 2016.

Because Georgia Power proposes that field studies be completed in 2016, the Progress Reports will be prepared at the level of detail of an Initial Study Report as described at

18 CFR § 5.15(c). The Progress Reports will describe overall progress in completing the study activities, summarize preliminary findings as available, and explain any variance from the FERC-approved Study Plan and schedule.

Since the Initial Study Reports will be completed within 1 year of FERC's Study Plan determination (December 24, 2015), they will be considered final study reports unless, as a result of stakeholder study review and the Study Results Meetings, FERC determines that modifications to the Study Plan are necessary. Updated Study Reports are not shown in the master schedule and would be prepared for the applicable studies only if a second season of field studies were to become necessary.

Georgia Power will communicate with all participants by e-mail, mail, or other available electronic means to ensure the distribution of the Progress Reports and Study Reports in a timely and efficient manner. Upon filing with FERC, the Progress Reports and Study Reports will be made available electronically for stakeholder review on the Internet at both FERC's website (using the eLibrary feature) and Georgia Power's Wallace Dam Relicensing Website:

<http://www.ferc.gov/docs-filing/elibrary.asp>

<http://www.georgiapower.com/about-energy/energy-sources/hydro-power/hydro-projects/wallace/home.cshtml>

TABLE 1-1
Master Schedule for Study Implementation for the Wallace Dam Project

Activity	Start Date	Completion Date or Deadline
Conduct Field Studies		
<i>Geology and Soils</i>	June 1, 2016	September 30, 2016
<i>Water Resources</i>	October 1, 2015	September 30, 2016
<i>Fish and Aquatic Resources</i>	March 1, 2016	September 30, 2016
<i>Terrestrial Resources</i>	April 1, 2016	September 30, 2016
<i>Rare, Threatened, and Endangered Species</i>	March 1, 2016	September 30, 2016
<i>Recreation and Land Use</i>	March 1, 2016	September 30, 2016
<i>Cultural Resources</i>	April 1, 2016	September 30, 2016
File Progress Reports (All Studies)	NA	August 31, 2016
File Final Study Reports (All Studies)	NA	November 18, 2016
Hold Study Results Meetings	December 5, 2016	December 6, 2016
File Study Results Meeting Summary	NA	December 21, 2016
Stakeholders File any Study Results Meeting Summary	NA	January 20, 2017

TABLE 1-1
Master Schedule for Study Implementation for the Wallace Dam Project

Activity	Start Date	Completion Date or Deadline
Disagreements and/or Modified or New Study Requests		
File Response to any Study Results Meeting Summary	NA	February 20, 2017
Disagreements and/or Modified or New Study Requests		
FERC Resolves any Disagreements (and Modifies Study Plans if Necessary)	NA	March 22, 2017

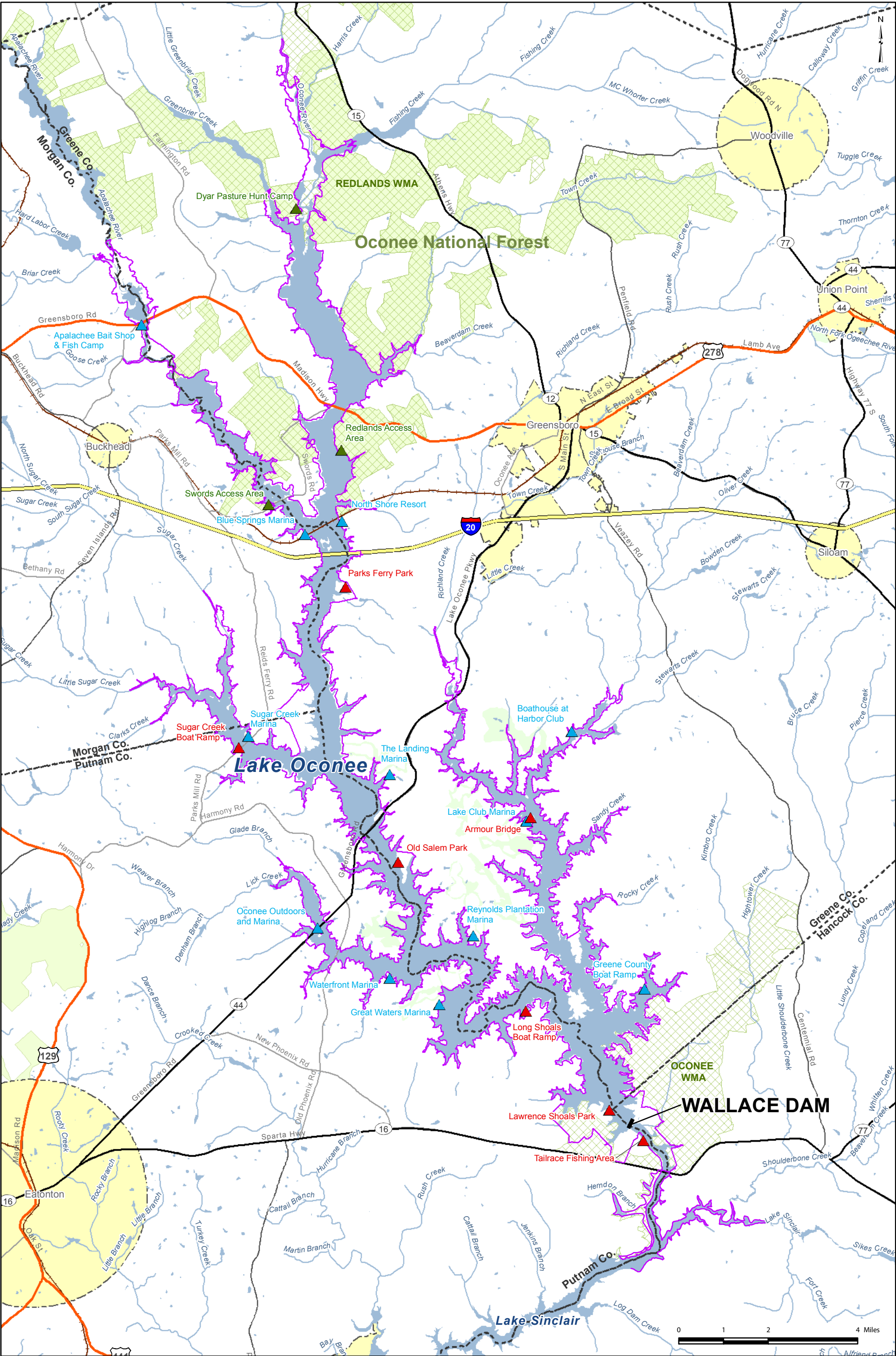
NA = not applicable.

1.5 Relationship of the Resource Studies to the License Application

Each resource study will culminate in the preparation of a Study Report (Table 1-1), which will develop information sufficient for characterizing the existing environment and evaluating the potential impacts of continued project operations in Georgia Power's Preliminary Licensing Proposal (PLP) and subsequent license application. The findings of the studies will be incorporated into the PLP, which will be filed by November 21, 2017, and made available for public comment (18 CFR § 5.16). The PLP will provide a draft environmental analysis by resource area of the impacts of the proposed action using the findings of the studies and will propose measures for the purpose of protecting, mitigating impacts to, or enhancing resources affected by the Project.

Based on comments on the PLP filed by stakeholders, Georgia Power will revise and incorporate the PLP into the license application as Exhibit E (18 CFR § 5.18). The license application will be filed by May 31, 2018. Exhibit E will include evaluation of reasonable and feasible alternatives to the proposed action, address cumulative impacts, and include measures as appropriate for enhancing environmental resources affected by the project proposal.

Under the ILP, FERC's NEPA document, which is also issued for public comment, will include FERC's determination regarding reasonable and feasible alternatives and cumulative impacts as part of its NEPA analysis.



Interstate Highway

U.S. Highway

State Highway

Major Roads

Local Streets

Railroads (Local)

Dam

Rivers/Creeks

Lake

Project Boundary

Towns/Cities

County Boundary

State Managed Lands

National Park or Forest

Golf Course

Recreation Access Point

Forest Service

Public/Private

Georgia Power

GEORGIA POWER

A SOUTHERN COMPANY

Geosyntec

consultants

Figure 1-1

Project Boundary and Surrounding Area

Wallace Dam Project

(FERC No. 2413)

2.0 GEOLOGY AND SOILS

2.1 Introduction

Georgia Power proposes to conduct a study characterizing existing erosion and sedimentation conditions within the Wallace Dam project boundary and evaluating the potential impacts of continued project operation and project-related recreation on erosion and sedimentation in the project area. This will be accomplished through a combination of a shoreline survey within the project boundary and review of existing information and data to analyze erosion and sedimentation as well as the effects of shoreline structural stabilization practices on littoral-zone aquatic habitats.

2.2 Goals and Objectives

The goal of this study is to develop information for: (1) characterizing existing shoreline conditions with respect to erosion and sedimentation in Lake Oconee and the Wallace Dam tailrace and (2) evaluating the Geology and Soils resource issues identified during FERC's public scoping process pursuant to NEPA that have a nexus with project operations.

The specific objective of the study is to characterize the distribution and sources of erosion and sedimentation within the FERC project boundary based on a shoreline field reconnaissance survey and review and analysis of existing information.

2.3 Study Background

This study will develop information needed to evaluate potential impacts of continued project operation in the PLP and license application in consideration of: (1) the geology and soils resource issues identified during NEPA scoping; (2) the studies and study modifications requested by resource agencies; (3) the known resource management goals of the agencies with jurisdiction over resources related to geology and soils; (4) existing information available for the Oconee River as summarized in the PAD; and (5) the requirement that there be a nexus between project operations and effects on the resources being evaluated.

2.3.1 Issues Identified

The Commission identified in SD1 the following resource issue pertaining to geologic and soils resources:

- Effects of continued project operation and project-related recreation on reservoir and tailrace shoreline erosion and sedimentation.

2.3.2 Study Requests

Georgia Power proposed in the PAD (Section 5.2.1, Preliminary Studies List) to conduct a study to characterize the distribution and sources of erosion and sedimentation within the project boundary, based on a shoreline field reconnaissance survey, as well as review and analysis of existing information and aerial photography. A shoreline survey would be conducted within the project boundary, including a shoreline aquatic habitat survey, and a literature review and analysis would be conducted on the effects of shoreline stabilization structures on littoral-zone aquatic habitat.

SD1 listed the proposed study as Study No. 1, Geology and Soils, with the shoreline habitat survey element of the proposed study listed separately as Study No. 3, Fish and Aquatic Resources. Georgia Power proposes to include the shoreline aquatic habitat survey as part of this Geology and Soils Study because the survey will be conducted concurrently with the reconnaissance survey for erosion and sedimentation (using the same field data form) and will be integral to the analysis of shoreline conditions and the effects of continued project operations and project-related recreation. The findings of the aquatic habitat survey portion of the field reconnaissance survey also will be cross-referenced in the Fish and Aquatic Resources Study as appropriate (Section 4.0).

In its PAD and SD1 comments letter dated June 15, 2015, the Georgia Department of Natural Resources (GDNR) Wildlife Resources Division (WRD) requested that additional objectives be incorporated into the shoreline habitat survey (Fish and Aquatic Resources Study No. 3). These include providing maps and information on the proportion of developed and undisturbed shoreline areas in the project reservoir and incorporating a literature review on the effects of shoreline development on sport fish species such as largemouth bass, black crappie, and sunfish.

Georgia Power proposes to survey shoreline aquatic habitat using a stratified random selection of sites to develop information on the proportions of natural versus modified shoreline with respect to vegetative buffer zone condition, bank stability and vegetative protection, proportions of shoreline with structural stabilization practices, potential causes of shoreline erosion/sedimentation and whether or not they are project-related, and sources of littoral-zone fish cover and habitat. As requested by WRD, the study will also provide a literature review on the relationship between shoreline structural stabilization practices and littoral-zone fish habitat.

2.3.3 Resource Management Goals

GDNR and the U.S. Fish and Wildlife Service (FWS) are the primary state and federal resource agencies having jurisdiction along the Oconee River pertaining to the protection of land and water resources. Relevant resource management goals of these agencies generally

include the maintenance and protection of native shoreline vegetation, water quality and littoral-zone habitats for fish and aquatic species.

2.3.4 Existing Information

The Wallace Dam Project is located in the Southern Outer Piedmont ecoregion. This ecoregion is characterized by low hills, major forest types of loblolly-shortleaf pine, underlying rocks of gneiss, schist and granite, fine sandy loam soils, and a deep, red clayey subsoil. The Lake Oconee shoreline is characterized by gently sloping topography in most areas. Rock outcroppings occur along the shoreline in several areas, particularly in the lower end of the reservoir around the confluence of the Oconee River and Richland Creek. Significant stretches of undeveloped, forested shoreline occur in the lower end of the reservoir in association with Georgia Power's Lawrence Shoals Park, which includes an area with a moderately sloping granite outcrop above the shoreline, Oconee WMA, and other areas reserved as natural areas or future recreation development. Natural vegetative shoreline cover is prevalent in many areas throughout the reservoir, including adjacent tracts of the Oconee NF in the upper end of the reservoir. Much of the shoreline in the more developed central and southern portions of Lake Oconee has shoreline stabilization structures in place, which may include riprap, a seawall, or a seawall with riprap at the base.

The vast majority of shorelines around Lake Oconee and in the Wallace Dam tailrace area exhibit low potential for erosion or other forms of instability due to a high degree of vegetative cover and/or the use of shoreline structural stabilization practices. Sites with the greatest potential for active shoreline erosion typically include public recreation access sites where shoreline activity may contribute to localized bank instability, and small undeveloped islands within the reservoir susceptible to wave action from boats.

2.3.5 Nexus between Project Operations and Effects

Georgia Power operates the Wallace Dam Project as a pumped storage development. Lake Oconee is normally operated between elevations 433.5 and 435 feet (ft) plant datum (PD),¹ with average daily fluctuations of about 1.5 ft. Wallace Dam releases water downstream during peak power demand hours and pumps water back up into Lake Oconee at night for reuse in the next day's generation cycle. Wallace Dam discharges directly into the backwaters of Lake Sinclair, with no intervening riverine reach or bypassed reach.

The FERC project boundary encompasses the normal full pool elevation of Lake Oconee and a fee-simple strip of land owned by Georgia Power around the entire shoreline. The shoreline strip is generally 25-ft wide, with the exception of lands comprising the Oconee NF, and

¹ Plant datum = mean sea level (NAVD88) – 0.20 feet (+/- 0.01 feet).

expands to widths of 100 to 200 ft across the reservoir from certain recreation areas. Larger land parcels define the project boundary in areas of the project works, Georgia Power's public recreation facilities, and other areas reserved for recreation development. The project boundary extends downstream of Wallace Dam about 4.0 river miles as thin strips of land along each side of the narrow upper reach of Lake Sinclair (Figure 1-1).

2.4 Study Area

For the purposes of the Geology and Soils Study, the proposed shoreline survey area includes the FERC project boundary around Lake Oconee and the tailrace area downstream of Wallace Dam. Literature review and analysis of existing information and data will extend to adjacent lands and watersheds upstream of the project boundary.

2.5 Methodology

Georgia Power's proposed approach for completing the Geology and Soils Study consists of the following study elements.

2.5.1 Shoreline Reconnaissance Survey

A single shoreline reconnaissance survey of Lake Oconee and the Wallace Dam tailrace area will be conducted in 2016 to inventory and characterize existing sources of erosion and sedimentation within the project boundary and to characterize physical aquatic habitat and available sources of littoral-zone cover for fish. Representative shoreline sites within the project boundary will be selected and visually evaluated in the field as described below.

Site Selection

A geographic information system shapefile will be prepared defining 500-ft shoreline segments for the entire project reservoir and tailrace area within the project boundary. The study area will be partitioned into five sections (Figure 2-1) for stratified random selection of 500-ft shoreline segments for the reconnaissance survey as follows:

- Upper reservoir (UR) – the upstream portion of Lake Oconee north of Interstate 20 (I-20), including the Oconee River and Apalachee River embayments.
- Middle reservoir (MR) – the middle portion of Lake Oconee on the mainstem river between Georgia Highway (Hwy) 44 and I-20, and including the Sugar Creek embayment.
- Richland Creek (RC) – the Richland Creek embayment of Lake Oconee in the downstream eastern portion of the reservoir.

- Lower reservoir (LR) – the downstream portion of Lake Oconee on the mainstem river from Wallace Dam upstream to the Georgia Hwy 44 bridge and including the Lick Creek embayment.
- Tailrace Area (TR) – the Wallace Dam tailrace area extending downstream to the Georgia Hwy 16 bridge.

A total of 106 shoreline segments, or sites, will be selected for the reconnaissance survey. First, sites will be selected at all seven project recreation sites, including six on Lake Oconee (Armour Bridge, Lawrence Shoals Park, Long Shoals Boat Ramp, Old Salem Park, Parks Ferry Park, and Sugar Creek Boat Ramp) and one in the tailrace area (Tailrace Fishing Area). In addition, a site will be selected in the tailrace area along the shoreline next to Pond 2, a waterfowl impoundment in the Oconee Wildlife Management Area (WMA) identified by WRD (PAD, Appendix B) as exhibiting active streambank erosion of the dike creating the impoundment. Next, sites will be randomly selected to include 25 total sites in each of the four sections of the reservoir (LR, RC, MR, and UR) and six sites in the tailrace area, three on each side of the river.

The geographic coordinates of the midpoint of each selected shoreline site will be determined and tabulated and mapped in the study report.

Field Survey

The shoreline survey will consist of visual observation and assessment of each shoreline segment in summer 2016 during dry weather and normal project operating conditions. The assessment sites will be surveyed from a boat.

Survey teams of at least three investigators each will complete the visual shoreline assessment using the field data form provided in Figure 2-2. The teams will be led by boat captains from Georgia Power's Oconee/Sinclair Land Management Office who have extensive familiarity with Lake Oconee. At each site, the survey team will inventory and rate the following shoreline attributes:

- Vegetative buffer zone condition;
- Adjacent land uses;
- Bank stability and vegetative protection;
- Shoreline structural stabilization practices (e.g., seawalls, riprap);
- Potential causes of erosion (project related and non-project related); and

- Sources of littoral-zone fish cover.

These shoreline attributes will be discussed and jointly rated by the survey team. The inventory of shoreline structural stabilization structures in place will include visual estimates of the proportional length of seawalls, riprap, a combination of seawalls with riprap at the base, and any other forms of non-vegetated armoring. Proportional length of the various sources of fish cover/habitat available will also be visually estimated for each site. Documentation will include digital photographs of representative shorelines, including any active erosion problem areas as well as least-disturbed shoreline conditions.

The visual assessment protocol (Figure 2-2) has been customized for use on this project. Similar visual habitat and waterbody assessment protocols are widely used by water resource agencies, including the U.S. Environmental Protection Agency (EPA) (Barbour et al., 1999; EPA, 2002), GDNr (2007), and Natural Resources Conservation Service (1998), to evaluate the condition of freshwater ecosystems. Thus, the proposed survey methodology is generally consistent with accepted practice in the scientific community.

2.5.2 Analysis of Existing Information and Data

The effects of continued project operation on shoreline erosion and sedimentation within the project boundary will be evaluated using: (1) findings of the shoreline reconnaissance survey; (2) aerial photography review of temporal change occurring at sites with documented active erosion problems; and (3) operational data characterizing Wallace Dam daily maximum and minimum reservoir fluctuations during normal, dry, and wet inflow periods.

The results of the shoreline survey will be presented in a variety of tables and graphs and will include photographs of representative survey sites. The shoreline survey will document current active erosion problem areas and their potential causes. Aerial photography review of these sites may reveal trends in erosion and sedimentation patterns related to various shoreline uses and help to determine whether the condition is project related, non-project related, or a combination of both. The survey results will also be used to characterize current shoreline and littoral-zone habitat conditions for fish and other aquatic organisms.

In addition, a literature review will be conducted on shoreline structural modifications associated with shoreline development, including seawalls/bulkheads, rock riprap, and combinations of seawalls with riprap at the base, and their effects on littoral-zone aquatic habitats as reflected in fish species composition, diversity, and abundance. The literature review will include studies conducted at southeastern hydropower reservoirs in North and South Carolina (Barwick, 2004) and Alabama (Purcell et al., 2010), and other relevant scientific literature dealing with shoreline structural stabilization practices.

2.6 Reporting

In accordance with 18 CFR § 5.15(b), a Geology and Soils Study Progress Report will be prepared and provided to participants prior to the completion of the study. The progress report will describe overall progress in completing the proposed shoreline reconnaissance survey, summarize preliminary findings as available, and explain any variance from the study plan and schedule.

In accordance with 18 CFR § 5.15(c)(1), a Geology and Soils Study Report will be prepared and provided to participants for review and comment at the conclusion of the study. The study report will compile the data gathered from the shoreline survey and present the analyses developed through the use of existing information and data.

2.7 Schedule

In accordance with the Wallace Dam Process Plan and Schedule and the master schedule provided in Section 1.4, the Geology and Soils Study will be completed according to the milestones listed in Table 2-1 below.

TABLE 2-1
Schedule for Conducting the Geology and Soils Study

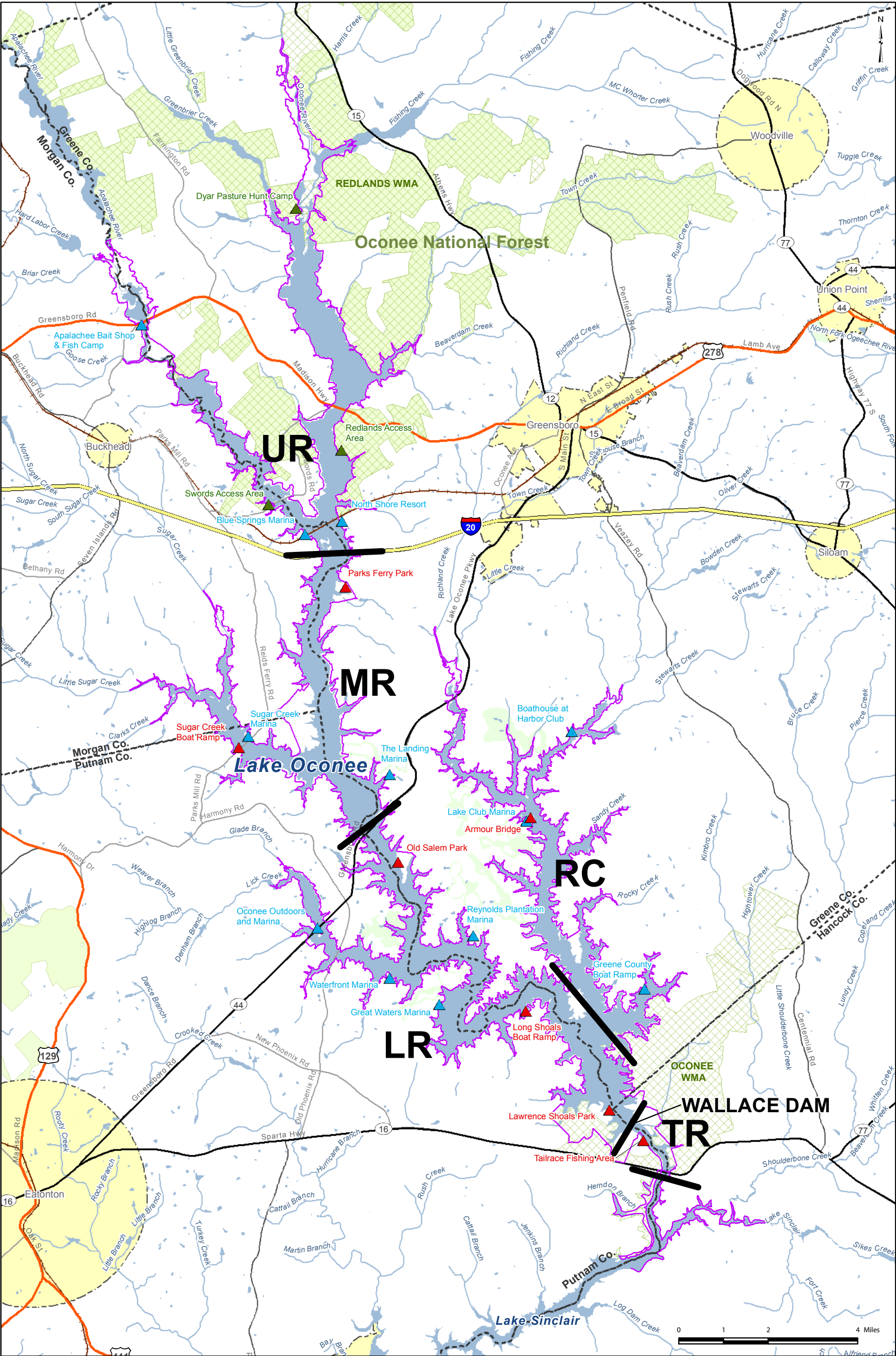
Activity	Deadline
Begin Field Studies and Literature-Based Review	June 1, 2016
File Progress Report	August 31, 2016
Complete Field Studies and Literature-Based Review	September 30, 2016
File Final Study Report	November 18, 2016

2.8 References

Barbour, M. T., J. Gerritsen, B. D. Snyder, and J. B. Stribling. 1999. Rapid bioassessment protocols for use in streams and Wadeable rivers: periphyton, benthic macroinvertebrates and fish, second edition. EPA 841-B-99-002. U.S. Environmental Protection Agency, Office of Water, Washington, D.C.

Barwick, D. H. 2004. Species richness and centrarchid abundance in littoral habitats of three southern U.S. reservoirs. North American Journal of Fisheries Management 24:76-81.

- Georgia Department of Natural Resources. 2007. Standard operating procedures, macroinvertebrate biological assessment of wadeable streams in Georgia. Environmental Protection Division, Watershed Protection Branch. Version 1.0.
- Natural Resources Conservation Service. 1998. Stream visual assessment protocol. U.S. Department of Agriculture. National Water and Climate Center Technical Note 99-1. December 1998.
- Purcell, T.R., D.R. DeVries, and R.A. Wright. 2010. The relationship between shoreline development and resident fish communities in Lake Martin, Alabama. Submitted to Alabama Power Company, December 1, 2010.
- U.S. Environmental Protection Agency. 2002. Environmental monitoring and assessment program (EMAP) research strategy. EPA 620/R-02/002. Office of Research and Development, National Health and Environmental Effects Research Laboratory, Research Triangle Park, North Carolina.



Interstate Highway

U.S. Highway

State Highway

Major Roads

Local Streets

Railroads (Local)

Dam

Rivers/Creeks

Lake

Project Boundary

Towns/Cities

County Boundary

State Managed Lands

National Park or Forest

Golf Course

Forest Service

Public/Private

Georgia Power

GEORGIA POWER

A SOUTHERN COMPANY

Geosyntec

consultants

Figure 2-1

Study Area Sections for Shoreline Survey

Wallace Dam Project

(FERC No. 2413)

Figure 2-2. Shoreline Reconnaissance Survey Form – Wallace Dam Project (FERC No. 2413)

Georgia Power Company

Site ID No.:		Date:	Time:
Waterbody: ___ Lake Oconee ___ Tailrace		County: ___ Greene ___ Hancock ___ Morgan ___ Putnam	
Site Description:			GPS?: ___ Yes ___ No
Adjacent Land Ownership: ___ GPC ___ Residential ___ Commercial ___ USFS ___ WMA ___ Other			
Weather:		Reservoir Pool Level: ___ Full ___ Medium ___ Low	
Investigators:			Photos Taken?: ___ Yes ___ No

Length of Assessment Site: ___ 500 feet ___ Other: ___ feet		Active Erosion Problem Present?: ___ Yes ___ No		
Shoreline Vegetative Buffer Zone Condition:	___ Natural: heavily vegetated, less than 20 percent of natural vegetation removed			
	___ Landscaped-Natural: disturbed and cleared up to 50 percent; some trees & understory remaining			
	___ Landscaped: cleared of more than 50 percent natural vegetation or underbrush completely removed			
Land Uses Adjacent to Shoreline (check all that apply):				
___ Residential	___ Forested	___ Golf Course	___ Open	___ Transportation
___ Recreation/access	___ Agricultural	___ Commercial	___ Logging	___ Other: _____

Bank Stability:	___ Stable; minimal erosion; <5% affected by erosion; low potential for future problems		
	___ Moderately stable; 5-30% affected by erosion or slumping; slight erosion potential during floods		
	___ Moderately unstable; 30-70% affected by erosion or slumping; high erosion potential during floods		
	___ Unstable; >70% affected by erosion or slumping; mass erosion and bank failure evident		
Bank Vegetative Protection:	___ >90% of bank surfaces covered by healthy, living vegetation		
	___ 70-90% of bank covered by variety of vegetation; some open areas with disruption evident		
	___ 50-70% of bank covered by vegetation; scattered shrubs, grasses, and forbs; bare spots visible		
	___ <50% of bank with vegetative cover; any shrubs or trees are widely scattered; many bare spots		
Shoreline Structural Stabilization Practices Present? ___ Yes ___ No (check all that apply):			
___ Seawall/bulkhead only (_____ % of site)		___ Seawall/bulkhead and riprap combined (_____ % of site)	
___ Riprap or other large stone only (_____ % of site)		___ Other armoring: _____ (_____ % of site)	
Potential Sources of Active Shoreline Erosion (check all that apply):			
___ Land-disturbing activity	___ Residential landscape	___ Reservoir fluctuations	___ Wave action from watercraft/wind
___ Impervious surfaces	___ Roads and bridges	___ Lack of buffer vegetation	___ Tributary inflow
___ Stormwater runoff	___ Recreation/access	___ Livestock activity	___ Other: _____

Sources of Shoreline Fish Cover/Habitat to 50 feet from Shoreline (check all that apply):	
___ Docks/piers/boatslips (_____ % of shoreline length)	___ Overhanging vegetation (_____ % of shoreline length)
___ Riprap (_____ % of shoreline length)	___ Large woody debris (_____ % of shoreline length)
___ Bedrock and boulders (_____ % of shoreline length)	___ Standing timber (_____ % of shoreline length)
___ Emergent vegetation (_____ % of shoreline length)	___ Other: _____ (_____ % of shoreline length)
___ Submersed vegetation (_____ % of shoreline length)	___ Other: _____ (_____ % of shoreline length)

Other Observations and Aquatic Habitat Notes:
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3.0 WATER RESOURCES

3.1 Introduction

Georgia Power proposes to conduct a study characterizing existing water resources in the Oconee River at the Wallace Dam Project, including water use, availability, and water quality, and evaluating potential impacts to water resources associated with continued project operation. A principal element of the study will be an evaluation of the effects of continued project operation on water quality, particularly dissolved oxygen (DO) levels and water temperature in Lake Oconee and in the tailrace area downstream of the dam. This study will be accomplished through a combination of new water quality monitoring within the project boundary and compilation and analysis of existing water resources information and data.

3.2 Goals and Objectives

The goal of this study is to develop information for characterizing existing water resources in the project area and evaluating the water resource issues identified during FERC's public scoping process pursuant to NEPA that have a nexus with project operations.

The specific objectives of the study are to:

- Characterize water use, availability, and water quality in the Wallace Dam Project study area.
- Characterize the effects of continued project operation on water quality in Lake Oconee and the tailrace area within the project boundary.
- Document the extent of mixing that occurs in Lake Oconee as a result of the pump-back/generation cycles. This information will also be used to assess (in the Fish and Aquatic Resources Study [Section 4.0]) how project operations affect habitat conditions for fish, including sport fish species, and other aquatic organisms in Lake Oconee and the Wallace Dam tailrace.
- Review the substantial amount of water resources information and data available for the Oconee River, along with the findings of Georgia Power's water quality monitoring in the project waters, to evaluate the effects of continued project operation on water quality, including water temperature and DO concentrations, in Lake Oconee and the tailrace area.

3.3 Study Background

This study will develop information needed to evaluate potential impacts of continued project operation on aquatic resources in the PLP and license application in consideration of: (1) the water resource issues identified during NEPA scoping; (2) the studies and modifications to studies requested by resource agencies; (3) the known resource management goals of the agencies with jurisdiction over the water resources; (4) the substantial amount of existing information available for the Oconee River as summarized in the PAD; and (5) the requirement that there be a nexus between project operations and effects on the resources being evaluated.

3.3.1 Issues Identified

The Commission identified in SD1 the following resource issue pertaining to water resources:

- Effects of continued project operation on water quality, including water temperature and DO concentrations, in Lake Oconee and the tailrace area.

3.3.2 Study Requests

Georgia Power proposed in the PAD (Section 5.2.1, Preliminary Studies List) to conduct a study to characterize water use, availability, and water quality in the project area; and to characterize the effects of project operations on water quality in the project reservoir and tailrace area immediately downstream of the dam. Seasonal water quality monitoring would be conducted in the project reservoir through 2016, including vertical profiles and water chemistry. DO and water temperature would be continuously monitored in the project tailrace through 2016, and a literature-based analysis would be conducted for water quantity and quality.

SD1 listed the proposed study as Study No. 2, Water Resources. Resource agencies made the following requests and recommendations for modifying Georgia Power's proposed study.

Water Quality Monitoring

In its PAD and SD1 comments letter dated June 15, 2015, WRD presented select summer DO values recorded by the GDNr Environmental Protection Division (GEPD) in Lake Oconee. WRD expressed concern about prolonged elevated water temperatures and suppressed DO concentrations in the Wallace Dam pool area (between Wallace Dam and Georgia Hwy 44) and their potential effects on growth and health conditions for sport fish species such as largemouth bass, striped bass, and black crappie. WRD requested that additional objectives be incorporated into the Water Resources study, including: expanding the reservoir water

quality monitoring efforts to weekly full water-column samples in July-September and monthly full water-column samples in October-June; and conducting continuous DO and temperature monitoring in the forebay and tailrace areas in July-September. WRD believes these efforts are needed to better define how water quality conditions change as a result of project operations and better assess existing habitat conditions for fish species.

In its PAD, Study Requests, and Study Requests Modification letter dated June 18, 2015, FWS expressed concern about existing continuous DO monitoring data for the tailrace being dated and including low DO values. FWS recommends that continuous water quality data be collected in the tailrace over a two-year period instead of one year and be correlated with factors that likely influence water quality results.

In its comments on the proposed studies in SD1 filed June 18, 2015, EPA recommended that nutrient sampling be conducted consistent with criteria expression in Georgia's Water Quality Standards at Section 391-3-6-.03(17) by collecting monthly photic zone composite samples from April through October. EPA also recommends coordinating with GEPD to obtain any available information regarding the likely development of water quality standards for nutrients for Lake Oconee.

Georgia Power has collected a substantial amount of vertical profile and water chemistry data for Lake Oconee representing the full length of the main-stem reservoir and major tributary coves, as summarized in the PAD (Section 4.3.1). Georgia Power proposes herein to conduct one year of monthly vertical profile measurements and quarterly water chemistry sampling at nine stations throughout Lake Oconee, and one year of continuous DO and water temperature monitoring in the project tailrace. In addition, Georgia Power proposes to conduct hourly monitoring of reservoir vertical profiles and tailrace transects for DO and water temperature over the course of a summer day to represent a normal cycle of pumpback and generation operations. Georgia Power believes that WRD's request to conduct weekly sampling in July-September is unnecessary because the proposed monthly sampling will be adequate to characterize how water quality changes over the course of the summer and the proposed hourly monitoring will characterize how water quality changes over the course of a pumpback/generation cycle.

The existing and newly collected water quality data will be analyzed to characterize the extent of mixing that occurs in Lake Oconee as a result of the pumpback and generation cycles. This information, combined with the results of the fisheries analysis (Section 4.0) and review of existing information and data, including any relevant information on nutrient criteria development obtained from GEPD, will be used to analyze the effects of project operations on water quality and habitat conditions for fish species and other aquatic organisms inhabiting Lake Oconee and the Wallace Dam tailrace.

Algal Blooms

In its comments on SD1, EPA recommended that the Water Resources Study analyze data on algal species in the reservoir, including whether any occurrences of nuisance algal blooms, harmful algal blooms, algal toxins, or fish kills may be affected by Wallace Dam operations. Although not recommending a specific study modification, FWS expressed concern that several blue-green algal blooms have been documented in Lake Oconee in recent years, likely due to nutrient loading in the reservoir, and that toxins produced by certain cyanobacteria can be harmful to wildlife.

Georgia Power proposes to include in the Water Resources Study a literature review and analysis of the occurrences of cyanobacteria blooms in Lake Oconee, the factors that could lead to harmful algal blooms, and their relationship, if any, to project operations.

3.3.3 Resource Management Goals

GDNR is the primary resource agency having jurisdiction over water resources in the project area. GEPD (2013) classifies the water use of Lake Oconee and the upstream end of Lake Sinclair within the Wallace Dam project boundary as Recreation and Drinking Water. The Fishing use classification also applies to the project waters.

3.3.4 Existing Information

As described in the PAD, a substantial amount of existing information and data are available for characterizing water use and water quality in the vicinity of the Wallace Dam Project. Georgia Power will review and apply this information as appropriate to evaluating the potential effects of continued project operation on water resources in the Oconee River. Key sources of this information include but are not limited to:

- Georgia Power seasonal water quality data collected in Lake Oconee at multiple reservoir locations, typically on a quarterly basis, from 1979 to the present. These data include vertical profile measurements and water chemistry analyses of grab samples from nine stations distributed longitudinally in the main-stem reservoir and in the major tributary coves.
- Georgia Power's two-year intensive study conducted in 1995-1996 to evaluate environmental factors related to DO variability in Lake Oconee, including inflow, nutrient loading, and pumpback/generation (Georgia Power, 1997).
- Scientific literature and technical papers assessing nutrient loading sources and land use practices upstream of Lake Oconee and their potential influences on nutrient concentrations and algal abundance in the reservoir.

- Monitoring data and research publications on algal species composition in Lake Oconee, Lake Sinclair, and other Georgia reservoirs, and factors that could contribute to harmful cyanobacteria blooms.
- Oconee River basin management plans developed as part of the Georgia State-wide Water Management Plan (CH2M HILL, 2011) and by GEPD (1998).
- Georgia 305(b)/303(d) list documents (GEPD, 2012, 2014), which assess whether surface water bodies in the project area and upstream are supporting their designated uses.

3.3.5 Nexus between Project Operations and Effects

Georgia Power operates the Wallace Dam Project as a pumped storage development. Wallace Dam generates during peak power demand hours to meet the electrical system demand. Some of this released water remains in Lake Sinclair for a few hours before being pumped back up and into Lake Oconee by the reversible units for reuse in the next day's generation cycle. Pumpback operations occur at night, when electrical system demand is low (i.e., off-peak electrical hours) and therefore the cost of power is lower. The average daily fluctuation of Lake Oconee is approximately 1.5 ft.

Wallace Dam discharges directly into Lake Sinclair, with no intervening riverine reach or bypassed reach of river. Although there is no instantaneous discharge requirement at Wallace Dam, Georgia Power operates the Wallace Dam Project to support the minimum flow requirements of the Sinclair Project during drought.

3.4 Study Area

For the purposes of water resources, the proposed study area includes Lake Oconee and the Wallace Dam tailrace area within the project boundary, the Oconee River upstream of the Project to Athens-Clarke County, tributary watersheds to Lake Oconee, and the Oconee River arm of Lake Sinclair downstream to the Wallace Dam project boundary at the Georgia Hwy 16 bridge. New water quality monitoring field studies are proposed in the project reservoir and tailrace area within the project boundary.

Regarding water quality and site-specific effects downstream of the Wallace Dam project boundary, Georgia Power fully evaluated water quality in Lake Sinclair as part of the previously completed relicensing of the separately licensed Sinclair Project. Georgia Power believes that existing site-specific studies and data characterizing water quality in Lake Sinclair are sufficient for evaluating downstream water quality effects. Georgia Power will use existing information in analyzing site-specific and cumulative water quality effects downstream of the Project in the PLP and license application for Wallace Dam.

3.5 Methodology

Georgia Power's proposed approach for completing the Water Resources Study consists of the following study elements.

3.5.1 Water Quality Monitoring in Lake Oconee

Monthly Vertical Profiles and Quarterly Water Chemistry

Georgia Power will conduct monthly monitoring by boat for one year at nine locations to characterize water quality in Lake Oconee on a more frequent basis than in past quarterly sampling. Georgia Power believes that these data along with quarterly data collected by Georgia Power in most years since 1995 will provide a robust water quality dataset for assessing water quality and the extent of mixing that occurs in Lake Oconee as a result of pumpback and generation operations. The nine monitoring locations represent the longitudinal change in water quality occurring through the mainstem reservoir as well as in major tributary coves. Data will be collected at the nine locations shown in Figure 3-1 and described below:

- Lower pool of reservoir next to Wallace Dam (forebay) (Station OC1);
- Richland Creek embayment (Station OC2);
- Mainstem reservoir between Richland Creek and Lick Creek (Station OC3);
- Lick Creek embayment (Station OC4);
- Mainstem reservoir at Georgia Hwy 44 between Lick Creek and Sugar Creek (Station OC5);
- Mainstem reservoir at I-20 downstream of the Oconee River and Apalachee River confluence (Station OC6);
- Apalachee River embayment in upstream end of reservoir (Station OC7);
- Oconee River embayment in upstream end of reservoir (Station OC8); and
- Sugar Creek embayment (Station OC9).

Data collection at all nine locations on a monthly basis will consist of vertical profile measurements of water temperature (°C), DO, pH (standard units), specific conductance (micromhos per centimeter), and turbidity (Nephelometric turbidity units [NTU]) taken at 1-meter intervals, along with Secchi disc transparency.

In addition, 11 water chemistry parameters, including nutrients, will be analyzed in surface grab samples (1-meter depth) collected at six of the locations on a quarterly basis (Table 3-1). The six locations will include Stations OC1, OC2, OC4, OC7, OC8, and OC9 (Figure 3-1). All water chemistry analyses will be performed by Georgia Power, which operates a laboratory accredited by the National Environmental Laboratory Accreditation Program and recognized by GEPD. The parameters chlorophyll *a* and total phosphorus will be used to calculate a trophic state index following Carlson (1977).

TABLE 3-1
List of Quarterly Water Chemistry Parameters and Analytical Methods

Parameter	Analytical Method ^a
Alkalinity (mg/L)	EPA 310.1
Turbidity (NTU)	EPA 180.1
Hardness (mg/L as CaCO ₃)	SM2340
Total Phosphorus (mg/L)	EPA 365.1
Nitrate (mg/L)	EPA 300
Nitrite (mg/L)	EPA 300
Ammonia (mg/L)	EPA 350.3
Chlorophyll <i>a</i> (mg/L)	EPA 670/4-73-001
Fecal Coliform Bacteria (MPN colonies/100 ml)	EPA 600/8-78-017
Biochemical Oxygen Demand (mg/L)	EPA 405.1
Chemical Oxygen Demand (mg/L)	EPA 410.4

^a EPA, Methods for Chemical Analysis of Water and Wastes; EPA SW-846, Test Methods for Evaluating Solid Waste – Physical/Chemical Properties; APHA-AWWA-WEF, Standard Methods (SM) for the Examination of Water and Wastewater. mg/L = milligrams per liter; ml = milliliter.

The monthly vertical profiles and quarterly water chemistry data from 2015-2016 will be compared with the abundant seasonal data collected by Georgia Power and GEPD since 1995 to document the extent of summer mixing in Lake Oconee and to assess how water quality conditions are influenced by project operations.

Hourly Vertical Profiles of Summer Pumpback/Generation

Georgia Power proposes to conduct one sampling event in summer 2016 (July-August) that measures hourly vertical profiles of DO and water temperature at each of seven of the project reservoir monitoring locations over the course of a single day to represent a normal summer cycle of pumpback and generation operations. These data will support the analysis of summer habitat conditions for sport fish species as described in the Fish and Aquatic Resources Study Plan (Section 4.0).

The seven monitoring locations for hourly vertical profiles will include four stations on the mainstem reservoir (OC1, OC3, OC5, and OC6) spanning a distance of 20 river miles from

the Wallace Dam forebay to the I-20 bridge, and three stations on the major tributary coves to this reach (OC2, OC4, and OC9) (Figure 3-1). Upstream Stations OC7 and OC8 in the Apalachee River and Oconee River embayments, respectively, will not be monitored for hourly vertical profiles because they exhibit similar summer vertical profile patterns as Station OC6, which is located a short distance downstream.

DO and water temperature vertical profiles will be measured in the field on an hourly basis to represent pumpback and generation cycles. Measurements will be taken for the entire water column at 1-m intervals, and the depth will be recorded. The hourly profile sampling event will be conducted in collaboration with WRD biologists.

Continuous measurements of DO and water temperature in the tailrace area during the sampling event will be recorded by the probe at Station OCT. Hourly vertical profiles are not proposed for Station OCTR because of the relatively shallow depth and daily mixing of the water column from Wallace Dam pumpback and generation cycles.

3.5.2 Water Quality Monitoring in the Tailrace

Continuous Monitoring of DO and Water Temperature

Georgia Power proposes to conduct continuous DO and water temperature monitoring in the Wallace Dam tailrace beginning in October 2015. The Station OCTR monitoring location will be established in the tailrace within the direct influence of generation and pumpback flows where the channel cross section is relatively uniform in depth and the water is well mixed. The specific station location will be selected based on cross-sectional transect measurements of DO and water temperature taken by Georgia Power during representative generation flows in summer 2015. Georgia Power proposes to collect data at this location for a period of one year. However, the ILP schedule allows for a second year of study in 2017.

An electronic multi-parameter water quality measurement sonde and data recorder will be deployed to continuously record DO concentration, pH, specific conductance, water temperature, and turbidity in the Wallace Dam tailrace. Water quality data will be recorded every 60 minutes. The sonde will be installed on a buoy-mounted system at a depth of approximately 1 meter, consistent with the application of Georgia Environmental Protection Division DO criteria as set forth in Rules and Regulations for Water Quality Control (Chapter 391-3-6). Routine maintenance and necessary equipment calibration will be performed monthly throughout the monitoring period.

Georgia Power will compile continuous DO and water temperature data collected from the tailrace monitoring location and align these data with real-time project operational data for the same periods, which indicate how the turbines were being operated (units, pumpback, generation, etc.). DO levels and water temperatures documented during these periods also

will be correlated with vertical profile data collected from the same month in Lake Oconee to evaluate the likely depth of the source water in the reservoir.

Hourly Transect Monitoring of Summer Pumpback/Generation

In addition, Georgia Power proposes to conduct hourly measurements of DO and water temperature across five transects in the tailrace area over the course of a summer day in 2016 (July-August) to characterize variation in tailrace water quality during a normal cycle of pumpback and generation operations. These data will also support the analysis of summer habitat conditions for sport fish species as described in the Fish and Aquatic Resources Study Plan (Section 4.0). Five representative cross-sectional transects will be located in the tailrace area extending downstream to the end of the project boundary at the Georgia Hwy 16 bridge. Transect selection and field data collection will be conducted in collaboration with WRD biologists. In addition, vertical profiles of the reservoir forebay will be measured on the same day as the tailrace transect monitoring.

3.5.3 Analysis of Information and Data

Data gathered during the monthly water quality monitoring of Lake Oconee will be compiled and summarized in tables and graphs for comparison and analysis with similar data previously collected since 1995. Monthly vertical profiles of temperature and DO in Lake Oconee will be plotted to depict vertical stratification patterns. Summer vertical profile data also will be graphed as monthly isopleths showing the variation in patterns of vertical stratification over the entire length of the reservoir, and these data will be used to evaluate the availability of suitable habitat for sport fish species as part of the Fish and Aquatic Resources Study (Section 4.0).

Continuous temperature and DO data collected in the tailrace will be summarized in tables and graphs, and combined with plots of corresponding turbine operations. Data will be plotted to demonstrate the effects of pumpback/generation operations during summer critical conditions.

Monitoring trends and data, and abundant existing information and literature on water use, quantity, quality, and cyanobacteria occurrence and blooms in Lake Oconee and the Oconee River will be used to evaluate the water resource issues identified during scoping. The review of cyanobacteria blooms in Lake Oconee will include the factors that could lead to harmful algal blooms, and their relationship, if any, to project operations. Evaluation of the effects of continued project operation on aquatic habitat in the project reservoir and tailrace will be provided in the separate Fish and Aquatic Resources Study.

3.6 Reporting

In accordance with 18 CFR § 5.15(b), a Water Resources Study Progress Report will be prepared and provided to participants prior to the completion of the study. The progress report will describe overall progress in completing the proposed monitoring and analysis, summarize preliminary findings as available, and explain any variance from the study plan and schedule.

In accordance with 18 CFR § 5.15(c)(1), a Water Resources Study Report will be prepared and provided to participants for review and comment at the conclusion of the 1-year study. The study report will compile the water quality monitoring data and present the analyses developed through the use of existing information and data.

3.7 Schedule

In accordance with the Wallace Dam Process Plan and Schedule and the master schedule provided in Section 1.4, the Water Resources Study will be completed according to the milestones listed in Table 3-2 below.

TABLE 3-2
Schedule for Conducting the Water Resources Study

Activity	Deadline
Begin Field Studies and Literature-Based Review	October 1, 2015
File Progress Report	August 31, 2016
Complete Field Studies and Literature-Based Review	September 30, 2016
File Initial Study Report	November 18, 2016

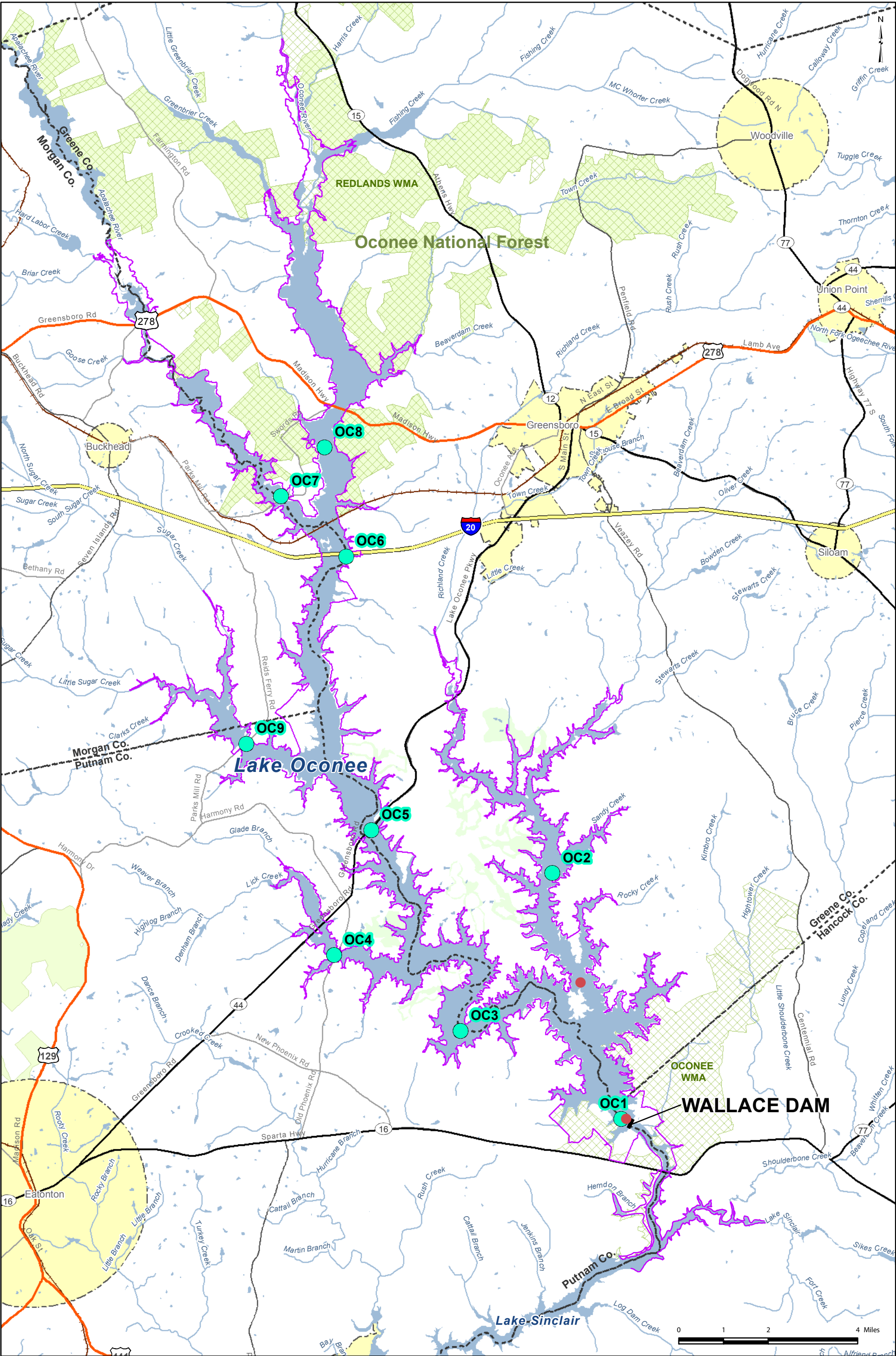
3.8 References

Carlson, R.E. 1977. A trophic state index for lakes. Limnol. Oceanogr. 22:363-369.

CH2M HILL. 2011. Upper Oconee regional water plan. September 2011. Prepared for the Upper Oconee Council. Adopted by Georgia Environmental Protection Division, November 15, 2011. http://www.upperoconee.org/documents/UOC_Adopted_RWP.pdf.

Georgia Environmental Protection Division. 1998. Oconee River basin management plan 1998. Atlanta, Georgia. <https://epd.georgia.gov/oconee-river-basin-watershed-protection-plan>. Georgia Department of Natural Resources, Atlanta.

- Georgia Environmental Protection Division. 2012. Water quality in Georgia; Georgia's 2012 305(b)/303(d) list, approved May 31, 2013. <https://epd.georgia.gov/georgia-305b303d-list-documents>. Georgia Department of Natural Resources, Atlanta.
- Georgia Environmental Protection Division. 2013. Rules and regulations for water quality control, Chapter 391-3-6. Effective October 22, 2013. Georgia Department of Natural Resources, Atlanta.
- Georgia Environmental Protection Division. 2014. Draft Georgia 2014 305(b)/303(d) List Documents. <https://epd.georgia.gov/georgia-305b303d-list-documents>. Georgia Department of Natural Resources, Atlanta.
- Georgia Power Company. 1997. Environmental factors (inflow, nutrient loading, and pumpback/generation) related to dissolved oxygen in Lake Oconee, Georgia. Georgia Power Company Environmental Laboratory, Smyrna, Georgia. June 1997.



Interstate Highway

U.S. Highway

State Highway

Major Roads

Local Streets

Railroads (Local)

Dam

Rivers/Creeks

Lake

Project Boundary

Towns/Cities

County Boundary

State Managed Lands

National Park or Forest

Golf Course

Georgia Power Water Quality Station

GEPD Station

GEORGIA POWER

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Figure 3-1

Georgia Power Water Quality Stations

Wallace Dam Project

(FERC No. 2413)

4.0 FISH AND AQUATIC RESOURCES

4.1 Introduction

Georgia Power proposes to conduct a study characterizing the existing fish and aquatic resources in the Wallace Dam Project waters and developing aquatic resource information for evaluating the potential impacts of continued project operation on the fish and aquatic resources of the Oconee River. This will be accomplished through a combination of: analyzing existing fisheries survey data; applying existing and newly collected water quality monitoring data from the Water Resources Study; a shoreline habitat survey conducted during the shoreline reconnaissance survey for the Geology and Soils Study; a freshwater mussel survey; and review of existing fisheries and water quality information and data.

4.2 Goals and Objectives

The goal of this study is to develop information for characterizing the existing aquatic environment and evaluating the fisheries-related aquatic resource issues identified during FERC's public scoping process pursuant to NEPA that have a nexus with project operations.

The specific objectives of the study are to:

- Characterize representative shoreline and littoral-zone aquatic habitats occurring throughout the reservoir.
- Evaluate the occurrence of Altamaha shiner, a Georgia threatened fish species, and other rare, threatened, or endangered (RTE) aquatic species within the project boundary based on review of existing information and data.
- Conduct a freshwater mussel survey within the project boundary characterizing the occurrence, distribution, relative abundance, species richness, and population status of the native freshwater mussel community, especially RTE species of mussels.
- Evaluate the effects of continued project operations on summer reservoir water quality and habitat for sport fish species such as largemouth bass and striped bass.
- Evaluate the potential for fish entrainment and turbine-induced mortality by applying trends and data from entrainment studies completed at other hydroelectric projects to the physical, operational, and fisheries characteristics of the Wallace Dam Project.

4.3 Study Background

This study will develop information needed to evaluate potential impacts of continued project operation on fish and aquatic resources in the PLP and license application in consideration of:

(1) the aquatic resource issues identified during NEPA scoping; (2) the studies and modification to studies requested by resource agencies; (3) the known resource management goals of the agencies with jurisdiction over the aquatic resources; (4) the substantial amount of existing information available for the Oconee River as summarized in the PAD; and (5) the requirement for there being a nexus between project operations and effects on the resources being evaluated.

4.3.1 Issues Identified

The Commission identified in SD1 the following list of aquatic resource issues pertaining to fisheries:

- Effects of continued project operation, non-project use of project lands (e.g., water supply intakes) and shoreline permitting (e.g., docks, seawalls, etc.) on fish habitat and aquatic resources in Lake Oconee.
- Effects of continued project operation on summer habitat for sport fish species, including largemouth bass and stocked striped bass, in Lake Oconee.
- Effects of continued project operation on tributary riverine fish and mussel habitat.
- Effects of continued project operation on aquatic habitat in the project tailrace area.
- Effects of continued project operation on fish entrainment and turbine-induced mortality.
- Aquatic non-native invasive species and their effects on native flora and fauna within the project boundary.
- Effects of continued project operation on state species of concern in the vicinity of the proposed project.

4.3.2 Study Requests

Georgia Power proposed in the PAD (Section 5.2.1, Preliminary Studies List) to conduct a study to characterize existing fish and aquatic resources in the project area and evaluate the effects of continued project operations on fish and aquatic resources inhabiting Lake Oconee and the Wallace Dam tailrace. The study would include the following key elements: (1) a shoreline habitat survey to characterize representative shoreline and littoral-zone aquatic habitats in the reservoir, conducted concurrently with the reconnaissance survey for shoreline erosion and sedimentation in the Geology and Soils Study; (2) evaluation of the occurrence of Altamaha shiner and native mussels within the project boundary; (3) evaluation of the effects

of continued project operations on summer reservoir water quality and habitat for sport fish species such as largemouth bass and striped bass; and (4) evaluation of the potential for fish entrainment and turbine-induced mortality.

FERC listed Georgia Power's proposed study in SD1 according to the four key study elements as follows:

- Study No. 3, Fish and Aquatic Resources – shoreline habitat survey;
- Study No. 4, Fish and Aquatic Resources – distribution of Altamaha shiner and native mussels;
- Study No. 5, Fish and Aquatic Resources – summer reservoir water quality and habitat for largemouth bass and striped bass; and
- Study No. 6, Fish and Aquatic Resources – fish entrainment and mortality.

Resource agencies made the following requests and recommendations for modifying Georgia Power's proposed study with reference to the numbered study elements above. This proposed study plan incorporates all the major study elements into a single Fish and Aquatic Resources Study, with the exception of the shoreline habitat survey, which will be implemented concurrently with the shoreline reconnaissance survey for erosion and sedimentation as part of the Geology and Soils Study Plan (Section 2.0).

Shoreline Habitat Survey

In its PAD and SD1 comments letter dated June 15, 2015, WRD requested that additional objectives be incorporated into the Fish and Aquatic Resources Study No. 3. These include providing maps and information on the proportion of developed and undisturbed shoreline areas in the project reservoir and incorporating a literature review on the effects of shoreline development on sport fish species such as largemouth bass, black crappie, and sunfish.

Georgia Power proposes to survey shoreline aquatic habitat and perform a literature review and analysis of the effects of shoreline development, including shoreline stabilization structures, as part of the shoreline reconnaissance survey included in the Geology and Soils Study Plan (see Section 2.0). The survey design will use a stratified random selection of shoreline segments. Shoreline conditions will be inventoried at each segment, including the proportions of shoreline structural stabilization practices in use (e.g., seawalls, riprap), and sources of littoral-zone fish cover. The results of the shoreline survey will be provided in the Geology and Soils Study Report along with a literature review on the relationship between shoreline structural stabilization practices and littoral-zone fish habitat.

Summer Reservoir Water Quality and Habitat for Sport Fish Species

In its PAD and SD1 comments, WRD requested that additional objectives be incorporated into Fish and Aquatic Resources Study No. 5. These include weekly full water-column sampling in July-September at multiple sites along the length of the project reservoir; isopleth graphs of water temperature and DO data over the entire reservoir; and delineating the reservoir areas that vertically stratify in summer, characterizing water quality (water temperature and DO levels) and growth of largemouth bass and striped bass (length increments and/or condition factors) in these areas, and comparing them to water quality and growth in areas of the reservoir that do not undergo summer vertical stratification.

Georgia Power proposes to conduct monthly vertical profile measurements at nine locations in Lake Oconee as part of the Water Resources Study Plan (Section 3.0). These data will be analyzed in conjunction with existing quarterly vertical profiles from the same locations to document trends in the spatial and seasonal extent of summer mixing in Lake Oconee across many years. In addition, Georgia Power proposes to conduct hourly monitoring of reservoir vertical profiles over the course of a summer day to represent a normal cycle of pumpback and generation operations and its effects on water column mixing (Section 3.0). WRD's request to conduct weekly sampling in July-September has not been adopted because Georgia Power believes the proposed monthly sampling will be adequate to characterize how water quality changes over the course of the summer and the proposed hourly monitoring will characterize how water quality changes over the course of a pumpback/generation cycle. Georgia Power believes this approach will develop water quality information sufficient for evaluating the effects of continued project operation on sport fish populations in Lake Oconee.

Freshwater Mussel Survey

In its PAD, Study Requests, and Study Requests Modification letter dated June 18, 2015, FWS requested a study to characterize the freshwater mussel populations in the project area. The objectives of the study would be to determine the presence/absence, distribution, relative abundance, species richness, and population status of the native freshwater mussel community, especially imperiled species. FWS also identified the recently documented occurrence (by GDNR) of the inflated floater (*Pyganodon gibbosa*) within Lake Oconee. This species is endemic to the Altamaha River basin and is currently under review by FWS for federal listing under the Endangered Species Act.

Georgia Power proposes herein to conduct a freshwater mussel survey in potentially suitable habitats in the lower free-flowing reaches of tributaries where they enter the project boundary, along representative shoreline areas of Lake Oconee, and in the Wallace Dam

tailrace area within the project boundary. The survey methodology will follow applicable guidelines and search approaches as recommended in the FWS letter.

Other Fish and Aquatic Resources Comments

WRD concurred with Georgia Power's proposed studies in SD1 that the effects of continued project operation on potential fish entrainment and turbine-induced mortality be evaluated. WRD recommended that language regarding fish passage be drafted for the relicensing period because of potential implications on recovery efforts of American shad inside the project boundary. In addition, WRD believes that, as a result of shoreline permitting of development and sedimentation, certain habitat improvements may be needed to help maintain, improve, and concentrate sport fish populations.

FWS commented that dams in the Oconee River basin have affected diadromous species including federally endangered Atlantic sturgeon, American shad, and American eel, and provided information on the historical distributions of these and closely related species above the Fall Line in Georgia in the Oconee River and other nearby drainages.

4.3.3 Resource Management Goals

GDNR and FWS are the primary resource agencies having jurisdiction over fish and aquatic resources in Lake Oconee and the Oconee River.

GEPD (2013) classifies the water use of Lake Oconee and the upstream end of Lake Sinclair within the Wallace Dam project boundary as Recreation and Drinking Water, which includes the Fishing use classification.

In its comments letter dated June 15, 2015, WRD identified that it manages the project waters to provide a quality outdoor recreational experience. From a fisheries standpoint, two important components of this effort include: (1) quality public access to the natural resource; and (2) implementing statewide fish harvest regulations to help manage and conserve sport fish populations.

FWS, in its letter dated June 18, 2015, related additional resource management goals of protecting the aquatic community in the project area, including native freshwater mussels, especially imperiled species.

4.3.4 Existing Information

A substantial amount of existing information and data are available for characterizing the fish and aquatic resources in the vicinity of the Wallace Dam Project and evaluating the potential resource impacts of continued project operation. Key sources of this information include but are not limited to:

- WRD standardized fishery surveys of Lake Oconee conducted annually since 2002; WRD uses these data to understand population characteristics and associated fishing trends, make fisheries management decisions, and characterize angler prospects.
- The Fishes of Georgia Website (Straight et al., 2009), cooperatively funded by FWS, GDNr Nongame Conservation Section, and Georgia Museum of Natural History, which provides an online distributional atlas of freshwater fishes in Georgia based on historical and recent collection data.
- Online species accounts and occurrence maps by Hydrologic Unit Code (HUC) 10 watershed for fish species of conservation concern, prepared by GDNr's Nongame Conservation Section.
- Fish species distribution, habitat use, and conservation information available in the scientific literature and through NatureServe Explorer, an online database providing in-depth coverage for rare and endangered species.
- The Georgia Bass Chapter Federation, which has gathered and compiled angler catch data annually for Lake Oconee, Lake Sinclair, and numerous other Georgia reservoirs from bass tournaments, which has established a long-term dataset of catch statistics for detecting changes in the largemouth bass fishery over time.
- Research studies on the use of standing timber by fish populations in Lake Oconee (Van Den Avyle and Petering, 1988) and the rapidly expanding, introduced blue catfish population (Homer and Jennings, 2011).
- Scientific literature on the distribution of sensitive species of fish in the Oconee NF (Nuckols and Roghair, 2004), community structure of floodplain fishes in the Altamaha River basin (Garnett and Batzer, 2014), and suitable host fishes for freshwater mussels from the Altamaha River basin (Johnson et al., 2012).
- The final environmental impact statement for the FS' Land and Resource Management Plan for the Chattahoochee-Oconee National Forests (FS, 2004a,b), which provides information on fish and mussels inhabiting streams on Oconee NF.
- Georgia Power fisheries survey data from Lake Sinclair, 2003-2005.

4.3.5 Nexus between Project Operations and Effects

Georgia Power operates the Wallace Dam Project as a pumped storage development. Wallace Dam generates during peak power demand hours to meet the electrical system demand. Some of this released water remains in Lake Sinclair for a few hours before being

pumped back up and into Lake Oconee by the reversible units for reuse in the next day's generation cycle. Generation occurs during the day, and pumpback operations occur at night. The average daily fluctuation of Lake Oconee is approximately 1.5 ft. There is no intervening riverine reach or bypassed reach of river between Wallace Dam and Lake Sinclair and no instantaneous discharge requirement at Wallace Dam.

Wallace Dam is one of two major dams located on the mainstem Oconee River. Sinclair Dam is located about 30 miles downstream. Downstream of Sinclair Dam, the Oconee River flows 143 miles south to its confluence with the Ocmulgee River to form the Altamaha River. The Altamaha River flows 137 miles southeast to the Atlantic Ocean.

4.4 Study Area

For the purposes of fish and aquatic resources, the proposed study area includes: the FERC project boundary extending around the reservoir upstream of the dam; the lower free-flowing reaches of larger tributaries to Lake Oconee within the project boundary; and the Wallace Dam tailrace area within the project boundary downstream of the dam. New field studies are proposed for Lake Oconee, the lower free-flowing reaches of larger tributaries within the project boundary, and the Wallace Dam tailrace area.

4.5 Methodology

Georgia Power's proposed approach for completing the Fish and Aquatic Resources Study consists of the following study elements.

4.5.1 Shoreline Habitat Survey

Georgia Power proposes to conduct a shoreline habitat survey that will characterize representative shoreline and littoral-zone aquatic habitats occurring throughout the project reservoir. Section 2.0 (Geology and Soils) describes the methodology for the shoreline habitat survey to be conducted concurrently with the shoreline reconnaissance survey for erosion and sedimentation.

4.5.2 Occurrence and Distribution of Altamaha Shiner

The occurrence and distribution of Altamaha shiner and other aquatic RTE species will be assessed by reviewing existing sources of information and data and updating the distributional information summarized in the PAD. Key sources of information and data will include recent occurrence records maintained by the GDNR Nongame Conservation Section and the FWS Ecological Services Field Office in Athens, Georgia, the Fishes of Georgia website, technical reports, and scientific publications. The information review will include

consulting with GDNR on a recently documented occurrence of the inflated floater in Lake Oconee, as cited in the FWS comment letter.

The findings of this review will be presented in the RTE Species Study Report (Section 6.0).

4.5.3 Freshwater Mussel Survey

A freshwater mussel survey will be conducted within the Wallace Dam project boundary to characterize the occurrence, distribution, relative abundance, and species richness of the native freshwater mussel community, focusing on habitats having the greatest potential to support RTE species of mussels. The mussel surveys will be conducted in representative areas containing potentially suitable habitat.

Mussel surveys will include representative shoreline habitats and tributary embayments in Lake Oconee, larger free-flowing tributaries entering the reservoir within the project boundary, and the Wallace Dam tailrace area within the project boundary.

Lake Oconee

A mussel survey will be conducted in representative habitats of Lake Oconee and the lower reaches of tributaries entering the reservoir in late spring-summer 2016. Up to 18 reservoir and tributary locations will be searched for native mussels around Lake Oconee. The locations will be selected with the input of FWS and WRD Nongame Conservation Section biologists and will include the recently documented location of inflated floater and other native mussels as appropriate. The survey will be conducted during daylight under normal project operations; seasonal drawdowns for dam maintenance and/or maintenance of homeowner's docks and seawalls are not conducted at the Wallace Dam Project.

Georgia Power will contract a qualified mussel expert and dive team to lead the field survey effort and survey reporting. Georgia Power also will seek volunteer participation of experienced biologists from the FWS, WRD Nongame Conservation Section, and other interested agencies to increase the number of surveyors in wadeable habitats. Surveys will be conducted by teams of three or more biologists experienced in mussel collection. The survey methodology will be consistent with the qualitative survey approaches set forth in the survey protocol developed by FWS and Georgia Department of Transportation (2008) to the extent practical subject to the type of search area and prevailing flow, depth, and turbidity conditions. Survey methods will include visual observations while walking shorelines and wading shallows, hand grubbing, and in non-wadeable search areas, the use of SCUBA and/or skin diving equipment. Divers will follow all applicable safety regulations.

Because Lake Oconee has 374 miles of shoreline, the mussel survey effort will be concentrated in representative areas containing potentially suitable mussel habitat and areas

previously documented to harbor native mussels, rather than all available habitats. Native mussels such as inflated floater, Altamaha arc mussel (*Alasmodonta arcula*), and Savannah lilliput (*Toxolasma pullus*) are most commonly found in shallow water with soft mud, silty sand, and/or sand substrates. Survey effort will prioritize these types of habitats.

The mussel survey will record observations of live mussels and shells of dead mussels. All occurrences of RTE species of mussels will be located in the field using mapping grade Global Positioning System (GPS) units. Digital photographs will be taken of representative specimens. All live mussels will be returned to source habitats. Survey observations will be recorded as field notes.

Wallace Dam Tailrace Area

Georgia Power also proposes to conduct a freshwater mussel survey in potentially suitable mussel habitat in the Wallace Dam tailrace area in spring-summer 2016. The search area will include the upstream end of Lake Sinclair extending from Wallace Dam approximately 1.3 river miles downstream to the end of the project boundary at the Georgia Hwy 16 bridge.

The tailrace mussel survey will be conducted according to the following methods:

- A survey team of at least four mussel surveyors will be led by an experienced mussel expert having knowledge of the mussel fauna of the Altamaha River basin and the ability to identify freshwater mussel species in the Oconee River.
- The survey will begin with a reconnaissance of benthic substrates and depths in the tailrace area. Much of the habitat below the dam and in the upper reach of Lake Sinclair consists of excavated bedrock, which is a much less suitable substrate for mussels than sand, gravel, mud, and loose rocky substrates. The mussel expert will apply best professional judgment in identifying representative habitats in the tailrace area containing potentially suitable substrates for native mussels. The survey efforts will then concentrate on these areas.
- The survey will be conducted using SCUBA and skin diving equipment in potentially suitable mussel habitat as operational flow conditions and safety considerations permit. The survey will be conducted during daylight hours between the end of the pump back cycle and the beginning of the generation cycle, when river flow velocity and turbulence are at a minimum.
- All occurrences of RTE mussel species will be located in the field using mapping grade GPS units. Digital photographs will be taken of representative live specimens of each native mussel species collected. All mussels will be returned unharmed to appropriate habitats in the area of collection.

- The surveyors will record field notes and general information about the survey area to include such information as the date and time of survey; flow and velocity conditions; water clarity; depth and substrate composition; and bank and riparian zone condition.

4.5.4 Summer Habitat for Sport Fish Species

Lake Oconee

The availability of suitable summer water quality for sport fish species in Lake Oconee, including largemouth bass and striped bass, will be assessed using reservoir water quality data collected annually by Georgia Power, standardized fisheries survey data for primary sport fishes collected annually by GDNr, and largemouth bass and striped bass temperature and DO preference criteria reported in the scientific literature. Georgia Power has collected seasonal water quality data in Lake Oconee on an annual basis since 1995, including vertical profile measurements of water temperature and DO at multiple locations. These existing data and vertical profile data proposed for collection in 2016 (Section 3.0) will provide the basis for characterizing summer reservoir water quality and habitat for largemouth bass and striped bass as two popular sport fisheries in the reservoir.

Summer vertical profile data collected at multiple locations oriented longitudinally in the mainstem reservoir and in major tributary embayments will be compiled and analyzed, including:

- Summer vertical profiles collected at up to nine stations annually from 1995 to 2014.
- Monthly vertical profiles collected at nine stations in 2015-2016, as proposed in the separate Water Resources Study Plan.
- Hourly vertical profiles collected over the course of a single day in summer 2016 to represent a normal cycle of pumpback and generation operations, as proposed in the Water Resources Study Plan.

Vertical profile data for the warmest months, including April through September, will be depicted in graphs of depth versus water temperature and depth versus DO concentration to characterize the spatial and temporal extent of mixing that occurs in Lake Oconee as a result of the pumpback and generation cycles. In addition, data will be graphed as monthly isopleths showing the variation in water temperature and DO over the entire length of the reservoir. This analysis will be used to delineate those areas of the reservoir which tend to mix during the summer as a result of project operations, and those areas which tend to undergo summer vertical stratification more typical of southeastern reservoirs.

Existing fisheries survey data for Lake Oconee will then be analyzed to compare growth characteristics of largemouth bass and striped bass in areas of the reservoir that vertically stratify in the summer to the growth characteristics of these species in areas of the reservoir that tend to vertically mix as a result of project operations. These different areas of the reservoir, as represented by the various water quality monitoring stations (Figure 3-1), will be aligned with the WRD fisheries survey locations (Figure 4-1) to segregate the fisheries data for comparative analysis. Data available from the standardized fisheries survey database include sampling procedures and effort information, species abundance, length, weight, and other sampling or reservoir specific details. Georgia Power will coordinate with WRD at the outset of the study to obtain the most updated version of the database and associated metadata defining station locations, parameters, units, species-specific weight-length relationships used as the basis for relative condition factors, and other relevant data fields.

The fisheries data will be analyzed between stratified and mixed areas of the reservoir to characterize the abundance and well-being and condition of largemouth bass and striped bass as a potential result of chronic water quality stress related to pumped storage operations. Population attributes to be compared may include length-frequency distribution, relative condition factors, species numerical abundance, catch per unit effort, and other descriptive statistics. In addition, habitat suitability for largemouth bass and striped bass between these different areas of the reservoir will be evaluated on the basis of temperature, DO concentration, and time of year with consideration for ranges defined by scientific literature sources as appropriate for each species.

Wallace Dam Tailrace

The suitability of summer water temperatures and DO concentrations for fish and other aquatic organisms in the Wallace Dam tailrace will be evaluated using a combination of existing and newly collected water quality monitoring data and literature review. The following sources of data will provide a sufficient basis for characterizing spatial and temporal variation in summer DO and water temperature conditions in the tailrace area as they relate to habitat suitability criteria for representative species as determined from literature sources:

- Continuous DO and temperature monitoring data collected in the Wallace Dam tailrace area in 2016, as proposed in the Water Resources Study Plan (Section 3.0).
- Existing summer vertical profile data and proposed monthly vertical profile data collected in the forebay of Lake Oconee (Station OC1 in Figure 3-1) in summer 2016.
- Hourly DO and water temperature data collected across multiple transects in the tailrace area over the course of a single day in summer 2016 to represent a normal

cycle of pumpback and generation operations as proposed in the Water Resources Study Plan (Section 3.0). Cross-sectional transects will be spaced over the length of the tailrace between the dam and the downstream end of the project boundary.

4.5.5 Fish Entrainment Evaluation

The potential for fish entrainment and turbine-induced mortality at the Wallace Dam Project will be evaluated using a literature-based approach that draws upon entrainment field studies completed at numerous other hydroelectric projects east of the Mississippi River, including several in the southeastern U.S. and other pumped storage facilities. Common trends and data from these other studies will be applied with consideration of the site-specific physical, operational, and fisheries characteristics of the Wallace Dam Project.

The primary source of turbine entrainment field study information will be the database prepared by the Electric Power Research Institute (EPRI, 1997). The EPRI database includes test data from 43 hydroelectric sites and provides detailed information on the species and size classes of fish collected in monthly entrainment samples. All of these sites are located east of the Mississippi River, and seven are located in the southeastern U.S. (South Carolina, Georgia, and Virginia).

Other sources of turbine entrainment information and data will include comprehensive reviews prepared by EPRI (1992) and FERC (1995a). The FERC (1995a) review provides information for two additional sites in South Carolina and Georgia. Entrainment sampling data for the Stevens Creek Project (Dames and Moore, 1993; FERC, 1995b) and the Richard B. Russell Pumped Storage Project (U.S. Army Corps of Engineers [USACE], 1999) on the Savannah River also will be examined for species composition, relative abundance, and size distribution trends.

The primary source of turbine mortality field study information will be the turbine passage survival database prepared by EPRI (1997). The database includes test data from studies conducted at 51 difference turbines (41 hydroelectric sites), including Francis turbines.

Common trends and data from field studies completed at other hydroelectric sites will be applied to the Wallace Dam Project to:

- Characterize potential turbine entrainment that could be occurring at the Project, including fish size distribution, species composition, and seasonal variation in entrainment rates.
- Evaluate potential mortality rates of fish passing through the turbines based on turbine survival tests conducted at other projects with head and turbine design characteristics similar to those in use at Wallace Dam.

- Characterize relative differences in entrainment and mortality potential between the generation and pumpback cycles based on the design differences between the reversible pump turbines (Francis type) and conventional turbines (modified propeller type), the times of day they operate, and other relevant factors.

The potential impacts of losses of fish due to entrainment mortality will be assessed based upon fishery survey data for the project reservoir, intake location and related factors in the reservoir forebay and in the tailrace, natural mortality rates of young fish, and other relevant factors.

4.6 Reporting

In accordance with 18 CFR § 5.15(b), a Fish and Aquatic Resources Study Progress Report will be prepared and provided to participants prior to the completion of the study. The progress report will describe overall progress in completing the proposed mussel survey and fisheries analyses, summarize preliminary findings as available, and explain any variance from the study plan and schedule.

In accordance with 18 CFR § 5.15(c)(1), a Fish and Aquatic Resources Study Report will be prepared and provided to participants for review and comment at the conclusion of the 1-year study. The study report will compile the data gathered from the mussel survey and present the analyses developed through the use of existing information and data.

4.7 Schedule

In accordance with the Wallace Dam Process Plan and Schedule and the master schedule provided in Section 1.4, the Fish and Aquatic Resources Study will be completed according to the milestones listed in Table 4-1 below.

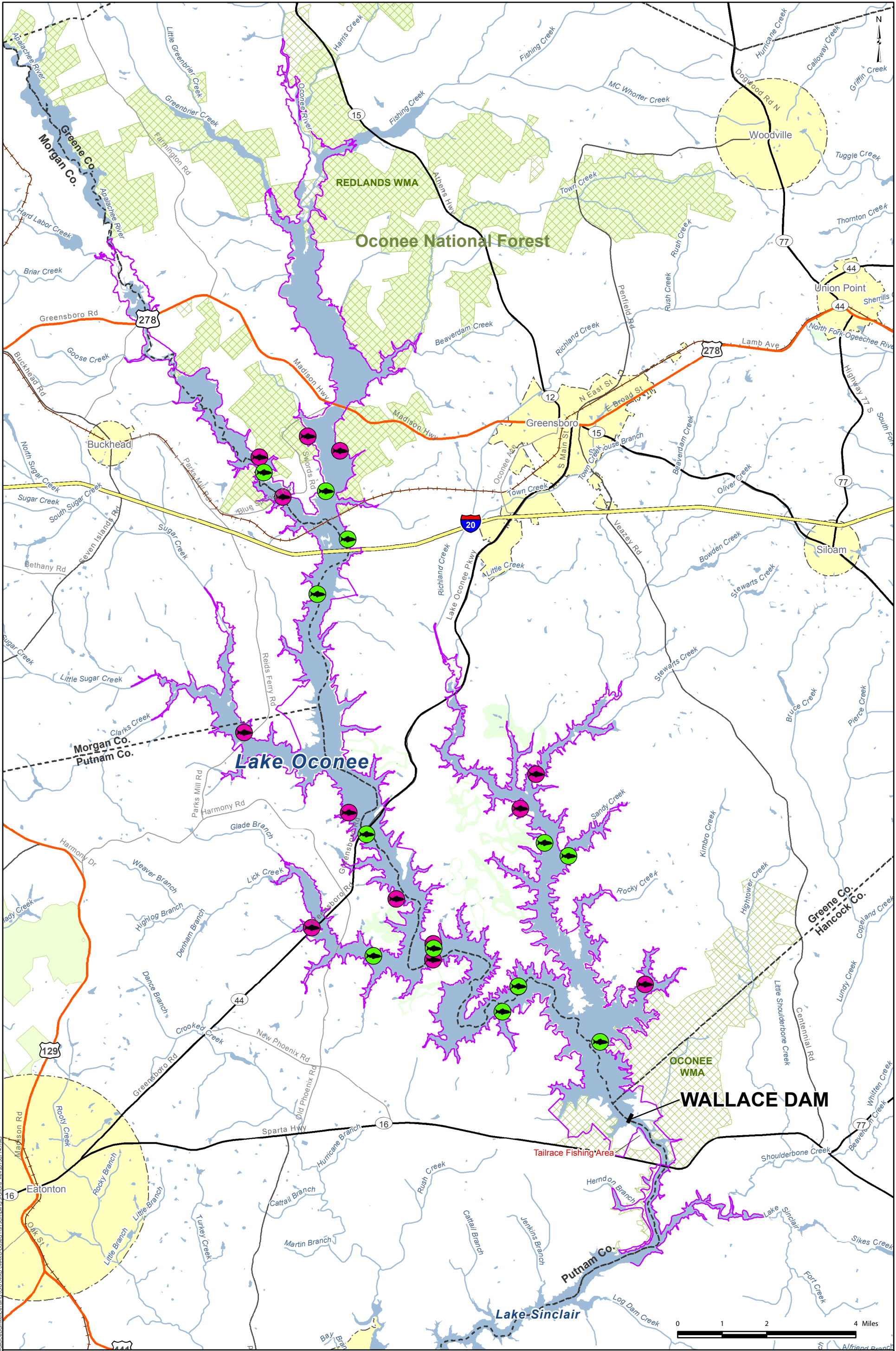
TABLE 4-1
Schedule for Conducting the Fish and Aquatic Resources Study

Activity	Deadline
Begin Field Studies and Literature-Based Review	March 1, 2016
File Progress Report	August 31, 2016
Complete Field Studies and Literature-Based Review	September 30, 2016
File Final Study Report	November 18, 2016

4.8 References

- Dames and Moore. 1993. Fish entrainment study report, Stevens Creek Hydroelectric Project, FERC No. 2535. Prepared for South Carolina Electric and Gas Company. September 1993.
- Electric Power Research Institute. 1992. Fish entrainment and turbine mortality review and guidelines. Prepared by Stone & Webster Environmental Services, Boston, Massachusetts. EPRI Report No. TR-101231, Project 2694-01. September 1992.
- Electric Power Research Institute. 1997. Turbine entrainment and survival database – field tests. Prepared by Alden Research Laboratory, Inc., Holden, Massachusetts. EPRI Report No. TR-108630. October 1997.
- Federal Energy Regulatory Commission. 1995a. Preliminary assessment of fish entrainment at hydropower projects, a report on studies and protective measures, volumes 1 and 2 (appendices). FERC Office of Hydropower Licensing, Washington, D.C. Paper No. DPR-10. June 1995 (volume 1) and December 1994 (volume 2).
- Federal Energy Regulatory Commission. 1995b. Final environmental assessment for hydropower license, Stevens Creek Hydroelectric Project, FERC Project No. 2535-South Carolina, Georgia. FERC Office of Hydropower Licensing, Washington, D.C. November 7, 1995.
- Garnett, J.A., and D.P. Batzer. 2014. Longitudinal variation in community structure of floodplain fishes along two rivers of the southeastern USA. *Canadian Journal of Fisheries and Aquatic Sciences* 71(9):1291-1302.
- Homer, M.D., Jr., and C.A. Jennings. 2011. Historical catch, age structure, sizes, and relative growth for an introduced population of blue catfish in Lake Oconee, Georgia. *American Fisheries Society Symposium* 77. 12 pp.
- Johnson, J.A., J.M. Wisniewski, A.K. Fritts, and R.B. Bringolf. 2012. Host identification and glochidia morphology of freshwater mussels from the Altamaha River basin. *Southeastern Naturalist* 11(4):733-746.
- Nuckols, D.R., and C.N. Roghair. 2004. Presence of Altamaha shiner (*Cyprinella xaenura*) and Ocmulgee shiner (*Cyprinella callisema*) within several Chattahoochee-Oconee National Forest streams, September 2003. U.S. Forest Service Southern Research Station, Blacksburg, Virginia.
- Straight, C.A., B. Albanese, and B.J. Freeman. 2009. Fishes of Georgia Website, Georgia Museum of Natural History, updated March 25, 2009. Accessed December 14, 2014 at: <http://fishesofgeorgia.uga.edu/>.

- U.S. Army Corps of Engineers. 1999. Final environmental assessment and finding of no significant impact. Richard B. Russell Dam and Lake Project Pumped Storage. Georgia and South Carolina. August 1999.
- U.S. Forest Service. 2004a. Chattahoochee-Oconee National Forest land and resource management plan. U.S. Department of Agriculture, Forest Service Southern Region, Atlanta, GA. Management Bulletin R8-MB 113A. January 2004.
- U.S. Forest Service. 2004b. Final environmental impact statement for the land and resource management plan, Chattahoochee-Oconee National Forests. U.S. Department of Agriculture, Forest Service Southern Region, Atlanta, GA. Management Bulletin R8-MB 113B.
- Van Den Avyle, M. J., and R.W. Petering. 1988. Inundated timber as nursery habitat for larval gizzard and threadfin shad in a new pumped storage reservoir. Transactions of the American Fisheries Society 117(1):84-89.



Interstate Highway

U.S. Highway

State Highway

Major Roads

Local Streets

Railroads (Local)

Dam

Rivers/Creeks

Lake

Project Boundary

Towns/Cities

County Boundary

State Managed Lands

National Park or Forest

Golf Course

Electrofishing Sample Station

Gillnet Sample Station

Source: Fish sampling station geographic locations taken from the Multistate Aquatic Resources Information System (MARIS), <http://www.maridata.org/>

GEORGIA POWER

A SOUTHERN COMPANY

Geosyntec

consultants

Figure 4-1

GDNr Fish Sampling Stations

Wallace Dam Project

(FERC No. 2413)

5.0 TERRESTRIAL RESOURCES

5.1 Introduction

Georgia Power proposes to characterize existing terrestrial resources at the Wallace Dam Project through a field reconnaissance survey and the use of existing information and data. For the purposes of this study, terrestrial resources include wildlife and botanical resources as described in Section 4.5 of the PAD, and wetlands, riparian, and littoral habitat as described in Section 4.6 of the PAD.

5.2 Goals and Objectives

The goal of the study is to characterize existing terrestrial resources for evaluating the terrestrial resource issues identified during FERC's public scoping process pursuant to NEPA that have a nexus to project operations.

The specific study objectives are to:

- Describe terrestrial wildlife and botanical resources occurring in the Wallace Dam Project area, including providing lists of representative plant and animal species that use representative upland habitats, and to identify invasive species in these habitats.
- Describe the floodplain, wetlands, and riparian habitats occurring in the project area, including lists of representative plant and animal species that use representative habitats, to identify invasive species, and to prepare a map delineating wetland, riparian, and littoral habitat.

Information compiled in the PAD substantially meets these objectives.

5.3 Study Background

This study will develop information needed to evaluate potential impacts of continued project operation in consideration of the terrestrial resource issues identified during scoping, known resource management goals of the agencies with jurisdiction over terrestrial resources, the availability of existing relevant information as to plant and animal species using upland and wetland, riparian, and littoral habitats in the project area, and the requirement that there be a nexus between project operations and effects on terrestrial resources.

5.3.1 Issues Identified

The Commission identified in SD1 the following list of resource issues pertaining to terrestrial resources:

- Upland non-native invasive species and their effects on native flora and fauna within the project boundary.
- Effects of continued project operation, maintenance, project-related recreation, and non-project use of project lands (e.g., boat docks) on upland habitat, reservoir wetland and littoral habitats, and associated wildlife.
- Effects of continued project operation, maintenance, and project-related recreation on state species of concern in the vicinity of the proposed project, including bald eagle.

5.3.2 Study Requests

Georgia Power proposed in the PAD (Section 5.2.1, Preliminary Studies List) to conduct separate studies for wildlife and botanical resources and for wetlands, riparian, and littoral habitat. The studies would describe terrestrial wildlife and botanical resources and floodplain, wetlands, riparian, and littoral habitats occurring in the study area based on a field reconnaissance survey conducted concurrently for both studies and through the review of existing information and data as summarized in the PAD.

In SD1, the Commission lists these proposed studies as Study No. 7, Terrestrial Resources (wildlife and botanical resources), and Study No. 8, Terrestrial Resources (wetlands, riparian, and littoral habitat). Georgia Power proposes herein to combine these two studies into a single Terrestrial Resources Study Plan because of their common field survey element and to consolidate into a single report all relevant information and analysis concerning the terrestrial resource issues identified in SD1. A separate study plan is also proposed for RTE species in Section 6.0 evaluating RTE species known to occur in the project area, and it also will incorporate relevant findings from the terrestrial resources field reconnaissance survey.

In its Study Requests, Comments on Preliminary Study Plan, and Requests for Additional Information letter dated June 18, 2015, FERC staff requested that the field surveys for terrestrial resources include certain study elements. These include: quantitatively describing and mapping vegetation cover types, wildlife, and an RTE species in areas where project-related disturbances would occur; delineating, quantitatively describing, and mapping all wetlands, bald eagle nests, and wading bird nests known to occur within the project boundary; and quantitatively describing the extent of any occurrences of terrestrial or aquatic non-native invasive species. Sensitive information pertaining to RTE species locations would be separated out and marked as “privileged” information upon filing the study results. Georgia Power has incorporated these elements in this Terrestrial Resources Study Plan.

In its PAD and SD1 comments, WRD requested that Georgia Power develop an aquatic vegetation plan for the project reservoir, which should outline all principles and practices as they relate to aquatic vegetation in the project reservoir and include notifying WRD of

aquatic nuisance vegetation treatment in the project area. Georgia Power proposes to develop these types of aquatic invasive species management information in the Terrestrial Resources Study.

5.3.3 Resource Management Goals

GDNR, FWS, and FS are the primary state and federal resource agencies having jurisdiction along the Oconee River pertaining to the protection of terrestrial resources.

GDNR has developed and implemented a Comprehensive Wildlife Conservation Strategy, also referred to as the State Wildlife Action Plan (SWAP), to conserve populations of Georgia's native wildlife species and their natural habitats before they become rarer and more costly to protect. The plan involves proactive measures emphasizing voluntary and incentive-based programs on private lands, habitat restoration and management by public agencies and private conservation organizations, rare species survey and recovery efforts, and environmental education and public outreach activities. The plan is currently undergoing comprehensive review and revision to incorporate new information and address changing conditions. The SWAP revision process involves staff within GDNR, representatives of private and public conservation organizations, and land managers and owners in Georgia.

While no specific resource management goals have been developed for the Wallace Dam project area in the SWAP, the intent is to maintain viable habitat for the native plant and animal species that would typically occur in the region and not to further contribute to the loss of native species in the region.

The Project currently occupies about 370 acres of FS lands within the Oconee NF, which abuts Lake Oconee's northernmost reaches (Figure 1-1). FS manages lands within the Oconee NF according to the direction provided in the Chattahoochee-Oconee NF Land and Resource Management Plan (FS, 2004). The Forest Plan guides all natural resource management activities and sets management standards. It describes resource management practices, levels of habitat production, protection, and management, and the availability and suitability of lands for resource management.

5.3.4 Existing Information

The Wallace Dam Project is located in the Southern Outer Piedmont ecoregion. Major forest types in the Southern Outer Piedmont ecoregion include loblolly-shortleaf pine, oak-hickory, and oak-pine forests. The PAD describes dominant native vegetation and other natural community types in the region and lists the Georgia invasive plant species posing the most serious problems or potential to become serious problems in the four counties occupied by the Project.

The wildlife community in the project area includes many terrestrial mammal species, a wide variety of birds using diverse, wetland, upland, and open-water habitats in the project vicinity, as well as diverse reptile and amphibian communities. The bald eagle, a Georgia threatened species, occurs year-round within the project area and nests on Lake Oconee within or near the project boundary. The PAD describes and lists the wildlife species occurring in the project area based on an extensive amount of existing information and data.

The wetlands surrounding the Wallace Dam Project are primarily palustrine forested, scrub-shrub, and emergent wetlands associated with Lake Oconee. There are approximately 2,360 acres of wetlands within the project boundary; forested/shrub wetlands are the dominant type. The wetlands and riparian areas provide diverse habitat for wildlife, including birds, reptiles, amphibians, and small mammals. The wetlands, riparian, and littoral habitats within and adjacent to Lake Oconee provide a variety of habitats preferred by waterfowl and wading birds. Important habitats in the project area include waterfowl impoundments downstream of Wallace Dam on Georgia Power land and in Oconee WMA, and Dyar Pasture Recreation Area at the upstream end of Lake Oconee (Figure 1-1).

Natural shoreline vegetation and riparian habitat exist within the floodplains along with residential developments and golf courses, resorts, and other businesses around the reservoir. The shoreline has been stabilized in many areas with seawalls and/or riprap. Georgia Power has occasionally documented small occurrences of nuisance invasive aquatic vegetation and cyanobacteria in Lake Oconee, and in a few instances has applied spot herbicide treatments.

5.3.5 Nexus between Project Operations and Effects

Lake Oconee is normally operated between elevations 433.5 and 435 ft PD, with average daily fluctuations of about 1.5 ft. Wallace Dam releases water downstream during peak power demand hours and pumps water back up into Lake Oconee at night for reuse in the next day's generation cycle. Wallace Dam discharges directly into the backwaters of Lake Sinclair, with no intervening riverine reach or bypassed reach.

The FERC project boundary encompasses the normal full pool elevation of Lake Oconee and a fee-simple strip of land owned by Georgia Power around the entire shoreline. The shoreline strip is generally 25-ft wide, with the exception of lands comprising the Oconee NF, and expands to widths of 100 to 200 ft across the reservoir from certain recreation areas. Larger land parcels define the project boundary in areas of the project works, Georgia Power's public recreation facilities, and other areas reserved for recreation development. The project boundary extends downstream of Wallace Dam about 4.0 river miles as thin strips of land along each side of the upper reach of Lake Sinclair (Figure 1-1).

5.4 Study Area

The proposed study area includes the project boundary around Lake Oconee including the project recreation facilities, the project lands adjacent to Wallace Dam, the project boundary around the Wallace Dam tailrace area, and the project transmission line right-of-way.

For the purposes of mapping vegetative cover types and wetlands, the study area will also include a zone extending to 2,000 ft beyond the project boundary around Lake Oconee to encompass a conservatively large area for characterizing the existing environment.

5.5 Methodology

Georgia Power's approach for completing the Terrestrial Resources Study consists of the following elements.

5.5.1 Review of Existing Information

Descriptions of existing terrestrial resources in the project study area (wildlife and botanical resources, and wetlands, riparian, and littoral habitat) will be based on review of existing information sources summarized in the PAD, inspection of existing aerial photography and National Wetlands Inventory (NWI) maps, and a field reconnaissance survey for observing habitat and specific plant and wildlife species occurrences and verifying approximate wetland boundaries and locations of significant beds of submerged aquatic vegetation (see below).

Terrestrial habitats will be quantitatively described and mapped in areas where project-related disturbances would occur. A map of vegetative cover types, including approximate wetland boundaries, will be prepared for the project boundary around Lake Oconee. Available habitat types will be compared against habitat requirements of wildlife known from the region to refine the list of species most likely to occur within the project area. Wildlife and plant species lists will be compiled for the common species found in the project area.

Wetlands, bald eagle nests, and wading bird nesting areas that occur within the project boundary will be approximately delineated, quantitatively described, and mapped. The extent to which these habitats may extend beyond the project boundary will also be described. Wildlife and plant species lists will be compiled for the common species found in the project area, and the extent of any known occurrences of aquatic non-native invasive plant species within the project boundary will be quantitatively described. Potentially sensitive information pertaining to bald eagle nesting and other RTE species locations will be separated out and marked as "privileged" information upon filing the study results.

In addition, Georgia Power will describe its invasive vegetation monitoring and management activities for Lake Oconee and project lands, including the species of invasive plants

previously reported from within the project boundary around Lake Oconee and the tailrace area, species and acreage treated, management techniques and frequency of maintenance applications, and guidance and best management practices used by Georgia Power in invasive vegetation management.

5.5.2 Field Reconnaissance Survey

A field reconnaissance survey of the study area, concentrating mainly on lands and waters within the project boundary, will be conducted in spring/early summer 2016 to observe representative terrestrial communities and associated wildlife habitat and to characterize wetland, riparian, and littoral habitats.

- Field biologists will inspect existing, recent aerial photography prior to and during the survey to identify signatures of representative upland, wetland, and riparian vegetation community types for reconnaissance.
- The survey will consist primarily of teams of two biologists each visually assessing upland, wetland, and riparian communities around and above the Lake Oconee and Wallace Dam tailrace shoreline from a boat and/or walking on Georgia Power and public lands. Areas inaccessible by boat or public lands will be evaluated by inspecting existing, recent aerial photography.
- Field notes will be recorded and aerial photographs annotated as to dominant vegetative cover classes, unique or unusual habitat types, observations of bird, reptile, amphibian, and mammal species, evidence of wildlife (nests, burrows, etc.), and locations of invasive plant species.
- A community evaluation form will be completed for each vegetative community observed. The form will be standardized for the survey to include a general habitat description, including moisture regime, and will document common species, invasive plant species, and any animal observations.
- Each wetland area, including submerged aquatic beds, will be documented on the community evaluation form, including common species, invasive plant species, and any animal observations. Each wetland will be characterized according to the FWS classification system (Cowardin et al., 1979).
- Where non-native invasive plant species are observed, biologists will estimate the size of the infestation and note whether the species appears to be actively spreading.
- Aerial photography and NWI maps will be used to help locate and verify approximate wetland boundaries for mapping purposes. Soils, hydrology, and plant composition

will be evaluated consistent with the USACE (1987) three-parameter approach, but wetland boundaries will not be formally delineated.

The field reconnaissance survey would likely be completed within 10 field days by three teams of two biologists each. Additional logistical support, such as boat operators or drivers, may be necessary. The field reconnaissance will not include a delineation of boundaries of wetlands suitable for a USACE jurisdictional determination, but will verify approximate boundaries of existing wetlands.

5.6 Reporting

In accordance with 18 CFR § 5.15(b), a Terrestrial Resources Study Progress Report will be prepared and provided to participants prior to the completion of the study. The progress report will describe overall progress in completing the field survey, summarize preliminary findings as available, and explain any variance from the study plan and schedule.

In accordance with 18 CFR § 5.15(c)(1), a Terrestrial Resources Study Report will be prepared and provided to participants for review and comment at the conclusion of the study. The study report will compile the information gathered from the field survey and the review of existing information and data.

5.7 Schedule

In accordance with the Wallace Dam Process Plan and Schedule and the master schedule provided in Section 1.4, the Terrestrial Resources Study will be completed according to the milestones listed in Table 5-1 below.

TABLE 5-1
Schedule for Conducting the Terrestrial Resources Study

Activity	Deadline
Begin Field Studies and Literature-Based Review	April 1, 2016
File Progress Report	August 31, 2016
Complete Field Studies and Literature-Based Review	September 30, 2016
File Final Study Report	November 18, 2016

5.8 References

Cowardin, L. M., V. Carter, F. C. Golet, and E. T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. 131 pp.

- U.S. Army Corps of Engineers. 1987. 1987 Wetland Delineation Manual. Wetlands Research Program Technical Report Y-87-1. U.S. Army Corps of Engineers Waterways Experiment Station Environmental Laboratory.
- U.S. Forest Service. 2004. Chattahoochee-Oconee National Forest land and resource management plan. U.S. Department of Agriculture, Forest Service Southern Region, Atlanta, GA. Management Bulletin R8-MB 113A. January 2004.

6.0 RARE, THREATENED, AND ENDANGERED SPECIES

6.1 Introduction

Georgia Power proposes to conduct a study to characterize existing federal and state RTE species of plants and wildlife that may be present in the Wallace Dam Project area through review of existing information and field surveys.

6.2 Goals and Objectives

The goal of the study is to characterize existing RTE species, including candidate and special concern species, that may be present in the project area for evaluating significant issues identified during FERC's public scoping process conducted pursuant to NEPA that have a nexus to project operations. The specific study objectives are to:

- List federal and state RTE plant and animal species with known records of occurrence near the project.
- Identify their habitat requirements.
- Describe distributions and habitat use of RTE species presently occurring near the project.

Information compiled in the PAD will be analyzed and updated for this study based on the findings of field surveys and other new information.

6.3 Study Background

The Commission's ILP requires an assessment of potential effects of continued project operation on RTE species in the license application (18 CFR § 5.18). This study will develop information needed to evaluate potential effects in consideration of resource issues identified during scoping, known resource management goals of agencies with jurisdiction over RTE species, the availability of existing information as to known occurrences of RTE species in the project area, and the requirement that there be a nexus between project operations and effects on RTE species.

6.3.1 Issues Identified

The Commission identified in SD1 the following resource issue pertaining to RTE species:

- Effects of continued project operation, maintenance, and project-related recreation on federally threatened or endangered species and their habitat in the vicinity of the

proposed project, including the endangered black-spored quillwort, mat-forming quillwort, harperella, and red-cockaded woodpecker, and the threatened pool sprite.

6.3.2 Study Requests

Georgia Power proposed in the PAD (Section 5.2.1, Preliminary Studies List) to conduct a study evaluating federal and state RTE plant and animal species with known occurrence records near the Project. The study would identify habitat requirements and describe distributions and habitat use of RTE species presently occurring near the Project. Information compiled in the PAD would be reconsidered and updated based on the findings of field surveys, consultation with resource agencies, and other new information. FERC listed the proposed study in SD1 as Study No. 9, Threatened and Endangered Species.

In its PAD, Study Requests, and Study Requests Modification letter dated June 18, 2015, FWS recommended that Georgia Power also consider species for which FWS has recently been petitioned to list under the Endangered Species Act and has subsequently issued a partial 90-day finding that listing may be warranted (Federal Register 76:59836). One such example is the inflated floater, a mussel species recently found in Lake Oconee. Georgia Power proposes to include the inflated floater and other petitioned aquatic species in its evaluation of RTE species.

6.3.3 Resource Management Goals

FWS and GDNR are the resource agencies having jurisdiction over federal and state RTE species. While no specific resource management goals have been developed for RTE species in the Wallace Dam project area, the intent is to maintain viable habitat for the RTE species that may occur in the project area.

6.3.4 Existing Information

Information on historic or present element of occurrences on RTE species potentially occurring in the upper Oconee River basin of Greene, Hancock, Morgan, and Putnam Counties, Georgia was retrieved from the following sources for the preparation of the PAD:

- GDNR Nongame Conservation Section rare species databases;
- FWS Environmental Conservation Online System;
- NatureServe (2014);
- Manuals on Georgia's rare plants (Patrick et al., 1995; Chafin, 2007); and

- Recovery plans and recent species evaluations completed by FWS for federally listed species.

Based on known element of occurrence records (historic or present) and species range and habitat data, five federally protected species of plants and wildlife potentially occur in the vicinity of the Wallace Dam Project. Seven other Georgia-listed plant species, seven state protected wildlife species, and an additional 18 species tracked by GDNR as species of special concern potentially occur in the project vicinity. Additionally, several nesting pairs of bald eagles are known to occur near Lake Oconee. As reproduced from the PAD, Table 6-1 lists all of these species and briefly describes their known habitat.

Federal Listed Species

Five federally threatened and endangered species potentially occur within the 4-county project vicinity (Table 6-1). These include 4 plant species and 1 bird species:

- Pool sprite (or little amphianthus) (*Amphianthus pusillus*) – threatened;
- Black-spored quillwort (*Isoetes melanospora*) – endangered;
- Mat-forming quillwort (*Isoetes tegetiformans*) – endangered;
- Harperella (*Ptilimnium nodosum*) – endangered; and
- Red-cockaded woodpecker (*Picoides borealis*) – endangered.

Brief accounts of the five federally protected species are provided in the PAD. Critical habitat has not been designated for any of these species. Two of the plant species, pool sprite and mat-forming quillwort, presently occur in vernal pools on a granite outcrop adjacent to, but outside, of the Wallace Dam project boundary in Putnam County. There are no known occurrences of the other three federally protected species within the project boundary.

State Protected Plant Species

Seven other Georgia listed plants potentially occur in the project vicinity, including one listed as endangered, three as threatened, two as rare, and one as unusual (Table 6-1). Based on reasonably available information, it is unknown whether these species occur within the project boundary. Two of the state-protected plant species, dwarf hatpins (endangered) and granite stonecrop (threatened), inhabit granite outcrops and could occur on the granite outcrop in the Oconee WMA near Wallace Dam.

TABLE 6-1

Rare, Threatened, and Endangered Species with Known Records of Occurrence in the Wallace Dam Project Vicinity^a

Scientific Name	Common Name	Federal Status ^b	Georgia Status ^c	Global Rank ^d	Habitat ^e	County
PLANTS:						
<i>Amorpha schwerinii</i>	Schwerin indigo-bush			G3G4	Rocky river bluffs and upland woods.	Greene
<i>Amphianthus pusillus</i>	Pool sprite	LT	T	G2	Shallow, flat-bottomed depressions (solution pits, vernal pools) on granite outcrops, with thin gravelly soils and winter-spring inundation.	Greene Putnam Hancock
<i>Cypripedium acaule</i>	Pink ladyslipper		U	G5	Upland pine and mixed pine-hardwood forests with acidic soils; in the mountains, near edges of rhododendron thickets and mountain bogs.	Morgan
<i>Eriocaulon koernickianum</i>	Dwarf hatpins		E	G2	Seepage areas and wet depressions on granite outcrops, often with horned bladderwort.	Greene Hancock
<i>Eurybia avita</i>	Alexander rock aster			G3	Granite outcrops; rooted in shallow soils of moist depressions in light shade.	Hancock
<i>Eurybia jonesiae</i>	Piedmont bigleaf aster			G3?	Rich deciduous forests bordering rivers and streams; moist ravines.	Morgan
<i>Fimbristylis brevivaginata</i>	Flatrock fimbry			G2	Sunny, wet areas on granite outcrops, such as around pools or along wet cracks in the rock.	Hancock
<i>Isoetes melanospora</i>	Black-spored quillwort	LE	E	G1	Shallow, temporarily flooded, flat-bottomed pools formed by natural erosion on granite outcrops.	Greene
<i>Isoetes tegetiformans</i>	Mat-forming quillwort	LE	E	G1	Shallow pools formed by natural erosion on granite outcrops.	Greene Putnam Hancock
<i>Lindera subcoriacea</i>	Bog spicebush			G2G3	Shrubby, seepage wetlands with peaty-mucky soils, such as hillside bogs and stream-heads.	Hancock
<i>Ludwigia spathulata</i>	Creeping smallflower seedbox			G2	Exposed shores and bottoms of cypress-gum ponds, sink-hole ponds; granite outcrop pools.	Hancock
<i>Panax quinquefolius</i>	American ginseng			G3G4	Rich, cool, moist but not extremely wet woods,	Greene

TABLE 6-1

Rare, Threatened, and Endangered Species with Known Records of Occurrence in the Wallace Dam Project Vicinity^a

Scientific Name	Common Name	Federal Status ^b	Georgia Status ^c	Global Rank ^d	Habitat ^e	County
					under a closed canopy.	
<i>Pilularia americana</i>	American pillwort			G5	Granite outcrops, seasonally exposed muddy shores.	Greene Hancock
<i>Ptilimnium nodosum</i>	Harperella	LE	E	G2	Granite outcrop seeps.	Greene Putnam Hancock
<i>Quercus oglethorpensis</i>	Oglethorpe oak		T	G3	Wet clay soils of upland seepage swamps, stream terraces, and moist hardwood forests.	Greene Putnam
<i>Schisandra glabra</i>	Bay star-vine		T	G3	Moist, deciduous hardwood forests on lower slopes, stream terraces, and floodplains.	Morgan
<i>Scutellaria nervosa</i>	Bottomland skullcap			G5	Rich floodplain forests and mesic to dry upland forests, generally over mafic or calcareous rocks.	Putnam
<i>Sedum pusillum</i>	Granite stonecrop		T	G3	Granite outcrops, usually in mats of moss beneath red cedar trees.	Greene
<i>Stewartia malacodendron</i>	Silky camellia		R	G4	Rich ravine and slope forests; lower slopes of sandhills above bogs and creek swamps.	Hancock
<i>Waldsteinia lobata</i>	Piedmont barren strawberry		R	G2G3	Stream terraces, floodplain forests, and rocky, lower slopes with oak-hickory-pine forest.	Morgan
MUSSELS:						
<i>Elliptio congaraea</i>	Carolina slabshell			G3	Sandy substrates in rivers and small streams; occurs in Ogeechee River but not Oconee River.	Hancock
<i>Fusconaia masoni</i>	Atlantic pigtoe		E	G2	Sand and gravel in large creeks and rivers; occurs in Ogeechee River but not Oconee River.	Hancock
FISH:						
<i>Cyprinella xaenura</i>	Altamaha shiner		T	G2G3	Small tributaries and rivers; often found in small	Greene

TABLE 6-1

Rare, Threatened, and Endangered Species with Known Records of Occurrence in the Wallace Dam Project Vicinity^a

Scientific Name	Common Name	Federal Status ^b	Georgia Status ^c	Global Rank ^d	Habitat ^e	County
					pools with rocky to sandy substrates.	Morgan Putnam
<i>Etheostoma parvipinne</i>	Goldstripe darter		R	G4G5	Small streams, spring seeps, and runs with aquatic vegetation; occurs below the Fall Line.	Hancock
<i>Moxostoma robustum</i>	Robust redhorse		E	G1	Medium to large rivers, shallow riffles to deep flowing water; moderately swift current.	Putnam
<i>Moxostoma</i> sp. 4	Brassy jumprock			G4	Silty to rocky pools and slow runs of large creeks; small to medium rivers; impoundments.	Morgan Hancock Putnam
AMPHIBIANS:						
<i>Hemidactylium scutatum</i>	Four-toed salamander			G5	Under objects or among mosses in swamps, boggy streams, and wet areas near quiet pools.	Greene Morgan Hancock Putnam
<i>Necturus punctatus</i>	Dwarf waterdog			G4	Sluggish streams with substrate of leaf litter or woody debris.	Hancock
REPTILE:						
<i>Clemmys guttata</i>	Spotted turtle		U	G5	Heavily vegetated swamps, marshes, bogs, and small ponds in soft, mucky substrates.	Hancock
BIRDS:						
<i>Peucaea aestivalis</i>	Bachman's sparrow		R	G3	Open pine or oak woods, clear-cuts, utility rights-of-way, old fields, and brushy areas.	Hancock
<i>Haliaeetus leucocephalus</i>	Bald eagle		T	G5	Almost always nest near open water (rivers, lakes, coastal waters, wetlands). Usually found in large, open-topped pines near open water.	Greene Morgan Hancock Putnam

TABLE 6-1

Rare, Threatened, and Endangered Species with Known Records of Occurrence in the Wallace Dam Project Vicinity^a

Scientific Name	Common Name	Federal Status ^b	Georgia Status ^c	Global Rank ^d	Habitat ^e	County
<i>Laterallus jamaicensis</i>	Black rail			G4	Freshwater marshes, salt marshes.	Greene
<i>Limnothlypis swainsonii</i>	Swainson's warbler			G4	Rich, damp, deciduous floodplain and swamp forests in areas with dense undergrowth.	Greene
<i>Picoides borealis</i>	Red-cockaded woodpecker	LE	E	G3	Large expanses of mature, open pine forest, particularly longleaf, slash, or loblolly pine. Nests in old living pines.	Putnam
<i>Rallus elegans</i>	King rail			G4	Freshwater to brackish marshes, marsh edges, rice fields, flooded farmlands, shrub swamps.	Greene
<i>Tyto alba</i>	Barn owl			G5	Nests in large hollow trees or old barns in areas with pasture, grassland, or open marsh.	Morgan
MAMMAL:						
<i>Myotis austroriparius</i>	Southeastern myotis			G3G4	Buildings and other structures, mines, and hollow trees for spring and summer roosts; also found in small number of caves in Georgia.	Greene

Sources:

^a This list is for rare species with known element of occurrence records in Hancock, Greene, Morgan, and/or Putnam Counties, Georgia.

^b Federal status: **LE** = listed endangered; **LT** = listed threatened.

^c Georgia state status: **E** = Georgia endangered; **T** = Georgia threatened; **R** = Georgia Rare; **U** = Georgia unusual.

^d Global ranks: **G1** = critically imperiled, at very high risk of extinction due to extreme rarity; **G2** = imperiled, at high risk of extinction due to very restricted range; **G3** = vulnerable, at moderate risk of extinction due to restricted range; **G4** = apparently secure, uncommon but not rare; **G5** = secure – common, widespread, abundant; **?** = denotes inexact numeric rank.

^e Habitat descriptions from GDNR (2013), Chafin (2007), NatureServe (2014).

State Protected Wildlife Species

Seven state protected wildlife species potentially occur in the project vicinity, including one mussel, three fish, one reptile, and two birds (Table 6-1). The mussel species (Atlantic pigtoe) does not occur in the Oconee River basin; it inhabits the adjacent Ogeechee River basin, and therefore, does not occur in the project vicinity. Of the three fish species, only the Altamaha shiner presently occurs in the Oconee River basin upstream of Wallace Dam. The Altamaha shiner has been reported from relatively recent collections in tributary streams upstream of Lake Oconee, including the Oconee River, Apalachee River, Hard Labor Creek, and Richland Creek (GDNR, 2014; Straight et al., 2009; Nuckols and Roghair, 2004b). Altamaha shiners inhabit small streams and rivers, where they are most often found in small pools with rocky and sandy substrates (Freeman, 2008).

Several established nesting pairs of bald eagles occur along Lake Oconee, either within or immediately adjacent to the project boundary. The species is protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

Based on reasonably available information, it is unknown whether the spotted turtle and Bachman's sparrow have been documented as occurring within the project boundary.

Species of Concern

An additional 18 species tracked by GDNR as species of special concern potentially occur in the project vicinity (Table 6-1). These include nine plants, one mussel, one fish, two amphibians, four birds, and one bat. The mussel species (Carolina slabshell) does not occur in the Oconee River basin, but rather inhabits the adjacent Ogeechee River basin. The fish species, brassy jumprock, has been reported from Lake Oconee and inhabits the Oconee River and three other tributaries to Lake Oconee upstream of the project boundary.

6.3.5 Nexus between Project Operations and Effects

Lake Oconee is normally operated between elevations 433.5 and 435 ft PD, with average daily fluctuations of about 1.5 ft. Wallace Dam releases water downstream during peak power demand hours and pumps water back up into Lake Oconee at night for reuse in the next day's generation cycle. Wallace Dam discharges directly into the backwaters of Lake Sinclair, with no intervening riverine reach or bypassed reach.

The FERC project boundary encompasses the normal full pool elevation of Lake Oconee and a fee-simple strip of land owned by Georgia Power around the entire shoreline. The shoreline strip is generally 25-ft wide, with the exception of lands comprising the Oconee NF, and expands to widths of 100 to 200 ft across the reservoir from certain recreation areas. Larger land parcels define the project boundary in areas of the project works, Georgia Power's

public recreation facilities, and other areas reserved for recreation development. The project boundary extends downstream of Wallace Dam about 4.0 river miles as thin strips of land along each side of the upper reach of Lake Sinclair (Figure 1-1).

6.4 Study Area

The proposed study area includes the area located inside the project boundary around Lake Oconee and the Wallace Dam tailrace area, and project lands adjacent to Wallace Dam, the project recreation facilities, an FS recreational access to Lake Oconee. Literature review and analysis of existing information and data will extend to the upper Oconee River basin and the four counties occupied by the Project (Greene, Hancock, Morgan, and Putnam Counties).

6.5 Methodology

Georgia Power's approach for completing the RTE Species Study consists of the following elements.

6.5.1 Review of Existing Information

The review will result in a tabular listing of RTE species with known records of occurrence in and near the Wallace Dam Project, their federal or state status (or that they have been petitioned for federal listing), their global and state ranks, their habitat requirements, and county of known occurrence. The listing will be prepared based on review of existing information sources listed above and contacts with the GDNR Nongame Conservation Section and FWS.

This activity will update and refine the listing of RTE species in Table 6-1 (reproduced from the PAD). RTE species with known records of occurrence in the project vicinity will be identified with respect to their historic and present distributions, their habitat use, and the potential availability of such habitats in the study area. Species potentially occurring in the project area will be characterized further as to their documented occurrences within the study area (upper Oconee River basin; and Greene, Hancock, Morgan, and Putnam Counties). Any present occurrences of RTE species within the project boundary will be identified. Information on species being tracked by GDNR as species of concern and species petitioned for federal listing (e.g., inflated floater) will also be summarized.

The following sources of existing information will be reviewed in completing this RTE Species Study:

- The GDNR Nongame Conservation Section on-line databases providing inventory data by county, quarter quad sheet, and watershed (HUC 10) for protected species and species of concern in Georgia.
- The FWS Environmental Conservation Online System and associated listing information, critical habitat designations, recovery plans, and status reviews; and the FWS Georgia Ecological Services Field Offices website, which provides links to endangered species information and facilitates requests for county listings of species.
- The freshwater mussel survey planned as part of Fish and Aquatic Resources Study described in Section 4.5.3.
- NatureServe compilation of species information for the Lake Oconee region.
- Research publications, regional texts, and other technical reports, including Field Guide to Protected Plants of Georgia (Chafin, 2007) and GNHP's protected plants (Patrick et al., 1995) and protected animals (GDNR, 1999) manuals for Georgia.

6.5.2 Field Surveys

A field survey for freshwater mussel species is proposed under the Fish and Aquatic Resources Study Plan in Section 4.5.3.

Georgia Power proposes to conduct a field reconnaissance survey that will identify potentially suitable habitats for RTE species of plants and wildlife within the study area. This survey will be conducted concurrently with the survey of wildlife, botanical, wetlands, riparian, and littoral habitats proposed in the Terrestrial Resources Study Plan (Section 5.5). As described in Section 5.5.2, the field work would likely be completed in about 10 field days by three teams of two biologists.

Field surveys will be conducted according to the following methods:

- Existing topographic maps, NWI maps, and recent aerial photography will be inspected prior to the survey to identify areas of potentially suitable habitat for protected species of interest.
- Surveys will be conducted by biologists visually assessing habitats along and above the shoreline from a boat and/or walking on public lands during spring or early

summer to coincide with flowering times of RTE plants having the greatest potential to occur in the study area.

- Observations of federally protected or state-protected species will be recorded on the appropriate GDNR Nongame Conservation Section reporting forms available for special concern plants and animals.
- Areas inaccessible by boat or public lands relevant to the project area will be evaluated by inspecting existing aerial photography.
- Particular attention will be given to any areas of previously documented sensitive plant occurrences, including granite outcrop habitats located in the Oconee WMA within the project boundary, or other areas of potentially suitable habitat as determined by field observation.
- Occurrences of RTE plants will be recorded as either an area polygon containing many plants, or a point for a single plant or a few plants, using a GPS unit. Habitat and demographic information will be recorded for the occurrence.

Should potentially suitable habitat be found within the project boundary for pool sprite, black-spored quillwort, mat-forming quillwort, or harperella, additional surveys could be required to determine whether these species occur. Any additional surveys would be timed to occur during the optimum time for identifying each species.

6.5.3 Analysis of Information and Data

Existing, relevant, and reasonably available information and data gathered during the RTE surveys in the form of log books, notes, and field data sheet entries will be compiled into electronic tabular and narrative form to describe existing and likely occurrences of RTE species in and near the Project. The results of the freshwater mussel survey conducted separately will be incorporated into this analysis. Maps or graphical illustrations will be used as appropriate to complement the narrative. This body of information will ultimately be used to evaluate the effects of continued project operations on RTE species in the project area.

6.6 Reporting

In accordance with 18 CFR § 5.15(b), an RTE Species Study Progress Report will be prepared and provided to participants prior to the completion of the study. The progress report will describe overall progress in completing the field survey, summarize preliminary findings as available, and explain any variance from the Study Plan and schedule.

In accordance with 18 CFR § 5.15(c)(1), an RTE Species Study Report will be prepared and provided to participants for review and comment at the conclusion of the study year. The study report will summarize current presence or absence of RTE species within the project area and, if RTE species are present, discuss any potential effects associated with continued project operations.

6.7 Schedule

In accordance with the Wallace Dam Process Plan and Schedule and the master schedule provided in Section 1.4, the RTE Species Study will be completed according to the milestones listed in Table 6-2 below.

TABLE 6-2
Schedule for Conducting the RTE Species Study

Activity	Deadline
Begin Field Studies and Literature-Based Review	March 1, 2016
File Progress Report	August 31, 2016
Complete Field Studies and Literature-Based Review	September 30, 2016
File Final Study Report	November 18, 2016

6.8 References

- Chafin, L.G. 2007. Field guide to the rare plants of Georgia. The State Botanical Garden of Georgia. Athens, Georgia.
- Freeman, B. J. 2008. Species profile for Altamaha shiner, *Cyprinella xaenura*. Georgia Department of Natural Resources. Accessed December 22, 2014. Available online at www.georgiawildlife.com/conservation.
- Georgia Department of Natural Resources. 1999. Protected animals of Georgia. Wildlife Resources Division. Nongame Wildlife Natural Heritage Section, Social Circle, GA.
- Georgia Department of Natural Resources. 2014. Occurrences by HUC 10 watershed of the Altamaha shiner (*Cyprinella xaenura*) and recent aquatic survey locations. Map created January 10, 2014. Wildlife Resources Division, Nongame Conservation Section. http://www.georgiawildlife.com/sites/default/files/uploads/wildlife/nongame/images/status_maps/aquatic/fishes/csam_cyprinella_xaenura.jpg.
- NatureServe. 2014. NatureServe Explorer, an online encyclopedia of life. Version 7.1 (2 February 2009). Data last updated March 2014. <http://explorer.natureserve.org/>.

- Nuckols, D.R., and C.N. Roghair. 2004. Presence of Altamaha shiner (*Cyprinella xaenura*) and Ocmulgee shiner (*Cyprinella callisema*) within several Chattahoochee-Oconee National Forest streams, September 2003. U.S. Forest Service Southern Research Station, Blacksburg, Virginia.
- Patrick, T.S., J.R. Allison, and G.A. Krakow. 1995. Protected plants of Georgia. Georgia Department of Natural Resources, Wildlife Resources Division. 246 pp.
- Straight, C.A., B. Albanese, and B.J. Freeman. 2009. Fishes of Georgia Website, Georgia Museum of Natural History, updated March 25, 2009. Accessed December 14, 2014 at: <http://fishesofgeorgia.uga.edu/>.

7.0 RECREATION AND LAND USE

7.1 Introduction

Georgia Power proposes to conduct a study characterizing existing recreational use and land use at the Wallace Dam Project and to evaluate the potential impacts of continued project operation on these resource areas. This study will be accomplished through the compilation and analysis of abundant existing recreational use information, including the results of recent field monitoring and surveys conducted at project recreation facilities to determine recreation usage trends and demand.

7.2 Goals and Objectives

The goal of this study is to develop information for characterizing existing recreation and land use at the Project and evaluate recreation and land use issues identified during FERC's public scoping process pursuant to NEPA that have a nexus with project operations.

The specific objectives of this study are to:

- Review existing information to describe existing recreation and land use in the Wallace Dam project area.
- Characterize the effects of continued project operation on recreational opportunities at the Project.
- Characterize existing recreational capacity and usage on Lake Oconee and in the Wallace Dam tailrace area.
- Evaluate the adequacy of existing recreational facilities to meet current and future recreational demand, including fishing tournaments at the Project.
- Evaluate the adequacy of the existing Shoreline Management Program to address land use practices, including erosion, and protect environmental resources within the project boundary.

7.3 Study Background

This study will develop information needed to evaluate potential impacts of continued project operation in the PLP and license application in consideration of: (1) the recreation and land use issues identified during NEPA scoping; (2) the studies requested by resource agencies; (3) the known resource management goals of the agencies with jurisdiction over recreation and land use; (4) existing information and data concerning recreation and land use in the

project area; and (5) the requirement for there being a nexus between project operations and effects on the resources being evaluated.

The PAD described the existing recreation facilities providing access to Lake Oconee and the Wallace Dam tailrace area in detail (Figure 1-1). Table 7-1 summarizes the operational responsibility, type of use, and amenities for each access point. Seven Georgia Power project recreation facilities, three FS facilities, and 14 privately owned facilities provide direct access to the Wallace Dam project area. Additionally, there are numerous “unofficial” locations that are popular spots for bank fishing along highways and bridge crossings.

7.3.1 Issues Identified

The Commission identified in SD1 the following list of resource issues pertaining to recreation and land use:

- Effects of the average daily 1.5-ft fluctuation of Lake Oconee on recreational opportunities at the Project, including use of existing boat launches.
- Effects of continued project operation on downstream recreational use in the project tailrace fishing area.
- Adequacy of existing public access and recreational facilities in the project boundary to meet current and future recreation demand, including special events (e.g., fishing tournaments) at the project.
- Adequacy of the existing Shoreline Management Program to address land use practices, including erosion, and protect environmental resources within the project boundary.

7.3.2 Study Requests

Georgia Power proposed in the PAD (Section 5.2.1, Preliminary Studies List) to conduct a study to characterize existing recreational use and land use at the Project and to evaluate the need for additional recreational access or facilities at Lake Oconee. FERC listed Georgia Power’s proposed study in SD1 as Study No. 10, Recreation and Land Use. The study would review existing information to describe recreation, land use, and visual aesthetic qualities in the Wallace Dam Project area; characterize current types and levels of recreational use on the reservoir and in the tailrace area; and evaluate the need for additional recreational access or facilities at the project. The study effort would include: (a) review and analysis of campground surveys and use information; (b) compilation and analysis of the Licensed Hydropower Development Recreation Report (Form 80) data; (c) review and analysis of fish tournament data and FS use data; and (d) an assessment of the adequacy of existing facilities.

TABLE 7-1
Recreation Facilities Providing Access to the Wallace Dam Project

Park/Facility	County	Acreage	Address	Amenities
Georgia Power Owned and Operated Facilities (located within Project Boundary):				
Armour Bridge	Greene	11	Brown's Ford Road, Greensboro	1 Boat Ramp (2 lanes), 30 parking slots, Barrier Free, Fishing, Picnic, Restrooms, Public Access within Reynolds Plantation
Lawrence Shoals Park	Putnam	81	123 Wallace Dam Road, Eatonton	1 Boat Ramp (2 lanes), 68 parking slots, 3 Docks, Full Service Campground, Primitive Campsites, Nature Trails, Swimming Beaches, Restrooms, Picnic Pavilion, Playground
Long Shoals Boat Ramp	Putnam	6	Long Shoals Road, Eatonton	1 Boat Ramp (2 lanes), 30 parking slots, 1 Dock, Barrier Free, Picnic
Old Salem Park	Greene	105	1530 Old Salem Road, Greensboro	1 Boat Ramp (2 lanes), 123 parking slots, 3 Docks, Full Service Campground, Primitive Campsites, Swimming Beaches, Restrooms, Picnic Pavilion, Playground
Parks Ferry Park	Greene	122	1491 Parks Mill Road NE, Greensboro	1 Boat Ramp (2 lanes), 74 parking slots, 1 Dock, Full Service Campground, Primitive Campsites, Swimming Beaches, Restrooms, Picnic Pavilion, Playground
Sugar Creek Boat Ramp	Putnam	9	Parks Mill Road, Buckhead	1 Boat Ramp (2 lanes), 37 parking slots, Barrier Free
Tailrace Fishing Area	Putnam	1	Wallace Dam Road West	Fishing Platform and Parking.
FS Owned and Operated Facilities:				
Dyar Pasture Recreation Area	Greene	36	USFS Road 1276 at Copeland Road, Greensboro	Boat Ramp (2 lanes), Fishing, Nature Trail, Picnic Facilities and Restroom
Redlands Recreation Area	Greene	8	USFS Road 1255 at US Hwy 278, Greensboro	Paved Boat Ramp (3 lanes), 2 picnic tables and Grill, Restrooms (No Water), 100 parking slots
Swords Recreation Area	Morgan	7	Blue Springs Road, Buckhead	Paved Boat Ramp (3 lanes), Courtesy Boat Dock, Restrooms, 100 parking slots
Privately Owned and Operated Facilities:				
Apalachee Bait Shop & Fish Camp	Morgan		1010 Apalachee River Rd, Madison	Boat Launch, Primitive Campsites, Restrooms
Blue Springs Marina	Morgan		1291 Blue Springs Drive, Buckhead	Food, Gas, Restaurant, Marina, Restrooms
Boathouse at Harbor Club	Greene		3991 Walker Church Road, Greensboro	Food, Full Service Campground, Gas, Marina, Picnic, Restrooms
Greene County Boat	Greene		SE End of Howard Lewis Road,	

TABLE 7-1
Recreation Facilities Providing Access to the Wallace Dam Project

Park/Facility	County	Acreage	Address	Amenities
Ramp			White Plains	
Great Waters Marina	Putnam		154 Oakton South, Eatonton	Reynolds Plantation
Hwy 44 Public Fishing	Greene		136 Clack Cir, Eatonton	Shoreline Fishing
Hwy 44 Public Fishing (Jerry's)	Putnam		1054 Greensboro Rd, Eatonton	Gas, Store
Lake Club Marina	Greene		Brown's Ford Road, Greensboro	Reynolds Plantation - Indoor/Outdoor Pools, Food, Children's Area, Beach Access, Boat Ramps and Docks
The Landing Marina	Greene		1021 Long Cove Drive, Greensboro	Reynolds Plantation - Boat Ramps and Docks
North Shore Resort	Greene		2541 Carey Station Road, Greensboro	Full RV accommodations, Rental Units, Picnic Pavilions, Two Swimming Pools, Fishing, Swimming, Boat Ramp, Game Courts, Playground, RV Storage
Oconee Outdoors and Marina	Putnam		891 Greensboro Road, Eatonton	Full Service Marina with Dry Storage, Fishing and Boat Ramps
Reynolds Plantation Marina	Greene		100 Linger Longer Road, Greensboro	Reynolds Plantation - Boat Ramps and Docks
Sugar Creek Marina	Putnam		353 Parks Mill Road, Buckhead	Gas, Marina, Picnic, Restrooms
Waterfront Marina	Putnam		144 Collis Marina Road, Eatonton	Food, Full Service Campground, Gas, Marina, Picnic, Restrooms

Recreation Use/Needs Study

WRD is the only agency that provided a specific study request related to recreation. In its PAD and SD1 comments letter dated June 15, 2015, WRD requested a recreational use/needs study to determine the adequacy of the existing recreational facilities to meet the current and future recreational demand. The objectives of the study would be to: determine whether existing recreational facilities are adequate to meet public demand; determine accurate use data and recreational demand over the life of the license; determine options for providing boating access areas large enough to accommodate fishing tournaments; and determine options to increase access for bank anglers.

In reference to the recreational use estimates included in the PAD from the FERC Licensed Hydropower Development Recreation Report (Form 80) from 2009, WRD questioned how these statistics were calculated and expressed concern about the difficulty assessing the accuracy of the recreational use and capacity data. WRD requests that Georgia Power evaluate its project recreational facilities as to the adequacy of existing boating access and believes that multiple-lane fishing tournament boat ramps and additional bank fishing facilities are needed to accommodate all anglers and should be considered.

Georgia Power proposes herein to conduct a recreation study that will address the interests of WRD for assessing the adequacy of the existing recreational facilities to meet the current and future recreational demand and evaluating the need for additional facilities.

Recreation and Land Use Study Comments

In its Study Requests, Comments on Preliminary Study Plan, and Requests for Additional Information letter dated June 18, 2015, FERC staff requested that the Recreation and Land Use Report describe for any lands designated for future recreation development Georgia Power's use of such tract(s), including but not limited to the original intended use, the historical use, and plans for future use. FERC also requests that Georgia Power's results of the Licensed Hydropower Development Recreation Report (Form 80) from 2015 be included for use and analysis in the Recreation and Land Use Study.

Georgia Power proposes to present and analyze the recreational use information data used to compile the 2015 Form 80. Data gathered at the project recreation facilities includes car counters, cameras, and visual observations, as well as the campground customer satisfaction surveys performed in 2011 and 2014 as the most up-to-date recreational data for the study.

7.3.3 Resource Management Goals

WRD and FS are the primary resource agencies having jurisdiction over recreation resources on Lake Oconee and the Oconee River.

WRD has the goal of managing the project waters to provide a quality outdoor recreational experience, including components related to quality public access to the natural resource as well as implementing statewide fish harvest regulations to help manage and conserve sport fish populations.

FS manages lands within the Oconee NF according to the direction provided in the Chattahoochee-Oconee NF Land and Resource Management Plan (FS, 2004). Recreational goals established in the Forest Plan include providing a spectrum of high quality, nature-based recreation settings and opportunities that reflect the unique or exceptional resources of the Forest and the interests of the recreating public on an environmentally sustainable, financially sound, and operationally effective basis.

7.3.4 Existing Information

The following sources of existing information, described further in the PAD, will be reviewed in completing the Recreation and Land Use Study:

- Form 80 Licensed Hydropower Development Recreation Report from 2015 and supporting data;
- Campground Customer Satisfaction Surveys from 2011 and 2014 and shoreline customer survey information from the same time period;
- The Statewide Comprehensive Outdoor Recreation Plan (SCORP) for Georgia;
- Chattahoochee-Oconee NF Land and Resource Management Plan (FS, 2004) and associated recreation and land use information;
- Regional Recreation Plans (Northeast Georgia Plan, Central Savannah River Area Plan);
- Georgia Power Shoreline Management Guidelines; and
- Population and employment projections developed by the University of Georgia for the Georgia state-wide water planning process.

7.3.5 Nexus between Project Operations and Effects

Georgia Power operates the Wallace Dam Project as a pumped storage development. Wallace Dam generates during peak power demand hours to meet the electrical system demand. Some of this released water remains in Lake Sinclair for a few hours before being pumped back up and into Lake Oconee by the reversible units for reuse in the next day's generation cycle. Generation occurs during the day, and pumpback operations occur at night.

The average daily fluctuation of Lake Oconee is approximately 1.5 ft. There is no intervening riverine reach or bypassed reach of river between Wallace Dam and Lake Sinclair and no instantaneous discharge requirement at Wallace Dam.

The FERC project boundary encompasses the normal full pool elevation of Lake Oconee and a fee-simple strip of land owned by Georgia Power around the entire shoreline. The shoreline strip is generally 25-ft wide, with the exception of lands comprising the Oconee NF, and expands to widths of 100 to 200 ft across the reservoir from certain recreation areas. Larger land parcels define the project boundary in areas of the project works, Georgia Power's public recreation facilities, and other areas reserved for recreation development. The project boundary extends downstream of Wallace Dam about 4.0 river miles as thin strips of land along each side of the narrow upper reach of Lake Sinclair (Figure 1-1).

7.4 Study Area

For the purposes of recreation and land use resources, the proposed study area includes: the project boundary extending around Lake Oconee and the Wallace Dam tailrace area, including the project recreation facilities and FS recreational access to Lake Oconee; and the four counties directly adjacent to the Project (Hancock, Putnam, Greene, and Morgan Counties) for future recreational demands analysis based on forecasted population growth.

The land use assessment will also include a zone extending to 2,000 ft beyond the project boundary to encompass a conservatively large area for characterizing existing land use around the Project, including the preparation of a land use map.

7.5 Methodology

Georgia Power's study approach for completing the Recreation and Land Use Study will analyze existing information and data to identify recreational usage trends and recreation demand. Existing recreation and land use in the project study area will be described based on: review of existing information sources listed in Section 7.3.4; analysis of the most recent recreational use information gathered by Georgia Power for the 2015 Form 80 and in campground customer satisfaction surveys and shoreline customer surveys; interviews with recreation managers and user groups; and review of available fishing tournament information and FS recreational use data.

The seven project recreation facilities and the three FS recreation access facilities will be delineated as to their associated acreage within the project boundary, and inventoried and described in terms of numbers of boat ramps, picnic tables, grills, picnic shelters, benches, restrooms, fishing docks, playgrounds, improved versus unimproved camp sites, hiking/nature trails, and car and boat trailer parking areas. The barrier-free characteristics of these facilities will be noted as well as their ability to provide access to persons with physical

disabilities. Private entities operating facilities and providing access, equipment, or storage for boating or sailing on the project waters will also be described. In addition, existing data on boat launch elevations will be used to assess the effects of average daily reservoir fluctuations of 1.5 ft on recreational opportunities at the Project.

Georgia Power will review current and future recreation needs identified in the SCORP, applicable plans, comprehensive plans, and resource management plans, as identified in the PAD (Sections 4.8, and 5.3). Georgia Power will seek additional land use and recreational use information for the Wallace Dam Project from:

- Interviews with FS, which operates three recreation sites within the project area in the Oconee NF, including (as named on the FS website) the Swords Recreation Area, Redlands Recreation Area, and Dyar Pasture Recreation Area (Table 7-1).
- Interviews with the park hosts that operate the camping facilities at several Georgia Power recreation facilities.
- Interviews with operators of private facilities.
- Interviews with Lake Oconee Anglers, Lake Oconee Bassmasters, and other fishing clubs that regularly use Lake Oconee for fishing tournaments.
- Interviews with the Chambers of Commerce for Putnam, Morgan, and Greene Counties.
- Organizations that organize or compile information on fishing tournaments on Lake Oconee.
- Campground use data at Lawrence Shoals, Old Salem, and Parks Ferry Parks, which will be provided by Georgia Power.
- Consultation with the Reynolds Plantation and other homeowners associations regarding its use of the reservoir and recreation facilities.
- Consultation with Hancock, Putnam, Greene, and Morgan Counties to obtain the most recent land use and zoning information.

A regional recreation overview and assessment of major recreation destinations within a 60-mile (1-hour) driving radius of the project boundary will also be developed. Summary descriptions of regional recreational facilities (including capacity, if available), trends and preferences will be developed from reasonably available information.

7.5.1 Recreation Assessment

Annual recreation use of the project reservoir will be estimated by extrapolating data contained in Form 80, recently updated in 2015. In completing Form 80, Georgia Power utilized a variety of recreational use sampling methods including trail cameras, traffic counters, attendance records, staff observations, visitor counts/surveys, and estimation. Sampling was conducted according to a planned schedule to target both winter and summer seasons, as well as to capture all the summer “peak” weekends (Memorial Day, Independence Day, and Labor Day).

The methods used in developing Form 80 values are described here. The raw data for Form 80 will be analyzed in detail for the Wallace Dam recreation assessment. Trail cameras were installed in high use areas to allow for observations of boat ramps and parking lots. Photographs were reviewed to count the number of axles and vehicles. Axle count was used to determine the number of vehicles and trailers recorded on traffic counters. Attendance records at campgrounds were collected by park hosts in Georgia Power owned facilities. Visitor counts and surveys were completed by operators of non-Georgia Power facilities to gather use information at these locations.

Georgia Power performed customer satisfaction surveys of its campground customers in 2011 and in 2014. The 2014 survey was distributed to all campground visitors between July 4th and September 1st and collected via a designated drop box; a total of 398 completed surveys were collected. Customer comments from the campground surveys are tracked, evaluated for feasibility and cost, and acted upon by the Georgia Power Parks Committee and the respective office managers on an ongoing basis. Follow-up actions may include construction, maintenance, and other capital or operational improvements to enhance the quality of the experience.

The Wallace Dam Project 2015 Form No. 80 Report estimated 376,000 daytime and 137,000 nighttime recreation days annually at the Project for the summer recreation season that runs from May 1 to October 31 each year. Of these, 36,000 daytime visits and 14,500 nighttime visits were observed on an average peak weekend. The assumptions and site-specific adjustment factors applied in scaling estimates of the number of recreation days will be clearly documented.

Information regarding WMAs is available from GDNr. GDNr recently commissioned a study of the Georgia’s WMAs to estimate county-level and statewide activity and to determine the contribution that select sportsman-related visitation activity makes to the economy. Drawing from license sales records of hunters with WMA privileges and Georgia Outdoor Recreation Pass holders, it assessed use at three of the WMA units around Lake Oconee: Dyar Pasture, Oconee, and Redlands. It found that approximately 147 participants

spent 1,061 visitor days at Dyar Pasture Recreation Area, 6,025 visitors spent 71,329 visitor days at the Oconee WMA, and 8,880 visitors spent 94,387 visitor days at the Redlands WMA (Southwick Associates, Inc. and Responsive Management, 2014).

The Recreation and Land Use Study Report will provide maps showing the project recreation sites and the FS recreational areas and their associated acreage in relation to the project boundary. In addition, maps will be provided showing the project lands designated in the current project Recreation Plan for future recreation development. Descriptions will include acreage, original intended use, the historical use, and plans for future use.

The proposed recreation assessment approach will develop the information required for the FERC license application as set forth at 18 CFR § 5.18(b) and will be consistent with guidance provided by FERC (1996) on recreation development at hydropower projects. The recreation survey methodology and level of effort proposed are consistent with generally accepted practice at FERC-licensed projects, employing field reconnaissance, traffic/trail cameras, vehicle counts, discussions with user groups, and the use of existing data.

Future Recreation Demands

Future annual visitation will be estimated based on review of existing population forecasts. This information will be evaluated, along with information from the SCORP and other relevant sources, to estimate future demand for recreation facilities in the project study area. Future demand will be compared to the estimated carrying capacity of existing facilities on Lake Oconee to characterize future facility needs. Campground surveys discussed above will also be reviewed for indications of future recreation demand.

Land Use Assessment

Land use information collected for the PAD will be augmented by reasonably available land use and zoning information from adjacent local governments, literature review, as well as observations from the shoreline reconnaissance survey described in the Geology and Soils Study Plan (Section 2.0). This information will be used to characterize and evaluate the existing shoreline management and shoreline and buffer zone within the Project. A land use map will also be prepared that incorporates field observations from the terrestrial resources reconnaissance survey (Section 5.0). The study will also evaluate the consistency of the Project with federal, state, regional, and local ordinances and resource management plans.

7.6 Reporting

In accordance with 18 CFR § 5.15(b), a Recreation and Land Use Study Progress Report will be prepared and provided to participants prior to the completion of the study. The progress

report will describe overall progress in summarizing preliminary findings as available, and explain any variance from the study plan and schedule.

In accordance with 18 CFR § 5.15(c)(1), a Recreation and Land Use Study Report will be prepared and provided to participants for review and comment at the conclusion of the study. The study report will characterize existing recreation and land use, and evaluate the need for additional recreational access or facilities.

7.7 Schedule

In accordance with the Wallace Dam Process Plan and Schedule and the master schedule provided in Section 1.4, the Recreation and Land Use Study will be completed according to the milestones listed in Table 7-2 below.

TABLE 7-2
Schedule for Conducting the Recreation and Land Use Study

Activity	Deadline
Begin Literature-Based Review	March 1, 2016
Complete Literature-Based Review	August 31, 2016
File Progress Report	September 30, 2016
File Final Study Report	November 18, 2016

7.8 References

Southwick Associates, Inc. and Responsive Management, 2014

8.0 CULTURAL RESOURCES

8.1 Introduction

Georgia Power proposes to conduct a cultural resources study of the Wallace Dam Project to identify and evaluate archaeological and historical resources within the area of potential effect (APE). The study will consist primarily of review of available information on known archaeological and historical sites in the project area, including extensive cultural resources assessments conducted before and after project construction as summarized in the PAD, and annual archaeological monitoring of selected sites since 1990. In addition, limited new field testing will be conducted of previously recorded archaeological sites within the project boundary recommended as potentially eligible for the National Register of Historic Places (National Register). The results of this work will be provided in a report describing the archaeological and historical resources at the Wallace Dam Project.

8.2 Goals and Objectives

The goal of this study is to identify and document historic properties located within the project boundary and immediately adjacent areas that could be affected by the continued operation and maintenance of the Project. This information will be used to develop a Historic Properties Management Plan (HPMP) based upon the guidelines established by the Advisory Council on Historic Preservation and FERC.

Specific objectives of this study are to:

- Identify and delineate the APE.
- Identify known historic resources through literature and site file review.
- Determine if any historic properties are eligible for listing on the National Register.
- Evaluate the potential for effects upon historic resources by the operation and maintenance of the Project or by activities conducted along the shoreline of the project reservoir.

8.3 Study Background

8.3.1 Issues Identified

The Commission identified in SD1 the following resource issues pertaining to cultural resources:

- Effects of continued project operation and maintenance on properties that are included in or eligible for inclusion in the National Register.
- Effects of continued project operation and maintenance on archaeological and historic resources at the Project.

8.3.2 Study Requests

Georgia Power proposed in the PAD (Section 5.2.1, Preliminary Studies List) to conduct a cultural resources study. The study would identify known historic resources through literature site file review, determine if any historic properties are eligible for listing on the National Register, and evaluate the potential for effects upon historic properties by the continued operation of the Project or by activities conducted along the project reservoir. The study effort would entail further assessments of sites being monitored by Georgia Power to assess effectiveness of the current management plan and provide photographic documentation of the project dam, powerhouse, and associated equipment. FERC listed Georgia Power's proposed study in SD1 as Study No. 11, Cultural Resources.

In its Study Requests, Comments on Preliminary Study Plan, and Requests for Additional Information letter dated June 18, 2015, FERC identified that the study area for cultural resources will include the APE, which will be defined by a Cultural Resources Work Group that will include FERC staff. No other requests for specific studies or study modifications have been received.

8.3.3 Resource Management Goals

The GDNR Historic Preservation Division (HPD) is Georgia's State Historic Preservation Office. *Georgia's State Historic Preservation Plan 2012-2016: Partnering for Preservation* is the guiding document for the state historic preservation program administered by HPD. Resource management goals consistent with this plan and applicable to the relicensing of the Wallace Dam Project include preventing the unintentional disturbance of historic properties by planning for the use of protective measures in activities that may cause a disturbance of the site, and preserving the integrity of any historical structures of the Project's dam and powerhouse and the historical information regarding the development of the Project.

8.3.4 Existing Information

The Wallace Dam project area was used for thousands of years before European settlers arrived at the Oconee River. Cultural resources studies were conducted on Oconee NF lands and lands adjacent to the Project which have helped to develop an overall cultural context for the project area. The entire Project has been surveyed and evaluated as described in detail in the PAD.

The cultural resources of the Wallace Dam project area have been well-studied through a variety of survey methodologies and for various project purposes. Gresham (1987) provides a thorough description and evaluation of the cultural resources known from the Wallace Dam project area prior to 1987 in “The Wallace Mitigation Survey: An Overview”. Prior to the large-scale, full-coverage mitigation survey (initiated in 1974), the majority of known cultural resources were the result of reports obtained from avocational archaeologists, arrowhead collectors, thematic or spatially targeted archaeological surveys, or from anonymous reports (Gresham, 1987). The archaeological record for the project area spans 10,800 years. There were eight known cultural resource records documented in the project area prior to the survey work that was completed for the Wallace Reservoir (Lake Oconee).

Wallace Reservoir site discovery activities resulted in a significant number of new finds bringing the cumulative totals to 1,385 sites and 3,108 occurrences (Gresham, 1987). Approximately 74 percent of the land area within the project boundary was evaluated (an area encompassing approximately 5,289 ha) during the cultural resource assessment activities. Specific locations within the project boundary that were evaluated included the Wallace Reservoir impoundment area (7,690 ha), the greater reservoir area (20,934 ha), the proposed tailrace location (Wood, 1977), and several bridge and road widening areas (Wood, 1975). Cultural resources data evaluated for the mitigation survey revealed a higher percentage of findings occurring at upland sites, at around 72.4 percent of all sites, compared to the 17.7 percent of findings that occurred at floodplain sites (Gresham, 1987).

In 1988, Brockington and Associates (Brockington) performed a cultural resource inventory and evaluation study of a 770-acre recreational tract of land located within the Wallace Dam Project, in Greene County. The Brockington study found a total of 52 cultural resources representing seven major types of cultural property (1988). The greatest frequency observed was 21 examples of prehistoric/protohistoric open property (e.g. open air, overhang, and quarry loci). The other major types of properties included prehistoric overhang, prehistoric quarry, Lamar open, Lamar overhang, historic sheet midden, and historic structural ruins (Brockington et al., 1988). Ten of the 52 newly located properties were recommended eligible for the National Register. This group of properties included one prehistoric quarry, six Lamar open properties, one Lamar overhang, and two historic structural ruins (Brockington et al., 1988).

In 1995, Brockington and Associates performed a cultural resources re-verification study in order to evaluate 33 previously recorded sites within the project boundary. The information gained from the review was used to update the site monitoring component of the Georgia Power Cultural Resource Management Program. The re-verification assessment resulted in 28 of 33 sites being re-verified; three of which were recommended for continued monitoring as they are either eligible or recommended potentially eligible for the National Register (Brockington, 1996). One additional unverified site was recommended for continued

monitoring due to an inability to access the mapped location to verify the site. The remaining sites of the original 33 were found to be inundated, located outside of the FERC project boundary, to have been destroyed, originally mis-located, or lacked appropriate type and affiliation to be verified; these sites were removed from the monitoring list (Brockington, 1996).

Southeastern Archaeological Services, Inc. (SAS) performed an archaeological survey of the undeveloped property for Reynolds Plantation. The 1860-acre property, located in Greene and Putnam Counties, was surveyed by 4 to 6 person crews using shovel tests (Ledbetter et al., 1998). The SAS survey documented 161 field sites and 41 low density artifact occurrences that depict an area that was intensively utilized and represented a range from 9000 B.C. to A.D. 1600 (Ledbetter et al., 1998). The majority of the sites were determined ineligible for the National Register, however, two sites were recommended eligible and 29 sites were determined to be potentially eligible and warranting further assessment. The eligible sites were primarily old home sites and habitation sites, while the majority of the potentially eligible sites were old home sites, lithic or pottery scatters, and one old sawmill site (Ledbetter et al., 1998). The remaining sites were determined to be ineligible for listing on the National Register.

In 2001, SAS performed an archaeological survey on a 610-acre tract known as the Lake Oconee Village, located in Greene County and additional testing on five Reynolds Plantation sites (Ledbetter et al., 1998) to firmly establish eligibility for the National Register. The survey resulted in the discovery of 25 archaeological sites, 11 low density scatters, and three of the five Reynolds Plantation sites being recommended as eligible for the National Register (Ledbetter et al., 2003).

Since 1990, Georgia Power has conducted archaeological monitoring of selected sites at the Wallace Dam Project. Georgia Power currently performs annual cultural resources monitoring activities for the Wallace Dam Project. Current monitoring efforts for Wallace Dam include one determined eligible prehistoric artifact/shell scatter, and six recommended eligible sites consisting of prehistoric artifact/ shell scatters, prehistoric Indian lithic scatters, and rock piles. Results from the 2014 monitoring activities found no changes in status or indications of new disturbances for any of the Wallace Dam Project cultural resources (Georgia Power, 2014).

No historic or archaeological sites listed or recommended for inclusion in the National Register are known to occur along the Wallace Dam-Eatonton transmission line in Putnam County. An intensive archaeological survey conducted along the proposed route in 1979, prior to construction of the line, documented three historic-period archaeological sites and four isolated finds within the impact corridor (SSI Earth Systems Division, 1979). However,

none of the sites were recommended for nomination to the National Register and none of the finds warranted further research.

The Rock Hawk effigy is located in the uplands adjacent to Lake Oconee and serves as the centerpiece of the Rock Hawk Effigy and Trails system (Figure 18). Although the trails and interpretive signage are maintained by Georgia Power, the effigy itself is not in the Wallace Dam project boundary.

8.3.5 Nexus between Project Operations and Effects

Georgia Power operates the Wallace Dam Project as a pumped storage development. Lake Oconee is normally operated between elevations 433.5 and 435 ft PD, with average daily fluctuations of about 1.5 ft. Wallace Dam releases water downstream during peak power demand hours and pumps water back up into Lake Oconee at night for reuse in the next day's generation cycle. Project operations and shoreline activities within the FERC project boundary could affect exposure of sub-surface archeological resources.

8.4 Study Area

The study area for cultural resources will include the area between the low daily Lake Oconee pool elevation of 433.5 ft PD and the project boundary. Other areas immediately adjacent to the project boundary may be added to the area evaluated, provided adjoining ownership is willing for cultural resource specialists to be present on adjoining property. Georgia Power proposes that this study area be considered the APE for archaeological resources. The study area for hydro-engineering resources evaluation will include the area immediately around the dam, powerhouse, and operations areas (i.e., the project works) within the project boundary. Georgia Power proposes that this study area be considered the APE for documentation of hydro-engineering resources.

8.5 Methodology

Georgia Power will contract the services of a professional cultural resources consultant who will use currently accepted practices as defined under Section 106 of the Historic Preservation Act of 1966 (as amended), and implementing regulations (36 CFR 800) for the identification and evaluation of historic properties. Specific field methods will conform to applicable state guidelines such as HPD's *Archaeological Assessment Reports Components and Guidelines* (2004).

The study will begin with review of available literature and data on file at the Georgia Archaeological Site File, as well as reports and other documents on file at Georgia Power as summarized above. These materials will provide information on site type, frequency, and location that will aid in reviewing and evaluating which archaeological sites should be

proposed for monitoring by Georgia Power under the new license. The review will aid in developing a field survey consisting of evaluation (Phase II) testing, as appropriate, of up to three archaeological sites within the project boundary previously recommended as potentially eligible to determine whether they meet defined criteria for inclusion on the National Register as set forth in 36 CFR Part 60.4. The evaluation testing will provide the basis for a definitive determination as to their eligibility and whether or not they warrant continued monitoring. The evaluation testing will be conducted in consultation with HPD and in accordance with the *Georgia Standards and Guidelines for Archaeological Surveys* (Georgia Council of Archaeologists, 2014).

Photographic documentation of the dam structure, powerhouse, and equipment will be undertaken for recordation to be used for future assessment of eligibility for the National Register. Because construction of the project works was completed in 1979 and they are not yet 50 years old, a historic hydro-engineering evaluation of the Project is not proposed. The project facilities will attain an age of 50 years during the term of the new license.

For any human remains accidentally or inadvertently exposed or discovered as part of the cultural resources field evaluation, Georgia Power personnel will:

- Stop all activity leading to the discovery or exposure of the human remains; secure the area from public access, protect and treat the remains respectfully, and notify the project manager.
- Notify the local law enforcement agency and other agencies (HPD, FERC) as appropriate of the discovery or exposure, and schedule a site visit to occur within 24 hours.

The study will culminate in the development of a HPMP for the Wallace Dam Project.

8.6 Reporting

In accordance with 18 CFR § 5.15(b), a Cultural Resources Study Progress Report will be prepared and provided to participants prior to the completion of the study. The progress report will describe overall progress in completing data collection and explain any variance from the study plan and schedule.

In accordance with 18 CFR § 5.15(c)(1), a Cultural Resources Study Report will be prepared and provided to participants for review and comment at the conclusion of the studies.

8.7 Schedule

In accordance with the Wallace Dam Process Plan and Schedule and the master schedule provided in Section 1.4, the Cultural Resources Study will be completed according to the milestones listed in Table 8-1.

TABLE 8-1
Schedule for Conducting the Cultural Resources Study

Activity	Deadline
Begin Field Studies and Literature-Based Review	April 1, 2016
File Progress Report	August 31, 2016
Complete Field Studies and Literature-Based Review	September 30, 2016
File Final Study Report	November 18, 2016

8.8 References

- Brockington and Associates. 1988. Cultural Resource Management Wallace Dam Project (Lake Oconee), Greene County, Georgia. Recreation Area A-1: Resource Inventory II Documentation. Brockington and Associates, Atlanta, Georgia. 91pp.
- Brockington and Associates. 1996. Verification of 33 Archaeological Sites, Lake Oconee Project (FERC # 2413), Greene, Hancock, Morgan, and Putnam Counties, Georgia. Brockington and Associates, Atlanta, Georgia. 183pp. Georgia Power, 2014
- Gresham, T.H. 1987. The Wallace mitigation survey: an overview. Wallace Reservoir Project Contribution Number 32, University of Georgia, Department of Anthropology, Laboratory of Archaeology Series, Report Number 57. 47pp. Ledbetter et al., 1998
- Ledbetter, R.J., Schoettmer, R. and M. Wyman. 1998. Intensive archeological survey of the undeveloped portions of Reynolds Plantation, Greene and Putnam Counties, Georgia. Southeastern Archaeological Services, Inc. Athens, Georgia, 406pp. (Georgia Archaeological Site File Report No. 518).
- Ledbetter, R.J., Schoettmer, R. and M. Wyman. 2003. Archeological and historical investigations on the Lake Oconee Village Tract, Greene County, Georgia. Southeastern Archaeological Services, Inc. Athens, Georgia, 406pp. (Georgia Archaeological Site File Report No. 3593). Wood, 1975

Wood, W.D. 1975. An archeological survey of Highway Relocation Project #27 of Georgia Power Company's Wallace Reservoir. Ms. 60, Department of Anthropology, University of Georgia, Athens.

Wood, W.D. 1977. An archaeological survey of the Wallace Dam Tailrace. Ms. 67, Department of Anthropology, University of Georgia, Athens.